Supuestos y Modelos de Estimación de Demanda TELSUR

Junio de 2009

Índice

1. *Introducción*

Este informe genera los antecedentes necesarios para la cuantificación de la demanda proyectada para los servicios de telecomunicaciones de la empresa TELSUR.

Los resultados obtenidos son utilizados en el estudio tarifario correspondiente al quinquenio 2009-2014, considerando los requerimientos de las Bases Técnico Económicas (BTE) dictadas por la Subsecretaria de Telecomunicaciones.

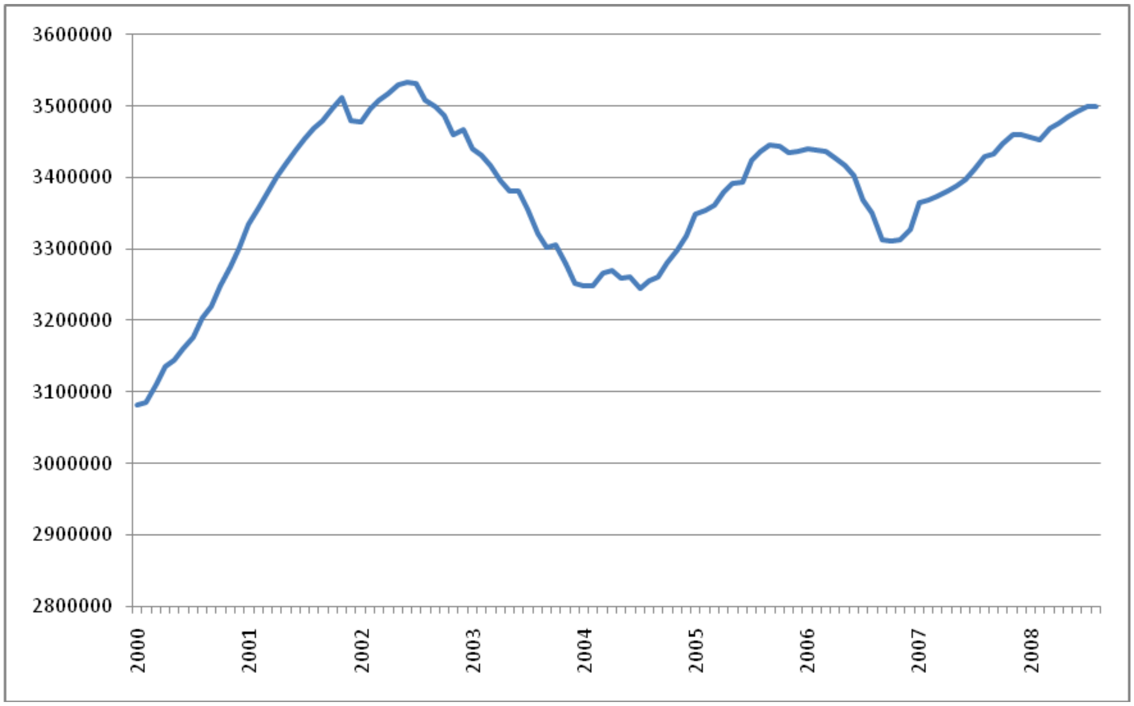
En el presente documento se discuten los determinantes de la demanda por servicios de telecomunicaciones a través de microdatos, para luego a partir de esos resultados y sujetos a las restricciones de información, generar estimaciones de demanda con modelos de series de tiempo. La selección de los modelos econométricos, es partiendo con un modelo sobreparametrizado para ir reduciéndolo bajo criterios de significancia estadística (p-value), resguardando que los residuos cumplan con ciertas características. Además, se discuten estimaciones para datos individuales de la empresa TELSUR, comentando las limitaciones, supuestos empleados y potenciales ventajas de cada uno, para la aplicación al presente proceso tarifario.

2. *Demanda de Líneas Telefónicas*

A continuación presentamos datos de corte transversal para discutir los determinantes de la demanda por líneas telefónicas de la industria a nivel nacional, luego en función de los resultados obtenidos realizaremos un análisis de los determinantes de demanda a nivel de zona primaria de TELSUR.

Para comenzar con el análisis realizamos una descripción de la evolución reciente de las líneas telefónicas a nivel nacional. En la Figura 1, se observa que durante el periodo 2000-2008 existe una fluctuación con marcados altibajos en los primeros años que se ha tendido a estabilizar o al menos suavizar su ciclo en años recientes. Este cambio en la variabilidad podría ser un resultado de los efectos de tecnologías sustitutas y/o complementarias que han afectado la tenencia de telefonía fija en los hogares en años recientes.

Figura 1: Evolución Líneas Telefónicas a Nivel Nacional



Fuente: SUBTEL

Para comprender los fenómenos que explican este comportamiento de la tenencia de líneas telefónicas a nivel de hogares, en la siguiente sección utilizamos modelos econométricos de corte transversal.

3. *Determinantes de la Telefonía Fija*

Aún cuando generar los determinantes a partir de microdatos de la demanda familiar por servicios de telecomunicación, no es muy útil para realizar proyecciones de mediano plazo como las requeridas por las Bases Técnico Económicas (debido a que no tendríamos proyecciones futuras de las variables explicativas en los microdatos como ingresos, educación, etc). Nos permite, al menos, identificar que variables agregadas de series de tiempo pueden ser relevantes y deberían ser incorporadas para realizar proyecciones. A modo de ejemplo podemos señalar que si encontramos evidencia en los microdatos que existe sustitución entre telefonía fija y móvil, justificaría utilizar en la especificación econométrica de series agregadas algún indicador de la tenencia de teléfonos móviles.

Los resultados de los determinantes de la telefonía fija basados en los datos de la Encuesta Casen 2006 para modelos uniecuacionales y multiecuacionales, son presentados a continuación.

En un primer intento abordamos la estimación de un modelo probit, el cual trata de modelar la probabilidad de tener un teléfono fijo (Y_i^*) para la familia i condicional a una serie de variables exógenas (X_i). Debemos apuntar, que aunque algunos estudios han intentado utilizar la variable tenencia de teléfono móvil dentro de las variables explicativas para evaluar la sustitución fijo-móvil, en realidad esto es un error ya que ambas variables son endógenas. En realidad, las demandas dependen de los precios y no de la tenencia de otros bienes sustitutos (sí del precio del sustituto). Por ello, más adelante abordamos el problema con la estimación de un modelo probit bivariado, asumiendo que la variable precio de ambas demandas están incorporadas en el componente no observable de cada ecuación de demanda, así estimaremos las funciones de demanda conjuntamente para obtener la correlación de ambas ecuaciones, que sería un indicador de sustitución en la medida que ella sea negativa.

En el modelo probit "simple" queremos estimar la probabilidad de tenencia de teléfono fijo Y_i^* la que varía entre 0 y 1, pero las respuestas que se obtienen en principio son sí o no, por tanto la variable dependiente podrá tomar valores de 1 o 0, es decir es una variable cualitativa que representa probabilidades. La ecuación *(1)* matricialmente representa estas respuestas para las N familias, siendo Y_i la variable dependiente y el término de la derecha es el equivalente al componente explicado por las variables exógenas X_i y el error aleatorio ε_i:

$$Y_i = X_i\,\beta + \varepsilon_i \qquad i: 1, 2, \ldots N \tag{1}$$

$$\text{Si} \quad \begin{matrix} Y_i = 1 \\ Y_i = 0 \end{matrix} \quad \Longrightarrow \quad \left.\begin{matrix} 1 - X_i\,\beta \\ - X_i\,\beta \end{matrix}\right\} \begin{matrix} \text{valores que toma} \\ \text{la variable aleatoria} \end{matrix}$$

Además:

$$E\,(\varepsilon_i) = 0 \qquad \text{probabilidad } \varepsilon_i \begin{cases} - X_i\,\beta \\ 1 - X_i\,\beta \end{cases}$$

$$Y_i^* = X_i\,\beta + \varepsilon_i \tag{2}$$

Y_i^* toma los valores:

$$\begin{matrix} Y = 1 & \text{si } Y_i^* > 0 \\ Y = 0 & \text{en otro caso} \end{matrix} \tag{3}$$

Relacionando (2) y (3) se obtiene en términos probabilísticos:

$$\begin{aligned} Prob\,(Y = 1) &= Prob\,(\varepsilon_i > -X_i\beta) \\ &= 1 - F(-X_i\beta) \end{aligned} \tag{4}$$

Donde $F(\cdot)$ es la función de distribución acumulativa para ε. El valor observado es la realización de un proceso binomial y el tratamiento adecuado para obtener los coeficientes de regresión será por medio de la maximización de la función de verosimilitud:

$$L = \prod_{Y_i=0} F(-X\beta)\prod_{Y_i=1}(1-F(-X\beta)) \tag{5}$$

La función de distribución que se asume para el comportamiento de ε determina el tratamiento econométrico, si se asume un comportamiento de la variable aleatoria como una distribución normal, asume ε_i es $N(0,\sigma^2)$ resulta el modelo probit:

$$F(-X_i\beta) = \int_{-\infty}^{-X\beta/\sigma} \left(2\pi\sigma^2\right)^{-1/2} exp-(t^2/2)dt \tag{6}$$

La estimación de este modelo para la tenencia de telefonía fija con el modelo probit utiliza las variables: región, zona urbano-rural, computador en el hogar, el logaritmo del ingreso familiar, número de personas en el hogar, sexo, edad, escolaridad y escolaridad al cuadrado del jefe de hogar.

Los resultados presentados en la Tabla 1 nos permiten obtener un par de conclusiones relevantes para el estudio de demanda posterior que realizará las proyecciones. Primero existen diferencias estadísticamente significativas (p-value menor que 0,05) de tenencia de teléfonos fijos entre regiones, la ruralidad es relevante para explicar una menor demanda y el ingreso familiar tiene un efecto positivo. Nos centramos en estas variables, ya que nos dan luces sobre la necesidad de estimar proyecciones de demanda por zona debido a diferencias regionales y ruralidad (aunque existen limitantes de desagregación para las series de líneas telefónicas), así como también encontrar alguna proxy de ingreso familiar como el IMACEC.

Tabla 1: Estimación de Tenencia de Teléfono Fijo

Probit regression — Number of obs = 73329

LR chi2(23) = .

Log likelihood = -29258.451 — Prob > chi2 = .

telfijo	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
region1	-8.196023	.1324475	-61.88	0.000	-8.455615	-7.936431
region2	-8.010058	.1222462	-65.52	0.000	-8.249656	-7.77046
region3	-7.651014	.1189623	-64.31	0.000	-7.884176	-7.417852
region4	-8.002374	.1198833	-66.75	0.000	-8.237341	-7.767407
region5	-7.906283	.115926	-68.20	0.000	-8.133493	-7.679072
region6	-7.72345	.1137286	-67.91	0.000	-7.946354	-7.500546
region7	-8.004748	.114489	-69.92	0.000	-8.229143	-7.780354
region8	-8.067292	.1145934	-70.40	0.000	-8.291891	-7.842693
region9	-7.93678	.1125881	-70.49	0.000	-8.157448	-7.716111
region10	-8.116087	.1138049	-71.32	0.000	-8.339141	-7.893034
region11	-7.956452	.1169585	-68.03	0.000	-8.185686	-7.727217
region12	-8.023761	.1159157	-69.22	0.000	-8.250952	-7.796571
region13	-7.971792	.1234269	-64.59	0.000	-8.213704	-7.72988
region14	-7.266892	.1222082	-59.46	0.000	-7.506416	-7.027369
region15	-7.416655	.1137926	-65.18	0.000	-7.639684	-7.193626
numper	-.0200434	.0036525	-5.49	0.000	-.0272021	-.0128848
sexo	.0779883	.0135513	5.76	0.000	.0514282	.1045485
edad	.0298638	.0004777	62.51	0.000	.0289275	.0308002
escolaridad	.1010471	.0048432	20.86	0.000	.0915546	.1105396
escolaridad2	-.0025048	.0002632	-9.52	0.000	-.0030206	-.0019889
rural	-.9493665	.015045	-63.10	0.000	-.9788541	-.9198788
pchogar	.6920923	.0152939	45.25	0.000	.6621168	.7220678
logingreso~m	.3982977	.008624	46.18	0.000	.3813949	.4152004

Fuente: Elaboración Propia

El modelo econométrico presentado anteriormente está diseñado para la estimación de una única ecuación, en este caso por la tenencia de telefonía fija. Es obvio, que sería muy útil tener los precios de la telefonía pagados por cada hogar, para estimar una verdadera ecuación de demanda. No obstante, el precio no observado está siendo incluido en el término de error aleatorio de la ecuación. Además, si disponemos de otra estimación de una función que determina la tenencia de teléfono móvil, con el precio incorporado en el componente no observable de la ecuación, podemos estimar estas dos funciones. Es decir, la demanda por telefonía fija y móvil en forma conjunta relacionadas al incorporar la correlación a través de los componentes no observables. Esto simplemente es determinar si existe una correlación positiva (complementariedad) o negativa (sustitución) entre ambas funciones de demanda.

Para estimar en forma conjunta las funciones de demanda por distintos servicios de telecomunicaciones, y no en forma aislada, se puede realizar una estimación de demanda por telefonía fija y telefonía móvil con un sistema completo de funciones correlacionadas mediante un probit bivariado.

Si uno estimase las funciones de demanda por separado existiendo correlación, estaría encontrando coeficientes y por ende las elasticidades sesgadas, el grado del sesgo dependerá del grado de correlación entre las diversas funciones de demanda.

La especificación para el modelo probit bivariado es la siguiente (Ver Green, 2003):

$$Y_1^* = X_1\,\beta + \varepsilon_1\,,\qquad Y_1 = 1 \quad si \quad Y_1^* > 0,\ 0 \text{ en otro caso}, \tag{7}$$

$$Y_2^* = X_2\,\beta + \varepsilon_2\,,\qquad Y_2 = 1 \quad si \quad Y_2^* > 0,\ 0 \text{ en otro caso}, \tag{8}$$

$$E[\varepsilon_1 | X_1, X_2] = E[\varepsilon_2 | X_1, X_2] = 0, \tag{9}$$

$$Var[\varepsilon_1 | X_1, X_2] = E[\varepsilon_2 | X_1, X_2] = 1, \tag{10}$$

$$Cov[\varepsilon_1, \varepsilon_2 | X_1, X_2] = \rho \tag{11}$$

La función de distribución normal bivariada es

$$Prob(X_1 < x_1, X_2 < x_2) = \int_{-\infty}^{x_2}\int_{-\infty}^{x_1} \frac{e^{-\left(\frac{1}{2}\right)(x_1^2 + x_2^2 - 2\rho x_1 x_2)/(1-\rho^2)}}{2\pi(1-\rho^2)^2}\, dz_1 dz_2 \tag{12}$$

Para construir la función de verosimilitud, sea $q_{i1} = 2\,y_{i1} - 1$ y $q_{i2} = 2\,y_{i2} - 1$. Así, $q_{ij} = 1$ si $y_{ij} = 1$ y -1 si $y_{ij} = 0$ para $j = 0$ y 2. Ahora denotemos

$$z_{ij} = X_{i1}\,\beta \quad \text{y} \quad w_{ij} = q_{ij}\, z_{ij}\,,\quad j=1,2 \tag{13}$$

y

$$\rho_{i*} = q_{i1}\, q_{i2}\rho \tag{14}$$

Las probabilidades que entran en la función de verosimilitud son

$$Prob(Y_1 = y_{i1}, Y_{12} = y_{i2} | X_1, X_2) = \Phi_2(w_{i1}, w_{i2}, \rho_{i*}), \tag{15}$$

Las cuales consideran todos los elementos necesarios para computar la maximización de la siguiente función de verosimilitud

$$\log L = \sum_{i=1}^{n} \Phi_2(w_{i1}, w_{i2}, \rho_{i*}) \tag{16}$$

En la Tabla 2 se realiza la estimación del probit bivariado con datos de la Encuesta CASEN 2006. Se aprecia en los resultados que existe correlación negativa entre las funciones de telefonía fija y móvil con un valor de -0,18, lo cual es un respaldo al hecho de considerar la sustitución entre ambos servicios.

Tabla 2: Estimación Probit Biariado de Tenencia de Teléfono Fijo y Móvil

```
Bivariate probit regression                       Number of obs   =      73135
                                                  Wald chi2(46)   =   38973.38
Log likelihood = -71313.266                       Prob > chi2     =     0.0000
------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
telfijo      |
     region1 |  -8.143436   .1321278   -61.63   0.000    -8.402401    -7.88447
     region2 |  -7.967898   .1221438   -65.23   0.000    -8.207295     -7.7285
     region3 |  -7.618673   .1189163   -64.07   0.000    -7.851745   -7.385602
     region4 |  -7.965587   .1198468   -66.46   0.000    -8.200483   -7.730692
     region5 |  -7.872373   .1158907   -67.93   0.000    -8.099514   -7.645231
     region6 |  -7.689547   .1136936   -67.63   0.000    -7.912382   -7.466711
     region7 |  -7.974734   .1144576   -69.67   0.000    -8.199067   -7.750401
     region8 |  -8.035818   .1145486   -70.15   0.000    -8.260329   -7.811307
     region9 |  -7.907334   .1125486   -70.26   0.000    -8.127925   -7.686742
    region10 |  -8.076729   .1137596   -71.00   0.000    -8.299694   -7.853765
    region11 |  -7.927011   .1169128   -67.80   0.000    -8.156156   -7.697866
    region12 |  -7.997975   .1159042   -69.01   0.000    -8.225143   -7.770807
    region13 |  -7.941564   .1233907   -64.36   0.000    -8.183406   -7.699723
    region14 |  -7.241935   .1222473   -59.24   0.000    -7.481535   -7.002335
    region15 |  -7.386302   .1137591   -64.93   0.000    -7.609266   -7.163338
      numper |  -.0200478   .0036541    -5.49   0.000    -.0272097   -.0128859
        sexo |   .0726598   .0135784     5.35   0.000     .0460467    .0992729
        edad |   .0295638   .0004778    61.88   0.000     .0286273    .0305002
 escolaridad |   .1002751   .0048465    20.69   0.000     .0907761    .1097742
escolaridad2 |  -.0024848   .0002636    -9.43   0.000    -.0030014   -.0019681
       rural |  -.9401901   .0150493   -62.47   0.000    -.9696862   -.9106941
     pchogar |   .6944179   .0153728    45.17   0.000     .6642877    .7245481
logingreso~m |   .3980023   .0086227    46.16   0.000     .3811021    .4149025
-------------+----------------------------------------------------------------
telmovil     |
     region1 |  -2.406235   .1032924   -23.30   0.000    -2.608684   -2.203786
     region2 |  -2.104813   .0959001   -21.95   0.000    -2.292774   -1.916853
     region3 |  -1.810816   .0962347   -18.82   0.000    -1.999432   -1.622199
     region4 |  -1.910206   .0954797   -20.01   0.000    -2.097343   -1.723069
     region5 |  -1.795725   .0914425   -19.64   0.000    -1.974949   -1.616501
     region6 |  -1.756056   .0902156   -19.47   0.000    -1.932875   -1.579236
     region7 |  -1.752701   .0899868   -19.48   0.000    -1.929072    -1.57633
     region8 |  -1.696971   .0895001   -18.96   0.000    -1.872388   -1.521554
     region9 |  -1.833653   .0881845   -20.79   0.000    -2.006491   -1.660815
    region10 |   -1.86167   .0887686   -20.97   0.000    -2.035653   -1.687687
    region11 |  -1.803474   .0920807   -19.59   0.000    -1.983949   -1.622999
    region12 |   -1.72043   .0914483   -18.81   0.000    -1.899666   -1.541195
    region13 |  -2.139825    .098657   -21.69   0.000    -2.333189   -1.946461
    region14 |  -2.041758   .1003147   -20.35   0.000    -2.238372   -1.845145
    region15 |  -1.916992   .0905372   -21.17   0.000    -2.094442   -1.739543
      numper |  -.0625676   .0031314   -19.98   0.000    -.0687051   -.0564302
        sexo |   .1417646   .0117365    12.08   0.000     .1187615    .1647676
        edad |  -.0253174   .0003956   -64.00   0.000    -.0260928   -.0245421
 escolaridad |   .0564277   .0040678    13.87   0.000      .048455    .0644004
escolaridad2 |  -.0003087    .000238    -1.30   0.195    -.0007752    .0001577
       rural |  -.0471891   .0112921    -4.18   0.000    -.0693212    -.025057
     pchogar |   .2767945   .0150774    18.36   0.000     .2472433    .3063457
logingreso~m |   .2270315   .0070806    32.06   0.000     .2131538    .2409091
-------------+----------------------------------------------------------------
     /athrho |  -.1804377   .0081574   -22.12   0.000    -.1964259   -.1644495
-------------+----------------------------------------------------------------
         rho |  -.1785047   .0078975                      -.193938   -.1629829
------------------------------------------------------------------------------
Likelihood-ratio test of rho=0:     chi2(1) =  493.479    Prob > chi2 = 0.0000
```

Siguiendo la lógica anterior, si deseamos incorporar otro servicio de telecomunicaciones, para evaluar en forma conjunta las funciones de demanda, podemos realizar una estimación de demanda por telefonía fija, telefonía móvil e internet con un sistema más completo de funciones correlacionadas mediante un probit trivariado.

Nuevamente, si uno estimase las funciones de demanda por separado existiendo correlación, estaría encontrando coeficientes y por ende las elasticidades sesgadas, el grado del sesgo dependerá del grado de correlación entre las diversas funciones de demanda.

A continuación en la Tabla 3 se realiza la estimación del probit trivariado con datos de la Encuesta CASEN 2006. Se aprecia en los resultados que baja levemente la correlación negativa entre las funciones de telefonía fija y móvil de -0,14 (representado por rho21), lo cual es un respaldo al hecho de considerar la sustitución entre ambos servicios. Además descubrimos una complementariedad entre telefonía fija e internet de 0,24 (representado por rho31) lo cual es una explicación lógica al empaquetamiento de estos servicios. Finalmente la correlación entre telefonía móvil e internet es cercana a cero, el cual es un resultado bastante razonable.

Tabla 3: Estimación Probit Trivariado de Tenencia de Teléfono Fijo, Móvil e Internet Dedicado

```
Multivariate probit (SML, # draws = 5)              Number of obs   =      73135
                                                    Wald chi2(69)   =   42184.89
Log likelihood = -79561.117                         Prob > chi2     =     0.0000

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
telfijo      |
     region1 |  -8.158658   .1322768   -61.68   0.000    -8.417915     -7.8994
     region2 |  -7.980751   .1222165   -65.30   0.000    -8.220291   -7.741211
     region3 |  -7.627439   .1190036   -64.09   0.000    -7.860682   -7.394196
     region4 |  -7.976998   .1199032   -66.53   0.000    -8.212004   -7.741992
     region5 |  -7.883329   .1159463   -67.99   0.000     -8.11058   -7.656078
     region6 |  -7.699409   .1137505   -67.69   0.000    -7.922356   -7.476463
     region7 |  -7.983886   .1145116   -69.72   0.000    -8.208324   -7.759447
     region8 |  -8.045362   .1146097   -70.20   0.000    -8.269993   -7.820731
     region9 |  -7.916599   .1126014   -70.31   0.000    -8.137294   -7.695905
    region10 |    -8.0882   .1138164   -71.06   0.000    -8.311276   -7.865124
    region11 |  -7.937303   .1169885   -67.85   0.000    -8.166596    -7.70801
    region12 |  -8.006311   .1159476   -69.05   0.000    -8.233565   -7.779058
    region13 |  -7.952651   .1234266   -64.43   0.000    -8.194563   -7.710739
    region14 |  -7.249779   .1222862   -59.29   0.000    -7.489455   -7.010102
    region15 |  -7.395064   .1138049   -64.98   0.000    -7.618117    -7.17201
      numper |  -.0199478   .0036554    -5.46   0.000    -.0271122   -.0127834
        sexo |   .0737012   .0135834     5.43   0.000     .0470783    .1003241
        edad |   .0296183   .0004781    61.95   0.000     .0286812    .0305554
 escolaridad |   .1004587   .0048507    20.71   0.000     .0909515    .1099658
escolaridad2 |  -.0024878   .0002638    -9.43   0.000    -.0030049   -.0019707
       rural |   -.941227   .0150576   -62.51   0.000    -.9707393   -.9117146
     pchogar |   .6970093   .0153705    45.35   0.000     .6668836     .727135
logingreso~m |   .3982781   .0086255    46.17   0.000     .3813723    .4151838
-------------+----------------------------------------------------------------
telmovil     |
     region1 |  -2.413383   .1032584   -23.37   0.000    -2.615766   -2.211001
     region2 |  -2.108134   .0958346   -22.00   0.000    -2.295966   -1.920301
```

```
     region3 |  -1.814684   .0961813   -18.87   0.000    -2.003196   -1.626173
     region4 |  -1.915526   .0954219   -20.07   0.000    -2.102549   -1.728503
     region5 |  -1.801593   .0913881   -19.71   0.000    -1.980711   -1.622476
     region6 |  -1.760878    .090164   -19.53   0.000    -1.937596    -1.58416
     region7 |  -1.757771   .0899349   -19.54   0.000     -1.93404   -1.581502
     region8 |  -1.702201   .0894496   -19.03   0.000    -1.877519   -1.526883
     region9 |  -1.838164    .088132   -20.86   0.000      -2.0109   -1.665429
    region10 |  -1.865949   .0887162   -21.03   0.000     -2.03983   -1.692069
    region11 |  -1.808204   .0920314   -19.65   0.000    -1.988582   -1.627825
    region12 |   -1.72514   .0913925   -18.88   0.000    -1.904266   -1.546014
    region13 |  -2.145027   .0985999   -21.75   0.000    -2.338279   -1.951775
    region14 |  -2.044661   .1002412   -20.40   0.000     -2.24113   -1.848192
    region15 |  -1.921453   .0904865   -21.23   0.000    -2.098803   -1.744103
      numper |  -.0624535   .0031293   -19.96   0.000    -.0685869   -.0563202
        sexo |   .1421424   .0117289    12.12   0.000     .1191542    .1651305
        edad |  -.0253053   .0003954   -64.00   0.000    -.0260802   -.0245304
 escolaridad |   .0566262    .004066    13.93   0.000      .048657    .0645953
escolaridad2 |  -.0003163   .0002379    -1.33   0.184    -.0007827    .0001501
       rural |  -.0473274   .0112838    -4.19   0.000    -.0694433   -.0252115
     pchogar |    .275601   .0150731    18.28   0.000     .2460583    .3051437
logingreso~m |   .2272184   .0070763    32.11   0.000     .2133491    .2410878
-------------+----------------------------------------------------------------
internetbw   |
     region1 |  -11.25355   70.56702    -0.16   0.873    -149.5624    127.0553
     region2 |  -11.02828   70.56693    -0.16   0.876    -149.3369    127.2804
     region3 |  -10.94099    70.5669    -0.16   0.877    -149.2496    127.3676
     region4 |  -11.33245   70.56691    -0.16   0.872    -149.6411    126.9762
     region5 |   -11.4394   70.56691    -0.16   0.871     -149.748    126.8692
     region6 |  -11.16766   70.56688    -0.16   0.874    -149.4762    127.1409
     region7 |  -11.16421   70.56688    -0.16   0.874    -149.4728    127.1443
     region8 |  -11.47883    70.5669    -0.16   0.871    -149.7874    126.8298
     region9 |  -11.17646   70.56688    -0.16   0.874     -149.485    127.1321
    region10 |  -11.43173   70.56689    -0.16   0.871    -149.7403    126.8768
    region11 |  -11.43785   70.56692    -0.16   0.871    -149.7465    126.8708
    region12 |  -11.40422    70.5669    -0.16   0.872    -149.7128    126.9044
    region13 |  -11.75581   70.56695    -0.17   0.868    -150.0645    126.5529
    region14 |  -11.90955   70.56694    -0.17   0.866    -150.2182    126.3991
    region15 |  -10.88813   70.56688    -0.15   0.877    -149.1967    127.4204
      numper |  -.0132023   .0077529    -1.70   0.089    -.0283978    .0019931
        sexo |   .0582913   .0283523     2.06   0.040     .0027218    .1138608
        edad |   .0073701   .0009976     7.39   0.000     .0054148    .0093254
 escolaridad |   .0383023   .0132061     2.90   0.004     .0124188    .0641859
escolaridad2 |   .0003743   .0005666     0.66   0.509    -.0007363     .001485
       rural |  -.4296594   .0345326   -12.44   0.000     -.497342   -.3619769
     pchogar |   5.980719   70.56653     0.08   0.932    -132.3271    144.2886
logingreso~m |     .28832   .0149473    19.29   0.000     .2590238    .3176162
-------------+----------------------------------------------------------------
    /atrho21 |  -.1398098   .0070742   -19.76   0.000     -.153675   -.1259446
-------------+----------------------------------------------------------------
    /atrho31 |   .2431102   .0148742    16.34   0.000     .2139574     .272263
-------------+----------------------------------------------------------------
    /atrho32 |   .0183452   .0147977     1.24   0.215    -.0106578    .0473482
-------------+----------------------------------------------------------------
       rho21 |  -.1389059   .0069377   -20.02   0.000    -.1524766   -.1252829
-------------+----------------------------------------------------------------
       rho31 |   .2384313   .0140286    17.00   0.000     .2107512    .2657293
-------------+----------------------------------------------------------------
       rho32 |   .0183432   .0147928     1.24   0.215    -.0106574    .0473129
------------------------------------------------------------------------------
Likelihood ratio test of  rho21 = rho31 = rho32 = 0:
             chi2(3) =  676.847   Prob > chi2 = 0.0000
```

Fuente: Elaboración Propia

Es necesario señalar, que aún cuando los coeficientes de las estimaciones de los modelos probit, probit bivariado y trivariado son similares, los efectos marginales son distintos ya que deben ser estimados considerando la correlación existente entre todas las ecuaciones del sistema. Lo cual es muy complejo para modelos probit con más de dos ecuaciones.

Además, estos modelos con microdatos aun cuando son útiles para encontrar las variables determinantes de la tenencia de teléfono fijo, no lo son para realizar proyecciones a mediano plazo. Esto último, resulta evidente al considerar los pasos para realizar proyecciones con microdatos basados en la función paramétrica estimada:

- Estimar los parámetros del modelo probit (los beta's)
- Multiplicar el valor de cada vector de variables del individuo o familia por sus respectivos parámetros betas ($X*\beta$)
- Evaluar el valor anterior de cada individuo o familia en la función de distribución normal estándar
- El valor obtenido es un índice con rangos entre 0 y 1 que entrega la probabilidad que el individuo con esas características y niveles de precio demande el servicio de telefonía fija (por ejemplo un valor de 0.85 significa que con un 85% de probabilidad se adquiriría el servicio)
- Fijar una cota de probabilidad sobre la cual se adquiera el servicio (por ejemplo 0,5, es decir, si un individuo tiene un valor sobre 0,5 se asume que adquiría el servicio y que no lo demanda si tiene un valor menor a 0,5)
- Cuantificar las familias de la localidad que si adquieren el servicio de telefonía fija.

El problema práctico es que no tenemos proyecciones de microdatos para las variables explicativas a través del tiempo, específicamente para el horizonte de interés 2009-2014. Este inconveniente es el que nos hace tomar otro camino de estimación econométrica, pero basando los nuevos modelos en la evidencia anteriormente encontrada.

En resumen, los elementos a considerar en los modelos de demanda de líneas telefónicas con datos agregados y de series de tiempo son los siguientes. Primero, existe efecto región del país lo cual es un indicador de estimar funciones desagregadas por zonas. Segundo, es útil incorporar la sustitución de la telefonía fija provocada por la telefonía móvil y complementariedad de internet a través de algún indicador. Sin embargo, surgen problemas de falta de datos para estos dos elementos. Las series de tenencia de telefonía móvil e internet se encuentran disponibles en forma agregada y no por zona primaria o localidad. Además una manera de incorporar la sustitución de telefonía móvil sería utilizar las líneas móviles y conexiones a internet totales disponibles, el problema es que estos datos están disponibles en SUBTEL en forma trimestral hasta el 2006 y mensual a partir del 2007. En consecuencia, decidimos utilizar estas dos variables mensualizando el valor trimestral sujetos a la premisa de tener mayor número de observaciones y por ende mayores grados de libertad en las estimaciones.

4. Estimación de Demanda por Líneas para la Empresa

Es necesario señalar que aun cuando las BTE establecen la necesidad de realizar proyecciones de demanda de mercado de las líneas telefónicas. En esta sección, discutimos el modelo utilizado para realizar la proyección sólo de la demanda de líneas telefónicas de la empresa TELSUR a partir de datos mensuales desde el año 2004 al 2008.

La razón para esta propuesta es que tenemos datos exactos de las líneas propias, precio, ingreso y líneas de la competencia, por lo que estamos estimando una curva de demanda de TELSUR con la mejor información que pudiésemos tener dadas las restricciones. Sin embargo, esto no es cierto si quisiéramos estimar una demanda de mercado, ya que no existe un precio promedio de mercado que permita estimarla correctamente. En realidad, en el mejor de los casos, necesitaríamos estimar un sistema de ecuaciones de demanda con tantas ecuaciones como empresas competidoras en el mercado existiesen. Luego agregando las demandas de líneas para cada una de las empresas que entran en el mercado obtenemos la demanda total de mercado.

El informe de contraposición del estudio tarifario de Telefónica plantea el siguiente párrafo: "El informe CMM no considera que la interacción entre empresas de telefonía fija es un elemento consustancial al funcionamiento del mercado... No obstante, en ninguna de las regresiones, se incluyó variable alguna para incluir el efecto de la competencia".

En conclusión, creemos que la modelación planteada en términos de estimación por tipo de cliente y zona primaria, más la interacción de la competencia, es un avance sustancial a la forma en la que se ha abordado la modelación de demanda con respecto a estudios previos.

Las BTE señalan "los oferentes que participan en una misma área de superposición son de similar eficiencia en cuanto a la captación de clientes, por lo que deberían obtener el mismo porcentaje de participación respecto a la demanda en sus respectivos proyectos de expansión". Lo cual se traduce que a cada oferente en una comuna, incluyendo la empresa eficiente, capta la misma proporción de los nuevos clientes del mercado en esa comuna en su zona relevante. Lo anterior, es válido si estimásemos una demanda agregada de mercado que es necesario desagregar entre las empresas que compiten en el área geográfica.

Al estimar una demanda individual para la empresa TELSUR, más que asumir la anterior forma de distribuir las líneas agregadas debemos generar una forma alternativa. Podemos pensar que si nuestra demanda individual está correctamente estimada, dado que disponemos de todas las variables relevantes según la teoría económica, podemos asumir que las otras empresas relevantes en cada zona tendrán una variación equivalente en las líneas a las que fueron proyectadas para TELSUR.

Las regresiones parten con un modelo de datos agregados de demanda a nivel de zona primaria (zp) para la empresa TELSUR, las cuales incluyen la zp2, zp41, zp42, zp43, zp45, zp63, zp64, y zp65, que corresponden a Santiago, Chillán, Los Angeles, Concepción, Temuco, Valdivia, Osorno y Puerto Montt respectivamente.

Antes de plantear el modelo final, se realizaron diversos test para detectar la presencia de raíz unitaria en la variable logaritmo de líneas telefónicas. Estos incluyeron los tradicionales tests de Dicky-Fuller y Phillips-Perron, adicionando algunos más recientes como el test KPSS (la serie es estacionaria en la hipótesis nula) y Zivot-Andrews (evalua quiebres estructurales en la serie). La conclusión general de los diversos tests para cada una de las zonas, es que no se podía rechazar la presencia de raíz unitaria, por lo cual procedimos a diferenciar la serie, para realizar la modelación econométrica.

El modelo finalmente utilizado corresponde a un análisis de series de tiempo, en el cual se relaciona el comportamiento de la variación del logaritmo del número de líneas telefónicas con respecto a la variación del logaritmo del índice mensual de actividad económica (IMACEC), la variación del logaritmo del cargo fijo, la variación del logaritmo de teléfonos móviles, la variación del logaritmo de internet, la variación del logaritmo de las líneas fijas de la competencia en la zona primaria, más dos términos rezagados de las variables anteriores.

Las tablas siguientes presentan las estimaciones para cada zona primaria, de un modelo lineal seleccionado, luego de probar distintas especificaciones de rezagos con la metodología inglesa (Hendry, 1983) al ir eliminando variables no significativas con un p-value mayor a 0,15.

Además debemos señalar que a los errores del modelo finalmente seleccionado se le realizaron diversos test de normalidad, test de autocorrelación (Q), test LM de correlación serial, y test ARCH. El detalle de las estimaciones, significancia, ajuste del modelo y tests realizados es presentado en el Anexo.

Tabla 4: Coeficientes de Regresiones para Zonas Primarias

Coeficientes Modelo	ZP2	ZP41	ZP42	ZP43	ZP45	ZP63	ZP64	ZP65
constante	-0.01056				-0.00181	0.00182		
dlog lineas t-1					0.26893		0.21368	
dlog lineas t-2		0.27768			0.22678		0.31776	
dlog imacec t		-0.13844					0.07596	
dlog imacec t-1		-0.10039	0.82621			0.05214		
dlog imacec t-2							-0.08333	
dlog cargofijo t					0.19052	0.15595		
dlog cargofijo t-1		-0.46505		2.49071			0.29256	0.18241
dlog cargofijo t-2		-0.48188	5.61380					
dlog moviles t				-2.27935				
dlog moviles t-1		1.00035	-8.00397	1.96719	0.25024			
dlog moviles t-2		-0.45554	3.30104				0.25142	0.18343
dlog internet t					0.10183		-0.10255	
dlog internet t-1			2.23493					-0.09921
dlog internet t-2								
dlog competencia t		-2.06558						-0.02088
dlog competencia t-1						-0.03552		-0.00962
dlog competencia t-2		1.54291		3.79704				

Fuente: Elaboración Propia

Los resultados de las elasticidades de largo plazo son mostrados en la Tabla 5. En ella se aprecia que no existe una clara consistencia en los signos que uno podría esperar de elasticidades de largo plazo. Especialmente para las variables cargo fijo, móviles, internet y competencia.

Tabla 5: Elasticidades de Largo Plazo para Zonas Primarias

Elasticidades de L/P	ZP2	ZP41	ZP42	ZP43	ZP45	ZP63	ZP64	ZP65
imacec	0.00	-0.33	0.83	0.00	0.00	0.05	-0.02	0.00
cargofijo	0.00	-1.31	5.61	2.49	0.38	0.16	0.62	0.18
moviles	0.00	0.75	-4.70	-0.31	0.50	0.00	0.54	0.18
internet	0.00	0.00	2.23	0.00	0.20	0.00	-0.22	-0.10
competencia	0.00	-0.72	0.00	3.80	0.00	-0.04	0.00	-0.03

Fuente: Elaboración Propia

A partir de las estimaciones realizadas más una serie de supuestos sobre el comportamiento futuro de las variables explicativas, fue posible realizar proyecciones de demanda por líneas telefónicas en las zonas primarias por tipo de cliente. Específicamente, la proyección de las variables explicativas fue obtenido del "Informe de Demanda: Líneas y Tráficos" realizado por Soto y Gutiérrez (2009), incluido en el informe de objeciones y contraposiciones al modelo de demanda presentado por Telefónica Chile en su Proceso Tarifario.

Tabla 6: Proyección de Variables Explicativas

Año	IMACEC	Cargo Fijo	Parque Internet	Parque Móvil	Competencia
2009	0.00%	0.00%	13.60%	4.60%	0.00%
2010	1.00%	0.00%	10.50%	5.40%	0.00%
2011	2.50%	0.00%	5.90%	4.90%	0.00%
2012	4.00%	0.00%	3.00%	4.20%	0.00%
2013	4.00%	0.00%	3.00%	3.90%	0.00%
2014	4.00%	0.00%	3.00%	3.90%	0.00%

Fuente: Elaboración Propia

Los resultados de las proyecciones de líneas de TELSUR, tanto como promedio anual y a diciembre de cada año, son las detalladas para las zonas primarias desde el año 2009 a 2014.

Tabla 7: Proyección de Líneas Zona Primaria en Promedio de Cada Año

Proyecciones de Modelo	2009	2010	2011	2012	2013	2014
ZP2	429	377	332	293	258	227
ZP41	19273	19975	20635	21125	21490	21834
ZP42	35	36	35	32	29	27
ZP43	67	66	65	65	64	63
ZP45	35359	35558	35510	35114	34522	33903
ZP63	47427	48483	49593	50768	51992	53245
ZP64	34500	34523	34846	35355	35879	36368
ZP65	66004	65862	65950	66207	66501	66774

Fuente: Elaboración Propia

Tabla 8: Proyección de Líneas Zona Primaria a Diciembre de Cada Año

Proyecciones de Modelo	2009	2010	2011	2012	2013	2014
ZP2	404	356	313	276	243	214
ZP41	19586	20310	20902	21301	21647	21994
ZP42	36	36	33	31	28	26
ZP43	67	66	65	64	63	63
ZP45	35497	35612	35392	34853	34237	33622
ZP63	47902	48980	50119	51324	52561	53828
ZP64	34461	34610	35049	35603	36104	36593
ZP65	65902	65853	66043	66348	66626	66899

Fuente: Elaboración Propia

Luego del análisis previo, presentamos a continuación la estimación de demanda al realizar una desagregación por área tarifaria o Ciudad Grande (CG), Ciudad Mediana (CM) y Ciudad Rural (CR), para las zonas primarias 45, 63, 64 y 65. La agregación de CG, CM y CR por zona primaria pueden no coincidir exactamente con las estimaciones previas presentadas en las tablas 7 y 8, la explicación es que los modelos de proyecciones fueron elaborados a partir de distintas variables explicativas, específicamente se diferencian por la incorporación de las líneas de la competencia a nivel de zona primaria, ya que al realizar la desagregación por CG, CM y CR este dato no está disponible.

Tabla 9: Proyección de Líneas por CG, CM y CR en Promedio de Cada Año

Proyecciones de Modelo	2009	2010	2011	2012	2013	2014
ZP63_CG	39172	39751	40345	40945	41521	42082
ZP63_CM	8034	7899	7758	7607	7450	7294
ZP63_CR	153	153	153	153	153	153
ZP64_CG	25785	25814	26060	26445	26844	27214
ZP64_CM	8691	8689	8736	8829	8931	9026
ZP64_CR	61	62	63	63	63	63
ZP65_CG	33421	33354	33354	33354	33354	33354
ZP65_CM	30779	30778	30759	30749	30737	30721
ZP65_CR	1117	1171	1228	1288	1351	1417

Fuente: Elaboración Propia

Tabla 10: Proyección de Líneas por CG, CM y CR a Diciembre de Cada Año

Proyecciones de Modelo	2009	2010	2011	2012	2013	2014
ZP63_CG	39459	40017	40619	41213	41778	42341
ZP63_CM	7976	7835	7690	7535	7378	7224
ZP63_CR	153	153	153	153	153	153
ZP64_CG	25769	25887	26219	26634	27015	27383
ZP64_CM	8688	8698	8772	8878	8975	9070
ZP64_CR	62	63	63	63	63	63
ZP65_CG	33356	33354	33354	33354	33354	33354
ZP65_CM	30799	30765	30751	30742	30730	30713
ZP65_CR	1141	1197	1255	1316	1381	1448

Fuente: Elaboración Propia

5. Demanda de Conexiones a Internet de TELSUR

En esta sección se discutirá el modelo de proyección de demanda para las conexiones de internet de TELSUR.

El modelo econométrico consta de un análisis de series de tiempo con cifras de conexiones de TELSUR desde enero de 2004 a diciembre de 2008. Para especificar el modelo primero se tomó la decisión de realizar la estimación en niveles originales y no en logaritmos dado que, existían bastantes series con valores de cero en los periodos iniciales, por lo cual se hubiesen perdido muchas observaciones relevantes. En segundo lugar, se realizaron diversos test de raíz unitaria (Dicky-Fuller, Dicky-Fuller Aumentado, Phillips-Perron, KPSS y Zivot-Andrews) para la serie de número de conexiones para cada localidad, de los resultados generales se desprende que no es posible rechazar la presencia de raíz unitaria, por lo cual se estimaron los modelos en diferencias.

Las variables explicativas incluidas son la variación de las conexiones de TELSUR rezagadas uno y dos periodos, la variación del ARPU real, la variación del IMACEC, conexiones nacionales de internet (efecto de red), conexiones nacionales de telefonía fija (efecto de bien relacionado) contemporáneas, y también rezagadas uno y dos periodos. Cada modelo fue seleccionado luego de probar distintas especificaciones de rezagos con la metodología inglesa de Hendry, al ir eliminando variables no significativas con un p-value mayor a 0,15. Los resultados de los modelos específicos para cada localidad pueden ser vistos detalladamente en el Anexo.

Las proyecciones de demanda para conexiones de internet de TELSUR, fueron estimadas a partir de los coeficientes de las regresiones para cada localidad, en conjunto con supuestos acerca del comportamiento futuro de las variables explicativas, los cuales son iguales a los planteados para la proyección de líneas telefónicas, más una proyección de una evolución constante para el número de líneas de telefonía fija a nivel nacional y una proyección de una caída anual de 10% del ARPU real de TELSUR.

Los resultados de las proyecciones como promedio anual y a final de diciembre de cada año son presentados en las Tablas 11 y 12, respectivamente.

Tabla 11: Proyección de Conexiones a Internet Promedio Anual

zona primaria	comuna	Localidad	Región	2009	2010	2011	2012	2013	2014
ZP65	CHLE	CHILOE	X	7813	9035	10126	11169	12211	13255
ZP42	CHLL	CHILLAN	VIII	7	9	10	12	14	16
ZP41	CNCP	CHIGUAYANTE	VIII	755	830	904	978	1051	1125
ZP41	CNCP	CONCEPCION	VIII	6421	7251	7985	8690	9393	10096
ZP41	CNCP	CORONEL	VIII	10	12	14	15	16	18
ZP41	CNCP	LOS ANGELES	VIII	3	4	4	4	5	5
ZP41	CNCP	SAN PEDRO	VIII	2806	3245	3683	4120	4557	4993
ZP41	CNCP	TALCAHUANO	VIII	1612	1813	2013	2214	2413	2613
ZP64	OSRN	CRUCEROS VALD	X	89	91	97	104	111	118
ZP64	OSRN	CASCADA	X	32	36	40	45	50	55

ZP64	OSRN	ENTRELAGOS	X	154	185	215	245	275	305
ZP64	OSRN	LAGO RANCO	X	77	101	125	149	173	197
ZP64	OSRN	LA UNION	X	1087	1250	1413	1575	1737	1899
ZP64	OSRN	OSORNO	X	7734	8753	9726	10685	11643	12602
ZP64	OSRN	PTO. OCTAY	X	83	96	106	117	127	137
ZP64	OSRN	PURRANQUE	X	482	548	606	661	717	772
ZP64	OSRN	RIO BUENO	X	832	1003	1169	1335	1501	1668
ZP64	OSRN	RIACHUELO	X	26	28	31	33	36	39
ZP64	OSRN	RIO NEGRO	X	271	324	366	403	440	476
ZP64	OSRN	SAN PABLO	X	57	69	82	94	107	119
ZP65	PMTT	CASMA COTELL	X	2	2	3	3	3	3
ZP65	PMTT	CASMA	X	23	23	23	23	23	22
ZP65	PMTT	CHAITEN	X	136	143	152	161	170	179
ZP65	PMTT	CALBUCO	X	768	882	990	1096	1202	1309
ZP65	PMTT	CANITAS COTELL	X	1	1	2	2	2	2
ZP65	PMTT	CONTAO	X	1	1	1	1	1	1
ZP65	PMTT	ENSENADA COTELL	X	2	2	2	2	2	2
ZP65	PMTT	ENSENADA	X	1	1	2	2	2	2
ZP65	PMTT	FRESIA COTELL	X	32	39	45	52	58	64
ZP65	PMTT	FRESIA	X	1	2	2	2	2	3
ZP65	PMTT	FRUTILLAR COTELL	X	84	91	97	103	108	114
ZP65	PMTT	FRUTILLAR	X	492	566	640	715	790	865
ZP65	PMTT	FUTALEUFU	X	121	144	167	190	213	236
ZP65	PMTT	LLANQUIHUE COTELL	X	86	91	96	102	107	112
ZP65	PMTT	LLANQUIHUE	X	473	536	598	661	724	786
ZP65	PMTT	LOS MUERMOS COTELL	X	23	26	29	32	35	38
ZP65	PMTT	LOS MUERMOS	X	209	261	313	366	420	473
ZP65	PMTT	LONCOTORO COTELL	X	3	3	3	4	4	4
ZP65	PMTT	LONCOTORO	X	0	0	0	0	0	0
ZP65	PMTT	LAS QUEMAS	X	2	3	3	3	3	4
ZP65	PMTT	MAULLIN	X	200	236	264	289	315	341
ZP65	PMTT	N. BRAUNAU COTELL	X	6	7	8	8	9	10
ZP65	PMTT	PALENA	X	98	117	135	154	172	191
ZP65	PMTT	PTO. MONTT COTELL	X	108	116	125	135	144	154
ZP65	PMTT	PTO. MONTT	X	10612	11911	13231	14561	15889	17218
ZP65	PMTT	PTO. OCTAY COTELL	X	2	3	3	3	3	4
ZP65	PMTT	PARGUA	X	1	1	2	2	2	2
ZP65	PMTT	PUERTO VARAS COTELL	X	334	351	383	419	456	492
ZP65	PMTT	PTO. VARAS	X	1737	1940	2146	2352	2558	2764
ZP65	PMTT	RIO FRIO COTELL	X	1	1	1	0	0	0
ZP65	PMTT	RIO NEGRO HORNOPIREN	X	128	147	176	209	241	273
ZP65	PMTT	TEGUALDA COTELL	X	0	0	0	0	0	0
ZP2	STGO	SANTIAGO	METRO	1	1	0	0	0	0
ZP45	TMCO	CHOLCHOL	IX	39	48	55	63	70	78
ZP45	TMCO	TEMUCO	IX	12570	13943	15196	16408	17617	18825
ZP63	VLDV	ANTILHUE	XIV	58	62	67	73	79	85
ZP63	VLDV	CHOSHUENCO	XIV	36	42	48	54	60	66
ZP63	VLDV	CONARIPE	XIV	1	1	1	1	2	2
ZP63	VLDV	CORRAL	XIV	122	144	153	156	159	163
ZP63	VLDV	FOLILCO	XIV	0	0	0	0	0	0
ZP63	VLDV	FUTRONO	XIV	273	318	362	406	451	495
ZP63	VLDV	LANCO	XIV	267	312	354	396	437	479
ZP63	VLDV	LLIFEN	XIV	4	5	6	7	8	9
ZP63	VLDV	LOS LAGOS	XIV	341	387	426	462	499	535
ZP63	VLDV	MAFIL	XIV	82	93	107	122	136	150
ZP63	VLDV	MEHUIN	XIV	9	10	11	12	13	14
ZP63	VLDV	LOS MOLINOS	XIV	4	5	5	6	7	8

ZP63	VLDV	MALALHUE	XIV	16	17	18	19	19	20
ZP63	VLDV	NIEBLA	XIV	125	148	172	196	219	243
ZP63	VLDV	PICHOY	XIV	5	5	6	6	7	7
ZP63	VLDV	PELCHUQUIN	XIV	3	4	4	4	5	5
ZP63	VLDV	PAILLACO	XIV	383	438	494	551	607	663
ZP63	VLDV	PANGUIPULLI	XIV	504	570	631	690	750	809
ZP63	VLDV	PICHI ROPULLI	XIV	61	64	68	72	76	80
ZP63	VLDV	REUMEN	XIV	38	42	47	52	57	62
ZP63	VLDV	SN JOSE DE LA MAR	XIV	356	405	446	483	521	559
ZP63	VLDV	VALDIVIA	XIV	11196	12730	14286	15852	17417	18983

Fuente: Elaboración Propia

Tabla 12: Proyección de Conexiones a Internet Diciembre de Cada Año

zona primaria	comuna	Localidad	Región	2009	2010	2011	2012	2013	2014
ZP65	CHLE	CHILOE	X	8407	9553	10604	11646	12689	13734
ZP42	CHLL	CHILLAN	VIII	8	10	11	13	15	17
ZP41	CNCP	CHIGUAYANTE	VIII	790	864	938	1011	1085	1158
ZP41	CNCP	CONCEPCION	VIII	6832	7602	8308	9012	9716	10419
ZP41	CNCP	CORONEL	VIII	11	13	14	16	17	18
ZP41	CNCP	LOS ANGELES	VIII	3	4	4	5	5	5
ZP41	CNCP	SAN PEDRO	VIII	3007	3446	3883	4320	4757	5193
ZP41	CNCP	TALCAHUANO	VIII	1704	1905	2105	2305	2505	2704
ZP64	OSRN	CRUCEROS VALD	X	90	93	100	107	114	121
ZP64	OSRN	CASCADA	X	33	38	42	47	52	57
ZP64	OSRN	ENTRELAGOS	X	168	198	229	259	289	319
ZP64	OSRN	LAGO RANCO	X	88	112	136	160	184	208
ZP64	OSRN	LA UNION	X	1162	1325	1487	1649	1812	1974
ZP64	OSRN	OSORNO	X	8218	9206	10165	11124	12083	13041
ZP64	OSRN	PTO. OCTAY	X	89	101	111	121	131	141
ZP64	OSRN	PURRANQUE	X	514	575	631	687	742	798
ZP64	OSRN	RIO BUENO	X	912	1079	1245	1411	1578	1744
ZP64	OSRN	RIACHUELO	X	27	29	32	35	37	40
ZP64	OSRN	RIO NEGRO	X	299	345	383	420	457	493
ZP64	OSRN	SAN PABLO	X	63	75	88	100	112	125
ZP65	PMTT	CASMA COTELL	X	2	2	3	3	3	3
ZP65	PMTT	CASMA	X	23	23	23	23	23	22
ZP65	PMTT	CHAITEN	X	138	148	157	166	175	183
ZP65	PMTT	CALBUCO	X	822	932	1039	1145	1251	1357
ZP65	PMTT	CANITAS COTELL	X	1	1	2	2	2	2
ZP65	PMTT	CONTAO	X	1	1	1	1	1	1
ZP65	PMTT	ENSENADA COTELL	X	2	2	2	2	2	2
ZP65	PMTT	ENSENADA	X	1	1	2	2	2	2
ZP65	PMTT	FRESIA COTELL	X	35	42	48	55	61	67
ZP65	PMTT	FRESIA	X	1	2	2	2	3	3
ZP65	PMTT	FRUTILLAR COTELL	X	88	94	100	105	111	116
ZP65	PMTT	FRUTILLAR	X	526	600	675	749	824	899
ZP65	PMTT	FUTALEUFU	X	132	155	178	201	224	247
ZP65	PMTT	LLANQUIHUE COTELL	X	88	94	99	104	109	115
ZP65	PMTT	LLANQUIHUE	X	502	565	627	690	752	815
ZP65	PMTT	LOS MUERMOS COTELL	X	24	27	30	33	36	39
ZP65	PMTT	LOS MUERMOS	X	233	284	337	391	444	498
ZP65	PMTT	LONCOTORO COTELL	X	3	3	3	4	4	4
ZP65	PMTT	LONCOTORO	X	0	0	0	0	0	0
ZP65	PMTT	LAS QUEMAS	X	3	3	3	3	4	4

ZP65	PMTT	MAULLIN	X	219	250	275	301	327	353
ZP65	PMTT	N. BRAUNAU COTELL	X	7	7	8	9	9	10
ZP65	PMTT	PALENA	X	107	125	144	162	181	199
ZP65	PMTT	PTO. MONTT COTELL	X	111	120	129	139	149	158
ZP65	PMTT	PTO. MONTT	X	11203	12513	13841	15170	16499	17828
ZP65	PMTT	PTO. OCTAY COTELL	X	2	3	3	3	4	4
ZP65	PMTT	PARGUA	X	1	1	2	2	2	2
ZP65	PMTT	PUERTO VARAS COTELL	X	338	365	400	436	472	508
ZP65	PMTT	PTO. VARAS	X	1830	2034	2241	2447	2653	2859
ZP65	PMTT	RIO FRIO COTELL	X	1	1	0	0	0	0
ZP65	PMTT	RIO NEGRO HORNOPIREN	X	135	159	191	223	256	288
ZP65	PMTT	TEGUALDA COTELL	X	0	0	0	0	0	0
ZP2	STGO	SANTIAGO	METRO	1	1	0	0	0	0
ZP45	TMCO	CHOLCHOL	IX	43	51	59	66	74	81
ZP45	TMCO	TEMUCO	IX	13237	14536	15752	16962	18171	19378
ZP63	VLDV	ANTILHUE	XIV	59	64	70	76	82	88
ZP63	VLDV	CHOSHUENCO	XIV	39	44	50	57	63	69
ZP63	VLDV	CONARIPE	XIV	1	1	1	1	2	2
ZP63	VLDV	CORRAL	XIV	135	149	154	157	161	164
ZP63	VLDV	FOLILCO	XIV	0	0	0	0	0	0
ZP63	VLDV	FUTRONO	XIV	293	338	382	427	471	515
ZP63	VLDV	LANCO	XIV	288	331	373	415	456	498
ZP63	VLDV	LLIFEN	XIV	5	6	6	7	8	9
ZP63	VLDV	LOS LAGOS	XIV	363	405	443	479	516	552
ZP63	VLDV	MAFIL	XIV	86	100	114	128	142	156
ZP63	VLDV	MEHUIN	XIV	9	11	12	12	13	14
ZP63	VLDV	LOS MOLINOS	XIV	4	5	6	7	7	8
ZP63	VLDV	MALALHUE	XIV	17	18	18	19	20	20
ZP63	VLDV	NIEBLA	XIV	136	159	183	206	230	253
ZP63	VLDV	PICHOY	XIV	5	6	6	6	7	7
ZP63	VLDV	PELCHUQUIN	XIV	3	4	4	4	5	5
ZP63	VLDV	PAILLACO	XIV	408	464	520	577	633	689
ZP63	VLDV	PANGUIPULLI	XIV	535	598	658	718	777	837
ZP63	VLDV	PICHI ROPULLI	XIV	63	66	70	74	78	82
ZP63	VLDV	REUMEN	XIV	40	45	50	55	60	65
ZP63	VLDV	SN JOSE DE LA MAR	XIV	380	425	463	500	538	576
ZP63	VLDV	VALDIVIA	XIV	11893	13439	15004	16569	18135	19701

Fuente: Elaboración Propia

6. *Demanda por Tráficos*

La modelación de los tráficos modelos de tráficos de acuerdo a las Bases Técnico-Económicas, tiene por objetivo estimar una aproximación razonable a la curva de demanda por cada tipo de tráfico. Para ello los modelos estimados econométricamente deben cumplir con la incorporación de variables como el precio del bien, precio de bienes relacionados e ingreso.

El período de tiempo utilizado corresponde a enero de 2006 a diciembre de 2008, el periodo se explica ya que al revisar los resultados de tráficos por línea existían inconsistencias relevantes para el período enero de 2004 a diciembre de 2005.

Para cada uno de los tráficos relevantes por zona primaria se realizó un análisis de series de tiempo, en el cual se relaciona el comportamiento del tráfico en minutos por línea con respecto al tráfico en minutos por línea rezagado uno y dos periodos, al imacec, a los precios reales del cargo fijo, slm, tramo local, cargos de acceso, ldn y ldi, también todos los anteriores rezagados uno y dos periodos.

Las tablas siguientes presentan las estimaciones para cada zona primaria, de un modelo lineal seleccionado, luego de probar distintas especificaciones de rezagos con la metodología inglesa (Hendry, 1983) al ir eliminando variables no significativas con un p-value mayor a 0,15.

CONFIDENCIAL

CONFIDENCIAL

Cabe mencionar que ningún modelo proyectó adecuadamente para el tráfico cargo de acceso LDI en la zona 45, 63 y 65, dado que ellos pronosticaban tráficos negativos, por ello se procedió a dejar un valor constante y justificable desde un punto de vista de la experiencia en el mercado de las telecomunicaciones de 0.6, 1.1, y 0.3, respectivamente.

ANEXOS

Anexo 1: Estimaciones para Telefonía de Telsur por Zona Primaria

```
. *LINEAS TOTALES
. **********************
. **********************
.
.  regress logzp2_d0 logzp2_d1 logzp2_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcftel
> sur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 logi
> nternet_d1 loginternet_d2 logzp2comp_d0 logzp2comp_d1 logzp2comp_d2
                      begin with full model
p = 0.9818 >= 0.1500  removing loginternet_d2
p = 0.9492 >= 0.1500  removing logzp2comp_d1
p = 0.7539 >= 0.1500  removing logzp2_d1
p = 0.6454 >= 0.1500  removing logzp2comp_d0
p = 0.6302 >= 0.1500  removing logimacec_d2
p = 0.7280 >= 0.1500  removing loginternet_d1
p = 0.4368 >= 0.1500  removing loginternet_d0
p = 0.4059 >= 0.1500  removing logzp2_d2
p = 0.2681 >= 0.1500  removing logcftelsur_d1
p = 0.3346 >= 0.1500  removing logmoviles_d0
p = 0.3651 >= 0.1500  removing logcftelsur_d0
p = 0.2388 >= 0.1500  removing logimacec_d1
p = 0.2068 >= 0.1500  removing logzp2comp_d2
p = 0.1678 >= 0.1500  removing logmoviles_d1
p = 0.0930 >= 0.1500  removing logcftelsur_d2
p = 0.1023 >= 0.1500  removing logmoviles_d2
p = 0.0834 >= 0.1500  removing logimacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    56) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  .414226154    56  .007396896           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  .414226154    56  .007396896           Root MSE      =  .08601

------------------------------------------------------------------------------
   logzp2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |  -.0105608   .0113917    -0.93   0.358    -.0333811    .0122594
------------------------------------------------------------------------------

.
. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0640  -0.0640   .25421  0.6141          |                  |
2       -0.0414  -0.0457   .36222  0.8343          |                  |
3        0.0168   0.0112   .38035  0.9443          |                  |
4       -0.0086  -0.0086   .38518  0.9837          |                  |
```

```
5        -0.0099  -0.0098   .39176  0.9956          |                  |
6         0.0039   0.0018   .39282  0.9989          |                  |
7        -0.0543  -0.0551    .5967  0.9990          |                  |
8        -0.0235  -0.0306   .63577  0.9997          |                  |
9         0.0389   0.0308   .74465  0.9998          |                  |
10       -0.0254  -0.0219   .79213  0.9999          |                  |
11       -0.0667  -0.0687   1.1261  0.9999          |                  |
12        0.0264   0.0098   1.1795  1.0000          |                  |
13       -0.0863  -0.0914   1.7625  0.9999          |                  |
14       -0.1237  -0.1413   2.9869  0.9991          |                 -|
15       -0.0148  -0.0537   3.0049  0.9996          |                  |
16        0.0036  -0.0159    3.006  0.9998          |                  |
17       -0.1908  -0.2117   6.1253  0.9923         -|                 -|
18        0.0177  -0.0480   6.1527  0.9955          |                  |
19        0.0374  -0.0026   6.2786  0.9972          |                  |
20        0.0047  -0.0181   6.2806  0.9985          |                  |
21        0.0581   0.0162   6.6007  0.9988          |                  |
22       -0.0179  -0.0495   6.6317  0.9993          |                  |
23        0.0118  -0.0139   6.6457  0.9996          |                  |
24       -0.0063  -0.0289   6.6498  0.9998          |                  |
25       -0.0200  -0.0301    6.692  0.9999          |                  |
26        0.0254   0.0383   6.7624  0.9999          |                  |
27        0.0150   0.0501   6.7876  1.0000          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.228               1                   0.6328
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.019               1                   0.8910
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   4569 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000               .       0.0000

.
```

```
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     59    0.36520     34.045      7.596  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     6.7876
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
.
.  regress logzp41_d0 logzp41_d1 logzp41_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp41comp_d0 logzp41comp_d1 logzp41comp_d2 ,
noconstant
                      begin with full model
p = 0.9689 >= 0.1500  removing logzp41_d1
p = 0.9134 >= 0.1500  removing loginternet_d0
p = 0.7954 >= 0.1500  removing logzp41comp_d1
p = 0.7020 >= 0.1500  removing logmoviles_d0
p = 0.5687 >= 0.1500  removing loginternet_d1
p = 0.4560 >= 0.1500  removing loginternet_d2
p = 0.3111 >= 0.1500  removing logimacec_d2
p = 0.2195 >= 0.1500  removing logcftelsur_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  9,    48) =    7.27
       Model |  .028064064     9  .003118229           Prob > F      =  0.0000
    Residual |  .020599561    48  .000429158           R-squared     =  0.5767
-------------+------------------------------           Adj R-squared =  0.4973
       Total |  .048663625    57  .000853748           Root MSE      =  .02072

------------------------------------------------------------------------------
  logzp41_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logzp41com~2 |   1.542913   .5511971     2.80   0.007     .4346565    2.651169
  logzp41_d2 |   .2776849   .1411384     1.97   0.055    -.0060928    .5614626
logimacec_d0 |  -.1384398   .0777214    -1.78   0.081    -.2947092    .0178296
logimacec_d1 |   -.100389   .0602162    -1.67   0.102    -.2214618    .0206838
logmoviles~2 |  -.4555389   .2071859    -2.20   0.033    -.8721141   -.0389637
logmoviles~1 |   1.000352   .2233648     4.48   0.000     .5512469    1.449457
logcftelsu~1 |  -.4650496   .2034604    -2.29   0.027    -.8741341   -.0559651
logcftelsu~2 |  -.4818764   .2073805    -2.32   0.024    -.8988428   -.0649099
logzp41com~0 |  -2.065584   .5267126    -3.92   0.000    -3.124611   -1.006558
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1062   0.1152   .67692  0.4106          |                  |
2       -0.1029  -0.1192    1.325  0.5156          |                  |
3       -0.1142  -0.1092   2.1365  0.5446          |                  |
4        0.0619   0.0710     2.38  0.6662          |                  |
5        0.0133  -0.0307   2.3914  0.7927          |                  |
6        0.1145   0.1521   3.2557  0.7761          |                  |-
7        0.0396   0.0530    3.361  0.8497          |                  |
8       -0.1129  -0.1282   4.2366  0.8352          |                 -|
9       -0.2750  -0.2853   9.5357  0.3894        --|                --|
10       0.0258   0.0711   9.5833  0.4778          |                  |
11       0.0418   0.0046   9.7109  0.5566          |                  |
12       0.1648   0.2041   11.742  0.4667          |-                 |-
13       0.0799   0.1321    12.23  0.5089          |                  |-
14       0.0883   0.2311    12.84  0.5392          |                  |-
15      -0.0174   0.1744   12.864  0.6128          |                  |-
16       0.1140   0.2638    13.93  0.6039          |                  |--
17       0.0947   0.2189   14.684  0.6182          |                  |-
18       0.0242  -0.0132   14.735  0.6801          |                  |
19       0.1205   0.3474   16.019  0.6560          |                  |--
20      -0.1170  -0.0460   17.263  0.6358          |                  |
21       0.0110   0.5908   17.275  0.6943          |                  |----
22      -0.1140   0.1753   18.522  0.6746          |                  |-
23      -0.1283   0.0525   20.152  0.6327         -|                  |
24      -0.1456  -0.3388   22.312  0.5607         -|                --|
25       0.0308   0.2774   22.411  0.6119          |                  |--
26       0.0225  -0.3934   22.466  0.6629          |               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.852               1                   0.3561
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.322               1                   0.5703
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   3.06 Chi(2)  .2165
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo
```

```
                  Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.087         0.295           4.17       0.1245

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.97678      1.212      0.412  0.34005

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.4662
 Prob > chi2(26)           =     0.6629

.
. drop residuo

.
.  regress logzp42_d0 logzp42_d1 logzp42_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp42comp_d0 logzp42comp_d1 logzp42comp_d2 ,
noconstant
                      begin with full model
p = 0.9101 >= 0.1500  removing logzp42comp_d2
p = 0.7952 >= 0.1500  removing logzp42_d2
p = 0.7904 >= 0.1500  removing loginternet_d0
p = 0.8164 >= 0.1500  removing logzp42comp_d1
p = 0.5299 >= 0.1500  removing logzp42comp_d0
p = 0.3823 >= 0.1500  removing logcftelsur_d0
p = 0.4625 >= 0.1500  removing logcftelsur_d1
p = 0.4917 >= 0.1500  removing logmoviles_d0
p = 0.3056 >= 0.1500  removing loginternet_d2
p = 0.3858 >= 0.1500  removing logzp42_d1
p = 0.1762 >= 0.1500  removing logimacec_d2
p = 0.1787 >= 0.1500  removing logimacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    52) =    6.79
       Model |  .940922499     5    .1881845           Prob > F      =  0.0001
    Residual |  1.44057872    52  .027703437           R-squared     =  0.3951
-------------+------------------------------           Adj R-squared =  0.3369
       Total |  2.38150122    57  .041780723           Root MSE      =  .16644

------------------------------------------------------------------------------
  logzp42_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logcftelsu~2 |     5.6138    1.43774     3.90   0.000     2.728764    8.498837
logmoviles~1 |  -8.003973   1.790966    -4.47   0.000    -11.59781   -4.410138
loginterne~1 |   2.234931    .654812     3.41   0.001     .9209546    3.548907
logimacec_d1 |   .8262133    .449169     1.84   0.072    -.0751103    1.727537
```

```
logmoviles~2 |   3.301037   1.584145     2.08   0.042      .122217    6.479858
------------------------------------------------------------------------------


.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1522   0.1608   1.3912  0.2382          |-                 |-
2        0.0556   0.0444     1.58  0.4538          |                  |
3       -0.1220  -0.1424   2.5072  0.4740          |                 -|
4       -0.1736  -0.1548   4.4192  0.3522         -|                 -|
5       -0.0863  -0.0320    4.901  0.4281          |                  |
6        0.1546   0.2037   6.4779  0.3718          |-                 |-
7        0.1501   0.0999   7.9933  0.3332          |-                 |
8       -0.0730  -0.2163    8.359  0.3992          |                 -|
9       -0.1092  -0.1235   9.1945  0.4195          |                  |
10      -0.2167  -0.1131   12.556  0.2496         -|                  |
11      -0.0126   0.1216   12.567  0.3225          |                  |
12       0.2315   0.2939   16.574  0.1663          |-                 |--
13       0.1038  -0.1157   17.398  0.1817          |                  |
14       0.0651  -0.0875    17.73  0.2194          |                  |
15      -0.0199   0.0448   17.761  0.2754          |                  |
16       0.0037   0.3138   17.762  0.3380          |                  |--
17      -0.1812  -0.1750   20.524  0.2483         -|                 -|
18      -0.0424  -0.3874   20.679  0.2959          |               ---|
19       0.0941   0.1522   21.463  0.3118          |                  |-
20      -0.0604   0.0826   21.794  0.3518          |                  |
21      -0.0946  -0.2030   22.631  0.3640          |                 -|
22       0.0445   0.1478   22.821  0.4119          |                  |-
23       0.0307   0.4001   22.914  0.4658          |                  |---
24      -0.1183  -0.2852   24.339  0.4423          |                --|
25       0.0551  -0.0467   24.659  0.4816          |                  |
26      -0.1052  -0.2854   25.859  0.4709          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.522               1                   0.2173
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.240               1                   0.6240
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
```

```
. jb6 residuo
Jarque-Bera normality test:  85.38 Chi(2)  2.9e-19
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           20.72       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.89572      5.441      3.640  0.00014

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.8592
 Prob > chi2(26)           =     0.4709

.
. drop residuo

.
.  regress logzp43_d0 logzp43_d1 logzp43_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp43comp_d0 logzp43comp_d1 logzp43comp_d2 ,
noconstant
                      begin with full model
p = 0.9942 >= 0.1500  removing logimacec_d2
p = 0.8905 >= 0.1500  removing logcftelsur_d2
p = 0.8853 >= 0.1500  removing logzp43_d2
p = 0.7841 >= 0.1500  removing logmoviles_d2
p = 0.6284 >= 0.1500  removing logcftelsur_d0
p = 0.5510 >= 0.1500  removing loginternet_d2
p = 0.4868 >= 0.1500  removing loginternet_d1
p = 0.3955 >= 0.1500  removing logimacec_d1
p = 0.3794 >= 0.1500  removing logzp43_d1
p = 0.3708 >= 0.1500  removing logimacec_d0
p = 0.2831 >= 0.1500  removing logzp43comp_d1
p = 0.1820 >= 0.1500  removing loginternet_d0
p = 0.1737 >= 0.1500  removing logzp43comp_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    53) =    3.53
       Model |  .285238621     4  .071309655           Prob > F      =  0.0126
    Residual |  1.07150918    53  .020217154           R-squared     =  0.2102
-------------+------------------------------           Adj R-squared =  0.1506
       Total |   1.3567478    57  .023802593           Root MSE      =  .14219
```

```
------------------------------------------------------------------------------
  logzp43_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~0 |  -2.279348   1.280358    -1.78   0.081    -4.847422    .2887248
logzp43com~2 |   3.797043   1.219107     3.11   0.003     1.351825    6.242261
logcftelsu~1 |   2.490714   1.206723     2.06   0.044     .0703339    4.911094
logmoviles~1 |   1.967194   1.218307     1.61   0.112    -.4764202    4.410808
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0592   0.0594   .21038  0.6465          |                  |
2       -0.0362  -0.0396    .2906  0.8648          |                  |
3       -0.0846  -0.0821   .73603  0.8647          |                  |
4        0.0255   0.0353   .77732  0.9415          |                  |
5        0.0183   0.0090   .79888  0.9771          |                  |
6       -0.0639  -0.0720    1.068  0.9829          |                  |
7       -0.0379  -0.0241   1.1644  0.9917          |                  |
8        0.0433   0.0467   1.2933  0.9956          |                  |
9        0.0043  -0.0142   1.2946  0.9984          |                  |
10      -0.0526  -0.0552   1.4926  0.9990          |                  |
11      -0.0728  -0.0591     1.88  0.9989          |                  |
12      -0.3908  -0.4174   13.295  0.3480       ---|               ---|
13       0.1627   0.2470   15.317  0.2880          |-                 |-
14       0.0860   0.0540   15.896  0.3198          |                  |
15       0.0268  -0.0646   15.954  0.3851          |                  |
16      -0.0846  -0.0202   16.541  0.4159          |                  |
17      -0.0951  -0.1708   17.302  0.4341          |                 -|
18       0.0094   0.0030   17.309  0.5019          |                  |
19       0.0243  -0.0082   17.362  0.5654          |                  |
20      -0.0796  -0.0482   17.938  0.5915          |                  |
21       0.0676   0.0583   18.365  0.6258          |                  |
22       0.2111   0.3191   22.647  0.4219          |-                 |--
23       0.0785  -0.1802   23.257  0.4459          |                 -|
24       0.0160  -0.9425   23.282  0.5032          |           -------|
25      -0.1529   0.4707    25.74  0.4216         -|                  |---
26      -0.0380  -0.0485   25.897  0.4688          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.217               1                   0.6410
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.021               1                   0.8841
---------------------------------------------------------------------------
```

```
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  685.6 Chi(2)  1.e-149
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           37.53       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.65034     18.243      6.240  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.8966
 Prob > chi2(26)           =     0.4688

.
. drop residuo

.
.  regress logzp45_d0 logzp45_d1 logzp45_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp45comp_d0 logzp45comp_d1 logzp45comp_d2
                      begin with full model
p = 0.9974 >= 0.1500  removing loginternet_d2
p = 0.9019 >= 0.1500  removing logimacec_d1
p = 0.8922 >= 0.1500  removing logimacec_d2
p = 0.7852 >= 0.1500  removing logmoviles_d0
p = 0.8358 >= 0.1500  removing logimacec_d0
p = 0.8202 >= 0.1500  removing logcftelsur_d1
p = 0.7412 >= 0.1500  removing logzp45comp_d2
p = 0.6634 >= 0.1500  removing loginternet_d1
p = 0.5870 >= 0.1500  removing logmoviles_d2
p = 0.5189 >= 0.1500  removing logcftelsur_d2
p = 0.4455 >= 0.1500  removing logzp45comp_d1
p = 0.3566 >= 0.1500  removing logzp45comp_d0

      Source |       SS       df       MS              Number of obs =      57
```

```
-------------+------------------------------           F(  5,    51) =    4.22
       Model |  .004318031     5  .000863606           Prob > F      =  0.0028
    Residual |  .010435004    51  .000204608           R-squared     =  0.2927
-------------+------------------------------           Adj R-squared =  0.2233
       Total |  .014753034    56  .000263447           Root MSE      =   .0143

------------------------------------------------------------------------------
  logzp45_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logzp45_d1 |   .2689336   .1244374     2.16   0.035     .0191151    .5187521
  logzp45_d2 |   .2267785   .1268715     1.79   0.080    -.0279267    .4814836
logmoviles~1 |   .2502447   .1531197     1.63   0.108    -.0571559    .5576453
loginterne~0 |   .1018346   .0572791     1.78   0.081    -.0131579    .2168271
logcftelsu~0 |   .1905152    .127604     1.49   0.142    -.0656605    .4466908
       _cons |  -.0018114   .0028658    -0.63   0.530    -.0075647    .0039418
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0373  -0.0374   .08338  0.7728          |                  |
2       -0.1432  -0.1466   1.3373  0.5124         -|                 -|
3        0.2632   0.2642   5.6515  0.1299          |--                |--
4        0.1443   0.1540    6.973  0.1373          |-                 |-
5       -0.0638   0.0117    7.236  0.2037          |                  |
6        0.0932   0.0982   7.8083  0.2525          |                  |
7       -0.0174  -0.1155   7.8287  0.3479          |                  |
8       -0.0136  -0.0052   7.8415  0.4491          |                  |
9        0.1591   0.1599   9.6148  0.3826          |-                 |-
10       0.0944   0.1252   10.253  0.4186          |                  |-
11      -0.0618  -0.0094   10.532  0.4833          |                  |
12      -0.2090  -0.3404   13.797  0.3139         -|                --|
13       0.0116  -0.1924   13.807  0.3875          |                 -|
14       0.1006   0.0383   14.598  0.4062          |                  |
15      -0.1458  -0.0522     16.3  0.3624         -|                  |
16      -0.1702  -0.1372   18.675  0.2859         -|                 -|
17       0.1303   0.1148   20.102  0.2690          |-                 |
18      -0.0973  -0.1256   20.918  0.2836          |                 -|
19      -0.0466  -0.0586   21.111  0.3307          |                  |
20       0.0130  -0.0892   21.126  0.3897          |                  |
21      -0.1635  -0.1093   23.623  0.3117         -|                  |
22      -0.0207   0.0867   23.664  0.3651          |                  |
23      -0.0023  -0.1212   23.665  0.4226          |                  |
24      -0.1102  -0.1569   24.901  0.4111          |                 -|
25      -0.0928  -0.0152   25.807  0.4180          |                  |
26      -0.0323   0.0987    25.92  0.4675          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.407               1                   0.5233
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.005               1                   0.9458
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  22.04 Chi(2)  1.6e-05
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-----------------------------------------------------
     residuo |      0.272         0.003            8.77       0.0124

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.94162      3.046      2.393  0.00834

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.9199
 Prob > chi2(26)           =     0.4675

.
. drop residuo

.
.  regress logzp63_d0 logzp63_d1 logzp63_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp63comp_d0 logzp63comp_d1 logzp63comp_d2
                      begin with full model
p = 0.9181 >= 0.1500  removing logmoviles_d0
p = 0.8075 >= 0.1500  removing logzp63comp_d0
p = 0.7968 >= 0.1500  removing logzp63_d1
p = 0.7262 >= 0.1500  removing loginternet_d1
p = 0.6766 >= 0.1500  removing logcftelsur_d1
p = 0.6534 >= 0.1500  removing loginternet_d2
p = 0.5322 >= 0.1500  removing logimacec_d2
```

```
p = 0.4001 >= 0.1500  removing loginternet_d0
p = 0.3612 >= 0.1500  removing logzp63_d2
p = 0.4819 >= 0.1500  removing logzp63comp_d2
p = 0.4223 >= 0.1500  removing logmoviles_d1
p = 0.3632 >= 0.1500  removing logimacec_d1
p = 0.2626 >= 0.1500  removing logcftelsur_d2
p = 0.2997 >= 0.1500  removing logmoviles_d2

      Source |       SS       df       MS              Number of obs =      51
-------------+------------------------------           F(  3,    47) =    6.88
       Model |  .002274683     3  .000758228           Prob > F      =  0.0006
    Residual |  .005182966    47  .000110276           R-squared     =  0.3050
-------------+------------------------------           Adj R-squared =  0.2607
       Total |  .007457649    50  .000149153           Root MSE      =   .0105

------------------------------------------------------------------------------
  logzp63_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logzp63com~1 |  -.0355228    .008246    -4.31   0.000    -.0521116   -.0189339
logcftelsu~0 |   .1559473   .1010613     1.54   0.130    -.0473618    .3592563
logimacec_d0 |   .0521367   .0300278     1.74   0.089    -.0082715    .1125449
       _cons |   .0018161   .0016848     1.08   0.287    -.0015732    .0052054
------------------------------------------------------------------------------


.
. predict residuo, residuals
(6 missing values generated)

. corrgram residuo
(note: time series has 1 gap)

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0891   0.1275   .45277  0.5010          |                  |-
2       -0.0710  -0.1033   .74617  0.6886          |                  |
3        0.0646   0.1136   .99335  0.8029          |                  |
4        0.0103   0.0239   .99973  0.9098          |                  |
5       -0.0604  -0.0301   1.2248  0.9425          |                  |
6       -0.2436  -0.2320   4.9634  0.5485         -|                 -|
7       -0.1281  -0.0479    6.019  0.5375         -|                  |
8       -0.1406  -0.1005   7.3192  0.5026         -|                  |
9        0.1615   0.4188   9.0714  0.4307          |-                 |---
10      -0.1091  -0.2498    9.889  0.4503          |                 -|
11      -0.1144  -0.1778    10.81  0.4593          |                 -|
12       0.1999   0.3136   13.688  0.3211          |-                 |--
13      -0.0406   0.1463    13.81  0.3874          |                  |-
14      -0.0688  -0.4689   14.168  0.4373          |               ---|
15       0.0146  -0.1169   14.185  0.5116          |                  |
16      -0.0103  -0.1370   14.193  0.5843          |                 -|
17      -0.0691  -1.1359   14.583  0.6255          |          --------|
18       0.0436        .   14.743  0.6795          |
19      -0.0251        .   14.797  0.7354          |
20      -0.0279        .   14.867  0.7840          |
21       0.0602        .   15.198  0.8129          |
22      -0.0841        .   15.866  0.8225          |
23       0.0349        .   15.985  0.8559          |
24       0.1053        .   17.102  0.8443          |
25      -0.0900        .   17.947  0.8446          |

. estat bgodfrey

Number of gaps in sample:  1
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.000               1                   0.9908
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm

Number of gaps in sample:  1
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.798               1                   0.3718
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  28.24 Chi(2)  7.4e-07
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                   ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.008         0.003          12.85       0.0016

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     54    0.94385      2.806      2.211  0.01353

.
. ***test Box-Ljung white noise
. wntestq residuo
(note: time series has 1 gap)

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.9466
 Prob > chi2(25)           =     0.8446

.
. drop residuo

.
.
```

```
.  regress logzp64_d0 logzp64_d1 logzp64_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp64comp_d0 logzp64comp_d1 logzp64comp_d2 ,
noconstant
                      begin with full model
p = 0.9138 >= 0.1500  removing logzp64comp_d2
p = 0.8220 >= 0.1500  removing loginternet_d2
p = 0.7837 >= 0.1500  removing logcftelsur_d0
p = 0.6872 >= 0.1500  removing logzp64comp_d0
p = 0.4923 >= 0.1500  removing loginternet_d1
p = 0.4376 >= 0.1500  removing logzp64comp_d1
p = 0.4519 >= 0.1500  removing logmoviles_d0
p = 0.3360 >= 0.1500  removing logcftelsur_d2
p = 0.3824 >= 0.1500  removing logimacec_d1
p = 0.1492 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    50) =    3.99
       Model |  .005533532     7  .000790505           Prob > F      =  0.0016
    Residual |  .009912289    50  .000198246           R-squared     =  0.3583
-------------+------------------------------           Adj R-squared =  0.2684
       Total |   .01544582    57  .000270979           Root MSE      =  .01408

------------------------------------------------------------------------------
  logzp64_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logzp64_d1 |   .2136833   .1255237     1.70   0.095    -.0384386    .4658051
  logzp64_d2 |   .3177583   .1414699     2.25   0.029     .0336075     .601909
logimacec_d0 |   .0759636   .0376493     2.02   0.049     .0003428    .1515845
logmoviles~2 |   .2514249   .1219121     2.06   0.044     .0065572    .4962927
logimacec_d2 |  -.0833272   .0345367    -2.41   0.020    -.1526962   -.0139581
loginterne~0 |  -.1025485   .0535836    -1.91   0.061    -.2101742    .0050773
logcftelsu~1 |   .2925575   .1223119     2.39   0.021     .0468868    .5382281
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1192  -0.1195   .85367  0.3555          |                  |
2       -0.0526  -0.0671   1.0229  0.5996          |                  |
3        0.2490   0.2459   4.8848  0.1804          |-                 |-
4       -0.0420   0.0045   4.9966  0.2876          |                  |
5       -0.0522  -0.0350   5.1731  0.3951          |                  |
6        0.0135  -0.0264   5.1852  0.5203          |                  |
7       -0.0672  -0.0936    5.489  0.6005          |                  |
8        0.1668   0.2218   7.3986  0.4943          |-                 |-
9       -0.0465  -0.0384     7.55  0.5801          |                  |
10       0.0475   0.0798   7.7116  0.6570          |                  |
11       0.0307  -0.0576   7.7803  0.7328          |                  |
12       0.1504   0.2146   9.4713  0.6622          |-                 |-
13       0.0062  -0.0055   9.4742  0.7363          |                  |
14      -0.1863  -0.2631    12.19  0.5911         -|                --|
15      -0.0412  -0.1173   12.326  0.6542          |                  |
16      -0.1116  -0.2634   13.347  0.6472          |                --|
17      -0.3180  -0.4236   21.851  0.1905        --|               ---|
```

```
18       0.0898   0.0786   22.545  0.2087          |                  |
19      -0.0511  -0.0320   22.776  0.2473          |                  |
20      -0.1053  -0.2136   23.784  0.2520          |                 -|
21       0.0692  -0.0009   24.231  0.2820          |                  |
22      -0.0396  -0.1578   24.382  0.3275          |                 -|
23       0.0592  -0.0197   24.728  0.3645          |                  |
24      -0.0733   0.0174   25.276  0.3909          |                  |
25      -0.0940  -0.0210   26.205  0.3967          |                  |
26       0.0426   0.1853   26.402  0.4412          |                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.165               1                   0.0752
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.056               1                   0.8132
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  16.75 Chi(2)  2.3e-04
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.793         0.005            7.28       0.0262

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95147      2.532      1.996  0.02295

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
```

```
 Portmanteau (Q) statistic =    26.4020
 Prob > chi2(26)           =     0.4412

.
. drop residuo

.
.  regress logzp65_d0 logzp65_d1 logzp65_d2 logimacec_d0 logimacec_d1 logimacec_d2
logcf
> telsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 logmoviles_d2
loginternet_d0 l
> oginternet_d1 loginternet_d2 logzp65comp_d0 logzp65comp_d1 logzp65comp_d2 ,
noconstant
                      begin with full model
p = 0.8456 >= 0.1500  removing logmoviles_d0
p = 0.7781 >= 0.1500  removing logimacec_d0
p = 0.6280 >= 0.1500  removing logcftelsur_d2
p = 0.5375 >= 0.1500  removing logcftelsur_d0
p = 0.4551 >= 0.1500  removing logzp65_d1
p = 0.4673 >= 0.1500  removing loginternet_d2
p = 0.4615 >= 0.1500  removing logimacec_d2
p = 0.2121 >= 0.1500  removing loginternet_d0
p = 0.2704 >= 0.1500  removing logzp65comp_d2
p = 0.3442 >= 0.1500  removing logimacec_d1
p = 0.2620 >= 0.1500  removing logzp65_d2
p = 0.1852 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      50
-------------+------------------------------           F(  5,    45) =    8.83
       Model |  .006523809     5  .001304762           Prob > F      =  0.0000
    Residual |  .006653083    45  .000147846           R-squared     =  0.4951
-------------+------------------------------           Adj R-squared =  0.4390
       Total |  .013176891    50  .000263538           Root MSE      =  .01216

------------------------------------------------------------------------------
  logzp65_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~1 |  -.0992135    .049864    -1.99   0.053    -.1996447    .0012177
logcftelsu~1 |   .1824112   .1186628     1.54   0.131    -.0565879    .4214103
logzp65com~1 |  -.0096175   .0058571    -1.64   0.108    -.0214143    .0021792
logzp65com~0 |  -.0208769   .0043743    -4.77   0.000    -.0296871   -.0120667
logmoviles~2 |   .1834333   .1155439     1.59   0.119     -.049284    .4161506
------------------------------------------------------------------------------

.
. predict residuo, residuals
(9 missing values generated)

. corrgram residuo
(note: time series has 1 gap)

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1218   0.1247   .80208  0.3705          |                  |
2        0.1487   0.1503   2.0223  0.3638          |-                 |-
3        0.0939   0.0914   2.5185  0.4720          |                  |
4       -0.1848  -0.2234   4.4835  0.3445         -|                 -|
5       -0.0774  -0.0743   4.8356  0.4363          |                  |
6       -0.1164  -0.0970    5.649  0.4636          |                  |
7       -0.0911  -0.0392   6.1592  0.5213          |                  |
8       -0.0899  -0.1062    6.667  0.5729          |                  |
9       -0.0558  -0.1011   6.8675  0.6509          |                  |
```

```
10       0.0598  -0.0448   7.1035  0.7156          |                  |
11       0.0655  -0.1473   7.3931  0.7664          |                 -|
12       0.1129  -0.2219   8.2764  0.7632          |                 -|
13       0.1492  -0.0317   9.8594  0.7054          |-                 |
14      -0.0747  -0.0538   10.267  0.7424          |                  |
15      -0.0016   0.5959   10.267  0.8026          |                  |----
16      -0.0230   0.7107   10.308  0.8501          |                  |-----
17      -0.3829        .   21.966  0.1860       ---|
18      -0.0179        .   21.992  0.2323          |
19      -0.1534        .   23.981  0.1969         -|
20      -0.1395        .   25.677  0.1768         -|
21       0.1510        .   27.732  0.1479          |-
22      -0.0238        .   27.785  0.1829          |
23       0.0490        .   28.017  0.2151          |

. estat bgodfrey

Number of gaps in sample:  1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.404               1                   0.5250
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm

Number of gaps in sample:  1
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.165               1                   0.6842
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  10.75 Chi(2)  .0046
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.076         0.018            7.72       0.0211

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
```

```
-------------+-----------------------------------------------------
     residuo |     51    0.96588      1.630      1.043  0.14853

.
. ***test Box-Ljung white noise
. wntestq residuo
(note: time series has 1 gap)

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    28.0168
 Prob > chi2(23)           =     0.2151

.
. drop residuo

.
.
.
.
end of do-file

*****************************
***ESTIMACION POR CG, CM Y CR
*****************************
. ***test para raiz unitaria
. kpss    logzp2_a1       , qs auto

KPSS test for logzp2_a1

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp2_a1 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .268

. dfuller         logzp2_a1

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.378            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5929

. dfuller logzp2_a1       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.916            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6464
```

```
. dfgls   logzp2_a1

DF-GLS for logzp2_a1                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.028           -3.732            -2.713            -2.430
    9            -1.990           -3.732            -2.766            -2.484
    8            -1.852           -3.732            -2.821            -2.539
    7            -1.853           -3.732            -2.877            -2.594
    6            -1.902           -3.732            -2.933            -2.648
    5            -1.829           -3.732            -2.988            -2.701
    4            -1.794           -3.732            -3.041            -2.750
    3            -1.734           -3.732            -3.090            -2.795
    2            -1.667           -3.732            -3.134            -2.836
    1            -1.707           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -4.727638 at lag  1 with RMSE  .0868786
Min MAIC = -4.712168 at lag  1 with RMSE  .0868786

. pperron logzp2_a1

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.014          -19.062           -13.372           -10.754
 Z(t)             -1.347           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6074

. zandrews        logzp2_a1

Zivot-Andrews unit root test for  logzp2_a1

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp2_a1 included = 0

Minimum t-statistic -15.705 at   2006m1 (obs 25)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp41_a1      , qs auto

KPSS test for logzp41_a1

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp41_a1 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
```

```
    2         .0462

. dfuller        logzp41_a1

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.026            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2752

. dfuller logzp41_a1      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.511            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0382

. dfgls   logzp41_a1

DF-GLS for logzp41_a1                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.154           -3.732            -2.713            -2.430
    9            -2.778           -3.732            -2.766            -2.484
    8            -3.477           -3.732            -2.821            -2.539
    7            -3.738           -3.732            -2.877            -2.594
    6            -4.050           -3.732            -2.933            -2.648
    5            -4.037           -3.732            -2.988            -2.701
    4            -3.855           -3.732            -3.041            -2.750
    3            -3.982           -3.732            -3.090            -2.795
    2            -3.988           -3.732            -3.134            -2.836
    1            -3.716           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -7.082144 at lag  1 with RMSE  .0267694
Min MAIC = -6.470729 at lag  1 with RMSE  .0267694

. pperron logzp41_a1

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -8.747           -19.062           -13.372           -10.754
 Z(t)             -2.081            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2522
```

```
. zandrews        logzp41_a1

Zivot-Andrews unit root test for  logzp41_a1

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp41_a1 included = 2

Minimum t-statistic -4.558 at   2005m1 (obs 13)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp42_a1      , qs auto

KPSS test for logzp42_a1

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp42_a1 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .0917

. dfuller         logzp42_a1

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.018            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0333

. dfuller logzp42_a1      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.199            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0845

. dfgls   logzp42_a1

DF-GLS for logzp42_a1                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.554           -3.732            -2.713            -2.430
    9           -1.693           -3.732            -2.766            -2.484
    8           -2.008           -3.732            -2.821            -2.539
    7           -3.158           -3.732            -2.877            -2.594
```

```
    6           -3.139          -3.732            -2.933            -2.648
    5           -3.081          -3.732            -2.988            -2.701
    4           -2.948          -3.732            -3.041            -2.750
    3           -3.649          -3.732            -3.090            -2.795
    2           -3.964          -3.732            -3.134            -2.836
    1           -3.682          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .1584284
Min SC   = -3.210998 at lag  1 with RMSE  .1854586
Min MAIC =  -2.88745 at lag 10 with RMSE   .153289

. pperron logzp42_a1

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -19.231           -19.062           -13.372           -10.754
 Z(t)             -3.283            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0156

. zandrews        logzp42_a1

Zivot-Andrews unit root test for  logzp42_a1

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp42_a1 included = 2

Minimum t-statistic -7.708 at   2006m1 (obs 25)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp43_a1      , qs auto

KPSS test for logzp43_a1

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp43_a1 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .389

. dfuller         logzp43_a1

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.508            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8904
```

```
. dfuller logzp43_a1      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.602            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7918

. dfgls   logzp43_a1

DF-GLS for logzp43_a1                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.772           -3.732            -2.713            -2.430
    9            -1.590           -3.732            -2.766            -2.484
    8            -1.580           -3.732            -2.821            -2.539
    7            -1.531           -3.732            -2.877            -2.594
    6            -1.481           -3.732            -2.933            -2.648
    5            -1.414           -3.732            -2.988            -2.701
    4            -1.446           -3.732            -3.041            -2.750
    3            -1.331           -3.732            -3.090            -2.795
    2            -1.337           -3.732            -3.134            -2.836
    1            -1.334           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -3.493868 at lag  1 with RMSE  .1609987
Min MAIC =  -3.53124 at lag  1 with RMSE  .1609987

. pperron logzp43_a1

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.354           -19.062           -13.372           -10.754
 Z(t)             -0.502            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8915

. zandrews        logzp43_a1

Zivot-Andrews unit root test for  logzp43_a1

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp43_a1 included = 0

Minimum t-statistic -5.257 at   2007m1 (obs 37)

Critical values: 1%: -5.43 5%: -4.80

.
```

```
. kpss    logzp45_a1      , qs auto

KPSS test for logzp45_a1

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp45_a1 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .247

. dfuller         logzp45_a1

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.215            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6670

. dfuller logzp45_a1      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.073            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9949

. dfgls   logzp45_a1

DF-GLS for logzp45_a1                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.537          -3.732            -2.713            -2.430
    9            -2.497          -3.732            -2.766            -2.484
    8            -2.172          -3.732            -2.821            -2.539
    7            -2.113          -3.732            -2.877            -2.594
    6            -1.899          -3.732            -2.933            -2.648
    5            -1.837          -3.732            -2.988            -2.701
    4            -1.963          -3.732            -3.041            -2.750
    3            -1.959          -3.732            -3.090            -2.795
    2            -1.367          -3.732            -3.134            -2.836
    1            -0.991          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE  .0138754
Min SC   =  -8.23758 at lag  3 with RMSE  .0138754
Min MAIC = -8.293288 at lag  1 with RMSE  .0151638

. pperron logzp45_a1
```

```
Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.045           -19.062           -13.372           -10.754
 Z(t)             -1.101            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7147

. zandrews        logzp45_a1

Zivot-Andrews unit root test for  logzp45_a1

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp45_a1 included = 2

Minimum t-statistic -2.185 at   2006m4 (obs 28)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp63_g       , qs auto

KPSS test for logzp63_g

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp63_g is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .255

. dfuller         logzp63_g

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.783            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8242

. dfuller logzp63_g       ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.788            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9667
```

```
. dfgls   logzp63_g

DF-GLS for logzp63_g                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.093          -3.732            -2.713            -2.430
    9            -2.140          -3.732            -2.766            -2.484
    8            -2.190          -3.732            -2.821            -2.539
    7            -2.364          -3.732            -2.877            -2.594
    6            -1.817          -3.732            -2.933            -2.648
    5            -1.814          -3.732            -2.988            -2.701
    4            -2.417          -3.732            -3.041            -2.750
    3            -1.988          -3.732            -3.090            -2.795
    2            -1.570          -3.732            -3.134            -2.836
    1            -1.364          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  .0077871
Min SC   = -9.248739 at lag  1 with RMSE  .0090608
Min MAIC = -9.285332 at lag  1 with RMSE  .0090608

. pperron logzp63_g

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.675         -19.062           -13.372           -10.754
 Z(t)             -0.778          -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8254

. zandrews        logzp63_g

Zivot-Andrews unit root test for  logzp63_g

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp63_g included = 1

Minimum t-statistic -2.825 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp63_m       , qs auto

KPSS test for logzp63_m

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp63_m is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2             .3
```

```
. dfuller         logzp63_m

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.515            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5262

. dfuller logzp63_m       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.868            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6713

. dfgls   logzp63_m

DF-GLS for logzp63_m                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.910           -3.732            -2.713            -2.430
    9            -1.925           -3.732            -2.766            -2.484
    8            -1.911           -3.732            -2.821            -2.539
    7            -1.761           -3.732            -2.877            -2.594
    6            -1.841           -3.732            -2.933            -2.648
    5            -1.950           -3.732            -2.988            -2.701
    4            -2.073           -3.732            -3.041            -2.750
    3            -2.094           -3.732            -3.090            -2.795
    2            -1.903           -3.732            -3.134            -2.836
    1            -1.981           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -6.956722 at lag  1 with RMSE  .0285019
Min MAIC = -6.896747 at lag  1 with RMSE  .0285019

. pperron logzp63_m

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -5.486           -19.062           -13.372           -10.754
 Z(t)             -1.630            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4677

. zandrews        logzp63_m
```

```
Zivot-Andrews unit root test for  logzp63_m

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp63_m included = 0

Minimum t-statistic -3.537 at  2005m10 (obs 22)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp63_r       , qs auto

KPSS test for logzp63_r

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp63_r is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .226

. dfuller         logzp63_r

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.841            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3604

. dfuller logzp63_r       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.906            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6517

. dfgls   logzp63_r

DF-GLS for logzp63_r                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.313           -3.732            -2.713            -2.430
    9            -1.665           -3.732            -2.766            -2.484
    8            -1.584           -3.732            -2.821            -2.539
    7            -1.522           -3.732            -2.877            -2.594
    6            -1.455           -3.732            -2.933            -2.648
```

```
    5           -1.410          -3.732            -2.988            -2.701
    4           -2.416          -3.732            -3.041            -2.750
    3           -2.221          -3.732            -3.090            -2.795
    2           -2.056          -3.732            -3.134            -2.836
    1           -1.927          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  .2526548
Min SC   = -2.444543 at lag  1 with RMSE  .2720698
Min MAIC = -2.387645 at lag  1 with RMSE  .2720698

. pperron logzp63_r

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -10.013           -19.062           -13.372           -10.754
 Z(t)             -2.092            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2476

. zandrews        logzp63_r

Zivot-Andrews unit root test for  logzp63_r

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp63_r included = 0

Minimum t-statistic -2.781 at   2007m6 (obs 42)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp64_g       , qs auto

KPSS test for logzp64_g

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp64_g is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .207

. dfuller         logzp64_g

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.251            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6512
```

```
. dfuller logzp64_g       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.543            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9816

. dfgls   logzp64_g

DF-GLS for logzp64_g                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -3.156           -3.732            -2.713            -2.430
    9            -2.820           -3.732            -2.766            -2.484
    8            -2.545           -3.732            -2.821            -2.539
    7            -1.698           -3.732            -2.877            -2.594
    6            -1.706           -3.732            -2.933            -2.648
    5            -1.864           -3.732            -2.988            -2.701
    4            -2.121           -3.732            -3.041            -2.750
    3            -2.207           -3.732            -3.090            -2.795
    2            -1.671           -3.732            -3.134            -2.836
    1            -1.594           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .0109442
Min SC   =  -8.56681 at lag  1 with RMSE  .0127423
Min MAIC = -8.572626 at lag  1 with RMSE  .0127423

. pperron logzp64_g

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.903           -19.062           -13.372           -10.754
 Z(t)             -1.261            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6468

. zandrews        logzp64_g

Zivot-Andrews unit root test for  logzp64_g

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp64_g included = 1

Minimum t-statistic -2.982 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp64_m       , qs auto
```

```
KPSS test for logzp64_m

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp64_m is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .162

. dfuller        logzp64_m

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.329            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6158

. dfuller logzp64_m       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.510            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8257

. dfgls   logzp64_m

DF-GLS for logzp64_m                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.404           -3.732            -2.713            -2.430
    9           -2.458           -3.732            -2.766            -2.484
    8           -2.380           -3.732            -2.821            -2.539
    7           -1.905           -3.732            -2.877            -2.594
    6           -2.153           -3.732            -2.933            -2.648
    5           -2.212           -3.732            -2.988            -2.701
    4           -2.624           -3.732            -3.041            -2.750
    3           -2.576           -3.732            -3.090            -2.795
    2           -2.156           -3.732            -3.134            -2.836
    1           -2.036           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .0153143
Min SC   = -8.023088 at lag  1 with RMSE   .016723
Min MAIC = -7.954484 at lag  1 with RMSE   .016723

. pperron logzp64_m

Phillips-Perron test for unit root                 Number of obs   =        59
```

```
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.345           -19.062           -13.372           -10.754
 Z(t)             -1.462            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5523

. zandrews        logzp64_m

Zivot-Andrews unit root test for  logzp64_m

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp64_m included = 1

Minimum t-statistic -3.481 at   2006m8 (obs 32)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp64_r       , qs auto

KPSS test for logzp64_r

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp64_r is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .159

. dfuller         logzp64_r

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.915            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3249

. dfuller logzp64_r       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.856            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6774

. dfgls   logzp64_r
```

```
DF-GLS for logzp64_r                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

              DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic       Value             Value             Value
------------------------------------------------------------------------------
    10           -1.219          -3.732            -2.713            -2.430
    9            -1.678          -3.732            -2.766            -2.484
    8            -1.414          -3.732            -2.821            -2.539
    7            -1.598          -3.732            -2.877            -2.594
    6            -2.148          -3.732            -2.933            -2.648
    5            -1.833          -3.732            -2.988            -2.701
    4            -2.690          -3.732            -3.041            -2.750
    3            -2.187          -3.732            -3.090            -2.795
    2            -1.685          -3.732            -3.134            -2.836
    1            -1.738          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE   .023438
Min SC   = -7.275785 at lag  1 with RMSE  .0242991
Min MAIC = -7.247218 at lag  1 with RMSE  .0242991

. pperron logzp64_r

Phillips-Perron test for unit root               Number of obs   =        59
                                                 Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -5.621          -19.062           -13.372           -10.754
 Z(t)             -1.899           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3327

. zandrews        logzp64_r

Zivot-Andrews unit root test for  logzp64_r

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp64_r included = 0

Minimum t-statistic -3.054 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp65_g       , qs auto

KPSS test for logzp65_g

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp65_g is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .213
```

```
. dfuller         logzp65_g

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.371            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5961

. dfuller logzp65_g       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.412            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9865

. dfgls   logzp65_g

DF-GLS for logzp65_g                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.825           -3.732            -2.713            -2.430
    9            -2.531           -3.732            -2.766            -2.484
    8            -2.380           -3.732            -2.821            -2.539
    7            -1.728           -3.732            -2.877            -2.594
    6            -1.926           -3.732            -2.933            -2.648
    5            -1.979           -3.732            -2.988            -2.701
    4            -2.093           -3.732            -3.041            -2.750
    3            -2.084           -3.732            -3.090            -2.795
    2            -1.866           -3.732            -3.134            -2.836
    1            -1.152           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .0136382
Min SC   = -8.210447 at lag  2 with RMSE  .0146347
Min MAIC = -8.200588 at lag  2 with RMSE  .0146347

. pperron logzp65_g

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.865           -19.062           -13.372           -10.754
 Z(t)             -1.456            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5553

. zandrews        logzp65_g
```

```
Zivot-Andrews unit root test for  logzp65_g

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp65_g included = 2

Minimum t-statistic -2.821 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp65_m       , qs auto

KPSS test for logzp65_m

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp65_m is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2            .14

. dfuller         logzp65_m

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.506            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5307

. dfuller logzp65_m       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.702            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7500

. dfgls   logzp65_m

DF-GLS for logzp65_m                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.864            -3.732            -2.713            -2.430
    9           -1.950            -3.732            -2.766            -2.484
    8           -1.750            -3.732            -2.821            -2.539
    7           -1.580            -3.732            -2.877            -2.594
    6           -1.738            -3.732            -2.933            -2.648
    5           -1.982            -3.732            -2.988            -2.701
```

```
    4           -2.545          -3.732           -3.041           -2.750
    3           -2.501          -3.732           -3.090           -2.795
    2           -2.484          -3.732           -3.134           -2.836
    1           -2.298          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .0160132
Min SC   = -8.109839 at lag  1 with RMSE  .0160132
Min MAIC = -7.984296 at lag  1 with RMSE  .0160132

. pperron logzp65_m

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.803          -19.062           -13.372           -10.754
 Z(t)             -1.607           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4800

. zandrews        logzp65_m

Zivot-Andrews unit root test for  logzp65_m

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp65_m included = 1

Minimum t-statistic -3.663 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logzp65_r       , qs auto

KPSS test for logzp65_r

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logzp65_r is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .0932

. dfuller         logzp65_r

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.683           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8511

. dfuller logzp65_r       ,  trend
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.393            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3835

. dfgls   logzp65_r

DF-GLS for logzp65_r                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.521           -3.732            -2.713            -2.430
    9            -2.453           -3.732            -2.766            -2.484
    8            -4.169           -3.732            -2.821            -2.539
    7            -3.526           -3.732            -2.877            -2.594
    6            -3.514           -3.732            -2.933            -2.648
    5            -2.700           -3.732            -2.988            -2.701
    4            -2.724           -3.732            -3.041            -2.750
    3            -2.500           -3.732            -3.090            -2.795
    2            -2.395           -3.732            -3.134            -2.836
    1            -2.291           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE  .0351273
Min SC   = -6.144039 at lag  1 with RMSE  .0427903
Min MAIC = -6.010915 at lag  1 with RMSE  .0427903

. pperron logzp65_r

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.756           -19.062           -13.372           -10.754
 Z(t)             -0.705            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8453

. zandrews        logzp65_r

Zivot-Andrews unit root test for  logzp65_r

Allowing for break in intercept

Lag selection via TTest: lags of D.logzp65_r included = 0

Minimum t-statistic -2.618 at   2007m8 (obs 44)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logimacec       , qs auto
```

```
KPSS test for logimacec

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logimacec is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .0504

. dfuller         logimacec

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.258            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0169

. dfuller logimacec       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.502            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. dfgls   logimacec

DF-GLS for logimacec                                     Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.012           -3.732            -2.713            -2.430
    9            -2.922           -3.732            -2.766            -2.484
    8            -2.683           -3.732            -2.821            -2.539
    7            -2.917           -3.732            -2.877            -2.594
    6            -2.561           -3.732            -2.933            -2.648
    5            -3.496           -3.732            -2.988            -2.701
    4            -2.821           -3.732            -3.041            -2.750
    3            -3.551           -3.732            -3.090            -2.795
    2            -3.905           -3.732            -3.134            -2.836
    1            -4.622           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  .0427927
Min SC   = -6.046667 at lag  1 with RMSE  .0449251
Min MAIC = -4.645358 at lag  1 with RMSE  .0449251

. pperron logimacec

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3
```

```
                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -13.581           -19.062           -13.372           -10.754
 Z(t)             -2.973            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0375

. zandrews        logimacec

Zivot-Andrews unit root test for  logimacec

Allowing for break in intercept

Lag selection via TTest: lags of D.logimacec included = 0

Minimum t-statistic -6.702 at   2005m3 (obs 15)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logcftelsur     , qs auto

KPSS test for logcftelsur

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logcftelsur is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .196

. dfuller         logcftelsur

Dickey-Fuller test for unit root                   Number of obs   =        59

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.173            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9707

. dfuller logcftelsur     ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.126            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9246

. dfgls   logcftelsur
```

```
DF-GLS for logcftelsur                                   Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.236           -3.732            -2.713            -2.430
    9            -1.159           -3.732            -2.766            -2.484
    8            -1.208           -3.732            -2.821            -2.539
    7            -1.548           -3.732            -2.877            -2.594
    6            -1.777           -3.732            -2.933            -2.648
    5            -2.281           -3.732            -2.988            -2.701
    4            -2.213           -3.732            -3.041            -2.750
    3            -2.913           -3.732            -3.090            -2.795
    2            -2.252           -3.732            -3.134            -2.836
    1            -2.622           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .0118663
Min SC   = -8.421065 at lag  1 with RMSE  .0137055
Min MAIC = -8.369771 at lag  8 with RMSE  .0118663

. pperron logcftelsur

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.523           -19.062           -13.372           -10.754
 Z(t)             -0.259            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9311

. zandrews        logcftelsur

Zivot-Andrews unit root test for  logcftelsur

Allowing for break in intercept

Lag selection via TTest: lags of D.logcftelsur included = 1

Minimum t-statistic -3.489 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    logmoviles      , qs auto

KPSS test for logmoviles

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: logmoviles is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .447

. dfuller         logmoviles
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.667            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0799

. dfuller logmoviles      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.752            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7274

. dfgls   logmoviles

DF-GLS for logmoviles                                    Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.192           -3.732            -2.713            -2.430
    9           -1.256           -3.732            -2.766            -2.484
    8           -1.103           -3.732            -2.821            -2.539
    7           -1.105           -3.732            -2.877            -2.594
    6           -1.145           -3.732            -2.933            -2.648
    5           -1.255           -3.732            -2.988            -2.701
    4           -0.860           -3.732            -3.041            -2.750
    3           -0.675           -3.732            -3.090            -2.795
    2           -0.563           -3.732            -3.134            -2.836
    1           -0.548           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  .0129113
Min SC   = -8.448276 at lag  1 with RMSE  .0135203
Min MAIC = -8.552336 at lag  1 with RMSE  .0135203

. pperron logmoviles

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.218           -19.062           -13.372           -10.754
 Z(t)             -3.269            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0163

. zandrews        logmoviles

Zivot-Andrews unit root test for  logmoviles
```

```
Allowing for break in intercept

Lag selection via TTest: lags of D.logmoviles included = 0

Minimum t-statistic -2.899 at   2008m1 (obs 49)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss    loginternet     , qs auto

KPSS test for loginternet

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: loginternet is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .141

. dfuller         loginternet

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.090            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9505

. dfuller loginternet     ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.836            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0148

. dfgls   loginternet

DF-GLS for loginternet                                   Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.234            -3.732            -2.713            -2.430
    9           -1.542            -3.732            -2.766            -2.484
    8           -1.795            -3.732            -2.821            -2.539
    7           -2.073            -3.732            -2.877            -2.594
    6           -2.283            -3.732            -2.933            -2.648
    5           -1.911            -3.732            -2.988            -2.701
    4           -2.210            -3.732            -3.041            -2.750
```

```
    3           -2.540          -3.732           -3.090           -2.795
    2           -3.110          -3.732           -3.134           -2.836
    1           -3.216          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -6.715355 at lag  1 with RMSE  .0321577
Min MAIC = -6.370537 at lag 10 with RMSE  .0298862

. pperron loginternet

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.074           -19.062           -13.372           -10.754
 Z(t)              0.084            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9649

. zandrews        loginternet

Zivot-Andrews unit root test for  loginternet

Allowing for break in intercept

Lag selection via TTest: lags of D.loginternet included = 0

Minimum t-statistic -4.827 at   2005m7 (obs 19)

Critical values: 1%: -5.43 5%: -4.80


.
. ***************************
. : regress logzp63g_d0 logzp63g_d1 logzp63g_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9993 >= 0.1500  removing loginternet_d0
p = 0.9622 >= 0.1500  removing logmoviles_d1
p = 0.8198 >= 0.1500  removing loginternet_d2
p = 0.7484 >= 0.1500  removing logmoviles_d0
p = 0.7016 >= 0.1500  removing logcftelsur_d1
p = 0.6361 >= 0.1500  removing loginternet_d1
p = 0.4849 >= 0.1500  removing logimacec_d1
p = 0.5674 >= 0.1500  removing logcftelsur_d2
p = 0.3357 >= 0.1500  removing logmoviles_d2
p = 0.2748 >= 0.1500  removing logimacec_d2
p = 0.2653 >= 0.1500  removing logzp63g_d2
p = 0.2757 >= 0.1500  removing logcftelsur_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    2.87
       Model |  .000700943     2  .000350472           Prob > F      =  0.0656
    Residual |  .006603721    54  .000122291           R-squared     =  0.0960
-------------+------------------------------           Adj R-squared =  0.0625
       Total |  .007304664    56   .00013044           Root MSE      =  .01106
```

```
------------------------------------------------------------------------------
 logzp63g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp63g_d1 |   .2542056   .1291431     1.97   0.054    -.0047107    .5131218
logimacec_d0 |   .0415188   .0269108     1.54   0.129     -.012434    .0954717
       _cons |   .0040984   .0016535     2.48   0.016     .0007834    .0074133
------------------------------------------------------------------------------

.
. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0489  -0.0489    .1459  0.7025          |                  |
2        0.0852   0.0839   .59672  0.7420          |                  |
3        0.2886   0.3045   5.8665  0.1183          |--                |--
4        0.0538   0.0801   6.0528  0.1952          |                  |
5       -0.0441  -0.0916   6.1806  0.2890          |                  |
6       -0.0527  -0.1640   6.3664  0.3834          |                 -|
7        0.1717   0.1639   8.3784  0.3004          |-                 |-
8       -0.1050  -0.0132   9.1462  0.3301          |                  |
9       -0.0530  -0.0598   9.3454  0.4060          |                  |
10       0.0505   0.0161   9.5304  0.4826          |                  |
11      -0.0324  -0.0240    9.608  0.5659          |                  |
12      -0.0571  -0.0493    9.855  0.6287          |                  |
13       0.1300   0.2511   11.161  0.5973          |-                 |--
14      -0.2127  -0.3795   14.738  0.3963         -|               ---|
15      -0.0013   0.0102   14.738  0.4704          |                  |
16      -0.1730  -0.2224   17.217  0.3717         -|                 -|
17      -0.0190   0.1443   17.248  0.4377          |                  |-
18      -0.1792  -0.1485    20.04  0.3306         -|                 -|
19      -0.1581  -0.0781    22.27  0.2710         -|                  |
20       0.0915  -0.0315   23.037  0.2870          |                  |
21      -0.1734  -0.0837   25.863  0.2117         -|                  |
22      -0.0377  -0.1075   26.001  0.2517          |                  |
23      -0.0802  -0.0171   26.641  0.2716          |                  |
24       0.0771   0.0931   27.249  0.2930          |                  |
25      -0.1774  -0.4233   30.566  0.2038         -|               ---|
26      -0.0578   0.0303   30.929  0.2309          |                  |
27      -0.0093  -0.3444   30.939  0.2737          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.931               1                   0.3345
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.047               1                   0.8285
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  24.76 Chi(2)  4.2e-06
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.002         0.006           13.37       0.0012

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.94762      2.771      2.192  0.01417

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    30.9387
 Prob > chi2(27)           =     0.2737

.
. drop residuo

.
. : regress logzp63m_d0 logzp63m_d1 logzp63m_d2 logimacec_d0 logimacec_d1 
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9706 >= 0.1500  removing loginternet_d2
p = 0.9587 >= 0.1500  removing logzp63m_d2
p = 0.9328 >= 0.1500  removing logmoviles_d0
p = 0.9027 >= 0.1500  removing logcftelsur_d1
p = 0.8784 >= 0.1500  removing logcftelsur_d0
p = 0.7476 >= 0.1500  removing logzp63m_d1
p = 0.5258 >= 0.1500  removing logimacec_d0
p = 0.3722 >= 0.1500  removing loginternet_d1
p = 0.3170 >= 0.1500  removing logimacec_d1
p = 0.3892 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =    2.93
       Model |  .008519805     4  .002129951           Prob > F      =  0.0291
    Residual |   .03774043    52  .000725777           R-squared     =  0.1842
-------------+------------------------------           Adj R-squared =  0.1214
```

```
       Total |  .046260235    56  .000826076           Root MSE      =  .02694

------------------------------------------------------------------------------
 logzp63m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logimacec_d2 |  -.0969115   .0660294    -1.47   0.148    -.2294091    .0355861
logmoviles~2 |   .5351662   .3158671     1.69   0.096    -.0986675       1.169
logcftelsu~2 |   .5832195   .2371609     2.46   0.017     .1073213    1.059118
logmoviles~1 |  -.4949114    .282703    -1.75   0.086    -1.062196    .0723737
       _cons |  -.0015715   .0063338    -0.25   0.805    -.0142811    .0111382
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0358   0.0363   .0771  0.7813          |                  |
2       -0.0394  -0.0415  .17215  0.9175          |                  |
3        0.0615   0.0668   .4079  0.9386          |                  |
4       -0.0949  -0.1054  .97977  0.9128          |                  |
5       -0.0025   0.0144  .98018  0.9641          |                  |
6        0.0932   0.0862  1.5536  0.9559          |                  |
7        0.0513   0.0565  1.7303  0.9733          |                  |
8        0.0130   0.0065  1.7419  0.9879          |                  |
9       -0.0334  -0.0350  1.8202  0.9940          |                  |
10      -0.1508  -0.1462  3.4463  0.9689         -|                 -|
11      -0.0218   0.0009  3.4811  0.9827          |                  |
12      -0.0629  -0.0942  3.7764  0.9871          |                  |
13       0.0311   0.0497  3.8504  0.9927          |                  |
14      -0.0809  -0.1509  4.3622  0.9929          |                 -|
15      -0.0340   0.0051  4.4547  0.9958          |                  |
16      -0.0596  -0.0760  4.7463  0.9969          |                  |
17      -0.4013  -0.4361  18.289  0.3708       ---|               ---|
18       0.0344   0.0727  18.391  0.4302          |                  |
19       0.1189   0.1672  19.642  0.4164          |                  |-
20      -0.0420  -0.0744  19.802  0.4704          |                  |
21       0.0536   0.0279   20.07  0.5168          |                  |
22       0.0175   0.0267    20.1  0.5768          |                  |
23      -0.0348   0.1176  20.219  0.6286          |                  |
24      -0.0941  -0.2712  21.121  0.6316          |                --|
25       0.0110   0.1064  21.134  0.6851          |                  |
26      -0.0639  -0.2141  21.577  0.7116          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.076               1                   0.7833
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.266               1                   0.6064
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  273.7 Chi(2)  3.7e-60
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.003         0.000           23.70       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.79469     10.712      5.096  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    21.5772
 Prob > chi2(26)           =     0.7116

.
. drop residuo

.
. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0
```

```
      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------

.
. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0149  -0.0150   .01363  0.9071          |                  |
2        0.0167   0.0165   .03093  0.9847          |                  |
3       -0.0550  -0.0546   .22219  0.9739          |                  |
4       -0.0137  -0.0157   .23425  0.9937          |                  |
5       -0.4109  -0.4137    11.32  0.0454       ---|               ---|
6       -0.0017  -0.0183   11.321  0.0790          |                  |
7        0.0320   0.0533    11.39  0.1225          |                  |
8        0.0061  -0.0481   11.393  0.1804          |                  |
9       -0.0130  -0.0366   11.405  0.2490          |                  |
10       0.0082  -0.2224    11.41  0.3265          |                 -|
11      -0.0012  -0.0196    11.41  0.4096          |                  |
12      -0.1369  -0.1640   12.829  0.3816         -|                 -|
13       0.2585   0.3740   17.998  0.1576          |--                |--
14      -0.0208  -0.0830   18.032  0.2053          |                  |
15       0.0053  -0.1533   18.034  0.2609          |                 -|
16      -0.0269  -0.0638   18.094  0.3184          |                  |
17       0.1291   0.0569   19.509  0.3001          |-                 |
18      -0.2370   0.0601   24.398  0.1424         -|                  |
19       0.0025  -0.0524   24.398  0.1813          |                  |
20      -0.0502  -0.2669   24.629  0.2160          |                --|
21       0.0028  -0.2309    24.63  0.2635          |                 -|
22      -0.0105   0.1645   24.641  0.3146          |                  |-
23      -0.0002  -0.5403   24.641  0.3691          |              ----|
24      -0.0443  -2.1179   24.841  0.4144          |          --------|
25       0.0416  -0.8555   25.024  0.4610          |            ------|
26      -0.0133  -0.8148   25.044  0.5165          |            ------|
27      -0.0011  -0.1534   25.044  0.5720          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.012               1                   0.9114
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
```

```
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.171               1                    0.6796
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  587.1 Chi(2)  3.e-128
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.463         0.000           21.88       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.51400     25.711      6.985  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.0437
 Prob > chi2(27)           =     0.5720

.
. drop residuo

.
. **********************
. : regress logzp64g_d0 logzp64g_d1 logzp64g_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9637 >= 0.1500  removing loginternet_d2
p = 0.7794 >= 0.1500  removing logcftelsur_d0
p = 0.4939 >= 0.1500  removing logmoviles_d0
p = 0.5026 >= 0.1500  removing loginternet_d1
p = 0.3772 >= 0.1500  removing logcftelsur_d2
p = 0.3856 >= 0.1500  removing logmoviles_d1
p = 0.4930 >= 0.1500  removing logimacec_d1
p = 0.2106 >= 0.1500  removing loginternet_d0
```

```
      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =    4.15
       Model |  .004670643     6   .00077844           Prob > F      =  0.0018
    Residual |  .009371119    50  .000187422           R-squared     =  0.3326
-------------+------------------------------           Adj R-squared =  0.2525
       Total |  .014041762    56  .000250746           Root MSE      =  .01369

------------------------------------------------------------------------------
 logzp64g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp64g_d1 |   .2723471   .1274165     2.14   0.037     .0164236    .5282707
 logzp64g_d2 |   .3109857   .1409422     2.21   0.032      .027895    .5940764
logimacec_d0 |   .0857667   .0383358     2.24   0.030      .008767    .1627663
logcftelsu~1 |   .3458577   .1306049     2.65   0.011       .08353    .6081855
logimacec_d2 |  -.0867337   .0343051    -2.53   0.015    -.1556376   -.0178298
logmoviles~2 |   .4467517   .1667576     2.68   0.010     .1118093    .7816941
       _cons |  -.0056648   .0030222    -1.87   0.067    -.0117351    .0004055
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1235  -0.1238   .91633  0.3384          |                  |
2       -0.1213  -0.1408   1.8161  0.4033          |                 -|
3        0.2920   0.2785   7.1266  0.0680          |--                |--
4       -0.0581  -0.0153   7.3407  0.1189          |                  |
5       -0.0241   0.0366   7.3784  0.1940          |                  |
6       -0.0405  -0.1179   7.4863  0.2782          |                  |
7       -0.0804  -0.1138   7.9206  0.3397          |                  |
8        0.1058   0.1345   8.6881  0.3693          |                  |-
9        0.1085   0.1661   9.5128  0.3913          |                  |-
10       0.0118   0.0802   9.5227  0.4833          |                  |
11       0.0013  -0.0520   9.5228  0.5738          |                  |
12       0.1421   0.0960   11.032  0.5262          |-                 |
13       0.1007   0.0786   11.807  0.5436          |                  |
14      -0.2178  -0.2786   15.516  0.3438         -|                --|
15      -0.0559  -0.0889   15.766  0.3978          |                  |
16      -0.0554  -0.1560   16.018  0.4517          |                 -|
17      -0.2203  -0.3315   20.098  0.2693         -|                --|
18       0.0667   0.0268   20.482  0.3064          |                  |
19      -0.1173  -0.2247     21.7  0.2995          |                 -|
20      -0.0951  -0.2207   22.522  0.3129          |                 -|
21       0.1054  -0.1068    23.56  0.3149          |                  |
22      -0.0313  -0.0388   23.654  0.3656          |                  |
23      -0.0105  -0.0399   23.665  0.4225          |                  |
24      -0.1056  -0.0871   24.801  0.4166          |                  |
25      -0.1193  -0.2588   26.297  0.3919          |                --|
26       0.0484   0.0927    26.55  0.4332          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          4.136               1                   0.0420
---------------------------------------------------------------------------
```

```
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.405               1                   0.5246
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  3.713 Chi(2)  .1562
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.538         0.062            4.04       0.1328

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.97336      1.390      0.708  0.23954

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    26.5504
 Prob > chi2(26)           =     0.4332

.
. drop residuo

.
. : regress logzp64m_d0 logzp64m_d1 logzp64m_d2 logimacec_d0 logimacec_d1 
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1 
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.8743 >= 0.1500  removing loginternet_d1
p = 0.6740 >= 0.1500  removing loginternet_d2
p = 0.5777 >= 0.1500  removing logmoviles_d0
p = 0.5614 >= 0.1500  removing logcftelsur_d0
p = 0.3192 >= 0.1500  removing logzp64m_d1
p = 0.2094 >= 0.1500  removing logmoviles_d1
p = 0.2372 >= 0.1500  removing logimacec_d1
```

```
p = 0.2831 >= 0.1500  removing logcftelsur_d2
p = 0.2183 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =    3.79
       Model |  .005200961     5  .001040192           Prob > F      =  0.0054
    Residual |  .013985294    51  .000274221           R-squared     =  0.2711
-------------+------------------------------           Adj R-squared =  0.1996
       Total |  .019186255    56  .000342612           Root MSE      =  .01656

------------------------------------------------------------------------------
 logzp64m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~2 |   .5162313   .2007084     2.57   0.013     .1132925    .9191701
 logzp64m_d2 |   .3585216   .1393481     2.57   0.013     .0787686    .6382746
logimacec_d0 |   .1383599   .0470852     2.94   0.005     .0438323    .2328875
logcftelsu~1 |   .5116783   .1604761     3.19   0.002      .189509    .8338476
logimacec_d2 |  -.1076347   .0417936    -2.58   0.013    -.1915388   -.0237306
       _cons |  -.0072352   .0035581    -2.03   0.047    -.0143784    -.000092
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0483   0.0483   .13995  0.7083          |                  |
2       -0.1343  -0.1391   1.2432  0.5371         -|                 -|
3        0.1914   0.2146   3.5258  0.3174          |-                 |-
4       -0.0565  -0.1131   3.7284  0.4440          |                  |
5       -0.1949  -0.1426   6.1844  0.2887         -|                 -|
6       -0.0528  -0.0554   6.3684  0.3832          |                  |
7       -0.0086  -0.0293   6.3733  0.4969          |                  |
8        0.0744   0.1373   6.7535  0.5634          |                  |-
9        0.0474   0.0257   6.9112  0.6464          |                  |
10      -0.0497  -0.0791   7.0881  0.7171          |                  |
11       0.1187   0.1077    8.119  0.7026          |                  |
12       0.1040   0.0720   8.9275  0.7091          |                  |
13      -0.0874  -0.0302   9.5109  0.7334          |                  |
14      -0.0770  -0.0937    9.975  0.7640          |                  |
15       0.0845   0.0776   10.547  0.7840          |                  |
16      -0.1077  -0.1220   11.498  0.7778          |                  |
17      -0.3235  -0.3710   20.298  0.2593        --|                --|
18       0.0230   0.0782   20.344  0.3138          |                  |
19       0.0241  -0.0746   20.395  0.3712          |                  |
20      -0.1110  -0.1227   21.515  0.3674          |                  |
21       0.0620   0.0908   21.874  0.4068          |                  |
22       0.0292  -0.1071   21.956  0.4625          |                  |
23       0.0114  -0.0768   21.969  0.5221          |                  |
24      -0.0900  -0.1029   22.795  0.5319          |                  |
25      -0.0169  -0.0106   22.825  0.5878          |                  |
26       0.0429   0.0492   23.025  0.6315          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.143              1                   0.7048
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.033              1                   0.8548
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  87.38 Chi(2)  1.1e-19
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.000          20.41       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.90288      5.067      3.488  0.00024

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    23.0247
 Prob > chi2(26)           =     0.6315

.
. drop residuo

.
. : regress logzp64r_d0 logzp64r_d1 logzp64r_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9336 >= 0.1500  removing logimacec_d1
p = 0.8464 >= 0.1500  removing loginternet_d0
p = 0.7908 >= 0.1500  removing logcftelsur_d1
p = 0.6870 >= 0.1500  removing logzp64r_d2
```

```
p = 0.6154 >= 0.1500  removing logmoviles_d0
p = 0.5784 >= 0.1500  removing logimacec_d0
p = 0.6150 >= 0.1500  removing logzp64r_d1
p = 0.4266 >= 0.1500  removing loginternet_d2
p = 0.3297 >= 0.1500  removing logcftelsur_d2
p = 0.3414 >= 0.1500  removing logmoviles_d1
p = 0.3611 >= 0.1500  removing logimacec_d2
p = 0.3211 >= 0.1500  removing logcftelsur_d0
p = 0.1681 >= 0.1500  removing logmoviles_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.82
       Model |  .001949289     1  .001949289           Prob > F      =  0.0985
    Residual |  .037961517    55  .000690209           R-squared     =  0.0488
-------------+------------------------------           Adj R-squared =  0.0315
       Total |  .039910806    56  .000712693           Root MSE      =  .02627

------------------------------------------------------------------------------
 logzp64r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~1 |   .1689681   .1005442     1.68   0.099     -.032527    .3704633
       _cons |  -.0004367   .0037291    -0.12   0.907      -.00791    .0070367
------------------------------------------------------------------------------


.
. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0572  -0.0572   .19966  0.6550          |                  |
2       -0.0924  -0.1002   .73013  0.6942          |                  |
3        0.2107   0.2097   3.5392  0.3157          |-                 |-
4        0.0809   0.1050   3.9605  0.4114          |                  |
5       -0.3700  -0.3636    12.95  0.0239        --|                --|
6        0.0374  -0.0105   13.044  0.0423          |                  |
7       -0.0929  -0.1980   13.633  0.0581          |                 -|
8       -0.1517  -0.0623   15.236  0.0547         -|                  |
9        0.0712   0.1355   15.596  0.0758          |                  |-
10      -0.0976  -0.2782   16.287  0.0917          |                --|
11       0.0945   0.2785   16.948  0.1094          |                  |--
12       0.2579   0.2311   21.981  0.0377          |--                |-
13      -0.0049  -0.1151   21.983  0.0556          |                  |
14      -0.2068  -0.2431   25.367  0.0311         -|                 -|
15       0.2654   0.1064   31.069  0.0086          |--                |
16      -0.1230  -0.1564   32.323  0.0091          |                 -|
17      -0.2568  -0.1907   37.918  0.0025        --|                 -|
18       0.0291   0.1621   37.992  0.0039          |                  |-
19       0.0568  -0.1003   38.281  0.0055          |                  |
20      -0.1459   0.1750    40.23  0.0047         -|                  |-
21       0.0503  -0.0049   40.468  0.0065          |                  |
22       0.1002  -0.2022   41.438  0.0073          |                 -|
23       0.0646   0.2017   41.852  0.0094          |                  |-
24       0.0803  -0.4289   42.512  0.0113          |               ---|
25      -0.1216  -0.6591   44.071  0.0106          |             -----|
26      -0.0544   0.0918   44.392  0.0137          |                  |
27       0.0921  -0.3740   45.344  0.0150          |                --|

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.192               1                   0.6616
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.092               1                   0.7617
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  14.73 Chi(2)  6.3e-04
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.417         0.006            7.26       0.0265

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.95231      2.523      1.991  0.02324

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    45.3435
 Prob > chi2(27)           =     0.0150

.
. drop residuo

.
. **********************
. : regress logzp65g_d0 logzp65g_d1 logzp65g_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
```

```
                      begin with full model
p = 0.9447 >= 0.1500  removing logimacec_d2
p = 0.9440 >= 0.1500  removing logmoviles_d1
p = 0.9182 >= 0.1500  removing loginternet_d2
p = 0.6386 >= 0.1500  removing logcftelsur_d0
p = 0.6904 >= 0.1500  removing logmoviles_d0
p = 0.3010 >= 0.1500  removing loginternet_d1
p = 0.1938 >= 0.1500  removing logzp65g_d1
p = 0.1847 >= 0.1500  removing logcftelsur_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =    3.56
       Model |  .005225853     6  .000870976           Prob > F      =  0.0051
    Residual |  .012224311    50  .000244486           R-squared     =  0.2995
-------------+------------------------------           Adj R-squared =  0.2154
       Total |  .017450164    56   .00031161           Root MSE      =  .01564

------------------------------------------------------------------------------
 logzp65g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logcftelsu~2 |   .3355079   .1445038     2.32   0.024     .0452636    .6257522
 logzp65g_d2 |   .4444332   .1247652     3.56   0.001     .1938349    .6950315
logimacec_d0 |   .0864951    .045789     1.89   0.065    -.0054748    .1784649
logimacec_d1 |   .1048723    .047951     2.19   0.033     .0085599    .2011847
loginterne~0 |  -.1394609   .0691466    -2.02   0.049     -.278346   -.0005758
logmoviles~2 |   .3641508   .2011044     1.81   0.076    -.0397793    .7680809
       _cons |  -.0037681   .0036134    -1.04   0.302    -.0110258    .0034896
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                         -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1033   0.1040   .64055  0.4235         |                  |
2        0.0327   0.0229   .70584  0.7026         |                  |
3        0.0794   0.0734   1.0986  0.7774         |                  |
4       -0.1376  -0.1590   2.2997  0.6808        -|                 -|
5        0.1217   0.1655   3.2574  0.6604         |                  |-
6        0.1002   0.0669   3.9194  0.6876         |                  |
7       -0.1439  -0.1851   5.3129  0.6218        -|                 -|
8        0.1948   0.2489   7.9176  0.4416         |-                 |-
9       -0.0588  -0.1308   8.1601  0.5181         |                 -|
10       0.0337   0.0748   8.2412  0.6053         |                  |
11       0.0291  -0.0829   8.3033  0.6859         |                  |
12      -0.1242  -0.0201   9.4562  0.6636         |                  |
13       0.0616   0.0328   9.7459  0.7146         |                  |
14      -0.0043  -0.0838   9.7474  0.7804         |                  |
15      -0.1174  -0.0063   10.851  0.7631         |                  |
16       0.0113  -0.1370   10.862  0.8179         |                 -|
17      -0.3003  -0.3522   18.446  0.3613       --|                --|
18      -0.1763  -0.2555   21.126  0.2731        -|                --|
19      -0.0797  -0.2945   21.688  0.3001         |                --|
20      -0.1025  -0.1143   22.643  0.3066         |                  |
21       0.2045   0.1780   26.551  0.1862         |-                 |-
22      -0.0064  -0.1872   26.555  0.2286         |                 -|
23      -0.0509  -0.0813   26.812  0.2640         |                  |
24      -0.0704  -0.4714   27.317  0.2899         |               ---|
25      -0.0619   0.2890    27.72  0.3209         |                  |--
```

```
26       0.0139   0.6692   27.741  0.3713          |                  |-----

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.659               1                   0.4168
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.525               1                   0.2169
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  5.221 Chi(2)  .0735
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+---------------------------------------------------------
     residuo |      0.578         0.038            4.63       0.0988

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.96979      1.576      0.978  0.16403

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    27.7410
 Prob > chi2(26)           =     0.3713

.
. drop residuo

.
. : regress logzp65m_d0 logzp65m_d1 logzp65m_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
```

```
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9981 >= 0.1500  removing loginternet_d1
p = 0.9756 >= 0.1500  removing logcftelsur_d0
p = 0.9151 >= 0.1500  removing loginternet_d2
p = 0.6952 >= 0.1500  removing loginternet_d0
p = 0.3938 >= 0.1500  removing logmoviles_d0
p = 0.1614 >= 0.1500  removing logimacec_d2
p = 0.1854 >= 0.1500  removing logcftelsur_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =    3.69
       Model |  .005999126     7  .000857018           Prob > F      =  0.0028
    Residual |  .011377209    49  .000232188           R-squared     =  0.3452
-------------+------------------------------           Adj R-squared =  0.2517
       Total |  .017376335    56  .000310292           Root MSE      =  .01524

------------------------------------------------------------------------------
 logzp65m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp65m_d1 |   .2032644   .1300094     1.56   0.124    -.0579992     .464528
 logzp65m_d2 |    .223103     .14213     1.57   0.123     -.062518    .5087239
logimacec_d0 |   .0998654   .0516055     1.94   0.059    -.0038397    .2035704
logimacec_d1 |    .095303   .0455781     2.09   0.042     .0037103    .1868956
logmoviles~1 |  -.5523042   .1804898    -3.06   0.004     -.915012   -.1895965
logmoviles~2 |   .6296898   .1997793     3.15   0.003     .2282183    1.031161
logcftelsu~2 |    .369633   .1431393     2.58   0.013     .0819838    .6572821
       _cons |  -.0024974    .003923    -0.64   0.527     -.010381    .0053862
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1058  -0.1102   .67226  0.4123          |                  |
2        0.0802   0.0690   1.0657  0.5869          |                  |
3       -0.0289  -0.0138   1.1175  0.7728          |                  |
4        0.0004  -0.0136   1.1175  0.8915          |                  |
5       -0.1537  -0.1568    2.645  0.7545         -|                 -|
6       -0.0567  -0.0935   2.8569  0.8266          |                  |
7       -0.1264  -0.1420   3.9309  0.7877         -|                 -|
8        0.0104  -0.0172   3.9384  0.8626          |                  |
9        0.1550   0.1971   5.6208  0.7772          |-                 |-
10      -0.0013  -0.0157   5.6209  0.8460          |                  |
11      -0.0162  -0.0619   5.6401  0.8963          |                  |
12       0.2264   0.2419   9.4716  0.6622          |-                 |-
13       0.1041   0.1113   10.299  0.6693          |                  |
14      -0.1879  -0.1904    13.06  0.5218         -|                 -|
15       0.0888   0.1614   13.691  0.5491          |                  |-
16      -0.2067  -0.2354   17.196  0.3730         -|                 -|
17      -0.1559  -0.3313   19.238  0.3150         -|                --|
18      -0.1500  -0.2093   21.178  0.2705         -|                 -|
19      -0.0032  -0.1408   21.179  0.3270          |                 -|
20      -0.0001  -0.0519   21.179  0.3867          |                  |
21       0.2157   0.0705   25.526  0.2251          |-                 |
22      -0.0306  -0.2334   25.615  0.2686          |                 -|
```

```
23       0.1258   0.2955    27.18  0.2484          |-                 |--
24      -0.0176  -0.4555   27.211  0.2947          |               ---|
25       0.0004  -0.1445   27.211  0.3454          |                 -|
26      -0.1034   0.1775   28.372  0.3404          |                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.296               1                   0.0694
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.969               1                   0.3249
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  4.312 Chi(2)  .1158
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.553         0.051           4.29       0.1171

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.97566      1.270      0.514  0.30373

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    28.3719
 Prob > chi2(26)           =     0.3404

.
. drop residuo
```

```
.
. : regress logzp65r_d0 logzp65r_d1 logzp65r_d2 logimacec_d0 logimacec_d1
logimacec_d2 lo
> gcftelsur_d0 logcftelsur_d1 logcftelsur_d2 logmoviles_d0 logmoviles_d1
logmoviles_d2 loginternet_d
> 0 loginternet_d1 loginternet_d2
                      begin with full model
p = 0.9969 >= 0.1500  removing logimacec_d1
p = 0.9790 >= 0.1500  removing logimacec_d0
p = 0.8820 >= 0.1500  removing logcftelsur_d1
p = 0.7883 >= 0.1500  removing logzp65r_d2
p = 0.7390 >= 0.1500  removing logmoviles_d1
p = 0.7532 >= 0.1500  removing loginternet_d1
p = 0.6516 >= 0.1500  removing logzp65r_d1
p = 0.6914 >= 0.1500  removing loginternet_d2
p = 0.7138 >= 0.1500  removing logmoviles_d2
p = 0.5989 >= 0.1500  removing logcftelsur_d0
p = 0.6064 >= 0.1500  removing logimacec_d2
p = 0.6397 >= 0.1500  removing loginternet_d0
p = 0.1616 >= 0.1500  removing logmoviles_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    3.01
       Model |  .005333746     1  .005333746           Prob > F      =  0.0882
    Residual |  .097348417    55  .001769971           R-squared     =  0.0519
-------------+------------------------------           Adj R-squared =  0.0347
       Total |  .102682163    56   .00183361           Root MSE      =  .04207

------------------------------------------------------------------------------
 logzp65r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logcftelsu~2 |    .627923   .3617207     1.74   0.088    -.0969814    1.352827
       _cons |   .0039776   .0059811     0.67   0.509    -.0080089     .015964
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0316  -0.0325   .05993  0.8066          |                  |
2       -0.0023  -0.0040   .06026  0.9703          |                  |
3       -0.0038  -0.0052   .06116  0.9961          |                  |
4        0.0005  -0.0021   .06117  0.9995          |                  |
5       -0.1504  -0.1579    1.525  0.9102         -|                 -|
6        0.0222   0.0960   1.5574  0.9556          |                  |
7       -0.0863  -0.3509   2.0583  0.9565          |                --|
8        0.0200   0.1154   2.0858  0.9783          |                  |
9       -0.2337  -1.0798   5.9134  0.7485         -|          --------|
10      -0.0406  -0.1882   6.0314  0.8126          |                 -|
11      -0.0869  -0.2566   6.5837  0.8317          |                --|
12       0.0216   0.2481   6.6185  0.8818          |                  |-
13      -0.0952  -0.5728   7.3112  0.8854          |              ----|
14      -0.0206  -0.6283   7.3443  0.9206          |             -----|
15      -0.0027   0.1588   7.3449  0.9474          |                  |-
16      -0.0252  -0.4605   7.3971  0.9648          |               ---|
17      -0.0627  -0.4433   7.7273  0.9720          |               ---|
18       0.2495   1.1877   13.094  0.7859          |-                 |--------
19       0.0210  -0.1905   13.133  0.8317          |                 -|
```

```
20       0.0369  -0.2820   13.257  0.8661          |                --|
21       0.0000  -0.5416   13.257  0.8994          |              ----|
22      -0.0337  -0.3594   13.366  0.9224          |                --|
23       0.0269   0.2929   13.438  0.9419          |                  |--
24      -0.0223  -0.8642   13.488  0.9574          |            ------|
25      -0.0153  -0.6451   13.513  0.9696          |             -----|
26       0.0482  -0.1009   13.765  0.9760          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.058               1                   0.8091
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.040               1                   0.8416
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1994 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           63.29       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.53114     24.463      6.871  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.7645
 Prob > chi2(26)           =     0.9760

.
```

```
. drop residuo

.
.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63g_d0 logzp63g_d1 logzp63g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.9993 >= 0.1500  removing loginternet_d0
p = 0.9622 >= 0.1500  removing logmoviles_d1
p = 0.8198 >= 0.1500  removing loginternet_d2
p = 0.7484 >= 0.1500  removing logmoviles_d0
p = 0.7016 >= 0.1500  removing logcftelsur_d1
p = 0.6361 >= 0.1500  removing loginternet_d1
p = 0.4849 >= 0.1500  removing logimacec_d1
p = 0.5674 >= 0.1500  removing logcftelsur_d2
p = 0.3357 >= 0.1500  removing logmoviles_d2
p = 0.2748 >= 0.1500  removing logimacec_d2
p = 0.2653 >= 0.1500  removing logzp63g_d2
p = 0.2757 >= 0.1500  removing logcftelsur_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    2.87
       Model |  .000700943     2  .000350472           Prob > F      =  0.0656
    Residual |  .006603721    54  .000122291           R-squared     =  0.0960
-------------+------------------------------           Adj R-squared =  0.0625
       Total |  .007304664    56   .00013044           Root MSE      =  .01106

------------------------------------------------------------------------------
 logzp63g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp63g_d1 |   .2542056   .1291431     1.97   0.054    -.0047107    .5131218
logimacec_d0 |   .0415188   .0269108     1.54   0.129     -.012434    .0954717
       _cons |   .0040984   .0016535     2.48   0.016     .0007834    .0074133
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63g_d0 logzp63g_d1 logzp63g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.9993 >= 0.1500  removing loginternet_d0
p = 0.9622 >= 0.1500  removing logmoviles_d1
p = 0.8198 >= 0.1500  removing loginternet_d2
p = 0.7484 >= 0.1500  removing logmoviles_d0
p = 0.7016 >= 0.1500  removing logcftelsur_d1
p = 0.6361 >= 0.1500  removing loginternet_d1
p = 0.4849 >= 0.1500  removing logimacec_d1
p = 0.5674 >= 0.1500  removing logcftelsur_d2
p = 0.3357 >= 0.1500  removing logmoviles_d2
p = 0.2748 >= 0.1500  removing logimacec_d2
p = 0.2653 >= 0.1500  removing logzp63g_d2
p = 0.2757 >= 0.1500  removing logcftelsur_d0
```

```
p = 0.1287 >= 0.1500  removing logimacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    3.27
       Model |  .000409849     1  .000409849           Prob > F      =  0.0761
    Residual |  .006894815    55   .00012536           R-squared     =  0.0561
-------------+------------------------------           Adj R-squared =  0.0389
       Total |  .007304664    56   .00013044           Root MSE      =   .0112

------------------------------------------------------------------------------
 logzp63g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp63g_d1 |   .2353611   .1301674     1.81   0.076    -.0255003    .4962224
       _cons |   .0043041   .0016686     2.58   0.013     .0009601    .0076481
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63g_d0 logzp63g_d1 logzp63g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9961 >= 0.1500  removing loginternet_d0
p = 0.9263 >= 0.1500  removing logmoviles_d1
p = 0.8131 >= 0.1500  removing loginternet_d2
p = 0.7654 >= 0.1500  removing logmoviles_d0
p = 0.6932 >= 0.1500  removing logcftelsur_d1
p = 0.6367 >= 0.1500  removing loginternet_d1
p = 0.4505 >= 0.1500  removing logimacec_d1
p = 0.4977 >= 0.1500  removing logcftelsur_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    51) =    4.32
       Model |  .003082781     6  .000513797           Prob > F      =  0.0013
    Residual |  .006065415    51   .00011893           R-squared     =  0.3370
-------------+------------------------------           Adj R-squared =  0.2590
       Total |  .009148196    57  .000160495           Root MSE      =  .01091

------------------------------------------------------------------------------
 logzp63g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp63g_d1 |   .2479501   .1255733     1.97   0.054    -.0041488    .5000491
 logzp63g_d2 |   .1991704   .1292746     1.54   0.130    -.0603592    .4587001
logimacec_d0 |    .058917   .0270948     2.17   0.034     .0045219    .1133121
logmoviles~2 |   .1672903   .0988582     1.69   0.097    -.0311757    .3657564
logimacec_d2 |  -.0405547   .0265568    -1.53   0.133    -.0938696    .0127603
logcftelsu~0 |    .132598   .0902014     1.47   0.148    -.0484889    .3136848
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63g_d0 logzp63g_d1 logzp63g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
```

```
p = 0.9961 >= 0.1500  removing loginternet_d0
p = 0.9263 >= 0.1500  removing logmoviles_d1
p = 0.8131 >= 0.1500  removing loginternet_d2
p = 0.7654 >= 0.1500  removing logmoviles_d0
p = 0.6932 >= 0.1500  removing logcftelsur_d1
p = 0.6367 >= 0.1500  removing loginternet_d1
p = 0.4505 >= 0.1500  removing logimacec_d1
p = 0.4977 >= 0.1500  removing logcftelsur_d2
p = 0.1477 >= 0.1500  removing logcftelsur_d0
p = 0.1288 >= 0.1500  removing logzp63g_d2
p = 0.1336 >= 0.1500  removing logimacec_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    54) =    5.86
       Model |  .002246716     3  .000748905           Prob > F      =  0.0015
    Residual |   .00690148    54  .000127805           R-squared     =  0.2456
-------------+------------------------------           Adj R-squared =  0.2037
       Total |  .009148196    57  .000160495           Root MSE      =  .01131

------------------------------------------------------------------------------
  logzp63g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  logzp63g_d1 |   .3324003   .1227868     2.71   0.009     .0862276    .5785729
logmoviles~2 |   .1762672   .0935671     1.88   0.065    -.0113236    .3638579
logimacec_d0 |   .0557532   .0278211     2.00   0.050    -.0000248    .1115312
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
  logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
```

```
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9614 >= 0.1500  removing logzp63r_d2
p = 0.8482 >= 0.1500  removing logmoviles_d2
p = 0.6632 >= 0.1500  removing logmoviles_d0
p = 0.4545 >= 0.1500  removing logzp63r_d1
p = 0.4167 >= 0.1500  removing loginternet_d2
p = 0.3173 >= 0.1500  removing logcftelsur_d0
p = 0.5101 >= 0.1500  removing logcftelsur_d1
p = 0.3030 >= 0.1500  removing logcftelsur_d2
p = 0.1651 >= 0.1500  removing loginternet_d1
p = 0.3380 >= 0.1500  removing logimacec_d2
p = 0.2858 >= 0.1500  removing logimacec_d0
p = 0.3346 >= 0.1500  removing logimacec_d1
p = 0.1501 >= 0.1500  removing loginternet_d0
p = 0.3146 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    57) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  3.92924962    57  .068934204           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  3.92924962    57  .068934204           Root MSE      =  .26255

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0
```

```
      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2 if logzp63r_d0<400
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
```

```
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
```

```
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. sw, pr(.20): regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0
logimacec_d1 logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2 , noconstant
                      begin with full model
p = 0.9614 >= 0.2000  removing logzp63r_d2
p = 0.8482 >= 0.2000  removing logmoviles_d2
p = 0.6632 >= 0.2000  removing logmoviles_d0
p = 0.4545 >= 0.2000  removing logzp63r_d1
p = 0.4167 >= 0.2000  removing loginternet_d2
p = 0.3173 >= 0.2000  removing logcftelsur_d0
p = 0.5101 >= 0.2000  removing logcftelsur_d1
p = 0.3030 >= 0.2000  removing logcftelsur_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    51) =    1.39
       Model |  .551656118     6  .091942686           Prob > F      =  0.2373
    Residual |   3.3775935    51  .066227324           R-squared     =  0.1404
-------------+------------------------------           Adj R-squared =  0.0393
       Total |  3.92924962    57  .068934204           Root MSE      =  .25735

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~1 |  -1.545172   1.097224    -1.41   0.165    -3.747941    .6575968
logmoviles~1 |   3.833953   2.375317     1.61   0.113    -.9346946    8.602601
logimacec_d0 |   1.027785    .707586     1.45   0.152     -.392753    2.448323
logimacec_d1 |   1.299081   .7783467     1.67   0.101    -.2635157    2.861677
logimacec_d2 |   1.075335   .7223936     1.49   0.143    -.3749308      2.5256
loginterne~0 |  -2.078138   1.062371    -1.96   0.056    -4.210936    .0546594
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. sw, pr(.16): regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0
logimacec_d1 logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2 , noconstant
                      begin with full model
p = 0.9614 >= 0.1600  removing logzp63r_d2
p = 0.8482 >= 0.1600  removing logmoviles_d2
p = 0.6632 >= 0.1600  removing logmoviles_d0
p = 0.4545 >= 0.1600  removing logzp63r_d1
p = 0.4167 >= 0.1600  removing loginternet_d2
p = 0.3173 >= 0.1600  removing logcftelsur_d0
p = 0.5101 >= 0.1600  removing logcftelsur_d1
p = 0.3030 >= 0.1600  removing logcftelsur_d2
p = 0.1651 >= 0.1600  removing loginternet_d1
p = 0.3380 >= 0.1600  removing logimacec_d2
p = 0.2858 >= 0.1600  removing logimacec_d0
p = 0.3346 >= 0.1600  removing logimacec_d1

      Source |       SS       df       MS              Number of obs =      57
```

```
-------------+------------------------------           F(  2,    55) =    1.59
       Model |  .214779854     2  .107389927           Prob > F      =  0.2131
    Residual |  3.71446976    55  .067535814           R-squared     =  0.0547
-------------+------------------------------           Adj R-squared =  0.0203
       Total |  3.92924962    57  .068934204           Root MSE      =  .25988

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~0 |  -1.442373   .9883324    -1.46   0.150    -3.423036    .5382891
logmoviles~1 |    3.16874   2.159803     1.47   0.148    -1.159603    7.497083
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2 , noconstant
                      begin with full model
p = 0.9614 >= 0.1500  removing logzp63r_d2
p = 0.8482 >= 0.1500  removing logmoviles_d2
p = 0.6632 >= 0.1500  removing logmoviles_d0
p = 0.4545 >= 0.1500  removing logzp63r_d1
p = 0.4167 >= 0.1500  removing loginternet_d2
p = 0.3173 >= 0.1500  removing logcftelsur_d0
p = 0.5101 >= 0.1500  removing logcftelsur_d1
p = 0.3030 >= 0.1500  removing logcftelsur_d2
p = 0.1651 >= 0.1500  removing loginternet_d1
p = 0.3380 >= 0.1500  removing logimacec_d2
p = 0.2858 >= 0.1500  removing logimacec_d0
p = 0.3346 >= 0.1500  removing logimacec_d1
p = 0.1501 >= 0.1500  removing loginternet_d0
p = 0.3146 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    57) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  3.92924962    57  .068934204           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  3.92924962    57  .068934204           Root MSE      =  .26255

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
```

```
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------


.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp64g_d0 logzp64g_d1 logzp64g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.9637 >= 0.1500  removing loginternet_d2
p = 0.7794 >= 0.1500  removing logcftelsur_d0
p = 0.4939 >= 0.1500  removing logmoviles_d0
p = 0.5026 >= 0.1500  removing loginternet_d1
p = 0.3772 >= 0.1500  removing logcftelsur_d2
p = 0.3856 >= 0.1500  removing logmoviles_d1
p = 0.4930 >= 0.1500  removing logimacec_d1
p = 0.2106 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =    4.15
       Model |  .004670643     6   .00077844           Prob > F      =  0.0018
    Residual |  .009371119    50  .000187422           R-squared     =  0.3326
-------------+------------------------------           Adj R-squared =  0.2525
       Total |  .014041762    56  .000250746           Root MSE      =  .01369

------------------------------------------------------------------------------
 logzp64g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp64g_d1 |   .2723471   .1274165     2.14   0.037     .0164236    .5282707
 logzp64g_d2 |   .3109857   .1409422     2.21   0.032      .027895    .5940764
logimacec_d0 |   .0857667   .0383358     2.24   0.030      .008767    .1627663
logcftelsu~1 |   .3458577   .1306049     2.65   0.011       .08353    .6081855
logimacec_d2 |  -.0867337   .0343051    -2.53   0.015    -.1556376   -.0178298
logmoviles~2 |   .4467517   .1667576     2.68   0.010     .1118093    .7816941
       _cons |  -.0056648   .0030222    -1.87   0.067    -.0117351    .0004055
------------------------------------------------------------------------------
```

```
.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp64g_d0 logzp64g_d1 logzp64g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9694 >= 0.1500  removing loginternet_d2
p = 0.8822 >= 0.1500  removing logcftelsur_d0
p = 0.4646 >= 0.1500  removing loginternet_d1
p = 0.4315 >= 0.1500  removing logmoviles_d0
p = 0.4105 >= 0.1500  removing logcftelsur_d2
p = 0.3891 >= 0.1500  removing logimacec_d1
p = 0.1985 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    50) =    4.20
       Model |  .00552345     7  .000789064           Prob > F      =  0.0010
    Residual |  .009400879    50  .000188018           R-squared     =  0.3701
-------------+------------------------------           Adj R-squared =  0.2819
       Total |  .01492433    57   .00026183           Root MSE      =  .01371

------------------------------------------------------------------------------
 logzp64g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp64g_d1 |   .2476386    .126551     1.96   0.056    -.0065465    .5018237
 logzp64g_d2 |    .304322   .1404475     2.17   0.035     .0222249    .5864191
logimacec_d0 |   .0659683   .0362281     1.82   0.075     -.006798    .1387345
logmoviles~2 |   .2460826   .1189258     2.07   0.044     .0072131    .4849522
logimacec_d2 |  -.0797247    .033546    -2.38   0.021    -.1471039   -.0123456
loginterne~0 |  -.0953188   .0521258    -1.83   0.073    -.2000164    .0093789
logcftelsu~1 |   .2571807   .1184344     2.17   0.035     .0192982    .4950631
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp64m_d0 logzp64m_d1 logzp64m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8743 >= 0.1500  removing loginternet_d1
p = 0.6740 >= 0.1500  removing loginternet_d2
p = 0.5777 >= 0.1500  removing logmoviles_d0
p = 0.5614 >= 0.1500  removing logcftelsur_d0
p = 0.3192 >= 0.1500  removing logzp64m_d1
p = 0.2094 >= 0.1500  removing logmoviles_d1
p = 0.2372 >= 0.1500  removing logimacec_d1
p = 0.2831 >= 0.1500  removing logcftelsur_d2
p = 0.2183 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =    3.79
       Model |  .005200961     5  .001040192           Prob > F      =  0.0054
    Residual |  .013985294    51  .000274221           R-squared     =  0.2711
-------------+------------------------------           Adj R-squared =  0.1996
       Total |  .019186255    56  .000342612           Root MSE      =  .01656
```

```
------------------------------------------------------------------------------
 logzp64m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~2 |   .5162313   .2007084     2.57   0.013     .1132925    .9191701
 logzp64m_d2 |   .3585216   .1393481     2.57   0.013     .0787686    .6382746
logimacec_d0 |   .1383599   .0470852     2.94   0.005     .0438323    .2328875
logcftelsu~1 |   .5116783   .1604761     3.19   0.002      .189509    .8338476
logimacec_d2 |  -.1076347   .0417936    -2.58   0.013    -.1915388   -.0237306
       _cons |  -.0072352   .0035581    -2.03   0.047    -.0143784    -.000092
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp64m_d0 logzp64m_d1 logzp64m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.8641 >= 0.1500  removing loginternet_d1
p = 0.6788 >= 0.1500  removing loginternet_d2
p = 0.4558 >= 0.1500  removing logzp64m_d1
p = 0.4506 >= 0.1500  removing logmoviles_d0
p = 0.3515 >= 0.1500  removing logcftelsur_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  9,    48) =    2.92
       Model |  .006954804     9  .000772756           Prob > F      =  0.0077
    Residual |  .012695216    48  .000264484           R-squared     =  0.3539
-------------+------------------------------           Adj R-squared =  0.2328
       Total |   .01965002    57  .000344737           Root MSE      =  .01626

------------------------------------------------------------------------------
 logzp64m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~0 |  -.1391726   .0709937    -1.96   0.056     -.281915    .0035697
 logzp64m_d2 |   .3662906   .1383779     2.65   0.011     .0880632     .644518
logimacec_d0 |   .1219346   .0490297     2.49   0.016     .0233537    .2205155
logimacec_d1 |   .0819261   .0555051     1.48   0.146    -.0296743    .1935266
logimacec_d2 |  -.0767172   .0434038    -1.77   0.083    -.1639865     .010552
logmoviles~1 |  -.3659128   .1741693    -2.10   0.041    -.7161037   -.0157219
logcftelsu~1 |   .2847099   .1650856     1.72   0.091     -.047217    .6166369
logcftelsu~2 |   .2628189    .167406     1.57   0.123    -.0737734    .5994112
logmoviles~2 |   .4425495    .164226     2.69   0.010     .1123509    .7727481
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp64m_d0 logzp64m_d1 logzp64m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.8641 >= 0.1500  removing loginternet_d1
p = 0.6788 >= 0.1500  removing loginternet_d2
p = 0.4558 >= 0.1500  removing logzp64m_d1
p = 0.4506 >= 0.1500  removing logmoviles_d0
```

```
p = 0.3515 >= 0.1500  removing logcftelsur_d0
p = 0.1465 >= 0.1500  removing logimacec_d1
p = 0.2608 >= 0.1500  removing logcftelsur_d2
p = 0.1723 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    51) =    3.31
       Model |  .005505703     6  .000917617           Prob > F      =  0.0079
    Residual |  .014144317    51   .00027734           R-squared     =  0.2802
-------------+------------------------------           Adj R-squared =  0.1955
       Total |   .01965002    57  .000344737           Root MSE      =  .01665

------------------------------------------------------------------------------
 logzp64m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~0 |  -.1184008   .0631528    -1.87   0.067    -.2451854    .0083838
 logzp64m_d2 |   .3474548   .1393805     2.49   0.016     .0676367    .6272729
logimacec_d0 |   .1115089    .044264     2.52   0.015     .0226453    .2003726
logmoviles~2 |   .2561266   .1432237     1.79   0.080    -.0314069    .5436601
logimacec_d2 |   -.097508   .0409444    -2.38   0.021    -.1797072   -.0153087
logcftelsu~1 |   .3949355   .1453696     2.72   0.009      .103094    .6867771
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65g_d0 logzp65g_d1 logzp65g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.9447 >= 0.1500  removing logimacec_d2
p = 0.9440 >= 0.1500  removing logmoviles_d1
p = 0.9182 >= 0.1500  removing loginternet_d2
p = 0.6386 >= 0.1500  removing logcftelsur_d0
p = 0.6904 >= 0.1500  removing logmoviles_d0
p = 0.3010 >= 0.1500  removing loginternet_d1
p = 0.1938 >= 0.1500  removing logzp65g_d1
p = 0.1847 >= 0.1500  removing logcftelsur_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =    3.56
       Model |  .005225853     6  .000870976           Prob > F      =  0.0051
    Residual |  .012224311    50  .000244486           R-squared     =  0.2995
-------------+------------------------------           Adj R-squared =  0.2154
       Total |  .017450164    56   .00031161           Root MSE      =  .01564

------------------------------------------------------------------------------
 logzp65g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logcftelsu~2 |   .3355079   .1445038     2.32   0.024     .0452636    .6257522
 logzp65g_d2 |   .4444332   .1247652     3.56   0.001     .1938349    .6950315
logimacec_d0 |   .0864951    .045789     1.89   0.065    -.0054748    .1784649
logimacec_d1 |   .1048723    .047951     2.19   0.033     .0085599    .2011847
loginterne~0 |  -.1394609   .0691466    -2.02   0.049     -.278346   -.0005758
logmoviles~2 |   .3641508   .2011044     1.81   0.076    -.0397793    .7680809
       _cons |  -.0037681   .0036134    -1.04   0.302    -.0110258    .0034896
------------------------------------------------------------------------------

.
end of do-file
```

```
. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65g_d0 logzp65g_d1 logzp65g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9454 >= 0.1500  removing loginternet_d2
p = 0.8657 >= 0.1500  removing logmoviles_d0
p = 0.8359 >= 0.1500  removing logcftelsur_d0
p = 0.8165 >= 0.1500  removing logimacec_d2
p = 0.5738 >= 0.1500  removing logmoviles_d1
p = 0.3494 >= 0.1500  removing logcftelsur_d2
p = 0.2255 >= 0.1500  removing logzp65g_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    50) =    3.38
       Model |  .005720138     7  .000817163           Prob > F      =  0.0050
    Residual |  .012098272    50  .000241965           R-squared     =  0.3210
-------------+------------------------------           Adj R-squared =  0.2260
       Total |   .01781841    57  .000312604           Root MSE      =  .01556

------------------------------------------------------------------------------
 logzp65g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loginterne~1 |  -.0969966   .0621219    -1.56   0.125    -.2217721    .0277789
 logzp65g_d2 |   .5073744   .1280873     3.96   0.000     .2501034    .7646453
logimacec_d0 |    .093026   .0439465     2.12   0.039     .0047568    .1812952
logimacec_d1 |   .0869829   .0449583     1.93   0.059    -.0033185    .1772843
logmoviles~2 |   .2309526   .1398509     1.65   0.105    -.0499462    .5118514
loginterne~0 |  -.1371161    .066097    -2.07   0.043    -.2698758   -.0043565
logcftelsu~1 |   .3134692   .1388418     2.26   0.028     .0345973    .5923411
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65g_d0 logzp65g_d1 logzp65g_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9454 >= 0.1500  removing loginternet_d2
p = 0.8657 >= 0.1500  removing logmoviles_d0
p = 0.8359 >= 0.1500  removing logcftelsur_d0
p = 0.8165 >= 0.1500  removing logimacec_d2
p = 0.5738 >= 0.1500  removing logmoviles_d1
p = 0.3494 >= 0.1500  removing logcftelsur_d2
p = 0.2255 >= 0.1500  removing logzp65g_d1
p = 0.1247 >= 0.1500  removing loginternet_d1
p = 0.2205 >= 0.1500  removing logmoviles_d2
p = 0.1324 >= 0.1500  removing logimacec_d1
p = 0.2482 >= 0.1500  removing logimacec_d0
p = 0.2330 >= 0.1500  removing loginternet_d0
p = 0.1209 >= 0.1500  removing logcftelsur_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    56) =   10.36
       Model |  .002782383     1  .002782383           Prob > F      =  0.0021
    Residual |  .015036027    56    .0002685           R-squared     =  0.1562
```

```
-------------+------------------------------           Adj R-squared =  0.1411
       Total |  .01781841    57  .000312604           Root MSE      =  .01639

------------------------------------------------------------------------------
 logzp65g_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp65g_d2 |   .3958648   .1229733     3.22   0.002     .1495196    .6422099
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65m_d0 logzp65m_d1 logzp65m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.9981 >= 0.1500  removing loginternet_d1
p = 0.9756 >= 0.1500  removing logcftelsur_d0
p = 0.9151 >= 0.1500  removing loginternet_d2
p = 0.6952 >= 0.1500  removing loginternet_d0
p = 0.3938 >= 0.1500  removing logmoviles_d0
p = 0.1614 >= 0.1500  removing logimacec_d2
p = 0.1854 >= 0.1500  removing logcftelsur_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =    3.69
       Model |  .005999126     7  .000857018           Prob > F      =  0.0028
    Residual |  .011377209    49  .000232188           R-squared     =  0.3452
-------------+------------------------------           Adj R-squared =  0.2517
       Total |  .017376335    56  .000310292           Root MSE      =  .01524

------------------------------------------------------------------------------
 logzp65m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp65m_d1 |   .2032644   .1300094     1.56   0.124    -.0579992     .464528
 logzp65m_d2 |    .223103     .14213     1.57   0.123     -.062518    .5087239
logimacec_d0 |   .0998654   .0516055     1.94   0.059    -.0038397    .2035704
logimacec_d1 |    .095303   .0455781     2.09   0.042     .0037103    .1868956
logmoviles~1 |  -.5523042   .1804898    -3.06   0.004     -.915012   -.1895965
logmoviles~2 |   .6296898   .1997793     3.15   0.003     .2282183    1.031161
logcftelsu~2 |    .369633   .1431393     2.58   0.013     .0819838    .6572821
       _cons |  -.0024974    .003923    -0.64   0.527     -.010381    .0053862
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65m_d0 logzp65m_d1 logzp65m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9996 >= 0.1500  removing loginternet_d1
p = 0.9370 >= 0.1500  removing loginternet_d2
p = 0.8167 >= 0.1500  removing logcftelsur_d0
p = 0.5684 >= 0.1500  removing loginternet_d0
p = 0.4263 >= 0.1500  removing logimacec_d2
p = 0.1971 >= 0.1500  removing logcftelsur_d1
```

```
p = 0.2361 >= 0.1500  removing logmoviles_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    50) =    3.91
       Model |  .006284157     7  .000897737           Prob > F      =  0.0018
    Residual |  .011471305    50  .000229426           R-squared     =  0.3539
-------------+------------------------------           Adj R-squared =  0.2635
       Total |  .017755462    57  .000311499           Root MSE      =  .01515

------------------------------------------------------------------------------
 logzp65m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp65m_d1 |   .1963126   .1287771     1.52   0.134    -.0623439    .4549691
 logzp65m_d2 |   .2143383   .1406178     1.52   0.134    -.0681008    .4967774
logimacec_d0 |   .0871661   .0473099     1.84   0.071    -.0078587    .1821909
logimacec_d1 |   .0885407   .0440586     2.01   0.050     .0000464     .177035
logmoviles~1 |  -.6016965   .1619901    -3.71   0.001    -.9270632   -.2763297
logmoviles~2 |   .5449309   .1480564     3.68   0.001     .2475509     .842311
logcftelsu~2 |   .3383204   .1336208     2.53   0.015     .0699351    .6067057
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp65m_d0 logzp65m_d1 logzp65m_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9996 >= 0.1500  removing loginternet_d1
p = 0.9370 >= 0.1500  removing loginternet_d2
p = 0.8167 >= 0.1500  removing logcftelsur_d0
p = 0.5684 >= 0.1500  removing loginternet_d0
p = 0.4263 >= 0.1500  removing logimacec_d2
p = 0.1971 >= 0.1500  removing logcftelsur_d1
p = 0.2361 >= 0.1500  removing logmoviles_d0
p = 0.1337 >= 0.1500  removing logzp65m_d2
p = 0.2272 >= 0.1500  removing logimacec_d0
p = 0.1642 >= 0.1500  removing logimacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    53) =    5.09
       Model |  .004926423     4  .001231606           Prob > F      =  0.0015
    Residual |  .012829038    53  .000242057           R-squared     =  0.2775
-------------+------------------------------           Adj R-squared =  0.2229
       Total |  .017755462    57  .000311499           Root MSE      =  .01556

------------------------------------------------------------------------------
 logzp65m_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 logzp65m_d1 |    .282044   .1251748     2.25   0.028     .0309752    .5331129
logcftelsu~2 |   .2766963   .1316827     2.10   0.040     .0125742    .5408183
logmoviles~2 |    .438858   .1388812     3.16   0.003     .1602975    .7174185
logmoviles~1 |  -.4491085   .1428327    -3.14   0.003    -.7355945   -.1626224
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"
```

```
. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------


.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2
                      begin with full model
p = 0.8503 >= 0.1500  removing logzp63r_d2
p = 0.8232 >= 0.1500  removing logmoviles_d0
p = 0.5580 >= 0.1500  removing logmoviles_d2
p = 0.4916 >= 0.1500  removing loginternet_d2
p = 0.4964 >= 0.1500  removing logzp63r_d1
p = 0.3556 >= 0.1500  removing logcftelsur_d0
p = 0.3173 >= 0.1500  removing logcftelsur_d1
p = 0.3889 >= 0.1500  removing logcftelsur_d2
p = 0.2256 >= 0.1500  removing loginternet_d1
p = 0.3256 >= 0.1500  removing logimacec_d2
p = 0.3404 >= 0.1500  removing logimacec_d1
p = 0.3240 >= 0.1500  removing logimacec_d0
p = 0.2316 >= 0.1500  removing loginternet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    2.99
       Model |  .201809206     1  .201809206           Prob > F      =  0.0896
    Residual |  3.71724993    55  .067586362           R-squared     =  0.0515
-------------+------------------------------           Adj R-squared =  0.0342
       Total |  3.91905913    56  .069983199           Root MSE      =  .25997
```

```
------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
logmoviles~1 |   4.712065   2.726907     1.73   0.090    -.7527787    10.17691
       _cons |  -.0669337   .0463309    -1.44   0.154    -.1597829    .0259155
------------------------------------------------------------------------------

.
end of do-file

. do "C:\DOCUME~1\CRISTI~1\CONFIG~1\Temp\STD02000000.tmp"

. : regress logzp63r_d0 logzp63r_d1 logzp63r_d2 logimacec_d0 logimacec_d1
logimacec_d2 logcftelsur_d0 logcftelsur_d1 logcftelsur
> _d2 logmoviles_d0 logmoviles_d1 logmoviles_d2 loginternet_d0 loginternet_d1
loginternet_d2, noconstant
                      begin with full model
p = 0.9614 >= 0.1500  removing logzp63r_d2
p = 0.8482 >= 0.1500  removing logmoviles_d2
p = 0.6632 >= 0.1500  removing logmoviles_d0
p = 0.4545 >= 0.1500  removing logzp63r_d1
p = 0.4167 >= 0.1500  removing loginternet_d2
p = 0.3173 >= 0.1500  removing logcftelsur_d0
p = 0.5101 >= 0.1500  removing logcftelsur_d1
p = 0.3030 >= 0.1500  removing logcftelsur_d2
p = 0.1651 >= 0.1500  removing loginternet_d1
p = 0.3380 >= 0.1500  removing logimacec_d2
p = 0.2858 >= 0.1500  removing logimacec_d0
p = 0.3346 >= 0.1500  removing logimacec_d1
p = 0.1501 >= 0.1500  removing loginternet_d0
p = 0.3146 >= 0.1500  removing logmoviles_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    57) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  3.92924962    57  .068934204           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  3.92924962    57  .068934204           Root MSE      =  .26255

------------------------------------------------------------------------------
 logzp63r_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
------------------------------------------------------------------------------

.
end of do-file
```

Anexo 2: Estimaciones para Internet de Telsur

```
. ***************************
. ***test para raiz unitaria
.
.
. kpss    chle    , qs auto

KPSS test for chle

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel
```

```
Critical values for H0: chle is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .226

. dfuller         chle

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.206            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9726

. dfuller         chle    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.977            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6141

. dfgls   chle

DF-GLS for chle                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.074           -3.732            -2.713            -2.430
    9           -1.890           -3.732            -2.766            -2.484
    8           -2.031           -3.732            -2.821            -2.539
    7           -1.985           -3.732            -2.877            -2.594
    6           -1.910           -3.732            -2.933            -2.648
    5           -1.905           -3.732            -2.988            -2.701
    4           -2.283           -3.732            -3.041            -2.750
    3           -2.220           -3.732            -3.090            -2.795
    2           -1.853           -3.732            -3.134            -2.836
    1           -1.620           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  64.71874
Min SC   =  8.498952 at lag  1 with RMSE  64.71874
Min MAIC =  8.501396 at lag  1 with RMSE  64.71874

. pperron         chle

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(rho)            0.090          -19.062          -13.372          -10.754
 Z(t)              0.155           -3.567           -2.923           -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9696

. zandrews        chle

Zivot-Andrews unit root test for  chle

Allowing for break in intercept

Lag selection via TTest: lags of D.chle included = 2

Minimum t-statistic -3.586 at  2007m10 (obs 46)

Critical values: 1%: -5.43 5%: -4.80

. kpss    chll    , qs auto

KPSS test for chll

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: chll is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .272

. dfuller         chll

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.032           -3.567           -2.923           -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9558

. dfuller         chll    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.389           -4.130           -3.491           -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3854

. dfgls   chll

DF-GLS for chll                                        Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
```

```
    10          -1.866          -3.732           -2.713           -2.430
    9           -1.984          -3.732           -2.766           -2.484
    8           -1.983          -3.732           -2.821           -2.539
    7           -1.962          -3.732           -2.877           -2.594
    6           -1.965          -3.732           -2.933           -2.648
    5           -1.263          -3.732           -2.988           -2.701
    4           -1.385          -3.732           -3.041           -2.750
    3           -1.351          -3.732           -3.090           -2.795
    2           -1.475          -3.732           -3.134           -2.836
    1           -1.588          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  6 with RMSE  .3800445
Min SC   = -1.563709 at lag  1 with RMSE   .422621
Min MAIC = -1.567625 at lag  1 with RMSE   .422621

. pperron         chll

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.145          -19.062           -13.372           -10.754
 Z(t)              0.117           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9672

. zandrews        chll

Zivot-Andrews unit root test for  chll

Allowing for break in intercept

Lag selection via TTest: lags of D.chll included = 0

Minimum t-statistic -4.052 at   2006m4 (obs 28)

Critical values: 1%: -5.43 5%: -4.80

. kpss    chyt    , qs auto

KPSS test for chyt

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: chyt is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .402

. dfuller         chyt

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -2.554            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1028

. dfuller         chyt    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.724            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7400

. dfgls   chyt

DF-GLS for chyt                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.932            -3.732            -2.713            -2.430
    9            -0.963            -3.732            -2.766            -2.484
    8            -0.836            -3.732            -2.821            -2.539
    7            -0.920            -3.732            -2.877            -2.594
    6            -0.843            -3.732            -2.933            -2.648
    5            -0.746            -3.732            -2.988            -2.701
    4            -0.637            -3.732            -3.041            -2.750
    3            -0.902            -3.732            -3.090            -2.795
    2            -0.829            -3.732            -3.134            -2.836
    1            -0.956            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  10.69693
Min SC   =  4.898762 at lag  1 with RMSE  10.69693
Min MAIC =  4.821619 at lag  1 with RMSE  10.69693

. pperron         chyt

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.248           -19.062           -13.372           -10.754
 Z(t)             -2.517            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1114

. zandrews        chyt

Zivot-Andrews unit root test for  chyt

Allowing for break in intercept

Lag selection via TTest: lags of D.chyt included = 2

Minimum t-statistic -2.688 at  2006m10 (obs 34)
```

```
Critical values: 1%: -5.43 5%: -4.80

. kpss    cp      , qs auto

KPSS test for cp

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: cp is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .339

. dfuller         cp

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.007            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2834

. dfuller         cp      ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.380            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8666

. dfgls   cp

DF-GLS for cp                                            Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -0.877           -3.732            -2.713            -2.430
    9           -0.735           -3.732            -2.766            -2.484
    8           -0.888           -3.732            -2.821            -2.539
    7           -1.160           -3.732            -2.877            -2.594
    6           -1.042           -3.732            -2.933            -2.648
    5           -0.964           -3.732            -2.988            -2.701
    4           -0.940           -3.732            -3.041            -2.750
    3           -1.136           -3.732            -3.090            -2.795
    2           -1.238           -3.732            -3.134            -2.836
    1           -1.222           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  75.37863
Min SC   =  8.803897 at lag  1 with RMSE  75.37863
Min MAIC =   8.75342 at lag  1 with RMSE  75.37863
```

```
. pperron         cp

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.746           -19.062           -13.372           -10.754
 Z(t)             -1.835            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3631

. zandrews        cp

Zivot-Andrews unit root test for  cp

Allowing for break in intercept

Lag selection via TTest: lags of D.cp included = 2

Minimum t-statistic -3.851 at   2005m1 (obs 13)

Critical values: 1%: -5.43 5%: -4.80

. kpss    crnl    , qs auto

KPSS test for crnl

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: crnl is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .199

. dfuller         crnl

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.008            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9579

. dfuller         crnl    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.084            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5550
```

```
. dfgls   crnl

DF-GLS for crnl                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.415           -3.732            -2.713            -2.430
    9            -1.468           -3.732            -2.766            -2.484
    8            -1.722           -3.732            -2.821            -2.539
    7            -1.581           -3.732            -2.877            -2.594
    6            -2.259           -3.732            -2.933            -2.648
    5            -2.363           -3.732            -2.988            -2.701
    4            -2.752           -3.732            -3.041            -2.750
    3            -2.085           -3.732            -3.090            -2.795
    2            -2.012           -3.732            -3.134            -2.836
    1            -1.876           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  4 with RMSE  .4569171
Min SC   = -1.278317 at lag  1 with RMSE  .4874422
Min MAIC = -1.240333 at lag  1 with RMSE  .4874422

. pperron         crnl

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.312           -19.062           -13.372           -10.754
 Z(t)             -0.237            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9340

. zandrews        crnl

Zivot-Andrews unit root test for  crnl

Allowing for break in intercept

Lag selection via TTest: lags of D.crnl included = 1

Minimum t-statistic -3.089 at   2006m3 (obs 27)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lag     , qs auto

KPSS test for lag

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lag is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .475
```

```
. dfuller         lag

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.698            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9898

. dfuller         lag     ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.289            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8906

. dfgls   lag

DF-GLS for lag                                           Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -0.935           -3.732            -2.713            -2.430
    9           -0.983           -3.732            -2.766            -2.484
    8           -1.030           -3.732            -2.821            -2.539
    7           -1.289           -3.732            -2.877            -2.594
    6           -1.315           -3.732            -2.933            -2.648
    5           -1.341           -3.732            -2.988            -2.701
    4           -1.355           -3.732            -3.041            -2.750
    3           -0.672           -3.732            -3.090            -2.795
    2           -0.779           -3.732            -3.134            -2.836
    1           -0.874           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  4 with RMSE  .2244709
Min SC   = -2.710764 at lag  1 with RMSE  .2381613
Min MAIC = -2.793878 at lag  1 with RMSE  .2381613

. pperron         lag

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.706           -19.062           -13.372           -10.754
 Z(t)              1.098            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9952

. zandrews        lag
```

```
Zivot-Andrews unit root test for  lag

Allowing for break in intercept

Lag selection via TTest: lags of D.lag included = 0

Minimum t-statistic -4.305 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    spdr    , qs auto

KPSS test for spdr

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: spdr is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .147

. dfuller         spdr

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.625            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8652

. dfuller         spdr    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.134            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5272

. dfgls   spdr

DF-GLS for spdr                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.023           -3.732            -2.713            -2.430
    9           -2.147           -3.732            -2.766            -2.484
    8           -2.538           -3.732            -2.821            -2.539
    7           -2.856           -3.732            -2.877            -2.594
    6           -2.682           -3.732            -2.933            -2.648
    5           -2.589           -3.732            -2.988            -2.701
```

```
    4           -3.320          -3.732           -3.041           -2.750
    3           -3.565          -3.732           -3.090           -2.795
    2           -3.349          -3.732           -3.134           -2.836
    1           -3.041          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  6.875901 at lag  1 with RMSE  28.74678
Min MAIC =  7.214615 at lag  1 with RMSE  28.74678

. pperron         spdr

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.523           -19.062           -13.372           -10.754
 Z(t)             -0.641            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8616

. zandrews        spdr

Zivot-Andrews unit root test for  spdr

Allowing for break in intercept

Lag selection via TTest: lags of D.spdr included = 2

Minimum t-statistic -3.866 at  2006m10 (obs 34)

Critical values: 1%: -5.43 5%: -4.80

. kpss    thno    , qs auto

KPSS test for thno

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: thno is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .268

. dfuller         thno

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.009            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2825

. dfuller         thno    ,  trend
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.696            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7527

. dfgls   thno

DF-GLS for thno                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.498           -3.732            -2.713            -2.430
    9           -1.536           -3.732            -2.766            -2.484
    8           -1.678           -3.732            -2.821            -2.539
    7           -1.925           -3.732            -2.877            -2.594
    6           -1.844           -3.732            -2.933            -2.648
    5           -1.567           -3.732            -2.988            -2.701
    4           -1.689           -3.732            -3.041            -2.750
    3           -1.413           -3.732            -3.090            -2.795
    2           -1.311           -3.732            -3.134            -2.836
    1           -1.507           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  19.03047
Min SC   =  6.050933 at lag  1 with RMSE  19.03047
Min MAIC =  6.036269 at lag  1 with RMSE  19.03047

. pperron         thno

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.064           -19.062           -13.372           -10.754
 Z(t)             -1.884            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3398

. zandrews        thno

Zivot-Andrews unit root test for  thno

Allowing for break in intercept

Lag selection via TTest: lags of D.thno included = 2

Minimum t-statistic -2.919 at   2006m2 (obs 26)

Critical values: 1%: -5.43 5%: -4.80

. kpss    crcs    , qs auto

KPSS test for crcs
```

```
Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: crcs is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .509

. dfuller         crcs

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.298            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1727

. dfuller         crcs    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.173            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9956

. dfgls   crcs

DF-GLS for crcs                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.736           -3.732            -2.713            -2.430
    9            -1.391           -3.732            -2.766            -2.484
    8            -1.334           -3.732            -2.821            -2.539
    7            -1.348           -3.732            -2.877            -2.594
    6            -1.297           -3.732            -2.933            -2.648
    5            -1.414           -3.732            -2.988            -2.701
    4            -1.439           -3.732            -3.041            -2.750
    3            -1.618           -3.732            -3.090            -2.795
    2            -1.401           -3.732            -3.134            -2.836
    1            -0.658           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  2 with RMSE  2.085399
Min SC   =  1.708195 at lag  2 with RMSE  2.085399
Min MAIC =  1.645952 at lag  2 with RMSE  2.085399

. pperron         crcs

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.107           -19.062           -13.372           -10.754
 Z(t)             -1.973            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2985

. zandrews        crcs

Zivot-Andrews unit root test for  crcs

Allowing for break in intercept

Lag selection via TTest: lags of D.crcs included = 1

Minimum t-statistic -2.246 at   2005m9 (obs 21)

Critical values: 1%: -5.43 5%: -4.80

. kpss    cscd    , qs auto

KPSS test for cscd

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: cscd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .484

. dfuller         cscd

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.414            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1377

. dfuller         cscd    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.079            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9325

. dfgls   cscd

DF-GLS for cscd                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion
```

```
               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.407           -3.732            -2.713            -2.430
    9            -0.703           -3.732            -2.766            -2.484
    8            -0.481           -3.732            -2.821            -2.539
    7            -0.425           -3.732            -2.877            -2.594
    6            -0.454           -3.732            -2.933            -2.648
    5            -0.598           -3.732            -2.988            -2.701
    4            -0.651           -3.732            -3.041            -2.750
    3            -0.437           -3.732            -3.090            -2.795
    2            -0.444           -3.732            -3.134            -2.836
    1            -0.372           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .7856692
Min SC   = -.3235892 at lag  1 with RMSE  .7856692
Min MAIC = -.4354244 at lag  1 with RMSE  .7856692

. pperron         cscd

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.710           -19.062           -13.372           -10.754
 Z(t)             -2.330            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1625

. zandrews        cscd

Zivot-Andrews unit root test for  cscd

Allowing for break in intercept

Lag selection via TTest: lags of D.cscd included = 0

Minimum t-statistic -2.211 at   2005m9 (obs 21)

Critical values: 1%: -5.43 5%: -4.80

. kpss    enlg    , qs auto

KPSS test for enlg

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: enlg is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .297

. dfuller         enlg

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             2.449            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9990

. dfuller         enlg    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.140            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5237

. dfgls   enlg

DF-GLS for enlg                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

            DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.250           -3.732            -2.713            -2.430
    9           -1.491           -3.732            -2.766            -2.484
    8           -1.655           -3.732            -2.821            -2.539
    7           -1.499           -3.732            -2.877            -2.594
    6           -1.452           -3.732            -2.933            -2.648
    5           -1.492           -3.732            -2.988            -2.701
    4           -1.544           -3.732            -3.041            -2.750
    3           -1.205           -3.732            -3.090            -2.795
    2           -1.160           -3.732            -3.134            -2.836
    1           -0.962           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  2.181672 at lag  1 with RMSE  2.749478
Min MAIC =  2.105178 at lag  1 with RMSE  2.749478

. pperron         enlg

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           1.142           -19.062           -13.372           -10.754
 Z(t)             2.119            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9988

. zandrews        enlg

Zivot-Andrews unit root test for  enlg

Allowing for break in intercept

Lag selection via TTest: lags of D.enlg included = 0
```

```
Minimum t-statistic -2.871 at  2007m10 (obs 46)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lgrn    , qs auto

KPSS test for lgrn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lgrn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2            .52

. dfuller         lgrn

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.215            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9367

. dfuller         lgrn    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.538            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8159

. dfgls   lgrn

DF-GLS for lgrn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.424           -3.732            -2.713            -2.430
    9            -1.302           -3.732            -2.766            -2.484
    8            -1.244           -3.732            -2.821            -2.539
    7            -1.076           -3.732            -2.877            -2.594
    6            -0.906           -3.732            -2.933            -2.648
    5            -0.762           -3.732            -2.988            -2.701
    4            -0.659           -3.732            -3.041            -2.750
    3            -0.621           -3.732            -3.090            -2.795
    2            -0.500           -3.732            -3.134            -2.836
    1            -0.622           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  2.094693
```

```
Min SC   =  1.637664 at lag  1 with RMSE  2.094693
Min MAIC =  1.536609 at lag  1 with RMSE  2.094693

. pperron         lgrn

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.333           -19.062           -13.372           -10.754
 Z(t)             -0.148            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9444

. zandrews        lgrn

Zivot-Andrews unit root test for  lgrn

Allowing for break in intercept

Lag selection via TTest: lags of D.lgrn included = 0

Minimum t-statistic -2.405 at  2007m10 (obs 46)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lunn    , qs auto

KPSS test for lunn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lunn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .208

. dfuller         lunn

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.035            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9555

. dfuller         lunn    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -2.271            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4498

. dfgls   lunn

DF-GLS for lunn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.705           -3.732            -2.713            -2.430
    9            -1.604           -3.732            -2.766            -2.484
    8            -1.372           -3.732            -2.821            -2.539
    7            -1.225           -3.732            -2.877            -2.594
    6            -1.333           -3.732            -2.933            -2.648
    5            -1.373           -3.732            -2.988            -2.701
    4            -1.537           -3.732            -3.041            -2.750
    3            -1.660           -3.732            -3.090            -2.795
    2            -1.717           -3.732            -3.134            -2.836
    1            -1.578           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  10.15934
Min SC   =  4.795637 at lag  1 with RMSE  10.15934
Min MAIC =  4.790527 at lag  1 with RMSE  10.15934

. pperron         lunn

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.002          -19.062           -13.372           -10.754
 Z(t)              0.003           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9588

. zandrews        lunn

Zivot-Andrews unit root test for  lunn

Allowing for break in intercept

Lag selection via TTest: lags of D.lunn included = 0

Minimum t-statistic -3.088 at   2006m6 (obs 30)

Critical values: 1%: -5.43 5%: -4.80

. kpss    osrn    , qs auto

KPSS test for osrn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: osrn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    2           .371

. dfuller         osrn

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.643            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4605

. dfuller         osrn    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.950            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6282

. dfgls   osrn

DF-GLS for osrn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.933            -3.732            -2.713            -2.430
    9           -1.461            -3.732            -2.766            -2.484
    8           -1.373            -3.732            -2.821            -2.539
    7           -1.373            -3.732            -2.877            -2.594
    6           -1.095            -3.732            -2.933            -2.648
    5           -1.158            -3.732            -2.988            -2.701
    4           -1.182            -3.732            -3.041            -2.750
    3           -0.844            -3.732            -3.090            -2.795
    2           -0.880            -3.732            -3.134            -2.836
    1           -0.921            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  52.27664
Min SC   =  8.270757 at lag  1 with RMSE   57.7402
Min MAIC =  8.191817 at lag  1 with RMSE   57.7402

. pperron         osrn

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.502           -19.062           -13.372           -10.754
 Z(t)             -1.643            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.4608

. zandrews        osrn

Zivot-Andrews unit root test for  osrn

Allowing for break in intercept

Lag selection via TTest: lags of D.osrn included = 2

Minimum t-statistic -2.979 at  2006m11 (obs 35)

Critical values: 1%: -5.43 5%: -4.80

. kpss    poct    , qs auto

KPSS test for poct

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: poct is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .517

. dfuller         poct

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              2.569            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9991

. dfuller         poct    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.456            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9851

. dfgls   poct

DF-GLS for poct                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.260            -3.732            -2.713            -2.430
     9          -1.341            -3.732            -2.766            -2.484
     8          -1.424            -3.732            -2.821            -2.539
```

```
    7           -1.513          -3.732            -2.877            -2.594
    6           -1.115          -3.732            -2.933            -2.648
    5           -1.515          -3.732            -2.988            -2.701
    4           -1.033          -3.732            -3.041            -2.750
    3           -1.196          -3.732            -3.090            -2.795
    2           -1.471          -3.732            -3.134            -2.836
    1           -1.021          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  1.951355
Min SC   =  1.682549 at lag  1 with RMSE  2.142235
Min MAIC =  1.610107 at lag  1 with RMSE  2.142235

. pperron         poct

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.519          -19.062           -13.372           -10.754
 Z(t)              1.186           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9959

. zandrews        poct

Zivot-Andrews unit root test for  poct

Allowing for break in intercept

Lag selection via TTest: lags of D.poct included = 2

Minimum t-statistic -10.734 at   2007m8 (obs 44)

Critical values: 1%: -5.43 5%: -4.80

. kpss    prrq    , qs auto

KPSS test for prrq

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: prrq is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .241

. dfuller         prrq

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.047           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9622
```

```
. dfuller         prrq    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.884            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6629

. dfgls   prrq

DF-GLS for prrq                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.141           -3.732            -2.713            -2.430
    9            -1.667           -3.732            -2.766            -2.484
    8            -1.572           -3.732            -2.821            -2.539
    7            -1.630           -3.732            -2.877            -2.594
    6            -1.286           -3.732            -2.933            -2.648
    5            -1.320           -3.732            -2.988            -2.701
    4            -1.216           -3.732            -3.041            -2.750
    3            -1.392           -3.732            -3.090            -2.795
    2            -1.458           -3.732            -3.134            -2.836
    1            -1.733           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  4.774118
Min SC   =  3.481097 at lag  1 with RMSE  5.265223
Min MAIC =  3.481654 at lag  2 with RMSE  5.201763

. pperron         prrq

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.048           -19.062           -13.372           -10.754
 Z(t)              0.068            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9638

. zandrews        prrq

Zivot-Andrews unit root test for  prrq

Allowing for break in intercept

Lag selection via TTest: lags of D.prrq included = 0

Minimum t-statistic -2.805 at  2005m12 (obs 24)

Critical values: 1%: -5.43 5%: -4.80

. kpss    rbno    , qs auto
```

```
KPSS test for rbno

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: rbno is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .275

. dfuller         rbno

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.571            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9869

. dfuller         rbno    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.697            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9734

. dfgls   rbno

DF-GLS for rbno                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.757           -3.732            -2.713            -2.430
    9           -1.547           -3.732            -2.766            -2.484
    8           -1.311           -3.732            -2.821            -2.539
    7           -1.497           -3.732            -2.877            -2.594
    6           -1.382           -3.732            -2.933            -2.648
    5           -1.666           -3.732            -2.988            -2.701
    4           -1.747           -3.732            -3.041            -2.750
    3           -1.342           -3.732            -3.090            -2.795
    2           -1.037           -3.732            -3.134            -2.836
    1           -0.925           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE  6.587082
Min SC   =  4.087921 at lag  3 with RMSE  6.587082
Min MAIC =  3.981327 at lag  3 with RMSE  6.587082

. pperron         rbno

Phillips-Perron test for unit root                 Number of obs   =        59
```

```
                                               Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)             0.277           -19.062           -13.372           -10.754
 Z(t)               0.250            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9749

. zandrews        rbno

Zivot-Andrews unit root test for  rbno

Allowing for break in intercept

Lag selection via TTest: lags of D.rbno included = 1

Minimum t-statistic -2.977 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    rchl    , qs auto

KPSS test for rchl

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: rchl is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .387

. dfuller         rchl

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              -2.607            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0916

. dfuller         rchl    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              -1.896            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6567

. dfgls   rchl
```

```
DF-GLS for rchl                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.695           -3.732            -2.713            -2.430
    9            -0.674           -3.732            -2.766            -2.484
    8            -0.688           -3.732            -2.821            -2.539
    7            -0.557           -3.732            -2.877            -2.594
    6            -0.733           -3.732            -2.933            -2.648
    5            -0.809           -3.732            -2.988            -2.701
    4            -0.845           -3.732            -3.041            -2.750
    3            -1.051           -3.732            -3.090            -2.795
    2            -0.922           -3.732            -3.134            -2.836
    1            -0.872           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .7462565
Min SC   = -.4265219 at lag  1 with RMSE  .7462565
Min MAIC = -.5101248 at lag  1 with RMSE  .7462565

. pperron         rchl

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -5.395           -19.062           -13.372           -10.754
 Z(t)             -2.603            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0923

. zandrews        rchl

Zivot-Andrews unit root test for  rchl

Allowing for break in intercept

Lag selection via TTest: lags of D.rchl included = 0

Minimum t-statistic -2.186 at  2007m11 (obs 47)

Critical values: 1%: -5.43 5%: -4.80

. kpss    rngr    , qs auto

KPSS test for rngr

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: rngr is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .546

. dfuller         rngr
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             2.054            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9987

. dfuller         rngr    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -1.635            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7783

. dfgls   rngr

DF-GLS for rngr                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.173           -3.732            -2.713            -2.430
    9           -1.338           -3.732            -2.766            -2.484
    8           -1.049           -3.732            -2.821            -2.539
    7           -0.991           -3.732            -2.877            -2.594
    6           -0.946           -3.732            -2.933            -2.648
    5           -0.958           -3.732            -2.988            -2.701
    4           -0.992           -3.732            -3.041            -2.750
    3           -0.949           -3.732            -3.090            -2.795
    2           -0.895           -3.732            -3.134            -2.836
    1           -0.987           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  7.223973
Min SC   =   4.11366 at lag  1 with RMSE  7.223973
Min MAIC =  4.038227 at lag  1 with RMSE  7.223973

. pperron         rngr

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           1.220           -19.062           -13.372           -10.754
 Z(t)             1.414            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9972

. zandrews        rngr

Zivot-Andrews unit root test for  rngr
```

```
Allowing for break in intercept

Lag selection via TTest: lags of D.rngr included = 1

Minimum t-statistic -2.754 at   2007m6 (obs 42)

Critical values: 1%: -5.43 5%: -4.80

. kpss    spbl    , qs auto

KPSS test for spbl

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: spbl is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .552

. dfuller         spbl

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              2.469            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9990

. dfuller         spbl    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.076            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9330

. dfgls   spbl

DF-GLS for spbl                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.134           -3.732            -2.713            -2.430
    9           -1.102           -3.732            -2.766            -2.484
    8           -0.870           -3.732            -2.821            -2.539
    7           -0.809           -3.732            -2.877            -2.594
    6           -0.903           -3.732            -2.933            -2.648
    5           -0.828           -3.732            -2.988            -2.701
    4           -0.851           -3.732            -3.041            -2.750
    3           -0.754           -3.732            -3.090            -2.795
    2           -0.530           -3.732            -3.134            -2.836
```

```
    1           -0.476          -3.732          -3.171          -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  1.299188 at lag  1 with RMSE  1.768566
Min MAIC =  1.191278 at lag  1 with RMSE  1.768566

. pperron         spbl

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.884          -19.062           -13.372           -10.754
 Z(t)              2.332           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9990

. zandrews        spbl

Zivot-Andrews unit root test for  spbl

Allowing for break in intercept

Lag selection via TTest: lags of D.spbl included = 0

Minimum t-statistic -1.919 at   2005m2 (obs 14)

Critical values: 1%: -5.43 5%: -4.80

. kpss    cas2    , qs auto

KPSS test for cas2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: cas2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .171

. dfuller         cas2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.556           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5055

. dfuller         cas2    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)          -2.420            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3690

. dfgls   cas2

DF-GLS for cas2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.212           -3.732            -2.713            -2.430
    9            -2.223           -3.732            -2.766            -2.484
    8            -2.229           -3.732            -2.821            -2.539
    7            -2.231           -3.732            -2.877            -2.594
    6            -2.229           -3.732            -2.933            -2.648
    5            -2.225           -3.732            -2.988            -2.701
    4            -2.219           -3.732            -3.041            -2.750
    3            -2.211           -3.732            -3.090            -2.795
    2            -2.224           -3.732            -3.134            -2.836
    1            -2.233           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -3.846103 at lag  1 with RMSE  .1350005
Min MAIC = -3.729513 at lag  1 with RMSE  .1350005

. pperron         cas2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)        -3.392           -19.062           -13.372           -10.754
 Z(t)          -1.533            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5169

. zandrews        cas2

Zivot-Andrews unit root test for  cas2

Allowing for break in intercept

Lag selection via TTest: lags of D.cas2 included = 0

Minimum t-statistic -4.042 at   2007m8 (obs 44)

Critical values: 1%: -5.43 5%: -4.80

. kpss    casm    , qs auto

KPSS test for casm

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel
```

```
Critical values for H0: casm is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .391

. dfuller         casm

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.899            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0454

. dfuller         casm    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.115            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5379

. dfgls   casm

DF-GLS for casm                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.491           -3.732            -2.713            -2.430
    9           -2.012           -3.732            -2.766            -2.484
    8           -2.413           -3.732            -2.821            -2.539
    7           -0.933           -3.732            -2.877            -2.594
    6           -0.869           -3.732            -2.933            -2.648
    5           -0.719           -3.732            -2.988            -2.701
    4           -0.944           -3.732            -3.041            -2.750
    3           -1.189           -3.732            -3.090            -2.795
    2           -1.056           -3.732            -3.134            -2.836
    1           -1.029           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .4246537
Min SC   = -.9981384 at lag  8 with RMSE  .4246537
Min MAIC = -1.136902 at lag 10 with RMSE  .4163512

. pperron         casm

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(rho)           -6.283           -19.062           -13.372           -10.754
 Z(t)             -2.879            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0478

. zandrews        casm

Zivot-Andrews unit root test for  casm

Allowing for break in intercept

Lag selection via TTest: lags of D.casm included = 0

Minimum t-statistic -2.171 at   2006m8 (obs 32)

Critical values: 1%: -5.43 5%: -4.80

. kpss    chtn    , qs auto

KPSS test for chtn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: chtn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2            .34

. dfuller         chtn

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.201            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2057

. dfuller         chtn    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.747            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. dfgls   chtn

DF-GLS for chtn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
```

```
    10          -0.923          -3.732           -2.713           -2.430
    9           -0.907          -3.732           -2.766           -2.484
    8           -1.073          -3.732           -2.821           -2.539
    7           -1.045          -3.732           -2.877           -2.594
    6           -1.170          -3.732           -2.933           -2.648
    5           -1.427          -3.732           -2.988           -2.701
    4           -1.587          -3.732           -3.041           -2.750
    3           -1.569          -3.732           -3.090           -2.795
    2           -1.017          -3.732           -3.134           -2.836
    1           -1.416          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE  8.544673
Min SC   =  4.608316 at lag  3 with RMSE  8.544673
Min MAIC =  4.566889 at lag  3 with RMSE  8.544673

. pperron         chtn

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.364           -19.062           -13.372           -10.754
 Z(t)             -1.980            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2953

. zandrews        chtn

Zivot-Andrews unit root test for  chtn

Allowing for break in intercept

Lag selection via TTest: lags of D.chtn included = 1

Minimum t-statistic -1.155 at   2005m9 (obs 21)

Critical values: 1%: -5.43 5%: -4.80

. kpss    clbc    , qs auto

KPSS test for clbc

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: clbc is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .261

. dfuller         clbc

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -0.745            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8347

. dfuller         clbc    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.185            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4984

. dfgls   clbc

DF-GLS for clbc                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.886           -3.732            -2.713            -2.430
    9            -1.764           -3.732            -2.766            -2.484
    8            -1.858           -3.732            -2.821            -2.539
    7            -1.543           -3.732            -2.877            -2.594
    6            -1.765           -3.732            -2.933            -2.648
    5            -1.681           -3.732            -2.988            -2.701
    4            -1.535           -3.732            -3.041            -2.750
    3            -1.506           -3.732            -3.090            -2.795
    2            -1.483           -3.732            -3.134            -2.836
    1            -1.578           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  4.170753 at lag  1 with RMSE  7.433163
Min MAIC =  4.143281 at lag  2 with RMSE  7.244359

. pperron         clbc

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.532           -19.062           -13.372           -10.754
 Z(t)             -0.746            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8344

. zandrews        clbc

Zivot-Andrews unit root test for  clbc

Allowing for break in intercept

Lag selection via TTest: lags of D.clbc included = 0

Minimum t-statistic -2.802 at   2006m9 (obs 33)
```

```
Critical values: 1%: -5.43 5%: -4.80

. kpss    cnt2    , qs auto

KPSS test for cnt2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: cnt2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .386

. dfuller         cnt2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.659            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8570

. dfuller         cnt2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.993            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6053

. dfgls   cnt2

DF-GLS for cnt2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.507          -3.732            -2.713            -2.430
    9            -1.515          -3.732            -2.766            -2.484
    8            -1.523          -3.732            -2.821            -2.539
    7            -1.532          -3.732            -2.877            -2.594
    6            -1.540          -3.732            -2.933            -2.648
    5            -1.548          -3.732            -2.988            -2.701
    4            -1.556          -3.732            -3.041            -2.750
    3            -1.563          -3.732            -3.090            -2.795
    2            -1.571          -3.732            -3.134            -2.836
    1            -1.578          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -3.805334 at lag  1 with RMSE  .1377807
Min MAIC = -3.811583 at lag  1 with RMSE  .1377807
```

```
. pperron         cnt2

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.432           -19.062           -13.372           -10.754
 Z(t)             -0.657            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8576

. zandrews        cnt2

Zivot-Andrews unit root test for  cnt2

Allowing for break in intercept

Lag selection via TTest: lags of D.cnt2 included = 0

Minimum t-statistic -6.935 at   2007m5 (obs 41)

Critical values: 1%: -5.43 5%: -4.80

. kpss    ctao    , qs auto

KPSS test for ctao

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: ctao is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .41

. dfuller         ctao

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.535            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1071

. dfuller         ctao    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.313            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4268
```

```
. dfgls   ctao

DF-GLS for ctao                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.076           -3.732            -2.713            -2.430
    9            -1.044           -3.732            -2.766            -2.484
    8            -1.014           -3.732            -2.821            -2.539
    7            -0.985           -3.732            -2.877            -2.594
    6            -0.959           -3.732            -2.933            -2.648
    5            -0.934           -3.732            -2.988            -2.701
    4            -0.911           -3.732            -3.041            -2.750
    3            -0.892           -3.732            -3.090            -2.795
    2            -0.899           -3.732            -3.134            -2.836
    1            -0.958           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .2354175
Min SC   = -2.733939 at lag  1 with RMSE  .2354175
Min MAIC =  -2.81042 at lag  1 with RMSE  .2354175

. pperron         ctao

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -8.280           -19.062           -13.372           -10.754
 Z(t)             -2.475            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1216

. zandrews        ctao

Zivot-Andrews unit root test for  ctao

Allowing for break in intercept

Lag selection via TTest: lags of D.ctao included = 0

Minimum t-statistic -3.316 at   2008m2 (obs 50)

Critical values: 1%: -5.43 5%: -4.80

. kpss    ens2    , qs auto

KPSS test for ens2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: ens2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .18
```

```
. dfuller         ens2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.363            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1525

. dfuller         ens2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.266            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4529

. dfgls   ens2

DF-GLS for ens2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.474           -3.732            -2.713            -2.430
    9            -2.354           -3.732            -2.766            -2.484
    8            -2.254           -3.732            -2.821            -2.539
    7            -2.169           -3.732            -2.877            -2.594
    6            -2.096           -3.732            -2.933            -2.648
    5            -2.032           -3.732            -2.988            -2.701
    4            -1.974           -3.732            -3.041            -2.750
    3            -1.937           -3.732            -3.090            -2.795
    2            -1.932           -3.732            -3.134            -2.836
    1            -1.999           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .2254894
Min SC   = -2.820115 at lag  1 with RMSE  .2254894
Min MAIC = -2.755002 at lag  1 with RMSE  .2254894

. pperron         ens2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -9.250           -19.062           -13.372           -10.754
 Z(t)             -2.461            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1252

. zandrews        ens2
```

```
Zivot-Andrews unit root test for  ens2

Allowing for break in intercept

Lag selection via TTest: lags of D.ens2 included = 0

Minimum t-statistic -3.678 at   2006m1 (obs 25)

Critical values: 1%: -5.43 5%: -4.80

. kpss    ensd    , qs auto

KPSS test for ensd

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: ensd is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .361

. dfuller         ensd

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.393            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9112

. dfuller         ensd    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.419            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8552

. dfgls   ensd

DF-GLS for ensd                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.732           -3.732            -2.713            -2.430
    9           -1.732           -3.732            -2.766            -2.484
    8           -1.487           -3.732            -2.821            -2.539
    7           -1.430           -3.732            -2.877            -2.594
    6           -1.390           -3.732            -2.933            -2.648
    5           -1.361           -3.732            -2.988            -2.701
```

```
    4           -1.341           -3.732           -3.041           -2.750
    3           -1.326           -3.732           -3.090           -2.795
    2           -1.315           -3.732           -3.134           -2.836
    1           -1.307           -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -3.786025 at lag  1 with RMSE  .1391174
Min MAIC = -3.825305 at lag  1 with RMSE  .1391174

. pperron         ensd

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.149           -19.062           -13.372           -10.754
 Z(t)             -0.391            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9116

. zandrews        ensd

Zivot-Andrews unit root test for  ensd

Allowing for break in intercept

Lag selection via TTest: lags of D.ensd included = 0

Minimum t-statistic -6.623 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    frs2    , qs auto

KPSS test for frs2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: frs2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .225

. dfuller         frs2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.782            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8243

. dfuller         frs2    ,  trend
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.743            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7316

. dfgls   frs2

DF-GLS for frs2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.984           -3.732            -2.713            -2.430
    9            -2.392           -3.732            -2.766            -2.484
    8            -2.364           -3.732            -2.821            -2.539
    7            -2.310           -3.732            -2.877            -2.594
    6            -2.341           -3.732            -2.933            -2.648
    5            -2.520           -3.732            -2.988            -2.701
    4            -2.734           -3.732            -3.041            -2.750
    3            -2.233           -3.732            -3.090            -2.795
    2            -1.861           -3.732            -3.134            -2.836
    1            -1.836           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  4 with RMSE  .8638987
Min SC   =  .0225494 at lag  1 with RMSE  .9341201
Min MAIC =  .0577246 at lag  1 with RMSE  .9341201

. pperron         frs2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.916           -19.062           -13.372           -10.754
 Z(t)             -0.804            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8179

. zandrews        frs2

Zivot-Andrews unit root test for  frs2

Allowing for break in intercept

Lag selection via TTest: lags of D.frs2 included = 0

Minimum t-statistic -2.461 at   2006m9 (obs 33)

Critical values: 1%: -5.43 5%: -4.80

. kpss    frsa    , qs auto

KPSS test for frsa
```

```
Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: frsa is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .215

. dfuller         frsa

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.950            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7712

. dfuller         frsa    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.032            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5840

. dfgls   frsa

DF-GLS for frsa                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.778           -3.732            -2.713            -2.430
    9           -1.776           -3.732            -2.766            -2.484
    8           -1.773           -3.732            -2.821            -2.539
    7           -1.771           -3.732            -2.877            -2.594
    6           -1.768           -3.732            -2.933            -2.648
    5           -1.766           -3.732            -2.988            -2.701
    4           -1.764           -3.732            -3.041            -2.750
    3           -1.761           -3.732            -3.090            -2.795
    2           -1.759           -3.732            -3.134            -2.836
    1           -1.757           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -3.817633 at lag  1 with RMSE   .136936
Min MAIC = -3.795379 at lag  1 with RMSE   .136936

. pperron         frsa

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -1.893           -19.062           -13.372           -10.754
 Z(t)            -0.947            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7722

. zandrews        frsa

Zivot-Andrews unit root test for  frsa

Allowing for break in intercept

Lag selection via TTest: lags of D.frsa included = 0

Minimum t-statistic -6.831 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

. kpss    fru2    , qs auto

KPSS test for fru2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: fru2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .365

. dfuller         fru2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.479            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1205

. dfuller         fru2    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.134            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5271

. dfgls   fru2

DF-GLS for fru2                                         Number of obs =    49
Maxlag = 10 chosen by Schwert criterion
```

```
               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.125          -3.732            -2.713            -2.430
    9           -1.617          -3.732            -2.766            -2.484
    8           -1.326          -3.732            -2.821            -2.539
    7           -1.146          -3.732            -2.877            -2.594
    6           -0.556          -3.732            -2.933            -2.648
    5           -0.662          -3.732            -2.988            -2.701
    4           -0.454          -3.732            -3.041            -2.750
    3           -0.615          -3.732            -3.090            -2.795
    2           -0.631          -3.732            -3.134            -2.836
    1           -0.624          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  1.028123
Min SC   =  .5193257 at lag  2 with RMSE  1.150878
Min MAIC =  .3809011 at lag  2 with RMSE  1.150878

. pperron         fru2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.065           -19.062           -13.372           -10.754
 Z(t)             -2.590            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0951

. zandrews        fru2

Zivot-Andrews unit root test for  fru2

Allowing for break in intercept

Lag selection via TTest: lags of D.fru2 included = 0

Minimum t-statistic -2.331 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    frut    , qs auto

KPSS test for frut

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: frut is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .151

. dfuller         frut

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                   Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.610            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8687

. dfuller         frut    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                   Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.399            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3800

. dfgls   frut

DF-GLS for frut                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.981           -3.732            -2.713            -2.430
    9            -2.225           -3.732            -2.766            -2.484
    8            -2.450           -3.732            -2.821            -2.539
    7            -2.211           -3.732            -2.877            -2.594
    6            -2.269           -3.732            -2.933            -2.648
    5            -2.146           -3.732            -2.988            -2.701
    4            -2.267           -3.732            -3.041            -2.750
    3            -2.401           -3.732            -3.090            -2.795
    2            -2.358           -3.732            -3.134            -2.836
    1            -2.378           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  5.459368
Min SC   =  3.553516 at lag  1 with RMSE  5.459368
Min MAIC =  3.697351 at lag  1 with RMSE  5.459368

. pperron         frut

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                   Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.466           -19.062           -13.372           -10.754
 Z(t)             -0.611            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8684

. zandrews        frut

Zivot-Andrews unit root test for  frut

Allowing for break in intercept

Lag selection via TTest: lags of D.frut included = 0
```

```
Minimum t-statistic -2.826 at  2007m11 (obs 47)

Critical values: 1%: -5.43 5%: -4.80

. kpss    ftfu    , qs auto

KPSS test for ftfu

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: ftfu is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .117

. dfuller         ftfu

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.330            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9787

. dfuller         ftfu    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.102            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5448

. dfgls   ftfu

DF-GLS for ftfu                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.258           -3.732            -2.713            -2.430
    9            -2.243           -3.732            -2.766            -2.484
    8            -2.141           -3.732            -2.821            -2.539
    7            -2.174           -3.732            -2.877            -2.594
    6            -2.161           -3.732            -2.933            -2.648
    5            -2.184           -3.732            -2.988            -2.701
    4            -2.191           -3.732            -3.041            -2.750
    3            -2.160           -3.732            -3.090            -2.795
    2            -2.128           -3.732            -3.134            -2.836
    1            -2.093           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
```

```
Min SC   =  3.505587 at lag  1 with RMSE  5.330093
Min MAIC =  3.587426 at lag  1 with RMSE  5.330093

. pperron         ftfu

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.224           -19.062           -13.372           -10.754
 Z(t)              0.167            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9704

. zandrews        ftfu

Zivot-Andrews unit root test for  ftfu

Allowing for break in intercept

Lag selection via TTest: lags of D.ftfu included = 1

Minimum t-statistic -4.860 at  2005m10 (obs 22)

Critical values: 1%: -5.43 5%: -4.80

. kpss    llq2    , qs auto

KPSS test for llq2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: llq2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .276

. dfuller         llq2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.476            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1214

. dfuller         llq2    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -2.033            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5834

. dfgls   llq2

DF-GLS for llq2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.857           -3.732            -2.713            -2.430
    9            -1.318           -3.732            -2.766            -2.484
    8            -1.190           -3.732            -2.821            -2.539
    7            -0.797           -3.732            -2.877            -2.594
    6            -0.925           -3.732            -2.933            -2.648
    5            -0.600           -3.732            -2.988            -2.701
    4            -0.579           -3.732            -3.041            -2.750
    3            -0.625           -3.732            -3.090            -2.795
    2            -0.621           -3.732            -3.134            -2.836
    1            -0.501           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  2 with RMSE  1.480513
Min SC   =  1.023052 at lag  2 with RMSE  1.480513
Min MAIC =  .8846506 at lag  2 with RMSE  1.480513

. pperron         llq2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.640           -19.062           -13.372           -10.754
 Z(t)             -2.516            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1116

. zandrews        llq2

Zivot-Andrews unit root test for  llq2

Allowing for break in intercept

Lag selection via TTest: lags of D.llq2 included = 0

Minimum t-statistic -2.554 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    llqh    , qs auto

KPSS test for llqh

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: llqh is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    2           .228

. dfuller         llqh

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.696            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4331

. dfuller         llqh    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.051            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9368

. dfgls   llqh

DF-GLS for llqh                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.733          -3.732            -2.713            -2.430
    9            -1.884          -3.732            -2.766            -2.484
    8            -1.477          -3.732            -2.821            -2.539
    7            -1.556          -3.732            -2.877            -2.594
    6            -2.104          -3.732            -2.933            -2.648
    5            -1.494          -3.732            -2.988            -2.701
    4            -1.394          -3.732            -3.041            -2.750
    3            -1.476          -3.732            -3.090            -2.795
    2            -1.239          -3.732            -3.134            -2.836
    1            -0.752          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  6 with RMSE  5.034845
Min SC   =  3.614381 at lag  2 with RMSE  5.408939
Min MAIC =  3.531888 at lag  2 with RMSE  5.408939

. pperron         llqh

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.166           -19.062           -13.372           -10.754
 Z(t)             -1.530            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.5184

. zandrews        llqh

Zivot-Andrews unit root test for  llqh

Allowing for break in intercept

Lag selection via TTest: lags of D.llqh included = 2

Minimum t-statistic -2.951 at   2005m1 (obs 13)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lmr2    , qs auto

KPSS test for lmr2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lmr2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .241

. dfuller         lmr2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.182            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2130

. dfuller         lmr2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.050            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5742

. dfgls   lmr2

DF-GLS for lmr2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.055           -3.732            -2.713            -2.430
    9           -1.023           -3.732            -2.766            -2.484
    8           -1.174           -3.732            -2.821            -2.539
```

```
    7           -1.578          -3.732            -2.877            -2.594
    6           -1.548          -3.732            -2.933            -2.648
    5           -1.241          -3.732            -2.988            -2.701
    4           -1.222          -3.732            -3.041            -2.750
    3           -1.229          -3.732            -3.090            -2.795
    2           -1.225          -3.732            -3.134            -2.836
    1           -1.233          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE  .6454414
Min SC   =  -.610995 at lag  1 with RMSE  .6805034
Min MAIC = -.6803488 at lag  3 with RMSE  .6454414

. pperron         lmr2

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.524          -19.062           -13.372           -10.754
 Z(t)             -2.231           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1950

. zandrews        lmr2

Zivot-Andrews unit root test for  lmr2

Allowing for break in intercept

Lag selection via TTest: lags of D.lmr2 included = 0

Minimum t-statistic -2.503 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lmrm    , qs auto

KPSS test for lmrm

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lmrm is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .571

. dfuller         lmrm

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              4.506           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000
```

```
. dfuller         lmrm    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.121            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9928

. dfgls   lmrm

DF-GLS for lmrm                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.914          -3.732            -2.713            -2.430
    9            -0.984          -3.732            -2.766            -2.484
    8            -0.896          -3.732            -2.821            -2.539
    7            -0.857          -3.732            -2.877            -2.594
    6            -1.120          -3.732            -2.933            -2.648
    5            -0.999          -3.732            -2.988            -2.701
    4            -0.764          -3.732            -3.041            -2.750
    3            -0.606          -3.732            -3.090            -2.795
    2            -0.418          -3.732            -3.134            -2.836
    1             0.007          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  2 with RMSE  4.387287
Min SC   =  3.195697 at lag  2 with RMSE  4.387287
Min MAIC =  3.047369 at lag  2 with RMSE  4.387287

. pperron         lmrm

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            2.507           -19.062           -13.372           -10.754
 Z(t)              3.553            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. zandrews        lmrm

Zivot-Andrews unit root test for  lmrm

Allowing for break in intercept

Lag selection via TTest: lags of D.lmrm included = 0

Minimum t-statistic -2.077 at  2006m11 (obs 35)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lnc2    , qs auto
```

```
KPSS test for lnc2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lnc2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .536

. dfuller         lnc2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.383            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1465

. dfuller         lnc2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.470            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8392

. dfgls   lnc2

DF-GLS for lnc2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.508           -3.732            -2.713            -2.430
    9           -1.399           -3.732            -2.766            -2.484
    8           -0.682           -3.732            -2.821            -2.539
    7           -0.436           -3.732            -2.877            -2.594
    6           -0.450           -3.732            -2.933            -2.648
    5           -0.465           -3.732            -2.988            -2.701
    4           -0.479           -3.732            -3.041            -2.750
    3           -0.493           -3.732            -3.090            -2.795
    2           -0.472           -3.732            -3.134            -2.836
    1           -0.449           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE  .2133852
Min SC   = -2.620528 at lag  1 with RMSE  .2491529
Min MAIC = -2.729643 at lag  1 with RMSE  .2491529

. pperron         lnc2

Phillips-Perron test for unit root                 Number of obs   =        59
```

```
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.496           -19.062           -13.372           -10.754
 Z(t)             -2.424            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1349

. zandrews        lnc2

Zivot-Andrews unit root test for  lnc2

Allowing for break in intercept

Lag selection via TTest: lags of D.lnc2 included = 0

Minimum t-statistic -2.708 at  2007m12 (obs 48)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lnct    , qs auto

KPSS test for lnct

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lnct is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .297

. dfuller         lnct

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.657            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0818

. dfuller         lnct    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.557            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2999

. dfgls   lnct
```

```
DF-GLS for lnct                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10               .            -3.732            -2.713            -2.430
    9                .            -3.732            -2.766            -2.484
    8                .            -3.732            -2.821            -2.539
    7                .            -3.732            -2.877            -2.594
    6                .            -3.732            -2.933            -2.648
    5                .            -3.732            -2.988            -2.701
    4                .            -3.732            -3.041            -2.750
    3                .            -3.732            -3.090            -2.795
    2                .            -3.732            -3.134            -2.836
    1                .            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =         . at lag  . with RMSE         .
Min MAIC =         . at lag  . with RMSE         .

. pperron         lnct

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -8.807           -19.062           -13.372           -10.754
 Z(t)             -2.604            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0923

. zandrews        lnct

Zivot-Andrews unit root test for  lnct

Allowing for break in intercept

Lag selection via TTest: lags of D.lnct included = 0

Minimum t-statistic -2.605 at  2006m12 (obs 36)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lqms    , qs auto

KPSS test for lqms

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lqms is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .433

. dfuller         lqms
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.564            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1008

. dfuller         lqms    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.718            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7428

. dfgls   lqms

DF-GLS for lqms                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -0.765           -3.732            -2.713            -2.430
    9           -0.392           -3.732            -2.766            -2.484
    8           -0.374           -3.732            -2.821            -2.539
    7           -0.384           -3.732            -2.877            -2.594
    6           -0.261           -3.732            -2.933            -2.648
    5           -0.397           -3.732            -2.988            -2.701
    4           -0.286           -3.732            -3.041            -2.750
    3           -0.149           -3.732            -3.090            -2.795
    2           -0.353           -3.732            -3.134            -2.836
    1           -0.474           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  .3261738
Min SC   = -1.771388 at lag  1 with RMSE  .3809379
Min MAIC = -1.931774 at lag  3 with RMSE   .357849

. pperron         lqms

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -6.737           -19.062           -13.372           -10.754
 Z(t)             -2.526            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1093

. zandrews        lqms

Zivot-Andrews unit root test for  lqms
```

```
Allowing for break in intercept

Lag selection via TTest: lags of D.lqms included = 0

Minimum t-statistic -2.385 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    mlln    , qs auto

KPSS test for mlln

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: mlln is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .504

. dfuller         mlln

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.913           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9985

. dfuller         mlln    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.379           -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9875

. dfgls   mlln

DF-GLS for mlln                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.455           -3.732            -2.713            -2.430
    9           -1.229           -3.732            -2.766            -2.484
    8           -1.214           -3.732            -2.821            -2.539
    7           -1.170           -3.732            -2.877            -2.594
    6           -1.164           -3.732            -2.933            -2.648
    5           -1.018           -3.732            -2.988            -2.701
    4           -1.107           -3.732            -3.041            -2.750
    3           -0.937           -3.732            -3.090            -2.795
    2           -0.773           -3.732            -3.134            -2.836
```

```
    1           -0.571          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  9.107713
Min SC   =  4.577093 at lag  1 with RMSE  9.107713
Min MAIC =  4.473455 at lag  1 with RMSE  9.107713

. pperron         mlln

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.880           -19.062           -13.372           -10.754
 Z(t)              1.312            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9967

. zandrews        mlln

Zivot-Andrews unit root test for  mlln

Allowing for break in intercept

Lag selection via TTest: lags of D.mlln included = 0

Minimum t-statistic -11.012 at   2007m9 (obs 45)

Critical values: 1%: -5.43 5%: -4.80

. kpss    nbr2    , qs auto

KPSS test for nbr2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: nbr2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .38

. dfuller         nbr2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.041            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2689

. dfuller         nbr2    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)          -1.794           -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7078

. dfgls   nbr2

DF-GLS for nbr2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

            DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic       Value             Value             Value
------------------------------------------------------------------------------
    10          -0.627           -3.732            -2.713            -2.430
    9           -0.833           -3.732            -2.766            -2.484
    8           -0.557           -3.732            -2.821            -2.539
    7           -0.817           -3.732            -2.877            -2.594
    6           -0.872           -3.732            -2.933            -2.648
    5           -1.407           -3.732            -2.988            -2.701
    4           -1.434           -3.732            -3.041            -2.750
    3           -1.376           -3.732            -3.090            -2.795
    2           -1.505           -3.732            -3.134            -2.836
    1           -1.529           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  6 with RMSE  .4333068
Min SC   = -1.418079 at lag  1 with RMSE  .4545422
Min MAIC = -1.427881 at lag  1 with RMSE  .4545422

. pperron         nbr2

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                             ---------- Interpolated Dickey-Fuller ---------
               Test         1% Critical       5% Critical      10% Critical
            Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)        -3.931          -19.062           -13.372           -10.754
 Z(t)          -2.041           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2688

. zandrews        nbr2

Zivot-Andrews unit root test for  nbr2

Allowing for break in intercept

Lag selection via TTest: lags of D.nbr2 included = 0

Minimum t-statistic -3.311 at   2005m9 (obs 21)

Critical values: 1%: -5.43 5%: -4.80

. kpss    plna    , qs auto

KPSS test for plna

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel
```

```
Critical values for H0: plna is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .263

. dfuller         plna

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.312            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9967

. dfuller         plna    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.810            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6997

. dfgls   plna

DF-GLS for plna                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.667           -3.732            -2.713            -2.430
    9           -1.798           -3.732            -2.766            -2.484
    8           -1.699           -3.732            -2.821            -2.539
    7           -1.630           -3.732            -2.877            -2.594
    6           -1.589           -3.732            -2.933            -2.648
    5           -1.595           -3.732            -2.988            -2.701
    4           -1.161           -3.732            -3.041            -2.750
    3           -1.253           -3.732            -3.090            -2.795
    2           -1.250           -3.732            -3.134            -2.836
    1           -1.122           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =   2.70043 at lag  1 with RMSE  3.563668
Min MAIC =  2.638764 at lag  1 with RMSE  3.563668

. pperron         plna

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(rho)            1.246           -19.062           -13.372           -10.754
 Z(t)              1.284            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9965

. zandrews        plna

Zivot-Andrews unit root test for  plna

Allowing for break in intercept

Lag selection via TTest: lags of D.plna included = 0

Minimum t-statistic -2.645 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pmt2    , qs auto

KPSS test for pmt2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pmt2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .245

. dfuller         pmt2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.188            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2107

. dfuller         pmt2    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.638            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7773

. dfgls   pmt2

DF-GLS for pmt2                                         Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
```

```
    10          -1.049          -3.732           -2.713           -2.430
    9           -1.006          -3.732           -2.766           -2.484
    8           -1.270          -3.732           -2.821           -2.539
    7           -0.927          -3.732           -2.877           -2.594
    6           -0.516          -3.732           -2.933           -2.648
    5           -0.912          -3.732           -2.988           -2.701
    4           -0.642          -3.732           -3.041           -2.750
    3           -0.940          -3.732           -3.090           -2.795
    2           -0.925          -3.732           -3.134           -2.836
    1           -0.660          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  1.925429
Min SC   =  1.722816 at lag  2 with RMSE    2.1007
Min MAIC =  1.607054 at lag  2 with RMSE    2.1007

. pperron         pmt2

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.064           -19.062           -13.372           -10.754
 Z(t)             -2.219            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1996

. zandrews        pmt2

Zivot-Andrews unit root test for  pmt2

Allowing for break in intercept

Lag selection via TTest: lags of D.pmt2 included = 0

Minimum t-statistic -2.326 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pmtt    , qs auto

KPSS test for pmtt

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pmtt is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .493

. dfuller         pmtt

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -2.545           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1048

. dfuller         pmtt    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.337           -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8785

. dfgls   pmtt

DF-GLS for pmtt                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.018           -3.732            -2.713            -2.430
    9           -0.953           -3.732            -2.766            -2.484
    8           -0.972           -3.732            -2.821            -2.539
    7           -0.782           -3.732            -2.877            -2.594
    6           -0.696           -3.732            -2.933            -2.648
    5           -0.476           -3.732            -2.988            -2.701
    4           -0.460           -3.732            -3.041            -2.750
    3           -0.278           -3.732            -3.090            -2.795
    2           -0.378           -3.732            -3.134            -2.836
    1           -0.371           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  111.3114
Min SC   =  9.583513 at lag  1 with RMSE  111.3114
Min MAIC =  9.471509 at lag  1 with RMSE  111.3114

. pperron         pmtt

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.166          -19.062           -13.372           -10.754
 Z(t)             -2.448           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1286

. zandrews        pmtt

Zivot-Andrews unit root test for  pmtt

Allowing for break in intercept

Lag selection via TTest: lags of D.pmtt included = 2

Minimum t-statistic -3.016 at   2007m7 (obs 43)
```

```
Critical values: 1%: -5.43 5%: -4.80

. kpss    poc2    , qs auto

KPSS test for poc2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: poc2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .263

. dfuller         poc2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.922            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7806

. dfuller         poc2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.187            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9132

. dfgls   poc2

DF-GLS for poc2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.720           -3.732            -2.713            -2.430
    9            -1.889           -3.732            -2.766            -2.484
    8            -1.691           -3.732            -2.821            -2.539
    7            -1.900           -3.732            -2.877            -2.594
    6            -1.656           -3.732            -2.933            -2.648
    5            -1.926           -3.732            -2.988            -2.701
    4            -1.604           -3.732            -3.041            -2.750
    3            -1.988           -3.732            -3.090            -2.795
    2            -1.509           -3.732            -3.134            -2.836
    1            -2.178           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  3 with RMSE  .1517761
Min SC   = -3.452998 at lag  3 with RMSE  .1517761
Min MAIC = -3.485847 at lag  2 with RMSE  .1586961
```

```
. pperron         poc2

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.991           -19.062           -13.372           -10.754
 Z(t)             -1.080            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7228

. zandrews        poc2

Zivot-Andrews unit root test for  poc2

Allowing for break in intercept

Lag selection via TTest: lags of D.poc2 included = 2

Minimum t-statistic -26.548 at   2006m2 (obs 26)

Critical values: 1%: -5.43 5%: -4.80

. kpss    prga    , qs auto

KPSS test for prga

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: prga is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .465

. dfuller         prga

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.816            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3723

. dfuller         prga    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.038            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5804
```

```
. dfgls   prga

DF-GLS for prga                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.233          -3.732            -2.713            -2.430
    9            -1.998          -3.732            -2.766            -2.484
    8            -1.112          -3.732            -2.821            -2.539
    7            -0.840          -3.732            -2.877            -2.594
    6            -0.836          -3.732            -2.933            -2.648
    5            -0.833          -3.732            -2.988            -2.701
    4            -0.829          -3.732            -3.041            -2.750
    3            -0.825          -3.732            -3.090            -2.795
    2            -0.821          -3.732            -3.134            -2.836
    1            -0.816          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE    .20578
Min SC   = -2.636464 at lag  1 with RMSE  .2471754
Min MAIC = -2.725473 at lag  1 with RMSE  .2471754

. pperron         prga

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.945           -19.062           -13.372           -10.754
 Z(t)             -1.835            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3632

. zandrews        prga

Zivot-Andrews unit root test for  prga

Allowing for break in intercept

Lag selection via TTest: lags of D.prga included = 0

Minimum t-statistic -3.065 at   2006m9 (obs 33)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pvr2    , qs auto

KPSS test for pvr2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pvr2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .304
```

```
. dfuller         pvr2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.278            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1792

. dfuller         pvr2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.350            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8751

. dfgls   pvr2

DF-GLS for pvr2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -0.694            -3.732            -2.713            -2.430
    9           -0.487            -3.732            -2.766            -2.484
    8           -0.873            -3.732            -2.821            -2.539
    7           -0.631            -3.732            -2.877            -2.594
    6           -0.211            -3.732            -2.933            -2.648
    5           -0.290            -3.732            -2.988            -2.701
    4           -0.327            -3.732            -3.041            -2.750
    3           -0.260            -3.732            -3.090            -2.795
    2           -0.114            -3.732            -3.134            -2.836
    1            0.110            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  4.641044
Min SC   =  3.388304 at lag  1 with RMSE  5.026517
Min MAIC =  3.251538 at lag  2 with RMSE  4.877544

. pperron         pvr2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.976           -19.062           -13.372           -10.754
 Z(t)             -2.302            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1714

. zandrews        pvr2
```

```
Zivot-Andrews unit root test for  pvr2

Allowing for break in intercept

Lag selection via TTest: lags of D.pvr2 included = 0

Minimum t-statistic -2.306 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pvrs    , qs auto

KPSS test for pvrs

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pvrs is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .429

. dfuller         pvrs

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.350            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1562

. dfuller         pvrs    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.549            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8119

. dfgls   pvrs

DF-GLS for pvrs                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.106            -3.732            -2.713            -2.430
    9           -0.989            -3.732            -2.766            -2.484
    8           -0.735            -3.732            -2.821            -2.539
    7           -0.689            -3.732            -2.877            -2.594
    6           -0.826            -3.732            -2.933            -2.648
    5           -0.749            -3.732            -2.988            -2.701
```

```
    4           -0.809          -3.732           -3.041           -2.750
    3           -0.580          -3.732           -3.090           -2.795
    2           -0.665          -3.732           -3.134           -2.836
    1           -0.565          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  17.69679
Min SC   =  5.905616 at lag  1 with RMSE  17.69679
Min MAIC =  5.801832 at lag  1 with RMSE  17.69679

. pperron         pvrs

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.228           -19.062           -13.372           -10.754
 Z(t)             -2.260            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1852

. zandrews        pvrs

Zivot-Andrews unit root test for  pvrs

Allowing for break in intercept

Lag selection via TTest: lags of D.pvrs included = 2

Minimum t-statistic -2.910 at   2005m1 (obs 13)

Critical values: 1%: -5.43 5%: -4.80

. kpss    rfr2    , qs auto

KPSS test for rfr2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: rfr2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .323

. dfuller         rfr2

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.723            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0701

. dfuller         rfr2    ,  trend
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.884            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6631

. dfgls   rfr2

DF-GLS for rfr2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10            1.732           -3.732            -2.713            -2.430
    9             1.732           -3.732            -2.766            -2.484
    8             1.732           -3.732            -2.821            -2.539
    7             1.732           -3.732            -2.877            -2.594
    6             1.732           -3.732            -2.933            -2.648
    5             1.732           -3.732            -2.988            -2.701
    4             1.732           -3.732            -3.041            -2.750
    3             1.732           -3.732            -3.090            -2.795
    2             1.732           -3.732            -3.134            -2.836
    1             1.732           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  2 with RMSE  .1370845
Min SC   = -3.815465 at lag  1 with RMSE  .1370845
Min MAIC = -3.672797 at lag  1 with RMSE  .1370845

. pperron         rfr2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -8.611           -19.062           -13.372           -10.754
 Z(t)             -2.705            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0731

. zandrews        rfr2

Zivot-Andrews unit root test for  rfr2

Allowing for break in intercept

Lag selection via TTest: lags of D.rfr2 included = 0

Minimum t-statistic -2.030 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    rnhp    , qs auto

KPSS test for rnhp
```

```
Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: rnhp is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .159

. dfuller         rnhp

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.529            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8862

. dfuller         rnhp    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.967            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6193

. dfgls   rnhp

DF-GLS for rnhp                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.991           -3.732            -2.713            -2.430
    9           -2.019           -3.732            -2.766            -2.484
    8           -2.077           -3.732            -2.821            -2.539
    7           -2.218           -3.732            -2.877            -2.594
    6           -2.146           -3.732            -2.933            -2.648
    5           -2.323           -3.732            -2.988            -2.701
    4           -2.315           -3.732            -3.041            -2.750
    3           -2.345           -3.732            -3.090            -2.795
    2           -2.370           -3.732            -3.134            -2.836
    1           -2.313           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  6.728164
Min SC   =  3.971454 at lag  1 with RMSE  6.728164
Min MAIC =  4.097523 at lag  1 with RMSE  6.728164

. pperron         rnhp

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -0.828           -19.062           -13.372           -10.754
 Z(t)            -0.626            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8651

. zandrews        rnhp

Zivot-Andrews unit root test for  rnhp

Allowing for break in intercept

Lag selection via TTest: lags of D.rnhp included = 1

Minimum t-statistic -8.648 at   2005m9 (obs 21)

Critical values: 1%: -5.43 5%: -4.80

. kpss    tgl2    , qs auto

KPSS test for tgl2

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: tgl2 is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .122

. dfuller         tgl2

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.108            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2414

. dfuller         tgl2    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.517            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3196

. dfgls   tgl2

DF-GLS for tgl2                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion
```

```
              DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.894          -3.732            -2.713            -2.430
    9           -2.925          -3.732            -2.766            -2.484
    8           -2.955          -3.732            -2.821            -2.539
    7           -4.963          -3.732            -2.877            -2.594
    6           -4.258          -3.732            -2.933            -2.648
    5           -3.809          -3.732            -2.988            -2.701
    4           -3.492          -3.732            -3.041            -2.750
    3           -3.255          -3.732            -3.090            -2.795
    2           -3.285          -3.732            -3.134            -2.836
    1           -3.314          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  .0906695
Min SC   = -4.086245 at lag  8 with RMSE  .0906695
Min MAIC =  -3.51185 at lag  1 with RMSE  .1282057

. pperron         tgl2

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -9.928          -19.062           -13.372           -10.754
 Z(t)             -2.267           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1829

. zandrews        tgl2

Zivot-Andrews unit root test for  tgl2

Allowing for break in intercept

Lag selection via TTest: lags of D.tgl2 included = 0

Minimum t-statistic -4.471 at   2005m4 (obs 16)

Critical values: 1%: -5.43 5%: -4.80

. kpss    stgo    , qs auto

KPSS test for stgo

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: stgo is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .306

. dfuller         stgo

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                Test         1% Critical       5% Critical      10% Critical
              Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.377            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1483

. dfuller         stgo    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                Test         1% Critical       5% Critical      10% Critical
              Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.049            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5745

. dfgls   stgo

DF-GLS for stgo                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

              DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic       Value             Value             Value
------------------------------------------------------------------------------
    10          -2.914          -3.732            -2.713            -2.430
    9           -2.813          -3.732            -2.766            -2.484
    8           -2.725          -3.732            -2.821            -2.539
    7           -2.646          -3.732            -2.877            -2.594
    6           -2.574          -3.732            -2.933            -2.648
    5           -2.508          -3.732            -2.988            -2.701
    4           -2.448          -3.732            -3.041            -2.750
    3           -2.394          -3.732            -3.090            -2.795
    2           -2.344          -3.732            -3.134            -2.836
    1           -2.296          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  -3.73687 at lag  1 with RMSE  .1425789
Min MAIC = -3.623053 at lag  1 with RMSE  .1425789

. pperron         stgo

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                Test         1% Critical       5% Critical      10% Critical
              Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -6.914           -19.062           -13.372           -10.754
 Z(t)            -2.400            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1419

. zandrews        stgo

Zivot-Andrews unit root test for  stgo

Allowing for break in intercept

Lag selection via TTest: lags of D.stgo included = 0
```

```
Minimum t-statistic -5.297 at  2004m11 (obs 11)

Critical values: 1%: -5.43 5%: -4.80

. kpss    chol    , qs auto

KPSS test for chol

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: chol is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .398

. dfuller         chol

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.292            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9770

. dfuller         chol    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.736            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7348

. dfgls   chol

DF-GLS for chol                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.242            -3.732            -2.713            -2.430
    9           -2.010            -3.732            -2.766            -2.484
    8           -1.687            -3.732            -2.821            -2.539
    7           -1.963            -3.732            -2.877            -2.594
    6           -1.886            -3.732            -2.933            -2.648
    5           -1.740            -3.732            -2.988            -2.701
    4           -1.406            -3.732            -3.041            -2.750
    3           -1.144            -3.732            -3.090            -2.795
    2           -0.992            -3.732            -3.134            -2.836
    1           -1.063            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
```

```
Min SC   =  1.253997 at lag  1 with RMSE  1.729052
Min MAIC =  1.184889 at lag  1 with RMSE  1.729052

. pperron         chol

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.167           -19.062           -13.372           -10.754
 Z(t)              0.167            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9703

. zandrews        chol

Zivot-Andrews unit root test for  chol

Allowing for break in intercept

Lag selection via TTest: lags of D.chol included = 0

Minimum t-statistic -4.666 at   2006m7 (obs 31)

Critical values: 1%: -5.43 5%: -4.80

. kpss    te      , qs auto

KPSS test for te

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: te is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .322

. dfuller         te

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.814            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3737

. dfuller         te      ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -1.778            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7154

. dfgls   te

DF-GLS for te                                            Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.327           -3.732            -2.713            -2.430
    9            -1.278           -3.732            -2.766            -2.484
    8            -1.434           -3.732            -2.821            -2.539
    7            -1.706           -3.732            -2.877            -2.594
    6            -1.547           -3.732            -2.933            -2.648
    5            -1.409           -3.732            -2.988            -2.701
    4            -1.470           -3.732            -3.041            -2.750
    3            -1.367           -3.732            -3.090            -2.795
    2            -1.459           -3.732            -3.134            -2.836
    1            -1.468           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  121.6172
Min SC   =  9.760607 at lag  1 with RMSE  121.6172
Min MAIC =  9.739434 at lag  1 with RMSE  121.6172

. pperron         te

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.828           -19.062           -13.372           -10.754
 Z(t)             -1.698            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4321

. zandrews        te

Zivot-Andrews unit root test for  te

Allowing for break in intercept

Lag selection via TTest: lags of D.te included = 2

Minimum t-statistic -3.394 at   2006m9 (obs 33)

Critical values: 1%: -5.43 5%: -4.80

. kpss    atlh    , qs auto

KPSS test for atlh

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: atlh is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    2           .536

. dfuller         atlh

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.535            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1073

. dfuller         atlh    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.770            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9681

. dfgls   atlh

DF-GLS for atlh                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.479           -3.732            -2.713            -2.430
    9           -1.309           -3.732            -2.766            -2.484
    8           -1.610           -3.732            -2.821            -2.539
    7           -1.319           -3.732            -2.877            -2.594
    6           -1.042           -3.732            -2.933            -2.648
    5           -0.646           -3.732            -2.988            -2.701
    4           -0.552           -3.732            -3.041            -2.750
    3           -0.472           -3.732            -3.090            -2.795
    2           -0.389           -3.732            -3.134            -2.836
    1           -0.522           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  6 with RMSE  1.560368
Min SC   =  1.172019 at lag  1 with RMSE  1.659613
Min MAIC =  1.066106 at lag  1 with RMSE  1.659613

. pperron         atlh

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -3.294           -19.062           -13.372           -10.754
 Z(t)             -2.469            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.1233

. zandrews        atlh

Zivot-Andrews unit root test for  atlh

Allowing for break in intercept

Lag selection via TTest: lags of D.atlh included = 0

Minimum t-statistic -1.834 at   2007m7 (obs 43)

Critical values: 1%: -5.43 5%: -4.80

. kpss    chos    , qs auto

KPSS test for chos

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: chos is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .529

. dfuller         chos

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.093            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2472

. dfuller         chos    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.659            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7683

. dfgls   chos

DF-GLS for chos                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.156           -3.732            -2.713            -2.430
    9            -1.197           -3.732            -2.766            -2.484
    8            -1.264           -3.732            -2.821            -2.539
```

```
    7           -1.251          -3.732           -2.877           -2.594
    6           -1.112          -3.732           -2.933           -2.648
    5           -1.010          -3.732           -2.988           -2.701
    4           -0.483          -3.732           -3.041           -2.750
    3           -0.541          -3.732           -3.090           -2.795
    2           -0.294          -3.732           -3.134           -2.836
    1           -0.583          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  1.010639
Min SC   =  .4379748 at lag  1 with RMSE  1.149771
Min MAIC =  .2815481 at lag  5 with RMSE  1.010639

. pperron         chos

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.365           -19.062           -13.372           -10.754
 Z(t)             -2.327            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1633

. zandrews        chos

Zivot-Andrews unit root test for  chos

Allowing for break in intercept

Lag selection via TTest: lags of D.chos included = 0

Minimum t-statistic -2.318 at   2007m1 (obs 37)

Critical values: 1%: -5.43 5%: -4.80

. kpss    cnrp    , qs auto

KPSS test for cnrp

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: cnrp is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .314

. dfuller         cnrp

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.894            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0461
```

```
. dfuller         cnrp    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.502            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3268

. dfgls   cnrp

DF-GLS for cnrp                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10              .             -3.732            -2.713            -2.430
    9               .             -3.732            -2.766            -2.484
    8               .             -3.732            -2.821            -2.539
    7               .             -3.732            -2.877            -2.594
    6               .             -3.732            -2.933            -2.648
    5               .             -3.732            -2.988            -2.701
    4               .             -3.732            -3.041            -2.750
    3               .             -3.732            -3.090            -2.795
    2               .             -3.732            -3.134            -2.836
    1               .             -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =         . at lag  . with RMSE         .
Min MAIC =         . at lag  . with RMSE         .

. pperron         cnrp

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -7.941           -19.062           -13.372           -10.754
 Z(t)             -2.901            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0452

. zandrews        cnrp

Zivot-Andrews unit root test for  cnrp

Allowing for break in intercept

Lag selection via TTest: lags of D.cnrp included = 0

Minimum t-statistic -2.504 at   2006m4 (obs 28)

Critical values: 1%: -5.43 5%: -4.80

. kpss    crrl    , qs auto
```

```
KPSS test for crrl

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: crrl is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .512

. dfuller         crrl

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              4.907            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. dfuller         crrl    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.138            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. dfgls   crrl

DF-GLS for crrl                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -1.644           -3.732            -2.713            -2.430
    9           -1.762           -3.732            -2.766            -2.484
    8           -1.643           -3.732            -2.821            -2.539
    7           -1.488           -3.732            -2.877            -2.594
    6           -1.639           -3.732            -2.933            -2.648
    5           -1.660           -3.732            -2.988            -2.701
    4           -1.131           -3.732            -3.041            -2.750
    3           -0.982           -3.732            -3.090            -2.795
    2           -0.893           -3.732            -3.134            -2.836
    1           -0.654           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  2.050728
Min SC   =  1.725016 at lag  1 with RMSE  2.188208
Min MAIC =  1.626303 at lag  1 with RMSE  2.188208

. pperron         crrl

Phillips-Perron test for unit root                 Number of obs   =        59
```

```
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)             2.965           -19.062           -13.372           -10.754
 Z(t)               2.757            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. zandrews        crrl

Zivot-Andrews unit root test for  crrl

Allowing for break in intercept

Lag selection via TTest: lags of D.crrl included = 1

Minimum t-statistic -7.386 at   2007m9 (obs 45)

Critical values: 1%: -5.43 5%: -4.80

. kpss    flco    , qs auto

KPSS test for flco

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: flco is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .117

. dfuller         flco

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              -2.414            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1378

. dfuller         flco    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              -2.426            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3660

. dfgls   flco
```

```
DF-GLS for flco                                         Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.370           -3.732            -2.713            -2.430
    9            -2.212           -3.732            -2.766            -2.484
    8            -2.087           -3.732            -2.821            -2.539
    7            -1.986           -3.732            -2.877            -2.594
    6            -1.901           -3.732            -2.933            -2.648
    5            -3.273           -3.732            -2.988            -2.701
    4            -2.943           -3.732            -3.041            -2.750
    3            -2.705           -3.732            -3.090            -2.795
    2            -2.523           -3.732            -3.134            -2.836
    1            -2.380           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  6 with RMSE  .1679565
Min SC   = -3.153346 at lag  1 with RMSE  .1908823
Min MAIC = -3.002589 at lag  1 with RMSE  .1908823

. pperron         flco

Phillips-Perron test for unit root                   Number of obs   =        59
                                                     Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -13.041           -19.062           -13.372           -10.754
 Z(t)             -2.621            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0887

. zandrews        flco

Zivot-Andrews unit root test for  flco

Allowing for break in intercept

Lag selection via TTest: lags of D.flco included = 0

Minimum t-statistic -3.918 at  2007m12 (obs 48)

Critical values: 1%: -5.43 5%: -4.80

. kpss    ftrn    , qs auto

KPSS test for ftrn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: ftrn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .241

. dfuller         ftrn
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.254            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9751

. dfuller         ftrn    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.373            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8687

. dfgls   ftrn

DF-GLS for ftrn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.983            -3.732            -2.713            -2.430
    9           -2.412            -3.732            -2.766            -2.484
    8           -2.288            -3.732            -2.821            -2.539
    7           -2.033            -3.732            -2.877            -2.594
    6           -2.060            -3.732            -2.933            -2.648
    5           -1.604            -3.732            -2.988            -2.701
    4           -1.560            -3.732            -3.041            -2.750
    3           -1.737            -3.732            -3.090            -2.795
    2           -1.045            -3.732            -3.134            -2.836
    1           -0.841            -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  3.192161
Min SC   =  2.873717 at lag  3 with RMSE  3.589484
Min MAIC =  2.827816 at lag  3 with RMSE  3.589484

. pperron         ftrn

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.205           -19.062           -13.372           -10.754
 Z(t)              0.246            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9747

. zandrews        ftrn

Zivot-Andrews unit root test for  ftrn
```

```
Allowing for break in intercept

Lag selection via TTest: lags of D.ftrn included = 0

Minimum t-statistic -2.354 at   2006m9 (obs 33)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lanc    , qs auto

KPSS test for lanc

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lanc is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2            .39

. dfuller         lanc

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.100            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9494

. dfuller         lanc    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.166            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9172

. dfgls   lanc

DF-GLS for lanc                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.836           -3.732            -2.713            -2.430
    9            -3.083           -3.732            -2.766            -2.484
    8            -2.811           -3.732            -2.821            -2.539
    7            -2.197           -3.732            -2.877            -2.594
    6            -2.448           -3.732            -2.933            -2.648
    5            -2.087           -3.732            -2.988            -2.701
    4            -1.821           -3.732            -3.041            -2.750
    3            -1.489           -3.732            -3.090            -2.795
    2            -1.062           -3.732            -3.134            -2.836
```

```
    1           -1.061          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  2.430897
Min SC   =   2.36668 at lag  4 with RMSE  2.677217
Min MAIC =  2.294145 at lag  4 with RMSE  2.677217

. pperron         lanc

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.071           -19.062           -13.372           -10.754
 Z(t)             -0.147            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9445

. zandrews        lanc

Zivot-Andrews unit root test for  lanc

Allowing for break in intercept

Lag selection via TTest: lags of D.lanc included = 0

Minimum t-statistic -2.858 at  2006m11 (obs 35)

Critical values: 1%: -5.43 5%: -4.80

. kpss    llfn    , qs auto

KPSS test for llfn

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: llfn is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .261

. dfuller         llfn

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.540            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8839

. dfuller         llfn    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.819            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6956

. dfgls   llfn

DF-GLS for llfn                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.224           -3.732            -2.713            -2.430
    9            -1.676           -3.732            -2.766            -2.484
    8            -1.203           -3.732            -2.821            -2.539
    7            -1.272           -3.732            -2.877            -2.594
    6            -1.339           -3.732            -2.933            -2.648
    5            -1.402           -3.732            -2.988            -2.701
    4            -1.461           -3.732            -3.041            -2.750
    3            -1.517           -3.732            -3.090            -2.795
    2            -1.561           -3.732            -3.134            -2.836
    1            -1.654           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  .2916935
Min SC   = -2.067922 at lag  1 with RMSE  .3284449
Min MAIC = -2.064124 at lag  1 with RMSE  .3284449

. pperron         llfn

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.837           -19.062           -13.372           -10.754
 Z(t)             -0.590            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8731

. zandrews        llfn

Zivot-Andrews unit root test for  llfn

Allowing for break in intercept

Lag selection via TTest: lags of D.llfn included = 0

Minimum t-statistic -4.708 at   2006m4 (obs 28)

Critical values: 1%: -5.43 5%: -4.80

. kpss    llgs    , qs auto

KPSS test for llgs

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel
```

```
Critical values for H0: llgs is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .355

. dfuller         llgs

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.469            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9974

. dfuller         llgs    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.283            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9899

. dfgls   llgs

DF-GLS for llgs                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -3.040          -3.732            -2.713            -2.430
    9           -3.273          -3.732            -2.766            -2.484
    8           -2.738          -3.732            -2.821            -2.539
    7           -2.602          -3.732            -2.877            -2.594
    6           -2.484          -3.732            -2.933            -2.648
    5           -2.107          -3.732            -2.988            -2.701
    4           -1.982          -3.732            -3.041            -2.750
    3           -1.813          -3.732            -3.090            -2.795
    2           -1.325          -3.732            -3.134            -2.836
    1           -1.020          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE  3.842853
Min SC   =  3.164528 at lag  1 with RMSE  4.494431
Min MAIC =  3.092604 at lag  1 with RMSE  4.494431

. pperron         llgs

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(rho)            0.811           -19.062           -13.372           -10.754
 Z(t)              0.999            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9943

. zandrews        llgs

Zivot-Andrews unit root test for  llgs

Allowing for break in intercept

Lag selection via TTest: lags of D.llgs included = 1

Minimum t-statistic -2.467 at  2007m10 (obs 46)

Critical values: 1%: -5.43 5%: -4.80

. kpss    mafi    , qs auto

KPSS test for mafi

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: mafi is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .466

. dfuller         mafi

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.361            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6010

. dfuller         mafi    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.228            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9910

. dfgls   mafi

DF-GLS for mafi                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
```

```
    10          -2.082          -3.732            -2.713            -2.430
    9           -1.676          -3.732            -2.766            -2.484
    8           -1.629          -3.732            -2.821            -2.539
    7           -1.552          -3.732            -2.877            -2.594
    6           -1.751          -3.732            -2.933            -2.648
    5           -1.930          -3.732            -2.988            -2.701
    4           -1.919          -3.732            -3.041            -2.750
    3           -1.498          -3.732            -3.090            -2.795
    2           -1.447          -3.732            -3.134            -2.836
    1           -1.344          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  4 with RMSE   2.11789
Min SC   =  1.759591 at lag  1 with RMSE  2.226366
Min MAIC =  1.721513 at lag  1 with RMSE  2.226366

. pperron         mafi

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.940           -19.062           -13.372           -10.754
 Z(t)             -1.172            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6856

. zandrews        mafi

Zivot-Andrews unit root test for  mafi

Allowing for break in intercept

Lag selection via TTest: lags of D.mafi included = 1

Minimum t-statistic -3.249 at   2005m2 (obs 14)

Critical values: 1%: -5.43 5%: -4.80

. kpss    mhin    , qs auto

KPSS test for mhin

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: mhin is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .338

. dfuller         mhin

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -1.069           -3.567           -2.923           -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7273

. dfuller         mhin    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.696           -4.130           -3.491           -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9734

. dfgls   mhin

DF-GLS for mhin                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.096           -3.732           -2.713           -2.430
    9            -2.251           -3.732           -2.766           -2.484
    8            -1.719           -3.732           -2.821           -2.539
    7            -1.413           -3.732           -2.877           -2.594
    6            -1.605           -3.732           -2.933           -2.648
    5            -1.545           -3.732           -2.988           -2.701
    4            -2.149           -3.732           -3.041           -2.750
    3            -1.985           -3.732           -3.090           -2.795
    2            -1.276           -3.732           -3.134           -2.836
    1            -0.815           -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE  .3463033
Min SC   = -1.564097 at lag  3 with RMSE  .3902771
Min MAIC = -1.614309 at lag  5 with RMSE  .3734455

. pperron         mhin

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.217          -19.062          -13.372          -10.754
 Z(t)             -1.065           -3.567           -2.923           -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7287

. zandrews        mhin

Zivot-Andrews unit root test for  mhin

Allowing for break in intercept

Lag selection via TTest: lags of D.mhin included = 2

Minimum t-statistic -4.022 at   2006m3 (obs 27)
```

```
Critical values: 1%: -5.43 5%: -4.80

. kpss    mlns    , qs auto

KPSS test for mlns

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: mlns is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .441

. dfuller         mlns

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.656            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9889

. dfuller         mlns    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.312            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8850

. dfgls   mlns

DF-GLS for mlns                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.959           -3.732            -2.713            -2.430
    9            -0.958           -3.732            -2.766            -2.484
    8            -0.997           -3.732            -2.821            -2.539
    7            -0.912           -3.732            -2.877            -2.594
    6            -0.960           -3.732            -2.933            -2.648
    5            -0.818           -3.732            -2.988            -2.701
    4            -0.880           -3.732            -3.041            -2.750
    3            -0.996           -3.732            -3.090            -2.795
    2            -1.051           -3.732            -3.134            -2.836
    1            -1.381           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -1.727281 at lag  1 with RMSE  .3894322
Min MAIC = -1.780656 at lag  2 with RMSE   .383536
```

```
. pperron         mlns

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            3.457           -19.062           -13.372           -10.754
 Z(t)              1.192            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9959

. zandrews        mlns

Zivot-Andrews unit root test for  mlns

Allowing for break in intercept

Lag selection via TTest: lags of D.mlns included = 0

Minimum t-statistic -3.024 at  2007m10 (obs 46)

Critical values: 1%: -5.43 5%: -4.80

. kpss    mlue    , qs auto

KPSS test for mlue

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: mlue is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .505

. dfuller         mlue

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.668            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0798

. dfuller         mlue    ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.584            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7987
```

```
. dfgls   mlue

DF-GLS for mlue                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.654           -3.732            -2.713            -2.430
    9            -0.882           -3.732            -2.766            -2.484
    8            -0.578           -3.732            -2.821            -2.539
    7            -0.598           -3.732            -2.877            -2.594
    6            -0.619           -3.732            -2.933            -2.648
    5            -0.624           -3.732            -2.988            -2.701
    4            -0.765           -3.732            -3.041            -2.750
    3            -0.833           -3.732            -3.090            -2.795
    2            -0.383           -3.732            -3.134            -2.836
    1            -0.220           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 10 with RMSE  .4469421
Min SC   = -.9102312 at lag  3 with RMSE  .5412005
Min MAIC = -1.072391 at lag  3 with RMSE  .5412005

. pperron         mlue

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.781           -19.062           -13.372           -10.754
 Z(t)             -2.705            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0731

. zandrews        mlue

Zivot-Andrews unit root test for  mlue

Allowing for break in intercept

Lag selection via TTest: lags of D.mlue included = 0

Minimum t-statistic -2.153 at   2005m5 (obs 17)

Critical values: 1%: -5.43 5%: -4.80

. kpss    nbla    , qs auto

KPSS test for nbla

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: nbla is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .254
```

```
. dfuller         nbla

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             1.270            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9964

. dfuller         nbla    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -1.654            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7705

. dfgls   nbla

DF-GLS for nbla                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -0.711           -3.732            -2.713            -2.430
    9           -0.726           -3.732            -2.766            -2.484
    8           -0.721           -3.732            -2.821            -2.539
    7           -0.879           -3.732            -2.877            -2.594
    6           -0.947           -3.732            -2.933            -2.648
    5           -0.920           -3.732            -2.988            -2.701
    4           -1.075           -3.732            -3.041            -2.750
    3           -1.155           -3.732            -3.090            -2.795
    2           -1.191           -3.732            -3.134            -2.836
    1           -1.500           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  9.724485
Min SC   =  4.857977 at lag  1 with RMSE    10.481
Min MAIC =  4.840822 at lag  2 with RMSE  10.38435

. pperron         nbla

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           7.486           -19.062           -13.372           -10.754
 Z(t)             1.499            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9975

. zandrews        nbla
```

```
Zivot-Andrews unit root test for  nbla

Allowing for break in intercept

Lag selection via TTest: lags of D.nbla included = 0

Minimum t-statistic -2.952 at   2005m1 (obs 13)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pchy    , qs auto

KPSS test for pchy

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pchy is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .243

. dfuller         pchy

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.436            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9039

. dfuller         pchy    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.226            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4754

. dfgls   pchy

DF-GLS for pchy                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.840           -3.732            -2.713            -2.430
    9            -1.656           -3.732            -2.766            -2.484
    8            -1.698           -3.732            -2.821            -2.539
    7            -1.776           -3.732            -2.877            -2.594
    6            -1.430           -3.732            -2.933            -2.648
    5            -1.643           -3.732            -2.988            -2.701
```

```
    4           -1.736          -3.732           -3.041           -2.750
    3           -1.821          -3.732           -3.090           -2.795
    2           -1.512          -3.732           -3.134           -2.836
    1           -1.641          -3.732           -3.171           -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  -2.49535 at lag  1 with RMSE  .2652454
Min MAIC = -2.491211 at lag  1 with RMSE  .2652454

. pperron         pchy

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.475           -19.062           -13.372           -10.754
 Z(t)             -0.408            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9087

. zandrews        pchy

Zivot-Andrews unit root test for  pchy

Allowing for break in intercept

Lag selection via TTest: lags of D.pchy included = 0

Minimum t-statistic -4.178 at   2007m3 (obs 39)

Critical values: 1%: -5.43 5%: -4.80

. kpss    plch    , qs auto

KPSS test for plch

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: plch is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .25

. dfuller         plch

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.669            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8545

. dfuller         plch    ,  trend
```

```
Dickey-Fuller test for unit root                   Number of obs   =        59

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.646            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7737

. dfgls   plch

DF-GLS for plch                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.227           -3.732            -2.713            -2.430
    9            -1.643           -3.732            -2.766            -2.484
    8            -2.230           -3.732            -2.821            -2.539
    7            -2.130           -3.732            -2.877            -2.594
    6            -2.209           -3.732            -2.933            -2.648
    5            -1.890           -3.732            -2.988            -2.701
    4            -1.515           -3.732            -3.041            -2.750
    3            -1.540           -3.732            -3.090            -2.795
    2            -1.547           -3.732            -3.134            -2.836
    1            -1.634           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  .2908881
Min SC   = -2.245243 at lag  1 with RMSE  .3005784
Min MAIC = -2.244823 at lag  1 with RMSE  .3005784

. pperron         plch

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.228           -19.062           -13.372           -10.754
 Z(t)             -0.755            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8319

. zandrews        plch

Zivot-Andrews unit root test for  plch

Allowing for break in intercept

Lag selection via TTest: lags of D.plch included = 1

Minimum t-statistic -3.461 at   2007m1 (obs 37)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pllc    , qs auto

KPSS test for pllc
```

```
Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pllc is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .252

. dfuller         pllc

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.184            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9404

. dfuller         pllc    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.279            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8930

. dfgls   pllc

DF-GLS for pllc                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.032           -3.732            -2.713            -2.430
    9           -2.154           -3.732            -2.766            -2.484
    8           -2.277           -3.732            -2.821            -2.539
    7           -2.186           -3.732            -2.877            -2.594
    6           -1.895           -3.732            -2.933            -2.648
    5           -2.186           -3.732            -2.988            -2.701
    4           -1.664           -3.732            -3.041            -2.750
    3           -1.472           -3.732            -3.090            -2.795
    2           -1.558           -3.732            -3.134            -2.836
    1           -1.394           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  4.793097
Min SC   =  3.433556 at lag  1 with RMSE  5.141541
Min MAIC =  3.400388 at lag  1 with RMSE  5.141541

. pperron         pllc

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -0.183           -19.062           -13.372           -10.754
 Z(t)            -0.274            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9290

. zandrews        pllc

Zivot-Andrews unit root test for  pllc

Allowing for break in intercept

Lag selection via TTest: lags of D.pllc included = 1

Minimum t-statistic -2.978 at   2006m6 (obs 30)

Critical values: 1%: -5.43 5%: -4.80

. kpss    pngp    , qs auto

KPSS test for pngp

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: pngp is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .265

. dfuller         pngp

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -1.191            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6774

. dfuller         pngp    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -2.055            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5712

. dfgls   pngp

DF-GLS for pngp                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion
```

```
              DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic       Value             Value             Value
------------------------------------------------------------------------------
    10           -2.314           -3.732            -2.713            -2.430
    9            -2.089           -3.732            -2.766            -2.484
    8            -1.485           -3.732            -2.821            -2.539
    7            -1.577           -3.732            -2.877            -2.594
    6            -1.349           -3.732            -2.933            -2.648
    5            -1.234           -3.732            -2.988            -2.701
    4            -1.450           -3.732            -3.041            -2.750
    3            -1.723           -3.732            -3.090            -2.795
    2            -1.566           -3.732            -3.134            -2.836
    1            -1.629           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  9 with RMSE  5.334108
Min SC   =  3.797658 at lag  1 with RMSE  6.168183
Min MAIC =  3.798408 at lag  1 with RMSE  6.168183

. pperron         pngp

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.167           -19.062           -13.372           -10.754
 Z(t)             -1.188            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6788

. zandrews        pngp

Zivot-Andrews unit root test for  pngp

Allowing for break in intercept

Lag selection via TTest: lags of D.pngp included = 0

Minimum t-statistic -2.500 at   2006m6 (obs 30)

Critical values: 1%: -5.43 5%: -4.80

. kpss    prop    , qs auto

KPSS test for prop

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: prop is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .448

. dfuller         prop

Dickey-Fuller test for unit root                  Number of obs   =        59

                              ---------- Interpolated Dickey-Fuller ---------
```

```
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.816            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0560

. dfuller         prop    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.795            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7072

. dfgls   prop

DF-GLS for prop                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.042           -3.732            -2.713            -2.430
    9            -1.078           -3.732            -2.766            -2.484
    8            -1.012           -3.732            -2.821            -2.539
    7            -0.583           -3.732            -2.877            -2.594
    6            -0.586           -3.732            -2.933            -2.648
    5            -0.497           -3.732            -2.988            -2.701
    4            -0.672           -3.732            -3.041            -2.750
    3            -0.833           -3.732            -3.090            -2.795
    2            -0.753           -3.732            -3.134            -2.836
    1            -0.615           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  8 with RMSE  1.358457
Min SC   =  .9552574 at lag  1 with RMSE  1.489147
Min MAIC =   .854013 at lag  1 with RMSE  1.489147

. pperron         prop

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
              Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -5.178           -19.062           -13.372           -10.754
 Z(t)             -2.837            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0532

. zandrews        prop

Zivot-Andrews unit root test for  prop

Allowing for break in intercept

Lag selection via TTest: lags of D.prop included = 0
```

```
Minimum t-statistic -1.988 at   2007m6 (obs 42)

Critical values: 1%: -5.43 5%: -4.80

. kpss    reum    , qs auto

KPSS test for reum

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: reum is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .378

. dfuller         reum

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.276            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1798

. dfuller         reum    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.723            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9716

. dfgls   reum

DF-GLS for reum                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.715           -3.732            -2.713            -2.430
    9            -0.956           -3.732            -2.766            -2.484
    8            -0.753           -3.732            -2.821            -2.539
    7            -0.835           -3.732            -2.877            -2.594
    6            -0.697           -3.732            -2.933            -2.648
    5            -0.483           -3.732            -2.988            -2.701
    4            -0.647           -3.732            -3.041            -2.750
    3            -0.589           -3.732            -3.090            -2.795
    2            -0.359           -3.732            -3.134            -2.836
    1            -0.436           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  1.119364
```

```
Min SC   =  .3843712 at lag  1 with RMSE  1.119364
Min MAIC =  .2751972 at lag  1 with RMSE  1.119364

. pperron         reum

Phillips-Perron test for unit root               Number of obs   =        59
                                                 Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.267           -19.062           -13.372           -10.754
 Z(t)             -2.236            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1935

. zandrews        reum

Zivot-Andrews unit root test for  reum

Allowing for break in intercept

Lag selection via TTest: lags of D.reum included = 0

Minimum t-statistic -1.841 at   2008m3 (obs 51)

Critical values: 1%: -5.43 5%: -4.80

. kpss    sjmq    , qs auto

KPSS test for sjmq

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: sjmq is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .241

. dfuller         sjmq

Dickey-Fuller test for unit root                 Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.088            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9506

. dfuller         sjmq    ,  trend

Dickey-Fuller test for unit root                 Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
```

```
 Z(t)             -1.751            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7279

. dfgls   sjmq

DF-GLS for sjmq                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.618           -3.732            -2.713            -2.430
    9           -2.332           -3.732            -2.766            -2.484
    8           -2.077           -3.732            -2.821            -2.539
    7           -1.887           -3.732            -2.877            -2.594
    6           -1.748           -3.732            -2.933            -2.648
    5           -1.580           -3.732            -2.988            -2.701
    4           -1.567           -3.732            -3.041            -2.750
    3           -1.664           -3.732            -3.090            -2.795
    2           -1.658           -3.732            -3.134            -2.836
    1           -1.715           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  4.446907
Min SC   =  3.143267 at lag  1 with RMSE  4.446907
Min MAIC =  3.155307 at lag  1 with RMSE  4.446907

. pperron         sjmq

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.070           -19.062           -13.372           -10.754
 Z(t)             -0.098            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9496

. zandrews        sjmq

Zivot-Andrews unit root test for  sjmq

Allowing for break in intercept

Lag selection via TTest: lags of D.sjmq included = 0

Minimum t-statistic -2.733 at   2006m6 (obs 30)

Critical values: 1%: -5.43 5%: -4.80

. kpss    vldv    , qs auto

KPSS test for vldv

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: vldv is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216
```

```
Lag order    Test statistic
    2             .4

. dfuller         vldv

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.747            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4070

. dfuller         vldv    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.862            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6742

. dfgls   vldv

DF-GLS for vldv                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -1.752          -3.732            -2.713            -2.430
    9            -1.527          -3.732            -2.766            -2.484
    8            -1.527          -3.732            -2.821            -2.539
    7            -1.388          -3.732            -2.877            -2.594
    6            -1.153          -3.732            -2.933            -2.648
    5            -1.019          -3.732            -2.988            -2.701
    4            -0.906          -3.732            -3.041            -2.750
    3            -0.981          -3.732            -3.090            -2.795
    2            -1.027          -3.732            -3.134            -2.836
    1            -1.067          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  1 with RMSE  102.0209
Min SC   =  9.409204 at lag  1 with RMSE  102.0209
Min MAIC =  9.342381 at lag  1 with RMSE  102.0209

. pperron         vldv

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.484           -19.062           -13.372           -10.754
 Z(t)             -1.736            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.4126

. zandrews       vldv

Zivot-Andrews unit root test for  vldv

Allowing for break in intercept

Lag selection via TTest: lags of D.vldv included = 2

Minimum t-statistic -2.862 at  2006m10 (obs 34)

Critical values: 1%: -5.43 5%: -4.80

. kpss    internet       , qs auto

KPSS test for internet

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: internet is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .396

. dfuller         internet

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.693            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9897

. dfuller         internet       ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.689            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2405

. dfgls   internet

DF-GLS for internet                                      Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -0.621           -3.732            -2.713            -2.430
    9            -0.779           -3.732            -2.766            -2.484
    8            -0.907           -3.732            -2.821            -2.539
```

```
    7          -1.089          -3.732            -2.877            -2.594
    6          -1.196          -3.732            -2.933            -2.648
    5          -0.904          -3.732            -2.988            -2.701
    4          -1.069          -3.732            -3.041            -2.750
    3          -1.315          -3.732            -3.090            -2.795
    2          -1.676          -3.732            -3.134            -2.836
    1          -1.840          -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   =  20.66163 at lag  1 with RMSE  28321.86
Min MAIC =   20.6856 at lag  4 with RMSE  27600.57

. pperron         internet

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.797          -19.062           -13.372           -10.754
 Z(t)              0.969           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9939

. zandrews        internet

Zivot-Andrews unit root test for  internet

Allowing for break in intercept

Lag selection via TTest: lags of D.internet included = 0

Minimum t-statistic -4.783 at   2005m7 (obs 19)

Critical values: 1%: -5.43 5%: -4.80

. kpss    imacec  , qs auto

KPSS test for imacec

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: imacec is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2          .0399

. dfuller         imacec

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.201           -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0200
```

```
. dfuller         imacec  ,  trend

Dickey-Fuller test for unit root                  Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.360            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. dfgls   imacec

DF-GLS for imacec                                        Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10           -2.589           -3.732            -2.713            -2.430
    9            -3.700           -3.732            -2.766            -2.484
    8            -3.321           -3.732            -2.821            -2.539
    7            -3.569           -3.732            -2.877            -2.594
    6            -3.005           -3.732            -2.933            -2.648
    5            -3.942           -3.732            -2.988            -2.701
    4            -3.115           -3.732            -3.041            -2.750
    3            -3.776           -3.732            -3.090            -2.795
    2            -4.027           -3.732            -3.134            -2.836
    1            -4.670           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  4.776067
Min SC   =  3.496149 at lag  1 with RMSE  5.304999
Min MAIC =  4.928872 at lag  1 with RMSE  5.304999

. pperron         imacec

Phillips-Perron test for unit root                Number of obs   =        59
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -13.455           -19.062           -13.372           -10.754
 Z(t)             -2.920            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0431

. zandrews        imacec

Zivot-Andrews unit root test for  imacec

Allowing for break in intercept

Lag selection via TTest: lags of D.imacec included = 0

Minimum t-statistic -6.472 at   2006m3 (obs 27)

Critical values: 1%: -5.43 5%: -4.80

. kpss    lineastotales   , qs auto
```

```
KPSS test for lineastotales

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: lineastotales is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .223

. dfuller         lineastotales

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.257            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6485

. dfuller         lineastotales   ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.215            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9073

. dfgls   lineastotales

DF-GLS for lineastotales                                 Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10          -2.211           -3.732            -2.713            -2.430
    9           -2.679           -3.732            -2.766            -2.484
    8           -2.728           -3.732            -2.821            -2.539
    7           -2.839           -3.732            -2.877            -2.594
    6           -2.101           -3.732            -2.933            -2.648
    5           -2.084           -3.732            -2.988            -2.701
    4           -1.924           -3.732            -3.041            -2.750
    3           -2.266           -3.732            -3.090            -2.795
    2           -2.265           -3.732            -3.134            -2.836
    1           -1.728           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  7 with RMSE  9830.849
Min SC   =  18.78963 at lag  2 with RMSE  10675.21
Min MAIC =  18.82084 at lag  1 with RMSE  11217.34

. pperron         lineastotales

Phillips-Perron test for unit root                 Number of obs   =        59
```

```
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -2.663           -19.062           -13.372           -10.754
 Z(t)             -1.372            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5957

. zandrews        lineastotales

Zivot-Andrews unit root test for  lineastotales

Allowing for break in intercept

Lag selection via TTest: lags of D.lineastotales included = 2

Minimum t-statistic -4.169 at   2006m5 (obs 29)

Critical values: 1%: -5.43 5%: -4.80

.
. kpss     arpu   , qs auto

KPSS test for arpu

Automatic bandwidth selection (maxlag) = 2
Autocovariances weighted by Quadratic Spectral kernel

Critical values for H0: arpu is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    2           .295

. dfuller         arpu

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.317            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1664

. dfuller         arpu    ,  trend

Dickey-Fuller test for unit root                   Number of obs   =        59

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.136            -4.130            -3.491            -3.175
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5258

. dfgls   arpu
```

```
DF-GLS for arpu                                          Number of obs =    49
Maxlag = 10 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    10            0.342           -3.732            -2.713            -2.430
    9             0.204           -3.732            -2.766            -2.484
    8             0.065           -3.732            -2.821            -2.539
    7             0.032           -3.732            -2.877            -2.594
    6             0.150           -3.732            -2.933            -2.648
    5             0.386           -3.732            -2.988            -2.701
    4            -0.162           -3.732            -3.041            -2.750
    3            -0.396           -3.732            -3.090            -2.795
    2            -0.302           -3.732            -3.134            -2.836
    1            -0.044           -3.732            -3.171            -2.870

Opt Lag (Ng-Perron seq t) =  5 with RMSE  .4151712
Min SC   = -1.362326 at lag  1 with RMSE  .4673916
Min MAIC = -1.542215 at lag  5 with RMSE  .4151712

. pperron         arpu

Phillips-Perron test for unit root                 Number of obs   =        59
                                                   Newey-West lags =         3

                              ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -7.441           -19.062           -13.372           -10.754
 Z(t)             -2.353            -3.567            -2.923            -2.596
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1553

. zandrews        arpu

Zivot-Andrews unit root test for  arpu

Allowing for break in intercept

Lag selection via TTest: lags of D.arpu included = 0

Minimum t-statistic -2.176 at   2006m9 (obs 33)

Critical values: 1%: -5.43 5%: -4.80

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. **************************
pr(.15): regress    chle_d0 chle_d1 chle_d2 arpu_d0 arpu_d1 arpu_d2 internet_d0
imacec_d0
>       lineastotales_d0        internet_d1     imacec_d1       lineastotales_d1
internet_d2
>     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9297 >= 0.1500  removing lineastotales_d1
p = 0.7854 >= 0.1500  removing imacec_d1
p = 0.7795 >= 0.1500  removing arpu_d1
p = 0.7244 >= 0.1500  removing lineastotales_d0
p = 0.5610 >= 0.1500  removing imacec_d0
p = 0.4676 >= 0.1500  removing chle_d1
```

```
p = 0.4190 >= 0.1500  removing internet_d2
p = 0.3280 >= 0.1500  removing lineastotales_d2
p = 0.2625 >= 0.1500  removing arpu_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =   34.56
       Model |  838801.234     5  167760.247           Prob > F      =  0.0000
    Residual |  247544.977    51  4853.82308           R-squared     =  0.7721
-------------+------------------------------           Adj R-squared =  0.7498
       Total |  1086346.21    56  19399.0395           Root MSE      =  69.669

------------------------------------------------------------------------------
     chle_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d1 |   .0005716   .0003595     1.59   0.118      -.00015    .0012933
     chle_d2 |   .2929016   .0668665     4.38   0.000     .1586615    .4271418
     arpu_d0 |  -4.846543    .395324   -12.26   0.000    -5.640189   -4.052897
   imacec_d2 |  -2.287921   1.499593    -1.53   0.133    -5.298481     .722638
 internet_d0 |   .0007011   .0003351     2.09   0.041     .0000284    .0013738
       _cons |    56.6271   13.62883     4.15   0.000     29.26608    83.98812
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0985   0.0993    .5826  0.4453          |                  |
2       -0.2138  -0.2285   3.3783  0.1847         -|                 -|
3        0.1760   0.2439    5.307  0.1506          |-                 |-
4        0.1772   0.0870   7.2999  0.1209          |-                 |
5        0.1081   0.1721   8.0564  0.1532          |                  |-
6       -0.0045  -0.0278   8.0577  0.2339          |                  |
7       -0.0785  -0.0957   8.4718  0.2928          |                  |
8       -0.0881  -0.2032    9.005  0.3419          |                 -|
9       -0.0434  -0.0904   9.1369  0.4247          |                  |
10       0.1685   0.3220   11.168  0.3446          |-                 |--
11       0.0026  -0.0081   11.168  0.4293          |                  |
12      -0.2725  -0.3030   16.719  0.1605        --|                --|
13      -0.1236  -0.1539   17.887  0.1619          |                 -|
14       0.0006  -0.2052   17.887  0.2120          |                 -|
15      -0.0645  -0.0890    18.22  0.2513          |                  |
16      -0.0787  -0.0098   18.728  0.2830          |                  |
17      -0.0328   0.2507   18.819  0.3390          |                  |--
18       0.0057   0.1479   18.821  0.4029          |                  |-
19       0.0207   0.1319   18.859  0.4659          |                  |-
20      -0.0104  -0.2318   18.869  0.5303          |                 -|
21      -0.0090  -0.1298   18.877  0.5930          |                 -|
22       0.0769   0.0753   19.445  0.6177          |                  |
23       0.0362   0.4624   19.575  0.6674          |                  |---
24       0.0093   0.6252   19.584  0.7202          |                  |-----
25       0.0241   0.3370   19.645  0.7652          |                  |--
26       0.0657  -0.1180   20.114  0.7861          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
```

```
-------------+-----------------------------------------------------------
       1     |          0.638               1                   0.4246
-------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
-------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-----------------------------------------------------------
       1     |          3.909               1                   0.0480
-------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chle_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      1.11
                  Prob > F =      0.3540

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   .072 Chi(2)  .9647
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.924         0.502            0.47       0.7912

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.97435      1.338      0.626  0.26572

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.1136
 Prob > chi2(26)           =     0.7861

.
. drop residuo

.
pr(.15): regress    chll_d0 chll_d1 chll_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
```

```
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8155 >= 0.1500  removing arpu_d1
p = 0.6912 >= 0.1500  removing imacec_d0
p = 0.7353 >= 0.1500  removing lineastotales_d2
p = 0.6375 >= 0.1500  removing arpu_d2
p = 0.6198 >= 0.1500  removing imacec_d2
p = 0.5693 >= 0.1500  removing chll_d1
p = 0.5354 >= 0.1500  removing internet_d2
p = 0.3990 >= 0.1500  removing internet_d0
p = 0.4030 >= 0.1500  removing lineastotales_d0
p = 0.3169 >= 0.1500  removing chll_d2
p = 0.3219 >= 0.1500  removing arpu_d0
p = 0.2770 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    4.02
       Model |  1.21461473     2  .607307365           Prob > F      =  0.0235
    Residual |  8.15380632    54  .150996413           R-squared     =  0.1296
-------------+------------------------------           Adj R-squared =  0.0974
       Total |  9.36842105    56  .167293233           Root MSE      =  .38858

------------------------------------------------------------------------------
     chll_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d1 |   .0111562   .0076207     1.46   0.149    -.0041224    .0264348
lineastota~1 |  -9.63e-06   3.78e-06    -2.55   0.014    -.0000172   -2.05e-06
       _cons |   .1436032   .0542676     2.65   0.011     .0348033    .2524031
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1054  -0.1055    .6781  0.4102          |                  |
2       -0.1668  -0.1811   2.4068  0.3002         -|                 -|
3       -0.1303  -0.1845    3.481  0.3232         -|                 -|
4       -0.0382  -0.1320    3.575  0.4666          |                 -|
5       -0.1348  -0.2612   4.7679  0.4449         -|                --|
6        0.2469   0.1583    8.848  0.1823          |-                 |-
7       -0.0443  -0.1042    8.982  0.2540          |                  |
8        0.0209   0.0426   9.0124  0.3412          |                  |
9       -0.0401  -0.0304   9.1266  0.4257          |                  |
10       0.0605   0.1499   9.3921  0.4953          |                  |-
11      -0.0464   0.0872   9.5517  0.5711          |                  |
12      -0.1262  -0.2240   10.756  0.5499         -|                 -|
13       0.0083   0.0366   10.761  0.6308          |                  |
14       0.0612  -0.0551   11.057  0.6815          |                  |
15      -0.0800  -0.1548   11.575  0.7108          |                 -|
16       0.0076  -0.2211    11.58  0.7723          |                 -|
17       0.2706   0.3263   17.795  0.4019          |--                |--
18      -0.1213   0.0040   19.075  0.3872          |                  |
19      -0.0709  -0.0329   19.523  0.4238          |                  |
20      -0.0471  -0.0505   19.726  0.4752          |                  |
21       0.1231   0.3795   21.151  0.4498          |                  |---
22      -0.0990   0.0773   22.098  0.4540          |                  |
23       0.1371  -0.0156   23.968  0.4056          |-                 |
```

```
24      -0.0975  -0.0453    24.94  0.4090          |                  |
25      -0.0535   0.0507   25.242  0.4489          |                  |
26      -0.0537  -0.1089   25.556  0.4877          |                  |
27       0.2197   0.7701   30.976  0.2721          |-                 |------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.665               1                   0.4149
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.163               1                   0.6862
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chll_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      3.51
                  Prob > F =      0.0217

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  296.8 Chi(2)  3.6e-65
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          41.49       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.61535     20.349      6.482  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
```

```
---------------------------------------
 Portmanteau (Q) statistic =    30.9761
 Prob > chi2(27)           =     0.2721

.
. drop residuo

.
pr(.15): regress    chyt_d0 chyt_d1 chyt_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9747 >= 0.1500  removing lineastotales_d0
p = 0.9667 >= 0.1500  removing imacec_d0
p = 0.7261 >= 0.1500  removing internet_d0
p = 0.6465 >= 0.1500  removing imacec_d1
p = 0.6730 >= 0.1500  removing imacec_d2
p = 0.6090 >= 0.1500  removing internet_d1
p = 0.3912 >= 0.1500  removing chyt_d2
p = 0.2777 >= 0.1500  removing internet_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =   95.99
       Model |  74505.5835     6  12417.5973           Prob > F      =  0.0000
    Residual |  6467.92526    50  129.358505           R-squared     =  0.9201
-------------+------------------------------           Adj R-squared =  0.9105
       Total |  80973.5088    56  1445.95551           Root MSE      =  11.374

------------------------------------------------------------------------------
     chyt_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     chyt_d1 |   .2570506   .0990497     2.60   0.012     .0581034    .4559977
lineastota~2 |   .0002879   .0001324     2.17   0.034     .0000219     .000554
     arpu_d0 |  -1.493942   .0689787   -21.66   0.000     -1.63249   -1.355394
     arpu_d1 |    .415152   .1559671     2.66   0.010     .1018829    .7284211
     arpu_d2 |  -.4868809   .0635808    -7.66   0.000    -.6145867   -.3591751
lineastota~1 |  -.0002381    .000133    -1.79   0.079    -.0005053    .0000291
       _cons |    4.40914   1.896216     2.33   0.024      .600478    8.217803
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0051  -0.0046   .00154  0.9687          |                  |
2       -0.0645  -0.0658   .25599  0.8799          |                  |
3       -0.1516  -0.1657   1.6867  0.6399         -|                 -|
4       -0.0245  -0.0329   1.7249  0.7862          |                  |
5        0.0506   0.0425   1.8904  0.8641          |                  |
6        0.0799   0.0671   2.3111  0.8890          |                  |
7       -0.1051  -0.1335   3.0534  0.8800          |                 -|
8       -0.2284  -0.2909    6.634  0.5766         -|                --|
9       -0.0378  -0.0209   6.7344  0.6648          |                  |
10      -0.0361  -0.1423   6.8276  0.7416          |                 -|
11       0.1215   0.0302   7.9066  0.7216          |                  |
12      -0.0518  -0.2263   8.1071  0.7767          |                 -|
13       0.0299   0.0834   8.1757  0.8320          |                  |
```

```
14       0.0902   0.1311   8.8116  0.8429          |                  |-
15       0.1582   0.1581   10.815  0.7656          |-                 |-
16       0.0541   0.0255   11.055  0.8061          |                  |
17      -0.0223   0.0271   11.097  0.8515          |                  |
18      -0.1497  -0.1444   13.029  0.7899         -|                -|
19       0.0129   0.0571   13.043  0.8363          |                  |
20      -0.0230  -0.1535   13.092  0.8734          |                -|
21       0.1054   0.1718    14.13  0.8639          |                  |-
22      -0.0030   0.2079   14.131  0.8968          |                  |-
23      -0.0559   0.1896   14.441  0.9136          |                  |-
24      -0.1352  -0.1463   16.302  0.8769         -|                -|
25       0.0774   0.0342   16.931  0.8843          |                  |
26       0.1204   0.2862   18.503  0.8567          |                  |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.003               1                   0.9572
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.171               1                   0.6795
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chyt_d0
       Ho:  model has no omitted variables
                  F(3, 47) =      6.50
                  Prob > F =      0.0009

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  3.891 Chi(2)  .1429
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.107         0.133            4.82       0.0898

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
```

```
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.97683      1.209      0.407  0.34189

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    18.5029
 Prob > chi2(26)           =     0.8567

.
. drop residuo

.
pr(.15): regress    cp_d0   cp_d1   cp_d2           arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8724 >= 0.1500  removing cp_d2
p = 0.8541 >= 0.1500  removing internet_d1
p = 0.8184 >= 0.1500  removing internet_d2
p = 0.7751 >= 0.1500  removing imacec_d2
p = 0.7180 >= 0.1500  removing lineastotales_d0
p = 0.7010 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  8,    48) =   48.27
       Model |  1787221.72     8  223402.715           Prob > F      =  0.0000
    Residual |   222163.16    48  4628.39917           R-squared     =  0.8894
-------------+------------------------------           Adj R-squared =  0.8710
       Total |  2009384.88    56  35881.8728           Root MSE      =  68.032

------------------------------------------------------------------------------
       cp_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       cp_d1 |   .2191986   .0705532     3.11   0.003     .0773419    .3610554
lineastota~2 |   .0013291   .0008347     1.59   0.118    -.0003492    .0030074
     arpu_d0 |  -5.973613   .3968062   -15.05   0.000    -6.771445   -5.175781
     arpu_d1 |   1.597251   .5624099     2.84   0.007     .4664497    2.728051
     arpu_d2 |  -4.332785   .3858385   -11.23   0.000    -5.108565   -3.557005
 internet_d0 |   .0009457   .0003571     2.65   0.011     .0002277    .0016636
lineastota~1 |  -.0014919   .0008226    -1.81   0.076    -.0031458    .0001621
   imacec_d1 |  -3.230257   1.563563    -2.07   0.044    -6.374011   -.0865022
       _cons |   42.44302    12.3593     3.43   0.001     17.59298    67.29306
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1509   0.1531   1.3671  0.2423          |-                 |-
2        0.2329   0.2266   4.6848  0.0961          |-                 |-
3        0.0321  -0.0103   4.7491  0.1911          |                  |
4        0.0283  -0.0267   4.8001  0.3084          |                  |
```

```
5       -0.2033  -0.2481   7.4728  0.1878         -|                  -|
6       -0.2135  -0.2077    10.48  0.1059         -|                  -|
7       -0.1921  -0.0905   12.961  0.0731         -|                   |
8       -0.2448  -0.1968   17.076  0.0293         -|                  -|
9       -0.0827  -0.0588   17.554  0.0407          |                   |
10      -0.0400  -0.0090   17.669  0.0608          |                   |
11       0.1104   0.0550    18.56  0.0695          |                   |
12       0.1163   0.0336    19.57  0.0757          |                   |
13       0.1989   0.1363   22.594  0.0468          |-                  |-
14       0.0038  -0.5060   22.595  0.0672          |               ----|
15       0.0538  -0.1941   22.827  0.0879          |                  -|
16       0.0350  -0.1302   22.927  0.1157          |                  -|
17      -0.1219  -0.5220   24.176  0.1147          |               ----|
18      -0.1256  -0.3270   25.536  0.1109         -|                 --|
19      -0.0181   0.2841   25.565  0.1428          |                   |--
20      -0.0799  -0.3921   26.145  0.1611          |                ---|
21      -0.0064  -0.1860   26.149  0.2008          |                  -|
22       0.1268   0.6103   27.693  0.1861          |-                  |----
23       0.0826  -0.1466   28.368  0.2022          |                  -|
24       0.1607   0.2478       31  0.1538          |-                  |-
25       0.0456   0.4328   31.219  0.1819          |                   |---
26       0.0770   0.3078   31.863  0.1977          |                   |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.748               1                   0.1861
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.506               1                   0.4768
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of cp_d0
       Ho:  model has no omitted variables
                  F(3, 45) =      1.26
                  Prob > F =      0.3001


.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  2.272 Chi(2)   .321
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
```

```
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.163         0.259           3.39       0.1840

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.97590      1.258      0.493  0.31117

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    31.8630
 Prob > chi2(26)           =     0.1977

.
. drop residuo

.
pr(.15): regress    crnl_d0 crnl_d1 crnl_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9640 >= 0.1500  removing arpu_d1
p = 0.9185 >= 0.1500  removing arpu_d0
p = 0.8857 >= 0.1500  removing lineastotales_d1
p = 0.8613 >= 0.1500  removing imacec_d1
p = 0.6108 >= 0.1500  removing crnl_d2
p = 0.5604 >= 0.1500  removing arpu_d2
p = 0.4165 >= 0.1500  removing lineastotales_d2
p = 0.4110 >= 0.1500  removing imacec_d0
p = 0.3690 >= 0.1500  removing internet_d2
p = 0.3511 >= 0.1500  removing lineastotales_d0
p = 0.3638 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    3.02
       Model |    1.979841     3  .659947001           Prob > F      =  0.0379
    Residual |  11.5991064    53  .218851063           R-squared     =  0.1458
-------------+------------------------------           Adj R-squared =  0.0975
       Total |  13.5789474    56  .242481203           Root MSE      =  .46782

------------------------------------------------------------------------------
     crnl_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     crnl_d1 |   .2540167   .1293428     1.96   0.055     -.005412    .5134454
 internet_d1 |   4.11e-06   2.41e-06     1.70   0.094    -7.30e-07    8.96e-06
   imacec_d2 |  -.0187743   .0099209    -1.89   0.064    -.0386731    .0011245
       _cons |   .0749508   .0699982     1.07   0.289    -.0654478    .2153494
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0463  -0.0463   .12848  0.7200          |                  |
2        0.0513   0.0504   .28925  0.8653          |                  |
3       -0.0642  -0.0698   .54571  0.9087          |                  |
4        0.2374   0.3181   4.1232  0.3896          |-                 |--
5       -0.0623  -0.1124   4.3745  0.4969          |                  |
6       -0.0194  -0.0379   4.3993  0.6228          |                  |
7       -0.3251  -0.4039   11.508  0.1179        --|               ---|
8        0.0115  -0.0544   11.518  0.1741          |                  |
9       -0.0701  -0.0741   11.862  0.2212          |                  |
10      -0.0611  -0.1029    12.13  0.2765          |                  |
11      -0.2268  -0.1334    15.89  0.1453         -|                 -|
12      -0.1595  -0.3789   17.791  0.1222         -|               ---|
13       0.0122  -0.1939   17.802  0.1652          |                 -|
14       0.0105  -0.2562   17.811  0.2155          |                --|
15       0.0722   0.3389   18.228  0.2509          |                  |--
16      -0.0747   0.0007   18.686  0.2853          |                  |
17       0.1409   0.2397   20.354  0.2565          |-                 |-
18       0.0727  -0.2974   20.811  0.2891          |                --|
19       0.1895  -0.1091   23.988  0.1966          |-                 |
20      -0.0838  -0.3125   24.626  0.2161          |                --|
21       0.0407  -0.4052   24.781  0.2568          |               ---|
22      -0.0491  -0.6217   25.012  0.2965          |              ----|
23       0.1702  -0.1844   27.878  0.2204          |-                -|
24      -0.0554  -0.2419   28.191  0.2520          |                 -|
25       0.0056  -0.7627   28.195  0.2990          |            ------|
26      -0.0385  -0.0999   28.356  0.3412          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.884               1                   0.3472
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.412               1                   0.1204
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of crnl_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      0.92
                  Prob > F =      0.4362

.
. ***test jarque bera
. jb6 residuo
```

```
Jarque-Bera normality test:  .7323 Chi(2)  .6934
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.625         0.269            1.52       0.4675

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.92948      3.680      2.800  0.00256

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    28.3558
 Prob > chi2(26)           =     0.3412

.
. drop residuo

.
pr(.15): regress    lag_d0  lag_d1  lag_d2          arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                    begin with full model
p = 0.9617 >= 0.1500  removing lag_d2
p = 0.9474 >= 0.1500  removing lineastotales_d1
p = 0.9443 >= 0.1500  removing internet_d0
p = 0.7622 >= 0.1500  removing lag_d1
p = 0.6920 >= 0.1500  removing internet_d1
p = 0.6657 >= 0.1500  removing imacec_d0
p = 0.5545 >= 0.1500  removing arpu_d0
p = 0.4852 >= 0.1500  removing arpu_d2
p = 0.4572 >= 0.1500  removing internet_d2
p = 0.4806 >= 0.1500  removing arpu_d1
p = 0.2940 >= 0.1500  removing imacec_d2
p = 0.2693 >= 0.1500  removing imacec_d1
p = 0.2158 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    4.22
       Model |  .202554593     1  .202554593           Prob > F      =  0.0447
    Residual |  2.63955067    55  .04799183           R-squared     =  0.0713
-------------+------------------------------           Adj R-squared =  0.0544
       Total |  2.84210526    56  .05075188           Root MSE      =  .21907

------------------------------------------------------------------------------
```

```
      lag_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~0 |   4.41e-06   2.14e-06     2.05   0.045     1.08e-07    8.70e-06
       _cons |   .0338292   .0304257     1.11   0.271    -.0271453    .0948037
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0251  -0.0251      .039  0.8435          |                  |
2        0.0055   0.0047    .04088  0.9798          |                  |
3       -0.0397  -0.0398    .14205  0.9864          |                  |
4        0.3487   0.3483    8.0984  0.0880          |--                |--
5       -0.0296  -0.0178    8.1567  0.1478          |                  |
6        0.0534   0.1073    8.3504  0.2135          |                  |
7       -0.0396  -0.0415    8.4591  0.2939          |                  |
8       -0.0375  -0.3163    8.5586  0.3809          |                --|
9       -0.0700  -0.1073    8.9111  0.4455          |                  |
10      -0.0474  -0.1618    9.0761  0.5249          |                 -|
11      -0.0609  -0.1139    9.3541  0.5892          |                  |
12      -0.0666  -0.1276    9.6938  0.6428          |                 -|
13      -0.0515  -0.0476    9.9017  0.7020          |                  |
14       0.2534   0.9612    15.035  0.3757          |--                |-------
15      -0.0712  -0.0397     15.45  0.4195          |                  |
16      -0.0687  -0.1026    15.845  0.4638          |                  |
17      -0.0588  -0.1271    16.142  0.5138          |                 -|
18       0.2891   0.6326     23.48  0.1728          |--                |-----
19      -0.0365  -0.1263      23.6  0.2119          |                 -|
20       0.0111  -0.2010    23.612  0.2598          |                 -|
21      -0.0428  -0.0702    23.785  0.3036          |                  |
22       0.0364  -0.0817    23.914  0.3518          |                  |
23       0.0004   0.2268    23.914  0.4086          |                  |-
24       0.0101  -0.3008    23.924  0.4659          |                --|
25      -0.0085  -0.0192    23.932  0.5233          |                  |
26      -0.0067   0.4675    23.937  0.5796          |                  |---
27      -0.0257  -1.6593    24.011  0.6297          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.049               1                   0.8251
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.211               1                   0.6461
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
```

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of lag_d0
       Ho:  model has no omitted variables
                  F(3, 52) =      2.80
                  Prob > F =      0.0489

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  522.2 Chi(2)  4.e-114
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           49.99      0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.46713     28.578      7.219  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    24.0112
 Prob > chi2(27)           =     0.6297

.
. drop residuo

.
pr(.15): regress    spdr_d0 spdr_d1 spdr_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9814 >= 0.1500  removing spdr_d2
p = 0.6940 >= 0.1500  removing imacec_d1
p = 0.7650 >= 0.1500  removing imacec_d2
p = 0.6777 >= 0.1500  removing internet_d1
p = 0.3976 >= 0.1500  removing lineastotales_d0
p = 0.3684 >= 0.1500  removing imacec_d0
p = 0.2365 >= 0.1500  removing internet_d2
p = 0.2638 >= 0.1500  removing internet_d0
p = 0.1906 >= 0.1500  removing spdr_d1
p = 0.3815 >= 0.1500  removing arpu_d1

      Source |       SS       df       MS              Number of obs =      57
```

```
-------------+------------------------------           F(  4,    52) =   53.35
       Model |  208069.052     4  52017.2631           Prob > F      =  0.0000
    Residual |   50698.667    52  974.974365           R-squared     =  0.8041
-------------+------------------------------           Adj R-squared =  0.7890
       Total |  258767.719    56  4620.85213           Root MSE      =  31.225

------------------------------------------------------------------------------
     spdr_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~1 |   -.000758   .0003566    -2.13   0.038    -.0014736   -.0000424
lineastota~2 |   .0005332   .0003507     1.52   0.134    -.0001706    .0012369
     arpu_d0 |  -2.084901   .1768606   -11.79   0.000    -2.439798   -1.730004
     arpu_d2 |  -1.378278   .1725149    -7.99   0.000    -1.724454   -1.032101
       _cons |   36.08674    4.50569     8.01   0.000     27.04541    45.12807
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0977   0.1060   .57313  0.4490          |                  |
2        0.1423   0.1487   1.8115  0.4042          |-                 |-
3        0.2115   0.2324   4.5983  0.2037          |-                 |-
4        0.0132  -0.0717   4.6093  0.3298          |                  |
5       -0.1482  -0.2948   6.0289  0.3034         -|                --|
6        0.1162   0.2079   6.9185  0.3284          |                  |-
7       -0.2419  -0.3897   10.853  0.1452         -|               ---|
8       -0.1623  -0.1135    12.66  0.1241         -|                  |
9       -0.1508  -0.0641   14.254  0.1136         -|                  |
10      -0.0570   0.1040   14.487  0.1519          |                  |
11      -0.0731   0.1646   14.877  0.1882          |                  |-
12      -0.0024   0.0035   14.877  0.2482          |                  |
13       0.0982   0.3156   15.614  0.2706          |                  |--
14       0.0859  -0.0519   16.191  0.3018          |                  |
15       0.0644   0.0532   16.523  0.3482          |                  |
16       0.2889   0.4907   23.371  0.1042          |--                |---
17       0.2252   0.2684   27.633  0.0494          |-                 |--
18      -0.0700  -0.2799   28.055  0.0612          |                --|
19       0.1072   0.2821   29.072  0.0649          |                  |--
20      -0.0161   0.0824   29.095  0.0859          |                  |
21       0.0405   0.6400   29.248  0.1082          |                  |-----
22      -0.0998  -0.1854   30.206  0.1135          |                 -|
23      -0.1217   0.3212   31.672  0.1072          |                  |--
24      -0.1997   0.3741   35.738  0.0582         -|                  |--
25      -0.0317   0.4329   35.844  0.0740          |                  |---
26      -0.1655   0.1909   38.817  0.0508         -|                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.678               1                   0.4104
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
```

```
----------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+--------------------------------------------------------------
       1     |          0.269               1                   0.6039
----------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of spdr_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      1.09
                  Prob > F =      0.3617

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .7703 Chi(2)  .6804
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.532         0.615            0.66       0.7184

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.98184      0.948     -0.116  0.54611

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    38.8166
 Prob > chi2(26)           =     0.0508

.
. drop residuo

.
pr(.15): regress    thno_d0 thno_d1 thno_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9476 >= 0.1500  removing imacec_d1
p = 0.8395 >= 0.1500  removing internet_d1
p = 0.7124 >= 0.1500  removing imacec_d2
```

```
p = 0.6896 >= 0.1500  removing imacec_d0
p = 0.5815 >= 0.1500  removing internet_d2
p = 0.4360 >= 0.1500  removing thno_d2
p = 0.3524 >= 0.1500  removing lineastotales_d0
p = 0.2863 >= 0.1500  removing lineastotales_d1
p = 0.2126 >= 0.1500  removing lineastotales_d2
p = 0.2296 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   90.69
       Model |  163096.594     4  40774.1485           Prob > F      =  0.0000
    Residual |  23379.6515    52  449.608682           R-squared     =  0.8746
-------------+------------------------------           Adj R-squared =  0.8650
       Total |  186476.246    56  3329.93296           Root MSE      =  21.204

------------------------------------------------------------------------------
     thno_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     thno_d1 |   .2652412   .0947232     2.80   0.007     .0751652    .4553173
     arpu_d2 |  -.9130784   .1183488    -7.72   0.000    -1.150563   -.6755943
     arpu_d0 |  -2.155567   .1241293   -17.37   0.000    -2.404651   -1.906484
     arpu_d1 |   .5615168   .2268941     2.47   0.017     .1062205    1.016813
       _cons |   11.99929   3.529949     3.40   0.001     4.915927    19.08265
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1644   0.1659   1.6226  0.2027          |-                 |-
2       -0.0290  -0.0532    1.674  0.4330          |                  |
3       -0.0117   0.0048   1.6826  0.6408          |                  |
4        0.0718   0.0713   2.0094  0.7340          |                  |
5        0.0259   0.0060   2.0529  0.8418          |                  |
6       -0.0229  -0.0243   2.0876  0.9115          |                  |
7       -0.1059  -0.1061   2.8413  0.8993          |                  |
8       -0.1495  -0.1348   4.3745  0.8219         -|                 -|
9       -0.1122  -0.1047   5.2571  0.8113          |                  |
10       0.0472   0.1191   5.4167  0.8617          |                  |
11       0.0556   0.0829   5.6431  0.8961          |                  |
12      -0.1190  -0.2410   6.7021  0.8767          |                 -|
13      -0.1640  -0.2044   8.7587  0.7909         -|                 -|
14      -0.0688  -0.0452   9.1287  0.8227          |                  |
15      -0.1278  -0.3455   10.436  0.7915         -|                --|
16       0.0412   0.1475   10.575  0.8349          |                  |-
17      -0.0764  -0.2581   11.065  0.8532          |                --|
18      -0.0229   0.0202    11.11  0.8896          |                  |
19       0.0842   0.2207   11.738  0.8965          |                  |-
20      -0.0484  -0.3115   11.951  0.9177          |                --|
21      -0.0968  -0.2874   12.828  0.9145          |                --|
22       0.0082   0.0139   12.834  0.9377          |                  |
23      -0.0418  -0.4005   13.007  0.9518          |               ---|
24      -0.0330  -0.3841   13.118  0.9641          |               ---|
25      -0.0568  -0.5994   13.456  0.9704          |              ----|
26       0.1477   0.6773   15.822  0.9404          |-                 |-----

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
```

```
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.869               1                   0.0903
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.037               1                   0.8479
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of thno_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      4.04
                  Prob > F =      0.0121

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   15.1 Chi(2)  5.3e-04
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.052         0.009           9.00       0.0111

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95330      2.436      1.914  0.02783

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.8217
 Prob > chi2(26)           =     0.9404

.
. drop residuo

.
```

```
pr(.15): regress    crcs_d0 crcs_d1 crcs_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9905 >= 0.1500  removing internet_d0
p = 0.9710 >= 0.1500  removing lineastotales_d0
p = 0.5277 >= 0.1500  removing imacec_d2
p = 0.2759 >= 0.1500  removing internet_d1
p = 0.2281 >= 0.1500  removing imacec_d1
p = 0.2467 >= 0.1500  removing arpu_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  8,    48) =   22.84
       Model |  730.357152     8   91.294644           Prob > F      =  0.0000
    Residual |  191.853375    48   3.9969453           R-squared     =  0.7920
-------------+------------------------------           Adj R-squared =  0.7573
       Total |  922.210526    56  16.4680451           Root MSE      =  1.9992

------------------------------------------------------------------------------
     crcs_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     crcs_d1 |   .2857377   .0742865     3.85   0.000     .1363747    .4351007
     crcs_d2 |   .4715841   .1077316     4.38   0.000     .2549751     .688193
     arpu_d0 |  -.1163985   .0114102   -10.20   0.000    -.1393403   -.0934567
lineastota~1 |  -.0000425   .0000263    -1.61   0.113    -.0000955    .0000104
     arpu_d2 |   .0601086    .016991     3.54   0.001     .0259459    .0942713
lineastota~2 |   .0000705   .0000251     2.81   0.007     .0000201    .0001209
   imacec_d0 |  -.1121717   .0457047    -2.45   0.018    -.2040671   -.0202762
 internet_d2 |  -.0000145   9.72e-06    -1.49   0.143     -.000034    5.07e-06
       _cons |   .2561912   .3830191     0.67   0.507    -.5139202    1.026303
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1232   0.1268   .91161  0.3397          |                  |-
2       -0.0171  -0.0323    .9294  0.6283          |                  |
3        0.1732   0.1952    2.797  0.4240          |-                 |-
4       -0.0846  -0.1559    3.251  0.5167          |                 -|
5       -0.1385  -0.1061   4.4923  0.4809         -|                  |
6       -0.0237  -0.0414   4.5293  0.6054          |                  |
7        0.0729   0.1339   4.8865  0.6738          |                  |-
8        0.0145   0.0131   4.9008  0.7681          |                  |
9        0.0825   0.0909   5.3771  0.8003          |                  |
10       0.1386   0.0489   6.7524  0.7486          |-                 |
11      -0.0893  -0.1292   7.3359  0.7713          |                 -|
12      -0.0630  -0.0290   7.6325  0.8131          |                  |
13      -0.1042  -0.1613   8.4631  0.8122          |                 -|
14      -0.1956  -0.1431   11.455  0.6500         -|                 -|
15       0.0285   0.1416    11.52  0.7150          |                  |-
16       0.0540   0.0608   11.759  0.7604          |                  |
17      -0.1935  -0.2610   14.907  0.6022         -|                --|
18      -0.0893  -0.1236   15.594  0.6209          |                  |
19      -0.0684  -0.2313   16.008  0.6567          |                 -|
20       0.0026   0.1847   16.009  0.7161          |                  |-
21      -0.0947  -0.0410   16.846  0.7204          |                  |
```

```
22      -0.1347  -0.1915    18.59  0.6705         -|                 -|
23       0.1056   0.1308   19.693  0.6603          |                  |-
24      -0.0519  -0.0435   19.967  0.6986          |                  |
25      -0.0450  -0.0273    20.18  0.7373          |                  |
26       0.1022   0.0062   21.312  0.7257          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.304               1                   0.2534
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.630               1                   0.4273
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of crcs_d0
       Ho:  model has no omitted variables
                  F(3, 45) =      6.75
                  Prob > F =      0.0007

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   11.2 Chi(2)  .0037
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.017         0.032           8.87       0.0119

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95846      2.167      1.662  0.04822

.
. ***test Box-Ljung white noise
. wntestq residuo
```

```
Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    21.3125
 Prob > chi2(26)           =     0.7257

.
. drop residuo

.
pr(.15): regress    cscd_d0 cscd_d1 cscd_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2      lineastotales_d2
                      begin with full model
p = 0.9995 >= 0.1500  removing internet_d0
p = 0.9688 >= 0.1500  removing arpu_d1
p = 0.9049 >= 0.1500  removing imacec_d1
p = 0.9023 >= 0.1500  removing arpu_d2
p = 0.6671 >= 0.1500  removing lineastotales_d0
p = 0.6780 >= 0.1500  removing imacec_d2
p = 0.7032 >= 0.1500  removing internet_d1
p = 0.4948 >= 0.1500  removing cscd_d2
p = 0.3146 >= 0.1500  removing lineastotales_d1
p = 0.1549 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   47.31
       Model |  102.142774     4  25.5356934           Prob > F      =  0.0000
    Residual |  28.0677528    52  .539764476           R-squared     =  0.7844
-------------+------------------------------           Adj R-squared =  0.7679
       Total |  130.210526    56  2.32518797           Root MSE      =  .73469

------------------------------------------------------------------------------
     cscd_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     cscd_d1 |   .2411247   .0653747     3.69   0.001     .1099408    .3723086
   imacec_d0 |  -.0228975   .0151635    -1.51   0.137    -.0533254    .0075303
     arpu_d0 |  -.0523721   .0040939   -12.79   0.000    -.0605871   -.0441571
 internet_d2 |  -8.31e-06   3.51e-06    -2.37   0.022    -.0000153   -1.27e-06
       _cons |   .3463085   .1149098     3.01   0.004     .1157252    .5768919
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1132  -0.1133   .76915  0.3805          |                  |
2        0.0337   0.0211   .83858  0.6575          |                  |
3        0.0366   0.0435   .92185  0.8202          |                  |
4        0.3311   0.3484   7.8784  0.0961          |--                |--
5        0.0411   0.1379   7.9876  0.1569          |                  |-
6        0.0704   0.0909   8.3148  0.2159          |                  |
7       -0.1524  -0.2032    9.876  0.1957         -|                 -|
8        0.0049  -0.2386   9.8776  0.2737          |                 -|
9        0.2553   0.2155   14.445  0.1073          |--                |-
10      -0.1997  -0.1982     17.3  0.0680         -|                 -|
11      -0.2092  -0.2166     20.5  0.0389         -|                 -|
12      -0.0310  -0.0696   20.572  0.0570          |                  |
```

```
13       0.1124   0.0028   21.537  0.0630          |                  |
14      -0.0635   0.0927   21.852  0.0817          |                  |
15      -0.2187  -0.1809   25.681  0.0415         -|                 -|
16       0.0222   0.2567   25.721  0.0581          |                  |--
17       0.0628   0.1327   26.052  0.0735          |                  |-
18       0.0934  -0.0456   26.805  0.0827          |                  |
19      -0.1390   0.0200   28.514  0.0740         -|                  |
20       0.0382   0.1383   28.647  0.0949          |                  |-
21      -0.0041   0.0955   28.649  0.1227          |                  |
22       0.0500  -0.3323   28.889  0.1481          |                --|
23      -0.0494  -0.2010    29.13  0.1760          |                 -|
24      -0.0647   0.1739   29.557  0.1999          |                  |-
25      -0.0314  -0.0387   29.661  0.2372          |                  |
26       0.0323  -0.1096   29.774  0.2771          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.020               1                   0.3126
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.785               1                   0.0517
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of cscd_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      1.99
                  Prob > F =      0.1281

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  11.88 Chi(2)  .0026
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.007         0.045           9.59      0.0083

.
. ***test Shapiro Wilk
. swilk residuo
```

```
                  Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.93139      3.579      2.740  0.00307

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    29.7743
 Prob > chi2(26)           =     0.2771

.
. drop residuo

.
pr(.15): regress    enlg_d0 enlg_d1 enlg_d2         arpu_d0 arpu_d1 arpu_d2
internet_d
> 0     imacec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1
>     internet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8499 >= 0.1500  removing internet_d1
p = 0.7459 >= 0.1500  removing imacec_d1
p = 0.7502 >= 0.1500  removing arpu_d1
p = 0.5988 >= 0.1500  removing lineastotales_d0
p = 0.6316 >= 0.1500  removing arpu_d2
p = 0.5784 >= 0.1500  removing internet_d2
p = 0.5542 >= 0.1500  removing internet_d0
p = 0.5414 >= 0.1500  removing imacec_d2
p = 0.5168 >= 0.1500  removing enlg_d2
p = 0.4908 >= 0.1500  removing imacec_d0
p = 0.2804 >= 0.1500  removing arpu_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    3.27
       Model |  66.7978075     3  22.2659358           Prob > F      =  0.0282
    Residual |  360.921491    53  6.80983945           R-squared     =  0.1562
-------------+------------------------------           Adj R-squared =  0.1084
       Total |  427.719298    56  7.63784461           Root MSE      =  2.6096

------------------------------------------------------------------------------
     enlg_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     enlg_d1 |   .2215258   .1296198     1.71   0.093    -.0384585    .4815102
lineastota~1 |  -.0000754   .0000293    -2.58   0.013    -.0001341   -.0000167
lineastota~2 |   .0000585     .00003     1.95   0.056    -1.53e-06    .0001186
       _cons |   1.958886   .5006189     3.91   0.000     .9547717       2.963
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0703  -0.0703   .29638  0.5862          |                  |
2        0.0808   0.0767   .69549  0.7063          |                  |
3        0.0121   0.0251   .70464  0.8721          |                  |
```

```
4        0.2583   0.2779   4.9384  0.2937          |--                |--
5       -0.0555   0.0071   5.1377  0.3993          |                  |
6        0.0644   0.0418   5.4112  0.4923          |                  |
7       -0.0686  -0.0675   5.7275  0.5719          |                  |
8        0.0985   0.0469   6.3937  0.6032          |                  |
9       -0.1660  -0.1330   8.3234  0.5019         -|                 -|
10      -0.0937  -0.1861   8.9515  0.5367          |                 -|
11       0.2673   0.3405   14.173  0.2235          |--                |--
12      -0.1358  -0.1309   15.551  0.2127         -|                 -|
13      -0.0469  -0.0205   15.719  0.2646          |                  |
14      -0.1389  -0.1787   17.229  0.2442         -|                 -|
15      -0.0292  -0.2520   17.297  0.3014          |                --|
16      -0.1330  -0.1311   18.748  0.2819         -|                 -|
17       0.0995   0.1342    19.58  0.2963          |                  |-
18      -0.2147  -0.2599   23.556  0.1701         -|                --|
19       0.0198  -0.2627   23.591  0.2123          |                --|
20      -0.1962  -0.0927   27.089  0.1328         -|                  |
21       0.0882   0.0341   27.815  0.1455          |                  |
22       0.1083   0.3417   28.942  0.1465          |                  |--
23      -0.0048   0.0880   28.945  0.1822          |                  |
24      -0.0551   0.1037   29.254  0.2107          |                  |
25       0.1308   0.2873   31.051  0.1873          |-                 |--
26      -0.0247  -0.1008   31.117  0.2239          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.573               1                   0.1087
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.591               1                   0.4421
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of enlg_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      0.17
                  Prob > F =      0.9186

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  45.02 Chi(2)  1.7e-10
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
```

```
                                                   ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.002          19.31        0.0001

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.89452      5.503      3.665  0.00012

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    31.1171
 Prob > chi2(26)           =     0.2239

.
. drop residuo

.
pr(.15): regress    lgrn_d0 lgrn_d1 lgrn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8710 >= 0.1500  removing internet_d1
p = 0.7967 >= 0.1500  removing internet_d2
p = 0.6976 >= 0.1500  removing lineastotales_d0
p = 0.6662 >= 0.1500  removing imacec_d0
p = 0.5423 >= 0.1500  removing lineastotales_d2
p = 0.5715 >= 0.1500  removing imacec_d2
p = 0.4863 >= 0.1500  removing internet_d0
p = 0.5119 >= 0.1500  removing imacec_d1
p = 0.4828 >= 0.1500  removing lineastotales_d1
p = 0.3642 >= 0.1500  removing arpu_d2
p = 0.6183 >= 0.1500  removing lgrn_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =  152.73
       Model |  2466.20846     3  822.069485           Prob > F      =  0.0000
    Residual |  285.265228    53  5.38236279           R-squared     =  0.8963
-------------+------------------------------           Adj R-squared =  0.8905
       Total |  2751.47368    56  49.1334586           Root MSE      =    2.32

------------------------------------------------------------------------------
     lgrn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lgrn_d1 |   .5893067   .1247627     4.72   0.000     .3390643     .839549
     arpu_d1 |  -.1458073   .0363366    -4.01   0.000    -.2186893   -.0729253
     arpu_d0 |   .2996485    .014722    20.35   0.000       .27012     .329177
       _cons |   .8380466   .3557653     2.36   0.022     .1244717    1.551621
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1         0.0727   0.0726   .32247  0.5701          |                  |
2        -0.0716  -0.0829   .64108  0.7258          |                  |
3        -0.0741  -0.0628   .98852  0.8040          |                  |
4        -0.1349  -0.1499   2.1611  0.7062         -|                 -|
5        -0.0099  -0.0089   2.1676  0.8255          |                  |
6         0.0361   0.0234    2.255  0.8948          |                  |
7         0.0423   0.0377   2.3771  0.9361          |                  |
8         0.1394   0.1620   3.7298  0.8806          |-                 |-
9        -0.1271  -0.1716   4.8774  0.8449         -|                 -|
10       -0.0590   0.0075   5.1297  0.8823          |                  |
11        0.0587   0.1265   5.3849  0.9111          |                  |-
12       -0.0520  -0.1168   5.5893  0.9354          |                  |
13       -0.0307  -0.0850   5.6621  0.9576          |                  |
14       -0.0199  -0.0849   5.6936  0.9736          |                  |
15       -0.0213   0.0574   5.7304  0.9839          |                  |
16        0.0354  -0.0278   5.8342  0.9898          |                  |
17       -0.1281  -0.3977   7.2279  0.9804         -|               ---|
18       -0.0483   0.1705   7.4311  0.9860          |                  |-
19        0.0530  -0.1361   7.6816  0.9896          |                 -|
20       -0.0886  -0.1185   8.4012  0.9889          |                  |
21       -0.0915  -0.4430    9.189  0.9876          |               ---|
22       -0.0265  -0.2015   9.2569  0.9919          |                 -|
23       -0.0509   0.1113   9.5142  0.9939          |                  |
24       -0.0639  -0.4671   9.9319  0.9948          |               ---|
25       -0.0260  -0.4195   10.003  0.9966          |               ---|
26       -0.0269  -0.6790   10.082  0.9978          |             -----|
27       -0.0575  -1.3055   10.453  0.9982          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.877               1                   0.1707
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         11.146               1                   0.0008
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lgrn_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      5.63
                  Prob > F =      0.0021

.
```

```
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  9.365 Chi(2)  .0093
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                      ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.013         0.064            8.31       0.0157

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W          V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.87831      6.438      4.006  0.00003

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    10.4527
 Prob > chi2(27)           =     0.9982

.
. drop residuo

.
pr(.15): regress    lunn_d0 lunn_d1 lunn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d
> 0     imacec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1
>     internet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.7354 >= 0.1500  removing lunn_d2
p = 0.5779 >= 0.1500  removing imacec_d1
p = 0.6263 >= 0.1500  removing arpu_d2
p = 0.2429 >= 0.1500  removing imacec_d2
p = 0.4291 >= 0.1500  removing internet_d1
p = 0.2253 >= 0.1500  removing imacec_d0
p = 0.1896 >= 0.1500  removing lineastotales_d2
p = 0.2788 >= 0.1500  removing lineastotales_d1
p = 0.2124 >= 0.1500  removing internet_d2
p = 0.1630 >= 0.1500  removing internet_d0
p = 0.2042 >= 0.1500  removing lineastotales_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   88.87
       Model |  36562.8324     3  12187.6108           Prob > F      =  0.0000
    Residual |  7268.64125    53  137.144174           R-squared     =  0.8342
-------------+------------------------------           Adj R-squared =  0.8248
       Total |  43831.4737    56  782.704887           Root MSE      =  11.711

------------------------------------------------------------------------------
```

```
     lunn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lunn_d1 |   .4101467   .1390128     2.95   0.005     .1313223    .6889712
     arpu_d1 |   .4887605   .1622413     3.01   0.004     .1633456    .8141754
     arpu_d0 |  -1.136492   .0718302   -15.82   0.000    -1.280565   -.9924191
       _cons |   7.919021   2.512806     3.15   0.003      2.87897    12.95907
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0436  -0.0441   .11607  0.7333          |                  |
2        0.0659   0.0663   .38623  0.8244          |                  |
3        0.0375   0.0421   .47538  0.9243          |                  |
4        0.1375   0.1405   1.6934  0.7919          |-                 |-
5       -0.0716  -0.0769   2.0298  0.8450          |                  |
6       -0.0593  -0.0898   2.2649  0.8938          |                  |
7       -0.1240  -0.1824   3.3139  0.8545          |                 -|
8        0.0468   0.0565   3.4662  0.9018          |                  |
9       -0.1044  -0.0837   4.2397  0.8949          |                  |
10       0.0025   0.0162   4.2401  0.9359          |                  |
11      -0.0332   0.0067   4.3217  0.9595          |                  |
12       0.1354   0.1312   5.7081  0.9301          |-                 |-
13      -0.1346  -0.2108   7.1092  0.8964         -|                 -|
14       0.3190   0.5076   15.157  0.3675          |--                |----
15      -0.0119  -0.0426   15.169  0.4393          |                  |
16       0.0613   0.0103   15.481  0.4898          |                  |
17      -0.1529  -0.2554   17.464  0.4234         -|                --|
18      -0.0073  -0.1178   17.469  0.4911          |                  |
19      -0.0824  -0.1453   18.075  0.5174          |                 -|
20      -0.0496  -0.0491     18.3  0.5676          |                  |
21      -0.2590  -0.2797   24.609  0.2645        --|                --|
22       0.0427   0.0241   24.785  0.3075          |                  |
23       0.0997   0.3844   25.773  0.3117          |                  |---
24       0.1463   0.8462   27.963  0.2616          |-                 |------
25      -0.1308   0.2299   29.768  0.2331         -|                  |-
26       0.0908  -0.2323   30.665  0.2410          |                 -|
27       0.0610   0.5361   31.083  0.2677          |                  |----

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.581               1                   0.4459
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.061               1                   0.3030
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lunn_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      5.62
                  Prob > F =      0.0021


.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  9.497 Chi(2)  .0087
Jarque-Bera test for Ho: normality: (residuo)


.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.445         0.015            6.07       0.0481


.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.95019      2.635      2.084  0.01857


.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    31.0830
 Prob > chi2(27)           =     0.2677


.
. drop residuo


.
pr(.15): regress    osrn_d0 osrn_d1 osrn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8258 >= 0.1500  removing internet_d1
p = 0.8169 >= 0.1500  removing lineastotales_d0
p = 0.8093 >= 0.1500  removing imacec_d2
p = 0.6280 >= 0.1500  removing imacec_d0
p = 0.5395 >= 0.1500  removing osrn_d2
p = 0.5296 >= 0.1500  removing arpu_d1
p = 0.3405 >= 0.1500  removing osrn_d1
p = 0.3164 >= 0.1500  removing internet_d2
p = 0.3177 >= 0.1500  removing imacec_d1
```

```
      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =  117.00
       Model |  2790460.43     5  558092.086           Prob > F      =  0.0000
    Residual |  243280.411    51  4770.20414           R-squared     =  0.9198
-------------+------------------------------           Adj R-squared =  0.9119
       Total |  3033740.84    56  54173.9436           Root MSE      =  69.067

------------------------------------------------------------------------------
     osrn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~1 |  -.0013093    .000789    -1.66   0.103    -.0028934    .0002747
 internet_d0 |   .0006548   .0003303     1.98   0.053    -8.22e-06    .0013178
     arpu_d0 |  -8.966596    .392048   -22.87   0.000    -9.753666   -8.179527
lineastota~2 |    .001612   .0007759     2.08   0.043     .0000544    .0031696
     arpu_d2 |  -2.184836   .3856982    -5.66   0.000    -2.959158   -1.410515
       _cons |    76.0649   10.86381     7.00   0.000     54.25489    97.87491
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1700   0.1809   1.7354  0.1877           |-                 |-
2       -0.1316  -0.1685   2.7949  0.2472          -|                 -|
3       -0.1144  -0.0800   3.6093  0.3069           |                  |
4        0.0818   0.1108   4.0338  0.4015           |                  |
5        0.0329  -0.0399   4.1039  0.5346           |                  |
6       -0.0700  -0.0724   4.4269  0.6191           |                  |
7       -0.1628  -0.1397    6.209  0.5156          -|                 -|
8       -0.2633  -0.2764   10.969  0.2035         --|                --|
9       -0.0031   0.0813   10.969  0.2778           |                  |
10       0.0875  -0.0075   11.517  0.3187           |                  |
11       0.0378   0.0240   11.621  0.3928           |                  |
12      -0.0277   0.0110   11.679  0.4718           |                  |
13      -0.0290  -0.0418   11.743  0.5488           |                  |
14       0.1418   0.1522   13.316  0.5018           |-                 |-
15       0.1041  -0.0308   14.184  0.5116           |                  |
16      -0.0349  -0.1852   14.284  0.5776           |                 -|
17      -0.0746   0.0833   14.751  0.6134           |                  |
18      -0.1100  -0.1882   15.795  0.6068           |                 -|
19      -0.1786  -0.4359   18.617  0.4817          -|               ---|
20      -0.1384  -0.0570   20.357  0.4358          -|                  |
21      -0.0108   0.0262   20.368  0.4981           |                  |
22       0.0010  -0.2625   20.368  0.5600           |                --|
23       0.1218   0.2749   21.834  0.5303           |                  |--
24       0.0688  -0.0603   22.316  0.5604           |                  |
25       0.0244  -0.3367   22.379  0.6138           |                --|
26      -0.0699  -0.6323   22.909  0.6381           |             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.366               1                   0.1240
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.016               1                   0.8999
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of osrn_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      7.12
                  Prob > F =      0.0005

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   11.2 Chi(2)  .0037
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.008         0.048            9.24       0.0099

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.94601      2.817      2.225  0.01302

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.9094
 Prob > chi2(26)           =     0.6381

.
. drop residuo

.
pr(.15): regress    poct_d0 poct_d1 poct_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                           begin with full model
p = 0.8715 >= 0.1500  removing arpu_d1
```

```
p = 0.8206 >= 0.1500  removing arpu_d0
p = 0.8395 >= 0.1500  removing lineastotales_d0
p = 0.7190 >= 0.1500  removing arpu_d2
p = 0.6428 >= 0.1500  removing internet_d2
p = 0.6407 >= 0.1500  removing internet_d1
p = 0.4645 >= 0.1500  removing lineastotales_d2
p = 0.3221 >= 0.1500  removing internet_d0
p = 0.4555 >= 0.1500  removing imacec_d1
p = 0.3715 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   16.38
       Model |  248.812432     4  62.2031081           Prob > F      =  0.0000
    Residual |  197.503357    52  3.79814149           R-squared     =  0.5575
-------------+------------------------------           Adj R-squared =  0.5234
       Total |  446.315789    56  7.96992481           Root MSE      =  1.9489

------------------------------------------------------------------------------
     poct_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     poct_d1 |   .5477194   .1293138     4.24   0.000     .2882323    .8072065
     poct_d2 |   .1998883   .1293068     1.55   0.128    -.0595849    .4593614
   imacec_d2 |  -.0693201   .0387941    -1.79   0.080    -.1471662    .0085261
lineastota~1 |   .0000333   .0000193     1.73   0.090    -5.38e-06    .0000719
       _cons |    .243241   .2968263     0.82   0.416    -.3523845    .8388665
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0208   0.0212   .02595  0.8720          |                  |
2        0.1115   0.1123   .78601  0.6750          |                  |
3       -0.0392  -0.0463   .88169  0.8298          |                  |
4       -0.1257  -0.1432   1.8838  0.7571         -|                 -|
5        0.1258   0.1544   2.9069  0.7143          |-                 |-
6       -0.2514  -0.2646   7.0736  0.3141        --|                --|
7        0.1165   0.1237   7.9859  0.3338          |                  |
8        0.0184   0.0642   8.0092  0.4326          |                  |
9        0.0332   0.0122   8.0866  0.5254          |                  |
10      -0.0265  -0.1467   8.1367  0.6155          |                 -|
11       0.0481   0.2552   8.3061  0.6857          |                  |--
12       0.0062  -0.1853   8.3089  0.7605          |                 -|
13       0.0154   0.1352   8.3272  0.8217          |                  |-
14      -0.0745  -0.2064   8.7609  0.8461          |                 -|
15       0.0755   0.3373   9.2169  0.8659          |                  |--
16       0.1454  -0.0286   10.951  0.8125          |-                 |
17      -0.1144  -0.6830   12.052  0.7970          |             -----|
18       0.0458   0.2253   12.233  0.8350          |                  |-
19      -0.0412   0.7142   12.383  0.8686          |                  |-----
20       0.0079  -0.0949   12.389  0.9020          |                  |
21      -0.0003   0.2094   12.389  0.9285          |                  |-
22      -0.0932  -0.7014   13.223  0.9268          |             -----|
23      -0.0176  -0.2870   13.254  0.9463          |                --|
24      -0.0829  -1.3844   13.954  0.9477          |          --------|
25      -0.0684  -1.3950   14.445  0.9534          |          --------|
26      -0.0207   0.0810   14.492  0.9659          |                  |

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.226               1                   0.6341
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         12.071               1                   0.0005
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of poct_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      4.68
                  Prob > F =      0.0059

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:    160 Chi(2)  1.8e-35
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           31.02       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.80298     10.279      5.008  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    14.4917
 Prob > chi2(26)           =     0.9659

.
. drop residuo
```

```
.
pr(.15): regress    prrq_d0 prrq_d1 prrq_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8626 >= 0.1500  removing imacec_d0
p = 0.6389 >= 0.1500  removing lineastotales_d0
p = 0.6344 >= 0.1500  removing internet_d0
p = 0.3690 >= 0.1500  removing internet_d2
p = 0.3704 >= 0.1500  removing lineastotales_d1
p = 0.2523 >= 0.1500  removing prrq_d2
p = 0.7241 >= 0.1500  removing arpu_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =   29.69
       Model |  5893.40167     7  841.914525           Prob > F      =  0.0000
    Residual |    1389.265    49  28.3523468           R-squared     =  0.8092
-------------+------------------------------           Adj R-squared =  0.7820
       Total |  7282.66667    56  130.047619           Root MSE      =  5.3247

------------------------------------------------------------------------------
     prrq_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     prrq_d1 |   .3968381   .1295588     3.06   0.004       .13648    .6571962
 internet_d1 |   .0000617   .0000278     2.22   0.031     5.76e-06    .0001176
     arpu_d0 |  -.4443682    .032077   -13.85   0.000    -.5088294    -.379907
     arpu_d1 |    .160703   .0614908     2.61   0.012     .0371325    .2842734
   imacec_d2 |   -.180539   .1234089    -1.46   0.150    -.4285384    .0674605
   imacec_d1 |   .1762904   .1142295     1.54   0.129    -.0532624    .4058433
lineastota~2 |   .0001104   .0000538     2.05   0.045     2.39e-06    .0002185
       _cons |   2.503141   1.171758     2.14   0.038      .148405    4.857876
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0646   0.0661   .25058  0.6167          |                  |
2       -0.1498  -0.1578   1.6221  0.4444         -|                 -|
3       -0.1578  -0.1456   3.1736  0.3656         -|                 -|
4        0.0243   0.0292   3.2111  0.5231          |                  |
5        0.1964   0.1709   5.7048  0.3360          |-                 |-
6        0.0723   0.0364   6.0492  0.4177          |                  |
7       -0.1437  -0.1171   7.4389  0.3847         -|                  |
8       -0.1329  -0.0651   8.6507  0.3726         -|                  |
9        0.0427   0.0477   8.7785  0.4580          |                  |
10       0.1107   0.0752   9.6549  0.4713          |                  |
11       0.1108   0.1014   10.553  0.4815          |                  |
12      -0.0431   0.0298   10.692  0.5555          |                  |
13      -0.0641   0.0747   11.006  0.6103          |                  |
14       0.0738   0.1978   11.431  0.6519          |                  |-
15       0.2058   0.3571   14.822  0.4643          |-                 |--
16       0.0713   0.1875   15.239  0.5072          |                  |-
17      -0.2483  -0.3157   20.425  0.2531         -|                --|
18      -0.0875   0.1468   21.085  0.2752          |                  |-
19       0.0582   0.1329   21.385  0.3159          |                  |-
```

```
20       0.1111   0.0952   22.506  0.3137          |                  |
21       0.1123   0.2494   23.685  0.3086          |                  |-
22       0.0618   0.6141   24.052  0.3445          |                  |----
23      -0.1105  -0.1110    25.26  0.3370          |                  |
24      -0.0101   0.5060   25.271  0.3912          |                  |----
25       0.0573   0.4462   25.615  0.4283          |                  |---
26      -0.0388   0.2042   25.779  0.4753          |                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.897               1                   0.3437
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.327               1                   0.5673
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of prrq_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      0.88
                  Prob > F =      0.4588

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  8.033 Chi(2)   .018
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.055         0.042           7.06       0.0294

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95910      2.134      1.629  0.05167

.
. ***test Box-Ljung white noise
```

```
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.7785
 Prob > chi2(26)           =     0.4753

.
. drop residuo

.
pr(.15): regress    rbno_d0 rbno_d1 rbno_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.7424 >= 0.1500  removing internet_d2
p = 0.6083 >= 0.1500  removing imacec_d1
p = 0.4784 >= 0.1500  removing rbno_d1
p = 0.4123 >= 0.1500  removing lineastotales_d0
p = 0.4052 >= 0.1500  removing imacec_d2
p = 0.5878 >= 0.1500  removing internet_d1
p = 0.1958 >= 0.1500  removing lineastotales_d1
p = 0.1965 >= 0.1500  removing imacec_d0
p = 0.1933 >= 0.1500  removing internet_d0
p = 0.2005 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =    7.93
       Model |  7573.58877     4  1893.39719           Prob > F      =  0.0000
    Residual |   12412.727    52  238.706289           R-squared     =  0.3789
-------------+------------------------------           Adj R-squared =  0.3312
       Total |  19986.3158    56  356.898496           Root MSE      =   15.45

------------------------------------------------------------------------------
     rbno_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d2 |   .2660365   .1225531     2.17   0.035     .0201156    .5119573
     rbno_d2 |   .5943055    .242407     2.45   0.018     .1078803    1.080731
     arpu_d0 |  -.4880497   .0895964    -5.45   0.000     -.667838   -.3082614
     arpu_d1 |   .3728348    .160517     2.32   0.024     .0507339    .6949356
       _cons |   5.633737   3.094466     1.82   0.074    -.5757637    11.84324
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1066  -0.1067   .68235  0.4088          |                  |
2       -0.0965  -0.1100   1.2515  0.5349          |                  |
3        0.0073  -0.0184   1.2548  0.7399          |                  |
4        0.0079   0.0117   1.2588  0.8683          |                  |
5        0.0518   0.0594   1.4326  0.9207          |                  |
6       -0.0385  -0.0396   1.5303  0.9575          |                  |
7       -0.0669  -0.0349   1.8313  0.9686          |                  |
8        0.0116  -0.0193   1.8406  0.9855          |                  |
9       -0.0022  -0.0282   1.8409  0.9937          |                  |
10       0.0272   0.0446    1.894  0.9971          |                  |
```

```
11       0.0265   0.0291   1.9454  0.9987          |                  |
12       0.0342   0.0768   2.0327  0.9994          |                  |
13       0.0268   0.0215   2.0877  0.9997          |                  |
14      -0.0726  -0.0449   2.4996  0.9997          |                  |
15      -0.0410  -0.0668   2.6345  0.9998          |                  |
16      -0.0208  -0.1174   2.6698  0.9999          |                  |
17      -0.0004   0.0240   2.6699  1.0000          |                  |
18       0.0017   0.0525   2.6701  1.0000          |                  |
19      -0.0410   0.0932    2.819  1.0000          |                  |
20      -0.0175   0.0268   2.8467  1.0000          |                  |
21      -0.0098  -0.0132   2.8556  1.0000          |                  |
22      -0.0271  -0.0721   2.9261  1.0000          |                  |
23       0.0022  -0.0328   2.9266  1.0000          |                  |
24       0.0532   0.0636   3.2146  1.0000          |                  |
25      -0.0549  -0.1607   3.5309  1.0000          |                 -|
26      -0.0527  -0.1750    3.832  1.0000          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.235               1                   0.1349
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.002               1                   0.9608
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of rbno_d0
       Ho:  model has no omitted variables
                  F(3, 49) =     14.62
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1526 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000          0.000          58.65       0.0000

.
. ***test Shapiro Wilk
```

```
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.62478     19.577     6.392  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     3.8320
 Prob > chi2(26)           =     1.0000

.
. drop residuo

.
pr(.15): regress    rchl_d0 rchl_d1 rchl_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2      lineastotales_d2
                      begin with full model
p = 0.9863 >= 0.1500  removing rchl_d2
p = 0.9204 >= 0.1500  removing internet_d0
p = 0.8822 >= 0.1500  removing lineastotales_d0
p = 0.5162 >= 0.1500  removing internet_d1
p = 0.3360 >= 0.1500  removing imacec_d1
p = 0.3137 >= 0.1500  removing arpu_d1
p = 0.1762 >= 0.1500  removing arpu_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =   82.88
       Model |  319.085561     7  45.5836516           Prob > F      =  0.0000
    Residual |  26.9495267    49  .549990341           R-squared     =  0.9221
-------------+------------------------------           Adj R-squared =  0.9110
       Total |  346.035088    56  6.17919799           Root MSE      =  .74161

------------------------------------------------------------------------------
     rchl_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     rchl_d1 |   .1194418   .0419813     2.85   0.006     .0350772    .2038063
lineastota~2 |   .0000181   9.32e-06     1.95   0.057    -5.79e-07    .0000369
     arpu_d0 |   -.094839   .0042391   -22.37   0.000    -.1033578   -.0863202
lineastota~1 |  -.0000284   9.17e-06    -3.10   0.003    -.0000468   -9.97e-06
 internet_d2 |  -7.26e-06   3.57e-06    -2.04   0.047    -.0000144   -9.76e-08
   imacec_d2 |   .0243889   .0148399     1.64   0.107     -.005433    .0542108
   imacec_d0 |  -.0445916   .0167911    -2.66   0.011    -.0783346   -.0108486
       _cons |   .2320621   .1211923     1.91   0.061    -.0114828    .4756071
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1250   0.1252   .93866  0.3326          |-                 |-
```

```
2        0.0187   0.0048   .96001  0.6188          |                  |
3        0.0471   0.0555   1.0981  0.7775          |                  |
4       -0.0275  -0.0638   1.1462  0.8869          |                  |
5       -0.1687  -0.1593   2.9877  0.7019         -|                 -|
6       -0.0560  -0.0012   3.1941  0.7841          |                  |
7        0.1394   0.1734   4.5018  0.7205          |-                 |-
8        0.1706   0.1790   6.4985  0.5916          |-                 |-
9        0.0646  -0.0005   6.7913  0.6588          |                  |
10       0.0074  -0.1347   6.7952  0.7446          |                 -|
11      -0.1505  -0.2653   8.4511  0.6724         -|                --|
12      -0.0077   0.1920   8.4556  0.7486          |                  |-
13      -0.1687  -0.0948   10.632  0.6416         -|                  |
14      -0.0961   0.0259   11.354  0.6580          |                  |
15       0.0294  -0.0954   11.423  0.7220          |                  |
16       0.1607   0.1593   13.542  0.6328          |-                 |-
17      -0.0007  -0.1154   13.542  0.6992          |                  |
18      -0.0385   0.0180    13.67  0.7503          |                  |
19      -0.0556  -0.1984   13.944  0.7870          |                 -|
20      -0.1447   0.0048   15.846  0.7261         -|                  |
21      -0.1938  -0.1356   19.354  0.5624         -|                 -|
22      -0.2502  -0.3595   25.367  0.2798        --|                --|
23       0.1221   0.3534   26.841  0.2628          |                  |--
24       0.1517   0.0960   29.187  0.2132          |-                 |
25      -0.0067   0.2752   29.192  0.2560          |                  |--
26       0.0286  -0.3680    29.28  0.2985          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.276               1                   0.2587
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.657               1                   0.1031
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of rchl_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      7.17
                  Prob > F =      0.0005

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  3.218 Chi(2)  .2001
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo
```

```
                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.520         0.075            3.77       0.1521

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.97598      1.253      0.485  0.31367

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    29.2805
 Prob > chi2(26)           =     0.2985

.
. drop residuo

.
pr(.15): regress    rngr_d0 rngr_d1 rngr_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8561 >= 0.1500  removing internet_d2
p = 0.8681 >= 0.1500  removing arpu_d1
p = 0.7944 >= 0.1500  removing lineastotales_d0
p = 0.6643 >= 0.1500  removing arpu_d0
p = 0.6585 >= 0.1500  removing lineastotales_d1
p = 0.4811 >= 0.1500  removing imacec_d0
p = 0.4167 >= 0.1500  removing rngr_d2
p = 0.4365 >= 0.1500  removing arpu_d2
p = 0.3151 >= 0.1500  removing lineastotales_d2
p = 0.3324 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =    6.88
       Model |  1173.16006     4  293.290014           Prob > F      =  0.0002
    Residual |  2215.15573    52  42.5991487           R-squared     =  0.3462
-------------+------------------------------           Adj R-squared =  0.2959
       Total |  3388.31579    56  60.5056391           Root MSE      =  6.5268

------------------------------------------------------------------------------
     rngr_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     rngr_d1 |   .4395414   .1131724     3.88   0.000     .2124443    .6666384
 internet_d0 |   .0000811   .0000333     2.44   0.018     .0000143    .0001479
   imacec_d1 |  -.3416689   .1458856    -2.34   0.023    -.6344097   -.0489281
   imacec_d2 |  -.2436244   .1369812    -1.78   0.081    -.5184974    .0312485
       _cons |   1.645784   1.080908     1.52   0.134    -.5232166    3.814784
------------------------------------------------------------------------------
```

```
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0077  -0.0077   .00358  0.9523          |                  |
2        0.0116   0.0121   .01183  0.9941          |                  |
3       -0.0778  -0.0803   .38914  0.9425          |                  |
4       -0.0053  -0.0080    .3909  0.9832          |                  |
5        0.0001  -0.0010    .3909  0.9956          |                  |
6        0.0498   0.0471   .55419  0.9971          |                  |
7        0.0422   0.0495   .67401  0.9985          |                  |
8       -0.1290  -0.1443   1.8158  0.9861         -|                 -|
9        0.1674   0.1968   3.7784  0.9254          |-                 |-
10      -0.1227  -0.1412    4.855  0.9007          |                 -|
11       0.1366   0.1527     6.22  0.8583          |-                 |-
12       0.0881   0.1316   6.8001  0.8705          |                  |-
13      -0.0049  -0.0275    6.802  0.9121          |                  |
14      -0.0417   0.0158   6.9383  0.9371          |                  |
15      -0.0289  -0.0028    7.005  0.9575          |                  |
16      -0.0253  -0.0294   7.0575  0.9721          |                  |
17      -0.0854  -0.0596   7.6712  0.9731          |                  |
18       0.1069   0.0624   8.6568  0.9672          |                  |
19      -0.0472   0.0372   8.8539  0.9758          |                  |
20       0.0809   0.1001   9.4486  0.9771          |                  |
21      -0.1341  -0.1751   11.129  0.9602         -|                 -|
22      -0.0936  -0.0470    11.97  0.9580          |                  |
23       0.0489   0.1029   12.207  0.9671          |                  |
24       0.0940   0.1457   13.107  0.9643          |                  |-
25      -0.0682  -0.0562   13.596  0.9683          |                  |
26      -0.1134  -0.0428   14.991  0.9575          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.010               1                   0.9196
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.142               1                   0.7067
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of rngr_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      1.31
                  Prob > F =      0.2815
```

```
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  592.5 Chi(2)  2.e-129
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          46.21       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.72965     14.105      5.688  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    14.9905
 Prob > chi2(26)           =     0.9575

.
. drop residuo

.
pr(.15): regress    spbl_d0 spbl_d1 spbl_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9939 >= 0.1500  removing lineastotales_d0
p = 0.9175 >= 0.1500  removing arpu_d1
p = 0.8776 >= 0.1500  removing internet_d2
p = 0.8595 >= 0.1500  removing lineastotales_d2
p = 0.8452 >= 0.1500  removing arpu_d2
p = 0.8023 >= 0.1500  removing internet_d0
p = 0.6178 >= 0.1500  removing spbl_d2
p = 0.5496 >= 0.1500  removing arpu_d0
p = 0.2795 >= 0.1500  removing imacec_d1
p = 0.1916 >= 0.1500  removing spbl_d1
p = 0.1518 >= 0.1500  removing imacec_d2
p = 0.2689 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    3.27
       Model |  17.7485783     2  8.87428913           Prob > F      =  0.0455
    Residual |  146.391773    54  2.71095875           R-squared     =  0.1081
-------------+------------------------------           Adj R-squared =  0.0751
       Total |  164.140351    56  2.93107769           Root MSE      =  1.6465
```

```
------------------------------------------------------------------------------
     spbl_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d0 |  -.0548522   .0345876    -1.59   0.119    -.1241962    .0144918
lineastota~1 |  -.0000373   .0000163    -2.29   0.026      -.00007   -4.65e-06
       _cons |   1.061594   .2310883     4.59   0.000     .5982899    1.524898
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1581   0.1585   1.5256  0.2168          |-                 |-
2       -0.0433  -0.0702   1.6422  0.4399          |                  |
3        0.1731   0.1994   3.5388  0.3158          |-                 |-
4        0.1338   0.0797   4.6917  0.3204          |-                 |
5        0.1014   0.1149   5.3665  0.3728          |                  |
6        0.1530   0.1364   6.9331  0.3271          |-                 |-
7        0.0151  -0.0253   6.9488  0.4342          |                  |
8        0.0159   0.0224   6.9665  0.5403          |                  |
9        0.2095   0.1970   10.082  0.3438          |-                 |-
10       0.0584   0.0055   10.329  0.4121          |                  |
11       0.0438   0.1041   10.472  0.4885          |                  |
12       0.2578   0.2642     15.5  0.2152          |--                |--
13       0.1501   0.1552   17.242  0.1885          |-                 |-
14      -0.0932  -0.0677   17.928  0.2101          |                  |
15       0.0926   0.1195   18.623  0.2313          |                  |
16       0.0108  -0.0705   18.632  0.2882          |                  |
17      -0.0401   0.0012   18.769  0.3419          |                  |
18       0.0109  -0.0496    18.78  0.4055          |                  |
19      -0.0511  -0.0484   19.013  0.4560          |                  |
20       0.0669   0.2283   19.423  0.4945          |                  |-
21       0.0169  -0.0541    19.45  0.5563          |                  |
22       0.0182   0.1872   19.482  0.6154          |                  |-
23      -0.0962  -0.0528   20.402  0.6175          |                  |
24      -0.0414  -0.0631   20.578  0.6635          |                  |
25       0.0506   0.1048   20.848  0.7010          |                  |
26      -0.1262  -0.1792   22.581  0.6565         -|                 -|
27      -0.2014  -0.2753   27.135  0.4565         -|                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.424               1                   0.2327
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.088               1                   0.7663
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of spbl_d0
       Ho:  model has no omitted variables
                  F(3, 51) =     14.92
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  454.9 Chi(2)  1.6e-99
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           42.94       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.75704     12.853      5.493  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    27.1354
 Prob > chi2(27)           =     0.4565

.
. drop residuo

.
pr(.15): regress    cas2_d0 cas2_d1 cas2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9763 >= 0.1500  removing arpu_d1
p = 0.9546 >= 0.1500  removing arpu_d2
p = 0.9572 >= 0.1500  removing lineastotales_d2
p = 0.8719 >= 0.1500  removing cas2_d1
p = 0.8005 >= 0.1500  removing internet_d2
p = 0.6603 >= 0.1500  removing lineastotales_d1
p = 0.6646 >= 0.1500  removing internet_d0
p = 0.4272 >= 0.1500  removing cas2_d2
p = 0.5067 >= 0.1500  removing internet_d1
```

```
p = 0.3646 >= 0.1500  removing imacec_d1
p = 0.5340 >= 0.1500  removing imacec_d0
p = 0.3410 >= 0.1500  removing imacec_d2
p = 0.2857 >= 0.1500  removing lineastotales_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =   50.63
       Model |  .92502671     1  .92502671             Prob > F      =  0.0000
    Residual | 1.00479785    55  .018269052            R-squared     =  0.4793
-------------+------------------------------           Adj R-squared =  0.4699
       Total | 1.92982456    56  .034461153            Root MSE      =  .13516

------------------------------------------------------------------------------
     cas2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |  -.0053436    .000751    -7.12   0.000    -.0068486   -.0038387
       _cons |   .0186629    .018051     1.03   0.306    -.0175121    .0548378
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0236  -0.0236   .03462  0.8524          |                  |
2       -0.0201  -0.0207   .06018  0.9704          |                  |
3       -0.0096  -0.0106   .06604  0.9956          |                  |
4       -0.0300  -0.0310   .12504  0.9981          |                  |
5       -0.0270  -0.0294   .17379  0.9994          |                  |
6       -0.0230  -0.0257    .2097  0.9998          |                  |
7       -0.0240  -0.0271   .24952  0.9999          |                  |
8       -0.0233  -0.0273    .2879  1.0000          |                  |
9       -0.0234  -0.0283   .32722  1.0000          |                  |
10      -0.0247  -0.0306    .3719  1.0000          |                  |
11      -0.0225  -0.0296   .40991  1.0000          |                  |
12      -0.0268  -0.0351   .46476  1.0000          |                  |
13      -0.0269  -0.0370   .52144  1.0000          |                  |
14      -0.0207  -0.0327   .55566  1.0000          |                  |
15      -0.0257  -0.0395   .60968  1.0000          |                  |
16      -0.0293  -0.0459   .68166  1.0000          |                  |
17      -0.0102  -0.2726   .69055  1.0000          |                --|
18      -0.0092  -0.2267   .69795  1.0000          |                 -|
19      -0.0102  -0.2339   .70724  1.0000          |                 -|
20      -0.0079  -0.1767   .71304  1.0000          |                 -|
21      -0.0076  -0.1840   .71853  1.0000          |                 -|
22      -0.0104  -0.2726   .72908  1.0000          |                --|
23      -0.0123  -2.7500   .74425  1.0000          |          --------|
24      -0.0117  -3.2418    .7584  1.0000          |          --------|
25      -0.0121  -8.9558   .77388  1.0000          |          --------|
26      -0.0104  -1.7453   .78574  1.0000          |          --------|
27      -0.0111  -9.2120    .7996  1.0000          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.050               1                   0.8227
---------------------------------------------------------------------------
```

```
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.020               1                   0.8868
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   6393 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000              .       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.22185     41.733      8.035  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.7996
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
pr(.15): regress    casm_d0 casm_d1 casm_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.7461 >= 0.1500  removing arpu_d2
p = 0.6469 >= 0.1500  removing imacec_d1
p = 0.7024 >= 0.1500  removing imacec_d2
p = 0.5902 >= 0.1500  removing internet_d2
p = 0.5117 >= 0.1500  removing internet_d1
```

```
p = 0.5515 >= 0.1500  removing lineastotales_d2
p = 0.2674 >= 0.1500  removing casm_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =  100.50
       Model |  251.958605     7  35.9940864           Prob > F      =  0.0000
    Residual |   17.550167    49  .358166674           R-squared     =  0.9349
-------------+------------------------------           Adj R-squared =  0.9256
       Total |  269.508772    56  4.81265664           Root MSE      =  .59847

------------------------------------------------------------------------------
     casm_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     casm_d1 |   .2565185   .1307487     1.96   0.055    -.0062309    .5192679
lineastota~0 |   .0000186   7.15e-06     2.61   0.012     4.28e-06     .000033
     arpu_d0 |  -.0872092   .0035523   -24.55   0.000    -.0943479   -.0800704
     arpu_d1 |   .0183423   .0118107     1.55   0.127    -.0053921    .0420768
lineastota~1 |  -.0000117   7.50e-06    -1.57   0.124    -.0000268    3.33e-06
 internet_d0 |   7.45e-06   2.93e-06     2.54   0.014     1.55e-06    .0000133
   imacec_d0 |  -.0240508   .0128068    -1.88   0.066     -.049787    .0016854
       _cons |  -.0451931   .0980167    -0.46   0.647    -.2421649    .1517787
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0055   0.0055   .00186  0.9656          |                  |
2        0.0895   0.0903   .49917  0.7791          |                  |
3        0.0461   0.0602   .63353  0.8887          |                  |
4        0.0048   0.0218   .63501  0.9591          |                  |
5       -0.0264  -0.0263   .68068  0.9840          |                  |
6        0.1032   0.1009    1.393  0.9663          |                  |
7        0.0985   0.1251    2.055  0.9567          |                  |-
8       -0.0895  -0.0687   2.6124  0.9563          |                  |
9       -0.0245  -0.0458   2.6548  0.9764          |                  |
10       0.0137   0.0125   2.6684  0.9882          |                  |
11       0.2468   0.3287   7.1768  0.7846          |-                 |--
12      -0.0502   0.0124   7.3673  0.8324          |                  |
13       0.3145   0.3514   15.018  0.3062          |--                |--
14       0.0900   0.2171   15.659  0.3346          |                  |-
15       0.0084   0.1145   15.665  0.4046          |                  |
16       0.0316   0.1292   15.748  0.4707          |                  |-
17       0.0197   0.1824   15.781  0.5394          |                  |-
18      -0.1118  -0.0793   16.868  0.5322          |                  |
19       0.0212   0.1123   16.908  0.5961          |                  |
20      -0.0288   0.0391   16.984  0.6540          |                  |
21      -0.0410   0.1099   17.142  0.7025          |                  |
22      -0.0092   0.0608    17.15  0.7550          |                  |
23      -0.0539  -0.0049   17.439  0.7872          |                  |
24       0.0060  -0.1774   17.442  0.8292          |                 -|
25       0.0078  -0.0440   17.449  0.8649          |                  |
26      -0.0026  -0.1334   17.449  0.8949          |                 -|
27       0.0045  -0.0834   17.452  0.9194          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
```

```
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.712               1                   0.3989
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.055               1                   0.8142
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of casm_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      9.60
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  11.71 Chi(2)  .0029
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.006         0.049            9.54       0.0085

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.93237      3.578      2.742  0.00305

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.4516
 Prob > chi2(27)           =     0.9194

.
. drop residuo

.
```

```
pr(.15): regress    chtn_d0 chtn_d1 chtn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9684 >= 0.1500  removing imacec_d2
p = 0.8890 >= 0.1500  removing lineastotales_d2
p = 0.7551 >= 0.1500  removing internet_d1
p = 0.6973 >= 0.1500  removing internet_d2
p = 0.6462 >= 0.1500  removing internet_d0
p = 0.6116 >= 0.1500  removing arpu_d2
p = 0.3378 >= 0.1500  removing lineastotales_d0
p = 0.4102 >= 0.1500  removing imacec_d0
p = 0.2859 >= 0.1500  removing imacec_d1
p = 0.1606 >= 0.1500  removing lineastotales_d1
p = 0.1605 >= 0.1500  removing chtn_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   20.54
       Model |  5297.9429     3  1765.98097           Prob > F      =  0.0000
    Residual |  4556.19745    53  85.9659896           R-squared     =  0.5376
-------------+------------------------------           Adj R-squared =  0.5115
       Total |  9854.14035    56  175.966792           Root MSE      =  9.2718

------------------------------------------------------------------------------
     chtn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     chtn_d1 |   .6172016   .1073769     5.75   0.000     .4018308    .8325724
     arpu_d1 |   .0939417   .0591449     1.59   0.118    -.0246879    .2125713
     arpu_d0 |  -.2825544   .0520973    -5.42   0.000    -.3870482   -.1780605
       _cons |   .2691109    1.26177     0.21   0.832    -2.261679    2.799901
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1108   0.1183   .74898  0.3868          |                  |
2       -0.2781  -0.3235   5.5548  0.0622        --|                --|
3        0.0705   0.2689   5.8696  0.1181          |                  |--
4        0.1595   0.2544   7.5082  0.1113          |-                 |--
5        0.1137   0.3285   8.3568  0.1376          |                  |--
6       -0.1624  -0.3695   10.121  0.1197         -|                --|
7       -0.1457  -0.1608   11.569  0.1156         -|                 -|
8        0.0167  -0.1236   11.589  0.1705          |                  |
9       -0.0826  -0.4093   12.074  0.2092          |               ---|
10      -0.0305  -0.1295   12.141  0.2757          |                 -|
11      -0.0269  -0.6643   12.195  0.3492          |             -----|
12      -0.0001  -0.0735   12.195  0.4302          |                  |
13       0.0140   0.0376    12.21  0.5105          |                  |
14      -0.0148  -0.2206   12.228  0.5880          |                 -|
15      -0.0174  -0.3099   12.252  0.6599          |                --|
16      -0.0164   0.1092   12.274  0.7249          |                  |
17       0.0671   0.3582   12.656  0.7589          |                  |--
18       0.0415   0.0523   12.806  0.8030          |                  |
19      -0.0273   0.1864   12.872  0.8451          |                  |-
20       0.0188   0.1027   12.905  0.8814          |                  |
21       0.0075  -0.4665    12.91  0.9117          |               ---|
```

```
22      -0.0083  -0.0287   12.917  0.9355          |                  |
23       0.0513   0.1509   13.178  0.9480          |                  |-
24       0.0455   0.0247    13.39  0.9592          |                  |
25      -0.0566  -1.1046   13.727  0.9663          |          --------|
26      -0.0784  -0.7447   14.395  0.9674          |             -----|
27       0.0407   0.0182   14.582  0.9749          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.356               1                   0.1248
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.006               1                   0.9397
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chtn_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      0.14
                  Prob > F =      0.9361

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  405.1 Chi(2)  1.1e-88
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           39.00       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.79546     10.821      5.123  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo
```

```
Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    14.5818
 Prob > chi2(27)           =     0.9749

.
. drop residuo

.
pr(.15): regress    clbc_d0 clbc_d1 clbc_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8959 >= 0.1500  removing lineastotales_d2
p = 0.8518 >= 0.1500  removing internet_d2
p = 0.7422 >= 0.1500  removing imacec_d1
p = 0.6773 >= 0.1500  removing lineastotales_d1
p = 0.6585 >= 0.1500  removing internet_d1
p = 0.6520 >= 0.1500  removing imacec_d2
p = 0.5089 >= 0.1500  removing arpu_d2
p = 0.4107 >= 0.1500  removing arpu_d1
p = 0.4009 >= 0.1500  removing clbc_d2
p = 0.2726 >= 0.1500  removing imacec_d0
p = 0.2230 >= 0.1500  removing clbc_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   98.23
       Model |  17116.4222     3  5705.47407           Prob > F      =  0.0000
    Residual |  3078.24444    53  58.0800838           R-squared     =  0.8476
-------------+------------------------------           Adj R-squared =  0.8389
       Total |  20194.6667    56  360.619048           Root MSE      =   7.621

------------------------------------------------------------------------------
     clbc_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~0 |   .0001365   .0000751     1.82   0.075    -.0000141    .0002872
 internet_d0 |   .0000877   .0000362     2.42   0.019      .000015    .0001603
     arpu_d0 |  -.7190705   .0424867   -16.92   0.000    -.8042881   -.6338529
       _cons |   8.415326   1.178234     7.14   0.000     6.052088    10.77857
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1019   0.1021   .64381  0.4223          |                  |
2       -0.1862  -0.1997   2.8326  0.2426         -|                 -|
3        0.0473   0.0957   2.9765  0.3953          |                  |
4       -0.0122  -0.0743   2.9862  0.5601          |                  |
5        0.1257   0.1896     4.04  0.5437          |-                 |-
6        0.0303  -0.0527   4.1022  0.6629          |                  |
7       -0.1802  -0.1421   6.3487  0.4997         -|                 -|
8       -0.1425  -0.1478   7.7823  0.4550         -|                 -|
9       -0.0063  -0.0090   7.7852  0.5559          |                  |
10       0.0408   0.0594   7.9076  0.6379          |                  |
11       0.0233   0.0311   7.9482  0.7179          |                  |
```

```
12      -0.0703  -0.1079   8.3268  0.7591          |                  |
13      -0.0805  -0.0579   8.8339  0.7854          |                  |
14       0.0223   0.0749   8.8737  0.8391          |                  |
15       0.0097  -0.0868   8.8814  0.8836          |                  |
16       0.0011   0.0235   8.8815  0.9182          |                  |
17      -0.1134  -0.3913   9.9826  0.9043          |               ---|
18      -0.0332   0.1931    10.08  0.9293          |                  |-
19       0.0512   0.0538   10.315  0.9447          |                  |
20      -0.0123  -0.2252   10.329  0.9618          |                 -|
21      -0.0414  -0.2481   10.491  0.9718          |                 -|
22      -0.0149  -0.2291   10.513  0.9810          |                 -|
23       0.0017  -0.0177   10.513  0.9876          |                  |
24      -0.0728  -1.0146   11.058  0.9886          |          --------|
25      -0.0445  -0.1954   11.267  0.9915          |                 -|
26      -0.0171  -0.4530   11.299  0.9945          |               ---|
27       0.0347  -0.5275   11.434  0.9962          |              ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.694               1                   0.4047
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.057               1                   0.8110
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of clbc_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      1.92
                  Prob > F =      0.1377

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  37.28 Chi(2)  8.0e-09
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.006         0.001           14.24       0.0008

.
. ***test Shapiro Wilk
```

```
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     59    0.93448      3.514     2.706  0.00340

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.4340
 Prob > chi2(27)           =     0.9962

.
. drop residuo

.
pr(.15): regress    cnt2_d0 cnt2_d1 cnt2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9530 >= 0.1500  removing arpu_d0
p = 0.9329 >= 0.1500  removing lineastotales_d2
p = 0.9166 >= 0.1500  removing arpu_d1
p = 0.8781 >= 0.1500  removing lineastotales_d1
p = 0.7870 >= 0.1500  removing arpu_d2
p = 0.4881 >= 0.1500  removing cnt2_d2
p = 0.4595 >= 0.1500  removing cnt2_d1
p = 0.4400 >= 0.1500  removing lineastotales_d0
p = 0.4944 >= 0.1500  removing internet_d0
p = 0.4108 >= 0.1500  removing internet_d2
p = 0.3322 >= 0.1500  removing internet_d1
p = 0.3014 >= 0.1500  removing imacec_d1
p = 0.3032 >= 0.1500  removing imacec_d2
p = 0.2374 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    56) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  .98245614    56   .01754386            R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  .98245614    56   .01754386            Root MSE      =  .13245

------------------------------------------------------------------------------
     cnt2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   .0175439   .0175439     1.00   0.322    -.0176007    .0526884
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0175  -0.0175   .01908  0.8901           |                  |
```

```
2       -0.0178  -0.0182   .03914  0.9806          |                   |
3       -0.0181  -0.0189   .06024  0.9961          |                   |
4       -0.0184  -0.0196   .08242  0.9992          |                   |
5       -0.0187  -0.0204   .10573  0.9998          |                   |
6       -0.0190  -0.0213   .13023  1.0000          |                   |
7       -0.0193  -0.0222   .15597  1.0000          |                   |
8       -0.0196  -0.0233   .18303  1.0000          |                   |
9       -0.0199  -0.0244   .21145  1.0000          |                   |
10      -0.0202  -0.0256   .24131  1.0000          |                   |
11      -0.0205  -0.0270   .27269  1.0000          |                   |
12      -0.0207  -0.0286   .30565  1.0000          |                   |
13      -0.0210  -0.0303   .34029  1.0000          |                   |
14      -0.0213  -0.0323   .37668  1.0000          |                   |
15      -0.0216  -0.0345   .41493  1.0000          |                   |
16      -0.0219  -0.0370   .45514  1.0000          |                   |
17      -0.0222  -0.0400    .4974  1.0000          |                   |
18      -0.0225  -0.0435   .54185  1.0000          |                   |
19      -0.0056        .   .54462  1.0000          |
20      -0.0058        .   .54777  1.0000          |
21      -0.0061        .   .55134  1.0000          |
22      -0.0064        .   .55536  1.0000          |
23      -0.0067        .   .55988  1.0000          |
24      -0.0070        .   .56494  1.0000          |
25      -0.0073        .   .57059  1.0000          |
26      -0.0076        .   .57688  1.0000          |
27      -0.0079        .   .58388  1.0000          |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.019               1                   0.8909
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.019               1                   0.8918
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   7724 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
```

```
     residuo |      0.000         0.000                .       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     59    0.51741     25.882      7.006  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.5839
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
pr(.15): regress    ctao_d0 ctao_d1 ctao_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2      lineastotales_d2
                      begin with full model
p = 0.8596 >= 0.1500  removing lineastotales_d0
p = 0.7179 >= 0.1500  removing imacec_d2
p = 0.8172 >= 0.1500  removing internet_d1
p = 0.7059 >= 0.1500  removing arpu_d2
p = 0.6023 >= 0.1500  removing imacec_d1
p = 0.5650 >= 0.1500  removing internet_d2
p = 0.4192 >= 0.1500  removing imacec_d0
p = 0.3461 >= 0.1500  removing internet_d0
p = 0.3295 >= 0.1500  removing ctao_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =   17.34
       Model |  4.39608397     5  .879216795           Prob > F      =  0.0000
    Residual |  2.58637217    51   .05071318           R-squared     =  0.6296
-------------+------------------------------           Adj R-squared =  0.5933
       Total |  6.98245614    56  .124686717           Root MSE      =   .2252

------------------------------------------------------------------------------
     ctao_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     ctao_d1 |   -.267487   .1306805    -2.05   0.046    -.5298389    -.005135
lineastota~2 |   4.71e-06   2.66e-06     1.77   0.083    -6.32e-07    .0000101
     arpu_d0 |  -.0100123    .001299    -7.71   0.000    -.0126201   -.0074045
     arpu_d1 |  -.0035729   .0018822    -1.90   0.063    -.0073516    .0002058
lineastota~1 |  -5.19e-06   2.63e-06    -1.97   0.054    -.0000105    9.79e-08
       _cons |  -.0160701    .032576    -0.49   0.624    -.0814691    .0493289
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo
```

```
                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0207  -0.0208   .02581  0.8724          |                  |
2       -0.1963  -0.1989    2.383  0.3038         -|                 -|
3        0.0011  -0.0154   2.3831  0.4968          |                  |
4        0.0861   0.0443   2.8531  0.5827          |                  |
5       -0.0602  -0.0609   3.0876  0.6865          |                  |
6       -0.0259  -0.0070   3.1317  0.7921          |                  |
7        0.0097  -0.0170    3.138  0.8719          |                  |
8        0.0291   0.0175   3.1962  0.9215          |                  |
9       -0.0335  -0.0328   3.2748  0.9524          |                  |
10      -0.0273  -0.0239   3.3284  0.9726          |                  |
11       0.0427   0.0869    3.462  0.9831          |                  |
12      -0.0568  -0.0867   3.7032  0.9882          |                  |
13      -0.0357  -0.0493   3.8007  0.9931          |                  |
14       0.1769   0.3453   6.2475  0.9599          |-                 |--
15       0.1719   0.5911   8.6147  0.8968          |-                 |----
16      -0.2941  -0.0989   15.708  0.4735        --|                  |
17      -0.1175  -0.1986   16.868  0.4633          |                 -|
18       0.0685  -0.2501   17.273  0.5044          |                --|
19      -0.0626  -0.5880    17.62  0.5480          |              ----|
20       0.0586  -0.1032   17.932  0.5919          |                  |
21       0.0311  -0.0921   18.022  0.6476          |                  |
22       0.0096   0.0182   18.031  0.7042          |                  |
23       0.0179   0.2040   18.063  0.7541          |                  |-
24      -0.0927  -0.2244   18.939  0.7552          |                 -|
25       0.0322   0.0784   19.048  0.7948          |                  |
26       0.0210   0.4083   19.096  0.8324          |                  |---

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.168               1                   0.6821
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.971               1                   0.3245
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of ctao_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      5.70
                  Prob > F =      0.0020

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:    371 Chi(2)  2.7e-81
Jarque-Bera test for Ho: normality: (residuo)
```

```
.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.013         0.000           23.32       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.67495     16.959      6.084  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    19.0958
 Prob > chi2(26)           =     0.8324

.
. drop residuo

.
pr(.15): regress    ens2_d0 ens2_d1 ens2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8352 >= 0.1500  removing imacec_d0
p = 0.8037 >= 0.1500  removing imacec_d2
p = 0.7254 >= 0.1500  removing imacec_d1
p = 0.7855 >= 0.1500  removing lineastotales_d2
p = 0.6902 >= 0.1500  removing lineastotales_d0
p = 0.6483 >= 0.1500  removing arpu_d2
p = 0.5304 >= 0.1500  removing internet_d1
p = 0.5043 >= 0.1500  removing internet_d0
p = 0.4418 >= 0.1500  removing internet_d2
p = 0.3896 >= 0.1500  removing ens2_d2
p = 0.1919 >= 0.1500  removing lineastotales_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   52.70
       Model |  8.93456242     3  2.97818747           Prob > F      =  0.0000
    Residual |  2.99526214    53   .05651438           R-squared     =  0.7489
-------------+------------------------------           Adj R-squared =  0.7347
       Total |  11.9298246    56  .213032581           Root MSE      =  .23773

------------------------------------------------------------------------------
     ens2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     ens2_d1 |    .324712   .1316718     2.47   0.017     .0606119    .5888122
     arpu_d1 |   .0053953   .0025322     2.13   0.038     .0003164    .0104743
```

```
     arpu_d0 |  -.0170073    .001362   -12.49   0.000    -.0197392   -.0142754
       _cons |   -.013513   .0319129    -0.42   0.674    -.0775221    .0504962
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0330   0.0330   .06647  0.7966          |                  |
2       -0.1124  -0.1133     .851  0.6534          |                  |
3        0.0164   0.0224   .86796  0.8332          |                  |
4       -0.0493  -0.0665   1.0243  0.9061          |                  |
5        0.0027   0.0110   1.0248  0.9605          |                  |
6       -0.0062  -0.0182   1.0274  0.9846          |                  |
7       -0.0147  -0.0112    1.042  0.9941          |                  |
8       -0.0005  -0.0034    1.042  0.9980          |                  |
9       -0.0026  -0.0052   1.0425  0.9993          |                  |
10      -0.0046  -0.0059   1.0441  0.9998          |                  |
11       0.1008   0.1012   1.7969  0.9991          |                  |
12      -0.2602  -0.2816   6.9199  0.8629        --|                --|
13      -0.2609  -0.2274   12.182  0.5128        --|                 -|
14       0.0948   0.0512   12.893  0.5350          |                  |
15       0.0279  -0.0223   12.956  0.6057          |                  |
16       0.0302   0.0317   13.031  0.6705          |                  |
17      -0.0421  -0.0761   13.182  0.7239          |                  |
18       0.1298   0.1693   14.648  0.6860          |-                 |-
19       0.0664   0.0453   15.042  0.7199          |                  |
20      -0.1344  -0.1511   16.696  0.6726         -|                 -|
21      -0.0674  -0.0660   17.124  0.7036          |                  |
22      -0.0905  -0.1650   17.916  0.7110          |                 -|
23      -0.0379   0.0741   18.058  0.7543          |                  |
24       0.0249   0.0159   18.122  0.7971          |                  |
25       0.0028  -0.4580   18.123  0.8371          |               ---|
26      -0.0037  -0.4900   18.124  0.8712          |               ---|
27       0.0131  -0.3016   18.143  0.8991          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.222               1                   0.6375
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.409               1                   0.1207
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest
```

```
Ramsey RESET test using powers of the fitted values of ens2_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      3.41
                  Prob > F =      0.0244

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  313.4 Chi(2)  9.0e-69
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.103         0.000          20.36       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.55609     23.484      6.790  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    18.1432
 Prob > chi2(27)           =     0.8991

.
. drop residuo

.
pr(.15): regress    ensd_d0 ensd_d1 ensd_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9089 >= 0.1500  removing arpu_d2
p = 0.8883 >= 0.1500  removing ensd_d1
p = 0.9040 >= 0.1500  removing imacec_d2
p = 0.8020 >= 0.1500  removing arpu_d0
p = 0.8121 >= 0.1500  removing arpu_d1
p = 0.7655 >= 0.1500  removing ensd_d2
p = 0.5945 >= 0.1500  removing internet_d0
p = 0.6001 >= 0.1500  removing internet_d2
p = 0.4904 >= 0.1500  removing lineastotales_d2
p = 0.4470 >= 0.1500  removing internet_d1
p = 0.3753 >= 0.1500  removing lineastotales_d0
p = 0.4068 >= 0.1500  removing lineastotales_d1
p = 0.3311 >= 0.1500  removing imacec_d0
```

```
      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    5.16
       Model |  .084317932     1  .084317932           Prob > F      =  0.0270
    Residual |  .898138209    55  .016329786           R-squared     =  0.0858
-------------+------------------------------           Adj R-squared =  0.0692
       Total |   .98245614    56   .01754386           Root MSE      =  .12779

------------------------------------------------------------------------------
     ensd_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d1 |   .0056729   .0024965     2.27   0.027     .0006698    .0106761
       _cons |   .0148407   .0169677     0.87   0.386    -.0191634    .0488447
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0315  -0.0315   .06073  0.8053          |                  |
2        0.0306   0.0297   .11886  0.9423          |                  |
3       -0.0249  -0.0232   .15803  0.9841          |                  |
4       -0.0151  -0.0176   .17279  0.9965          |                  |
5       -0.0112  -0.0109   .18109  0.9993          |                  |
6       -0.0242  -0.0245   .22019  0.9998          |                  |
7       -0.0150  -0.0169   .23564  1.0000          |                  |
8        0.0084   0.0080   .24059  1.0000          |                  |
9        0.0448   0.5907   .38344  1.0000          |                  |----
10      -0.0123   0.1697   .39439  1.0000          |                  |-
11       0.0070   0.3772   .39799  1.0000          |                  |---
12      -0.0629  -0.7666   .69718  1.0000          |            ------|
13       0.0133  -0.1342   .71093  1.0000          |                 -|
14       0.0206   0.1219   .74447  1.0000          |                  |
15      -0.0456  -0.6105    .9124  1.0000          |              ----|
16      -0.0015  -0.6077   .91258  1.0000          |              ----|
17      -0.0285  -0.7803   .98148  1.0000          |            ------|
18      -0.0140  -1.6801   .99854  1.0000          |          --------|
19       0.0214  -0.1957   1.0392  1.0000          |                 -|
20      -0.0126  -4.2625   1.0538  1.0000          |          --------|
21       0.0451   6.4055   1.2448  1.0000          |                  |--------
22      -0.0274  -7.9636   1.3174  1.0000          |          --------|
23       0.0110  -4.3815   1.3294  1.0000          |          --------|
24      -0.0730  -2.5492   1.8749  1.0000          |          --------|
25       0.0129   1.8629   1.8925  1.0000          |                  |--------
26       0.0324   5.3051   2.0064  1.0000          |                  |--------
27      -0.0527   2.7029   2.3177  1.0000          |                  |--------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.053               1                   0.8184
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
```

```
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.026               1                   0.8715
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of ensd_d0
       Ho:  model has no omitted variables
                  F(3, 52) =      5.34
                  Prob > F =      0.0028

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   5034 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000              .        0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.33474     35.195      7.660  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     2.3177
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
pr(.15): regress    frs2_d0 frs2_d1 frs2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9052 >= 0.1500  removing arpu_d1
p = 0.8124 >= 0.1500  removing frs2_d2
p = 0.7592 >= 0.1500  removing imacec_d1
p = 0.6086 >= 0.1500  removing lineastotales_d0
```

```
p = 0.6186 >= 0.1500  removing internet_d0
p = 0.6054 >= 0.1500  removing internet_d1
p = 0.6058 >= 0.1500  removing arpu_d2
p = 0.5377 >= 0.1500  removing imacec_d2
p = 0.4781 >= 0.1500  removing internet_d2
p = 0.2530 >= 0.1500  removing lineastotales_d2
p = 0.2661 >= 0.1500  removing frs2_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   28.94
       Model |  65.9738369     3   21.991279           Prob > F      =  0.0000
    Residual |  40.2717772    53  .759844852           R-squared     =  0.6210
-------------+------------------------------           Adj R-squared =  0.5995
       Total |  106.245614    56  1.89724311           Root MSE      =  .87169

------------------------------------------------------------------------------
     frs2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~1 |  -.0000312   8.78e-06    -3.55   0.001    -.0000488   -.0000136
   imacec_d0 |  -.0326825   .0183221    -1.78   0.080     -.069432     .004067
     arpu_d0 |  -.0381751   .0049284    -7.75   0.000    -.0480603     -.02829
       _cons |   .5419061   .1244303     4.36   0.000     .2923305    .7914817
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1185   0.1188   .85761  0.3544          |                  |
2       -0.0811  -0.0960   1.2663  0.5309          |                  |
3        0.2467   0.2825   5.1165  0.1635          |-                 |--
4        0.2720   0.2458   9.8861  0.0424          |--                |-
5       -0.0192   0.0014   9.9104  0.0778          |                  |
6       -0.0512  -0.0705   10.086  0.1211          |                  |
7        0.0303  -0.1249   10.148  0.1803          |                  |
8        0.0615  -0.0025   10.412  0.2373          |                  |
9       -0.1371  -0.1322   11.746  0.2280         -|                 -|
10      -0.1467  -0.0994   13.306  0.2071         -|                  |
11       0.0220   0.0431   13.342  0.2716          |                  |
12      -0.0621  -0.1126   13.634  0.3247          |                  |
13      -0.0504   0.1287    13.83  0.3859          |                  |-
14      -0.2063  -0.2956   17.197  0.2458         -|                --|
15       0.0313   0.1148   17.276  0.3026          |                  |
16       0.0273  -0.0802   17.338  0.3641          |                  |
17      -0.1441  -0.1159   19.102  0.3227         -|                  |
18      -0.0864  -0.0119   19.752  0.3470          |                  |
19       0.1310   0.1450   21.283  0.3214          |-                 |-
20      -0.1828  -0.5007   24.343  0.2277         -|              ----|
21      -0.0314   0.4003   24.436  0.2724          |                  |---
22      -0.0279  -0.6753   24.511  0.3210          |             -----|
23      -0.3007  -0.7017   33.503  0.0727        --|             -----|
24      -0.1452  -0.3006   35.661  0.0592         -|                --|
25       0.0084  -0.1266   35.668  0.0768          |                 -|
26      -0.0054   0.0713   35.671  0.0979          |                  |
27      -0.1536   0.1445   38.319  0.0730         -|                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
```

```
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.765               1                   0.3818
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.050               1                   0.8224
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of frs2_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      1.28
                  Prob > F =      0.2927

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  20.02 Chi(2)  4.5e-05
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.028           13.35       0.0013

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.90625      4.960      3.445  0.00029

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    38.3193
 Prob > chi2(27)           =     0.0730

.
. drop residuo

.
```

```
pr(.15): regress    frsa_d0 frsa_d1 frsa_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9468 >= 0.1500  removing lineastotales_d2
p = 0.9273 >= 0.1500  removing arpu_d1
p = 0.8156 >= 0.1500  removing arpu_d2
p = 0.7494 >= 0.1500  removing lineastotales_d0
p = 0.6630 >= 0.1500  removing imacec_d1
p = 0.4833 >= 0.1500  removing internet_d2
p = 0.4257 >= 0.1500  removing internet_d0
p = 0.4538 >= 0.1500  removing arpu_d0
p = 0.4150 >= 0.1500  removing frsa_d1
p = 0.4229 >= 0.1500  removing imacec_d0
p = 0.2120 >= 0.1500  removing frsa_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    4.84
       Model |  .211380518     3  .070460173           Prob > F      =  0.0047
    Residual |  .771075622    53  .014548597           R-squared     =  0.2152
-------------+------------------------------           Adj R-squared =  0.1707
       Total |   .98245614    56   .01754386           Root MSE      =  .12062

------------------------------------------------------------------------------
     frsa_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~1 |  -3.06e-06   1.21e-06    -2.54   0.014    -5.48e-06   -6.41e-07
   imacec_d2 |  -.0042233   .0026199    -1.61   0.113    -.0094781    .0010316
 internet_d1 |   1.23e-06   6.28e-07     1.95   0.056    -3.40e-08    2.48e-06
       _cons |   .0180326   .0188191     0.96   0.342    -.0197137    .0557789
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0757  -0.0757   .34371  0.5577          |                  |
2       -0.2048  -0.2128   2.9076  0.2337         -|                 -|
3       -0.0900  -0.1363   3.4115  0.3324          |                 -|
4       -0.0213  -0.1007   3.4402  0.4870          |                  |
5       -0.0330  -0.1123   3.5105  0.6218          |                  |
6        0.1327   0.0783   4.6709  0.5867          |-                 |
7       -0.0089  -0.0318   4.6763  0.6994          |                  |
8       -0.1016  -0.0845   5.3845  0.7158          |                  |
9       -0.0320  -0.0513   5.4564  0.7928          |                  |
10      -0.0416  -0.1108   5.5801  0.8492          |                  |
11       0.0136  -0.0484   5.5935  0.8991          |                  |
12       0.1663   0.1043   7.6594  0.8111          |-                 |
13       0.0170   0.0275   7.6814  0.8637          |                  |
14      -0.1605  -0.1026   9.6957  0.7841         -|                  |
15      -0.0609  -0.0843    9.993  0.8202          |                  |
16       0.0646  -0.0031   10.335  0.8486          |                  |
17      -0.0239  -0.0910   10.383  0.8868          |                  |
18       0.1218   0.0668   11.662  0.8642          |                  |
19      -0.0016  -0.0248   11.662  0.8996          |                  |
20       0.0107   0.1035   11.673  0.9269          |                  |
21       0.0046   0.0826   11.675  0.9480          |                  |
```

```
22      -0.0233   0.0123   11.727  0.9628          |                  |
23       0.0325   0.1128   11.831  0.9730          |                  |
24      -0.0247  -0.0488   11.894  0.9811          |                  |
25      -0.0085   0.0141   11.901  0.9873          |                  |
26      -0.1789  -0.2468   15.372  0.9501         -|                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.332               1                   0.5647
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.015               1                   0.9028
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of frsa_d0
       Ho:  model has no omitted variables
                  F(3, 50) =   1796.92
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   2543 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           66.96       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.51900     25.096      6.926  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo
```

```
Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.3724
 Prob > chi2(26)           =     0.9501

.
. drop residuo

.
pr(.15): regress    fru2_d0 fru2_d1 fru2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2      lineastotales_d2
                      begin with full model
p = 0.8869 >= 0.1500  removing fru2_d1
p = 0.8725 >= 0.1500  removing internet_d1
p = 0.8538 >= 0.1500  removing internet_d2
p = 0.7849 >= 0.1500  removing imacec_d1
p = 0.6323 >= 0.1500  removing imacec_d0
p = 0.4555 >= 0.1500  removing imacec_d2
p = 0.4824 >= 0.1500  removing lineastotales_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =  127.41
       Model |  1897.46778     7  271.066825           Prob > F      =  0.0000
    Residual |  104.251523    49   2.1275821           R-squared     =  0.9479
-------------+------------------------------           Adj R-squared =  0.9405
       Total |   2001.7193    56  35.7449875           Root MSE      =  1.4586

------------------------------------------------------------------------------
     fru2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~2 |   .0000324   .0000169     1.91   0.062    -1.64e-06    .0000663
     fru2_d2 |   .3463845   .1659066     2.09   0.042     .0129827    .6797863
     arpu_d0 |  -.2322863   .0087939   -26.41   0.000    -.2499584   -.2146143
     arpu_d1 |  -.0159196   .0107369    -1.48   0.145    -.0374961    .0056569
     arpu_d2 |   .0960905   .0416327     2.31   0.025     .0124265    .1797546
 internet_d0 |   .0000107   7.26e-06     1.48   0.145    -3.84e-06    .0000253
lineastota~1 |  -.0000256   .0000171    -1.50   0.140    -.0000599    8.72e-06
       _cons |   .2452417   .2856779     0.86   0.395    -.3288496     .819333
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1373  -0.1374   1.1328  0.2872         -|                 -|
2        0.0011  -0.0235   1.1329  0.5675          |                  |
3       -0.0181  -0.0289   1.1533  0.7642          |                  |
4       -0.0488  -0.0330   1.3047  0.8606          |                  |
5       -0.0450  -0.0547   1.4357  0.9204          |                  |
6        0.0644   0.0645   1.7093  0.9444          |                  |
7        0.0989   0.1229   2.3676  0.9367          |                  |
8       -0.1709  -0.1626   4.3732  0.8220         -|                 -|
9        0.1009   0.0742   5.0863  0.8267          |                  |
10      -0.1163  -0.1425   6.0535  0.8107          |                 -|
11      -0.0548  -0.0431   6.2734  0.8545          |                  |
12       0.1292   0.1243   7.5218  0.8213          |-                 |
```

```
13      -0.0961  -0.1787    8.227  0.8285          |                 -|
14      -0.0008   0.0314    8.227  0.8772          |                  |
15       0.0810   0.0679   8.7522  0.8901          |                  |
16      -0.0052  -0.0149   8.7545  0.9232          |                  |
17      -0.0276   0.0630   8.8185  0.9458          |                  |
18       0.1057   0.1824   9.7825  0.9388          |                  |-
19       0.0165  -0.0781   9.8068  0.9576          |                  |
20      -0.1262  -0.0170   11.255  0.9393         -|                  |
21       0.0208   0.0261   11.296  0.9567          |                  |
22       0.0622   0.0566   11.667  0.9639          |                  |
23      -0.1182  -0.0462    13.05  0.9509          |                  |
24       0.0022  -0.1640    13.05  0.9653          |                 -|
25      -0.0655  -0.0795   13.501  0.9698          |                  |
26       0.0069   0.0849   13.506  0.9790          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.811               1                   0.1784
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.036               1                   0.8493
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of fru2_d0
       Ho:  model has no omitted variables
                  F(3, 46) =     16.15
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  99.76 Chi(2)  2.2e-22
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           22.92       0.0000

.
. ***test Shapiro Wilk
. swilk residuo
```

```
                 Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.90220      5.103      3.503  0.00023

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.5061
 Prob > chi2(26)           =     0.9790

.
. drop residuo

.
pr(.15): regress    frut_d0 frut_d1 frut_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9923 >= 0.1500  removing imacec_d0
p = 0.8966 >= 0.1500  removing internet_d0
p = 0.8602 >= 0.1500  removing arpu_d2
p = 0.8700 >= 0.1500  removing frut_d2
p = 0.7900 >= 0.1500  removing lineastotales_d1
p = 0.5957 >= 0.1500  removing imacec_d2
p = 0.4954 >= 0.1500  removing lineastotales_d2
p = 0.2043 >= 0.1500  removing lineastotales_d0
p = 0.2209 >= 0.1500  removing internet_d2
p = 0.1877 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   53.04
       Model |  7334.43266     4  1833.60816           Prob > F      =  0.0000
    Residual |  1797.60243    52  34.5692775           R-squared     =  0.8032
-------------+------------------------------           Adj R-squared =  0.7880
       Total |  9132.03509    56  163.072055           Root MSE      =  5.8796

------------------------------------------------------------------------------
     frut_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     frut_d1 |   .3647691   .1369556     2.66   0.010     .0899475    .6395907
   imacec_d1 |   .2399089    .115523     2.08   0.043      .008095    .4717229
     arpu_d0 |  -.4942388   .0353191   -13.99   0.000    -.5651117   -.4233659
     arpu_d1 |    .158726   .0727494     2.18   0.034     .0127436    .3047084
       _cons |   3.817193    1.19906     3.18   0.002     1.411102    6.223284
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0329  -0.0340   .06621  0.7969          |                  |
2        0.0245   0.0242   .10353  0.9496          |                  |
3       -0.0060  -0.0042   .10578  0.9911          |                  |
```

```
4        0.0379   0.0391    .1984  0.9954          |                  |
5        0.0291   0.0368   .25408  0.9984          |                  |
6        0.1015   0.1036   .94387  0.9877          |                  |
7       -0.1488  -0.1621   2.4543  0.9305         -|                 -|
8       -0.0288  -0.0456   2.5122  0.9612          |                  |
9       -0.1529  -0.1668   4.1722  0.8997         -|                 -|
10       0.0035  -0.0224   4.1731  0.9392          |                  |
11      -0.0171   0.0046   4.1946  0.9639          |                  |
12      -0.1990  -0.2749   7.1896  0.8448         -|                --|
13      -0.0175   0.0340   7.2131  0.8908          |                  |
14      -0.0840  -0.2190   7.7718  0.9009          |                 -|
15       0.0687   0.2571   8.1537  0.9175          |                  |--
16       0.1508   0.2576   10.038  0.8647          |-                 |--
17      -0.0969  -0.2779   10.834  0.8650          |                --|
18      -0.0727   0.0026   11.294  0.8815          |                  |
19      -0.0057  -0.0869   11.297  0.9134          |                  |
20       0.0232   0.2243   11.346  0.9367          |                  |-
21       0.0118  -0.1987   11.359  0.9553          |                 -|
22       0.2154   0.5068   15.847  0.8234          |-                 |----
23      -0.0228   0.1187   15.898  0.8596          |                  |
24      -0.0104  -0.3328   15.909  0.8913          |                --|
25      -0.0837  -0.0886   16.648  0.8942          |                  |
26       0.0610  -0.2613   17.053  0.9075          |                --|
27       0.0320   0.6986   17.168  0.9269          |                  |-----

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.231               1                   0.6310
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.943               1                   0.3314
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of frut_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      1.92
                  Prob > F =      0.1378

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   20.3 Chi(2)  3.9e-05
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo
```

```
                 Skewness/Kurtosis tests for Normality
                                                ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.026         0.005          10.58        0.0050

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z       Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.93596      3.388      2.625  0.00433

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.1681
 Prob > chi2(27)           =     0.9269

.
. drop residuo

.
pr(.15): regress    ftfu_d0 ftfu_d1 ftfu_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9817 >= 0.1500  removing arpu_d1
p = 0.9207 >= 0.1500  removing arpu_d0
p = 0.8685 >= 0.1500  removing imacec_d0
p = 0.8306 >= 0.1500  removing ftfu_d2
p = 0.7835 >= 0.1500  removing internet_d2
p = 0.7457 >= 0.1500  removing internet_d1
p = 0.7219 >= 0.1500  removing arpu_d2
p = 0.5805 >= 0.1500  removing lineastotales_d2
p = 0.4881 >= 0.1500  removing imacec_d2
p = 0.5436 >= 0.1500  removing lineastotales_d0
p = 0.4023 >= 0.1500  removing lineastotales_d1
p = 0.4188 >= 0.1500  removing imacec_d1
p = 0.2176 >= 0.1500  removing internet_d0
p = 0.2209 >= 0.1500  removing ftfu_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    56) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  1582.5614    56  28.2600251           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  1582.5614    56  28.2600251           Root MSE      =   5.316

------------------------------------------------------------------------------
     ftfu_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   1.912281   .7041235     2.72   0.009     .5017518     3.32281
------------------------------------------------------------------------------

. predict residuo, residuals
```

```
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1657   0.1669   1.7044  0.1917          |-                 |-
2        0.0210  -0.0056   1.7323  0.4206          |                  |
3       -0.0096  -0.0120   1.7382  0.6285          |                  |
4       -0.0202  -0.0160    1.765  0.7789          |                  |
5       -0.0409  -0.0349   1.8766  0.8659          |                  |
6       -0.0543  -0.0418    2.077  0.9125          |                  |
7       -0.0435  -0.0289   2.2077  0.9475          |                  |
8       -0.0606  -0.0533   2.4669  0.9633          |                  |
9       -0.0153   0.0009   2.4838  0.9813          |                  |
10      -0.0406  -0.0468   2.6046  0.9893          |                  |
11      -0.0813  -0.0809   3.0998  0.9893          |                  |
12      -0.0772  -0.0653   3.5558  0.9902          |                  |
13      -0.0489  -0.0456   3.7427  0.9936          |                  |
14      -0.0981  -0.1166   4.5116  0.9915          |                  |
15       0.0140   0.0193   4.5277  0.9954          |                  |
16      -0.0815  -0.1394   5.0841  0.9953          |                 -|
17      -0.0139  -0.0390   5.1005  0.9975          |                  |
18      -0.0840  -0.1590   5.7205  0.9972          |                 -|
19      -0.1208  -0.2141   7.0331  0.9940          |                 -|
20      -0.0807  -0.2156   7.6339  0.9940          |                 -|
21      -0.0141  -0.0518   7.6528  0.9964          |                  |
22      -0.0274  -0.1087   7.7259  0.9978          |                  |
23       0.0602   0.0275   8.0884  0.9982          |                  |
24       0.0544  -0.0464   8.3931  0.9986          |                  |
25       0.0943   0.0396   9.3354  0.9981          |                  |
26       0.0807  -0.0388   10.045  0.9979          |                  |
27       0.1176   0.1130   11.602  0.9957          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.506               1                   0.2197
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.002               1                   0.9657
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   3685 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)
```

```
.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           73.47       0.0000


.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.44591     29.717      7.304  0.00000


.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.6018
 Prob > chi2(27)           =     0.9957

.
. drop residuo

.
pr(.15): regress    llq2_d0 llq2_d1 llq2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8383 >= 0.1500  removing lineastotales_d1
p = 0.8723 >= 0.1500  removing internet_d1
p = 0.7333 >= 0.1500  removing lineastotales_d2
p = 0.7463 >= 0.1500  removing internet_d2
p = 0.7513 >= 0.1500  removing imacec_d1
p = 0.5219 >= 0.1500  removing lineastotales_d0
p = 0.5229 >= 0.1500  removing arpu_d1
p = 0.3220 >= 0.1500  removing imacec_d0
p = 0.1589 >= 0.1500  removing imacec_d2
p = 0.1550 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =  193.04
       Model |  3073.2476     4  768.311899           Prob > F      =  0.0000
    Residual |  206.962931    52  3.98005637           R-squared     =  0.9369
-------------+------------------------------           Adj R-squared =  0.9321
       Total |  3280.21053    56   58.575188           Root MSE      =   1.995

------------------------------------------------------------------------------
     llq2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     llq2_d1 |   .0698858   .0387528     1.80   0.077    -.0078774    .1476489
     llq2_d2 |   .3705216   .1386844     2.67   0.010      .092231    .6488122
     arpu_d0 |  -.2992867   .0113692   -26.32   0.000    -.3221006   -.2764728
     arpu_d2 |   .1262102   .0441362     2.86   0.006     .0376444    .2147759
```

```
       _cons |   .2290633   .2944859     0.78   0.440    -.3618659    .8199924
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0514  -0.0513   .15842  0.6906          |                  |
2       -0.0356  -0.0401   .23608  0.8887          |                  |
3       -0.0357  -0.0436   .31561  0.9571          |                  |
4        0.1613   0.1754   1.9657  0.7421          |-                 |-
5        0.0573   0.0589   2.1778  0.8240          |                  |
6       -0.0139   0.0049   2.1905  0.9014          |                  |
7       -0.1035  -0.1272   2.9113  0.8931          |                 -|
8        0.0839   0.0781   3.3939  0.9073          |                  |
9       -0.0434  -0.1000    3.526  0.9398          |                  |
10      -0.0854  -0.0735   4.0479  0.9452          |                  |
11       0.0688   0.1012   4.3938  0.9570          |                  |
12       0.0770   0.1397   4.8367  0.9632          |                  |-
13      -0.0786  -0.1000   5.3084  0.9678          |                  |
14      -0.1262  -0.1558   6.5543  0.9505         -|                 -|
15       0.0227   0.0434   6.5954  0.9679          |                  |
16       0.0194   0.0201   6.6264  0.9798          |                  |
17      -0.1375  -0.2912   8.2165  0.9617         -|                --|
18      -0.0556  -0.0740   8.4835  0.9705          |                  |
19      -0.0582  -0.1507   8.7828  0.9769          |                 -|
20      -0.0249  -0.0595   8.8392  0.9847          |                  |
21       0.0720   0.2051   9.3228  0.9864          |                  |-
22      -0.0953   0.0516   10.196  0.9844          |                  |
23      -0.0580  -0.2097   10.528  0.9875          |                 -|
24      -0.0737  -0.2724   11.081  0.9884          |                --|
25       0.0420  -0.1070   11.267  0.9915          |                  |
26      -0.0255  -0.2792   11.337  0.9943          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.322               1                   0.5707
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.078               1                   0.7795
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of llq2_d0
       Ho:  model has no omitted variables
```

```
                  F(3, 49) =     14.61
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  134.8 Chi(2)  5.4e-30
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-----------------------------------------------------
     residuo |      0.000         0.000           28.24       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.86603      6.990      4.179  0.00001

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.3375
 Prob > chi2(26)           =     0.9943

.
. drop residuo

.
pr(.15): regress    llqh_d0 llqh_d1 llqh_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9873 >= 0.1500  removing imacec_d0
p = 0.9463 >= 0.1500  removing internet_d2
p = 0.8985 >= 0.1500  removing imacec_d2
p = 0.7989 >= 0.1500  removing lineastotales_d1
p = 0.7043 >= 0.1500  removing internet_d1
p = 0.5546 >= 0.1500  removing llqh_d1
p = 0.4628 >= 0.1500  removing imacec_d1
p = 0.5191 >= 0.1500  removing lineastotales_d2
p = 0.2911 >= 0.1500  removing arpu_d1
p = 0.1895 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   48.92
       Model |  6418.37523     4  1604.59381           Prob > F      =  0.0000
    Residual |  1705.65986    52  32.8011512           R-squared     =  0.7900
-------------+------------------------------           Adj R-squared =  0.7739
```

```
      Total |  8124.03509    56  145.072055           Root MSE      =  5.7272

------------------------------------------------------------------------------
     llqh_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~0 |   .0001475   .0000584     2.53   0.015     .0000303    .0002648
     llqh_d2 |   .1333242   .0794807     1.68   0.099    -.0261655     .292814
     arpu_d0 |  -.2790112    .031963    -8.73   0.000    -.3431496   -.2148727
     arpu_d2 |   -.286129    .037856    -7.56   0.000    -.3620925   -.2101654
       _cons |   4.463005   .9649849     4.62   0.000     2.526621    6.399389
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2836   0.3187   4.8293  0.0280          |--                |--
2        0.2198   0.2000   7.7821  0.0204          |-                 |-
3        0.1822   0.1533   9.8492  0.0199          |-                 |-
4        0.0053  -0.1007    9.851  0.0430          |                  |
5        0.2849   0.3747     15.1  0.0099          |--                |--
6        0.0879   0.0002    15.61  0.0160          |                  |
7       -0.1451  -0.2981   17.025  0.0172         -|                --|
8       -0.1112  -0.1493   17.874  0.0222          |                 -|
9       -0.1828  -0.2077   20.215  0.0166         -|                 -|
10      -0.1383  -0.2253   21.584  0.0174         -|                 -|
11      -0.1096  -0.2067   22.462  0.0210          |                 -|
12      -0.2480  -0.1997   27.059  0.0076         -|                 -|
13      -0.1831  -0.0521   29.621  0.0053         -|                  |
14      -0.0613   0.2528   29.914  0.0078          |                  |--
15      -0.1848  -0.2847    32.65  0.0052         -|                --|
16      -0.1228  -0.2985   33.886  0.0056          |                --|
17      -0.1241  -0.2587    35.18  0.0059          |                --|
18       0.0036   0.2417   35.182  0.0090          |                  |-
19      -0.0222  -0.4958   35.225  0.0131          |               ---|
20       0.0158  -0.0595   35.248  0.0188          |                  |
21      -0.0015  -0.1475   35.248  0.0265          |                 -|
22       0.0567   0.6269   35.557  0.0339          |                  |-----
23       0.1430   0.2224   37.581  0.0282          |-                 |-
24       0.0298  -0.1391   37.671  0.0375          |                 -|
25       0.0846   0.5818   38.423  0.0420          |                  |----
26      -0.0101   0.2425   38.435  0.0552          |                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          5.427               1                   0.0198
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          4.043               1                   0.0444
```

```
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of llqh_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      0.79
                  Prob > F =      0.5053

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .5889 Chi(2)   .745
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.432         0.493            1.13       0.5691

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.98645      0.707     -0.745  0.77198

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    38.4346
 Prob > chi2(26)           =     0.0552

.
. drop residuo

.
pr(.15): regress    lmr2_d0 lmr2_d1 lmr2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9636 >= 0.1500  removing lmr2_d1
p = 0.8939 >= 0.1500  removing imacec_d0
p = 0.8581 >= 0.1500  removing arpu_d1
p = 0.8944 >= 0.1500  removing arpu_d2
p = 0.6553 >= 0.1500  removing lineastotales_d0
p = 0.5810 >= 0.1500  removing imacec_d2
p = 0.6489 >= 0.1500  removing internet_d1
```

```
p = 0.3672 >= 0.1500  removing lmr2_d2
p = 0.4098 >= 0.1500  removing internet_d2
p = 0.2800 >= 0.1500  removing lineastotales_d2
p = 0.3393 >= 0.1500  removing lineastotales_d1
p = 0.2871 >= 0.1500  removing imacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =  145.51
       Model |  134.544217     2  67.2721085           Prob > F      =  0.0000
    Residual |   24.964555    54  .462306575           R-squared     =  0.8435
-------------+------------------------------           Adj R-squared =  0.8377
       Total |  159.508772    56  2.84837093           Root MSE      =  .67993

------------------------------------------------------------------------------
     lmr2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d0 |  -6.24e-06   3.21e-06    -1.94   0.058    -.0000127    2.08e-07
     arpu_d0 |  -.0635387    .003786   -16.78   0.000    -.0711293   -.0559482
       _cons |   .2707119   .1000609     2.71   0.009     .0701019    .4713219
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0226   0.0227   .03174  0.8586          |                  |
2       -0.0588  -0.0590   .24998  0.8825          |                  |
3        0.2460   0.2603   4.1384  0.2469          |-                 |--
4        0.0175   0.0168   4.1585  0.3850          |                  |
5       -0.0061   0.0472   4.1609  0.5265          |                  |
6        0.0748   0.0123   4.5408  0.6039          |                  |
7        0.0388   0.0314   4.6452  0.7032          |                  |
8        0.0106   0.0225   4.6532  0.7939          |                  |
9       -0.0045  -0.0218   4.6547  0.8633          |                  |
10       0.1802   0.2140   7.0401  0.7216          |-                 |-
11      -0.1538  -0.2217   8.8142  0.6390         -|                 -|
12      -0.1517  -0.1246   10.576  0.5656         -|                  |
13       0.0178  -0.1162   10.601  0.6442          |                  |
14      -0.0488  -0.0228   10.791  0.7024          |                  |
15      -0.0826   0.0224   11.349  0.7275          |                  |
16      -0.1283  -0.1573   12.727  0.6926         -|                 -|
17      -0.0776  -0.0549   13.243  0.7198          |                  |
18      -0.1526  -0.2407   15.288  0.6421         -|                 -|
19      -0.2547  -0.2795   21.124  0.3300        --|                --|
20      -0.0299  -0.1479   21.206  0.3851          |                 -|
21      -0.0516  -0.0455   21.458  0.4313          |                  |
22      -0.0830   0.1353   22.129  0.4522          |                  |-
23      -0.0636  -0.2800   22.533  0.4883          |                --|
24      -0.0473  -0.1751   22.763  0.5338          |                 -|
25      -0.0658  -0.2685   23.221  0.5646          |                --|
26      -0.0370   0.0487   23.371  0.6119          |                  |
27      -0.0159  -0.1799   23.399  0.6634          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.005              1                   0.9442
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.019              1                   0.8914
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lmr2_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      4.28
                  Prob > F =      0.0091

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  9.174 Chi(2)  .0102
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                   ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.080         0.027            7.18       0.0277

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     59    0.89706      5.521      3.679  0.00012

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    23.3992
 Prob > chi2(27)           =     0.6634

.
. drop residuo

.
pr(.15): regress    lmrm_d0 lmrm_d1 lmrm_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
```

```
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9449 >= 0.1500  removing arpu_d0
p = 0.8481 >= 0.1500  removing internet_d0
p = 0.7317 >= 0.1500  removing lineastotales_d0
p = 0.7285 >= 0.1500  removing arpu_d2
p = 0.5299 >= 0.1500  removing imacec_d2
p = 0.5529 >= 0.1500  removing internet_d2
p = 0.5036 >= 0.1500  removing arpu_d1
p = 0.2965 >= 0.1500  removing lineastotales_d1
p = 0.3453 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =    5.63
       Model |  443.868812     5  88.7737624           Prob > F      =  0.0003
    Residual |  803.499609    51  15.7548943           R-squared     =  0.3558
-------------+------------------------------           Adj R-squared =  0.2927
       Total |  1247.36842    56  22.2744361           Root MSE      =  3.9692

------------------------------------------------------------------------------
     lmrm_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lmrm_d1 |   .2828993   .1271656     2.22   0.031     .0276037    .5381948
     lmrm_d2 |    .354865   .1278567     2.78   0.008     .0981821     .611548
lineastota~2 |   -.000075   .0000399    -1.88   0.066    -.0001552    5.14e-06
   imacec_d1 |   .1277116   .0849775     1.50   0.139    -.0428878    .2983109
   imacec_d0 |   .2088714   .0881126     2.37   0.022     .0319781    .3857647
       _cons |   1.461161   .6767881     2.16   0.036     .1024524     2.81987
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1029  -0.1030   .63525  0.4254          |                  |
2       -0.1416  -0.1601   1.8617  0.3942         -|                 -|
3        0.0964   0.0818   2.4406  0.4861          |                  |
4       -0.0013  -0.0076   2.4408  0.6553          |                  |
5        0.1631   0.2599   4.1617  0.5264          |-                 |--
6        0.1161   0.2092   5.0512  0.5373          |                  |-
7       -0.1960  -0.1047   7.6344  0.3659         -|                  |
8        0.0258  -0.0131   7.6799  0.4653          |                  |
9        0.1481   0.1145   9.2163  0.4176          |-                 |
10      -0.0810  -0.0640   9.6852  0.4685          |                  |
11       0.0828   0.0636   10.186  0.5137          |                  |
12      -0.0312   0.0201   10.259  0.5933          |                  |
13       0.0080   0.1183   10.264  0.6722          |                  |
14       0.1268   0.1460   11.522  0.6447          |-                 |-
15      -0.2130  -0.3446   15.154  0.4404         -|                --|
16       0.0597   0.2161   15.447  0.4922          |                  |-
17       0.2392   0.3151   20.256  0.2613          |-                 |--
18      -0.0677   0.0483   20.651  0.2974          |                  |
19      -0.1034  -0.1914   21.597  0.3048          |                 -|
20      -0.0013   0.1148   21.597  0.3628          |                  |
21       0.1595   0.5570   23.974  0.2943          |-                 |----
22       0.1024   0.0561   24.982  0.2979          |                  |
23       0.1010   0.4664    25.99  0.3013          |                  |---
```

```
24      -0.2540  -0.3314   32.567  0.1135        --|                --|
25      -0.0318   0.3753   32.674  0.1394          |                  |---
26       0.0041  -0.9562   32.675  0.1717          |          -------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.410               1                   0.0648
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.015               1                   0.9017
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lmrm_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      1.82
                  Prob > F =      0.1554

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  112.2 Chi(2)  4.3e-25
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           25.30       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.88340      6.083      3.880  0.00005

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
```

```
 Portmanteau (Q) statistic =    32.6753
 Prob > chi2(26)           =     0.1717

.
. drop residuo

.
pr(.15): regress    lnc2_d0 lnc2_d1 lnc2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9937 >= 0.1500  removing arpu_d1
p = 0.7877 >= 0.1500  removing lnc2_d1
p = 0.7418 >= 0.1500  removing lineastotales_d1
p = 0.7327 >= 0.1500  removing imacec_d2
p = 0.4118 >= 0.1500  removing lnc2_d2
p = 0.4549 >= 0.1500  removing arpu_d2
p = 0.4636 >= 0.1500  removing imacec_d1
p = 0.4618 >= 0.1500  removing lineastotales_d2
p = 0.4761 >= 0.1500  removing internet_d2
p = 0.3941 >= 0.1500  removing lineastotales_d0
p = 0.3873 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   25.42
       Model |  4.03687699     3  1.34562566           Prob > F      =  0.0000
    Residual |  2.80522827    53  .052928835           R-squared     =  0.5900
-------------+------------------------------           Adj R-squared =  0.5668
       Total |  6.84210526    56  .122180451           Root MSE      =  .23006

------------------------------------------------------------------------------
     lnc2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d0 |  -.0070643   .0047371    -1.49   0.142    -.0165656     .002437
 internet_d1 |   2.03e-06   1.10e-06     1.85   0.071    -1.77e-07    4.24e-06
     arpu_d0 |  -.0111218   .0012959    -8.58   0.000     -.013721   -.0085226
       _cons |  -.0050357   .0340025    -0.15   0.883     -.073236    .0631646
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0073  -0.0073   .00327  0.9544          |                  |
2        0.0968   0.0973   .58505  0.7464          |                  |
3        0.0114   0.0149   .59326  0.8980          |                  |
4       -0.0427  -0.0505   .71053  0.9500          |                  |
5        0.1141   0.1135   1.5651  0.9054          |                  |
6        0.0150   0.0253   1.5802  0.9540          |                  |
7       -0.0080  -0.0287   1.5846  0.9792          |                  |
8        0.2613   0.2668   6.3384  0.6094          |--                |--
9       -0.0454  -0.0312   6.4851  0.6906          |                  |
10      -0.0166  -0.0935   6.5051  0.7712          |                  |
11       0.0596   0.0853   6.7683  0.8175          |                  |
12       0.0084   0.0477   6.7736  0.8722          |                  |
13       0.0290  -0.0814   6.8387  0.9103          |                  |
14       0.0983   0.2043   7.6028  0.9090          |                  |-
```

```
15      -0.0689  -0.0747   7.9872  0.9243          |                  |
16       0.0320  -0.1071    8.072  0.9467          |                  |
17       0.0141   0.1397   8.0888  0.9646          |                  |-
18      -0.0821  -0.1256   8.6759  0.9668          |                 -|
19       0.1011   0.1274   9.5877  0.9624          |                  |-
20       0.0030   0.1515   9.5885  0.9750          |                  |-
21      -0.0259  -0.0613   9.6515  0.9831          |                  |
22       0.1607   0.2504   12.148  0.9542          |-                 |--
23      -0.3661  -0.6810   25.474  0.3263        --|             -----|
24      -0.0234   0.0858    25.53  0.3775          |                  |
25      -0.0145   0.1442   25.552  0.4318          |                  |-
26      -0.0039  -0.1565   25.554  0.4878          |                 -|
27      -0.0271  -0.2578   25.636  0.5389          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.027               1                   0.8705
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.180               1                   0.6716
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lnc2_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      4.18
                  Prob > F =      0.0103

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  319.2 Chi(2)  5.0e-70
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.139         0.000           20.14       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
```

```
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     58    0.65895     18.043     6.223  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.6361
 Prob > chi2(27)           =     0.5389

.
. drop residuo

.
pr(.15): regress    lnct_d0 lnct_d1 lnct_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2    imacec_d2      lineastotales_d2
                      begin with full model
p = 0.5898 >= 0.1500  removing imacec_d0
p = 0.5842 >= 0.1500  removing internet_d0
p = 0.4682 >= 0.1500  removing lineastotales_d0
p = 0.2452 >= 0.1500  removing internet_d2
p = 0.1820 >= 0.1500  removing internet_d1
p = 0.2412 >= 0.1500  removing lineastotales_d1
p = 0.3427 >= 0.1500  removing imacec_d2
p = 0.4268 >= 0.1500  removing imacec_d1
p = 0.3874 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =  365.40
       Model |  21725.4641     5  4345.09282           Prob > F      =  0.0000
    Residual |  606.465712    51  11.8914845           R-squared     =  0.9728
-------------+------------------------------           Adj R-squared =  0.9702
       Total |  22331.9298    56  398.784461           Root MSE      =  3.4484

------------------------------------------------------------------------------
     lnct_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     lnct_d1 |  -1.931682   .3799644    -5.08   0.000    -2.694493   -1.168872
     lnct_d2 |   .8298364   .3692087     2.25   0.029      .088619    1.571054
     arpu_d0 |   .4636727   .0692884     6.69   0.000     .3245704     .602775
     arpu_d1 |   1.762607   .3359256     5.25   0.000     1.088209    2.437006
     arpu_d2 |  -.7104296   .3068674    -2.32   0.025    -1.326492   -.0943676
       _cons |   .5035702   .4655297     1.08   0.284    -.4310196     1.43816
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1897  -0.1905   2.1601  0.1416          -|                 -|
2       -0.0736  -0.1255    2.491  0.2878           |                 -|
3       -0.2207  -0.2941   5.5235  0.1372          -|                --|
4        0.4293   0.4279   17.216  0.0018           |---              |---
```

```
5       -0.2076  -0.0554   20.002  0.0012         -|                  |
6       -0.0543  -0.0677   20.196  0.0026          |                  |
7       -0.1087  -0.0806   20.991  0.0038          |                  |
8        0.0474  -0.0477   21.145  0.0068          |                  |
9        0.0104   0.0007   21.153  0.0120          |                  |
10      -0.0100  -0.0288    21.16  0.0200          |                  |
11      -0.0310  -0.0231    21.23  0.0311          |                  |
12      -0.0072   0.0427   21.234  0.0471          |                  |
13       0.0129  -0.0072   21.247  0.0682          |                  |
14      -0.0069  -0.0062    21.25  0.0954          |                  |
15      -0.0011   0.0150    21.25  0.1290          |                  |
16      -0.0076  -0.0652   21.255  0.1689          |                  |
17      -0.0020   0.0260   21.255  0.2151          |                  |
18       0.0147   0.0482   21.274  0.2658          |                  |
19       0.0463   0.0998   21.464  0.3118          |                  |
20      -0.0288  -0.0775   21.539  0.3660          |                  |
21       0.0348   0.0128   21.652  0.4198          |                  |
22       0.0259   0.0073   21.716  0.4769          |                  |
23      -0.0167  -0.0708   21.744  0.5357          |                  |
24      -0.0790  -0.0122    22.38  0.5566          |                  |
25       0.0407   0.0579   22.554  0.6036          |                  |
26       0.0295   0.0511   22.648  0.6528          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          8.565               1                   0.0034
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.037               1                   0.8480
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lnct_d0
       Ho:  model has no omitted variables
                  F(3, 48) =    258.02
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  981.2 Chi(2)  9.e-214
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
```

```
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           53.56       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.53397     24.315      6.858  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.6481
 Prob > chi2(26)           =     0.6528

.
. drop residuo

.
pr(.15): regress    lqms_d0 lqms_d1 lqms_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8149 >= 0.1500  removing arpu_d2
p = 0.7976 >= 0.1500  removing imacec_d1
p = 0.7432 >= 0.1500  removing lineastotales_d2
p = 0.7054 >= 0.1500  removing internet_d1
p = 0.6032 >= 0.1500  removing internet_d0
p = 0.5385 >= 0.1500  removing lqms_d2
p = 0.3591 >= 0.1500  removing lineastotales_d1
p = 0.6081 >= 0.1500  removing lineastotales_d0
p = 0.2676 >= 0.1500  removing imacec_d0
p = 0.2550 >= 0.1500  removing lqms_d1
p = 0.6212 >= 0.1500  removing arpu_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   28.44
       Model |   9.8262299     3  3.27540997           Prob > F      =  0.0000
    Residual |  6.10359466    53  .115162163           R-squared     =  0.6168
-------------+------------------------------           Adj R-squared =  0.5952
       Total |  15.9298246    56  .284461153           Root MSE      =  .33936

------------------------------------------------------------------------------
     lqms_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d2 |   4.46e-06   1.60e-06     2.79   0.007     1.25e-06    7.67e-06
   imacec_d2 |  -.0105407    .006675    -1.58   0.120     -.023929    .0028476
     arpu_d0 |  -.0162831   .0019045    -8.55   0.000    -.0201031   -.0124632
       _cons |  -.0646207   .0496951    -1.30   0.199    -.1642964    .0350549
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0547  -0.0673   .17987  0.6715          |                  |
2       -0.1296  -0.1653   1.2071  0.5469         -|                 -|
3       -0.2405  -0.3438   4.8087  0.1864         -|                --|
4        0.1509   0.0959   6.2536  0.1810          |-                 |
5        0.2305   0.2486   9.6908  0.0845          |-                 |-
6       -0.0721  -0.0954   10.033  0.1233          |                  |
7        0.0843   0.3101   10.511  0.1614          |                  |--
8       -0.0433   0.1472    10.64  0.2230          |                  |-
9        0.1633   0.1739   12.507  0.1862          |-                 |-
10      -0.0092   0.1119   12.513  0.2522          |                  |
11       0.0047   0.1825   12.515  0.3262          |                  |-
12       0.0102   0.1682   12.522  0.4047          |                  |-
13       0.1258   0.3521   13.732  0.3930          |-                 |--
14       0.0450   0.2748    13.89  0.4579          |                  |--
15      -0.0970   0.0362   14.644  0.4773          |                  |
16      -0.0541  -0.0624   14.885  0.5331          |                  |
17       0.0812   0.1993   15.439  0.5639          |                  |-
18       0.1304   0.1074   16.904  0.5297          |-                 |
19      -0.0048   0.1191   16.906  0.5963          |                  |
20      -0.1342  -0.0784   18.544  0.5516         -|                  |
21      -0.0173   0.0750   18.572  0.6126          |                  |
22       0.0401   0.1026   18.726  0.6622          |                  |
23       0.1124   0.4547   19.976  0.6434          |                  |---
24      -0.0167   0.3624   20.004  0.6965          |                  |--
25      -0.0966   0.4017   20.984  0.6935          |                  |---
26      -0.1101   0.2583     22.3  0.6722          |                  |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.228               1                   0.6329
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.075               1                   0.7843
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lqms_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      3.16
                  Prob > F =      0.0326

.
. ***test jarque bera
. jb6 residuo
```

```
Jarque-Bera normality test:  43.34 Chi(2)  3.9e-10
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.068         0.001          12.37       0.0021

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.82884      8.930      4.705  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.2997
 Prob > chi2(26)           =     0.6722

.
. drop residuo

.
pr(.15): regress    mlln_d0 mlln_d1 mlln_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                            begin with full model
p = 0.9272 >= 0.1500  removing arpu_d1
p = 0.9140 >= 0.1500  removing arpu_d0
p = 0.9014 >= 0.1500  removing internet_d2
p = 0.8829 >= 0.1500  removing lineastotales_d0
p = 0.6903 >= 0.1500  removing lineastotales_d2
p = 0.6809 >= 0.1500  removing internet_d1
p = 0.5174 >= 0.1500  removing imacec_d0
p = 0.4533 >= 0.1500  removing imacec_d2
p = 0.4586 >= 0.1500  removing arpu_d2
p = 0.2605 >= 0.1500  removing lineastotales_d1
p = 0.2061 >= 0.1500  removing mlln_d2
p = 0.2287 >= 0.1500  removing imacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    5.26
       Model |  736.459495     2  368.229747           Prob > F      =  0.0082
    Residual |  3782.10191    54  70.0389242           R-squared     =  0.1630
-------------+------------------------------           Adj R-squared =  0.1320
       Total |   4518.5614    56  80.6885965           Root MSE      =  8.3689

------------------------------------------------------------------------------
     mlln_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
     mlln_d1 |   .2815091   .1252133     2.25   0.029     .0304716    .5325466
 internet_d0 |   .0000843   .0000396     2.13   0.038     4.86e-06    .0001638
       _cons |   1.175666   1.261094     0.93   0.355    -1.352675    3.704007
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0120  -0.0121   .00885  0.9251          |                  |
2        0.0847   0.0852   .45423  0.7968          |                  |
3        0.0588   0.0621   .67309  0.8795          |                  |
4        0.1392   0.1378   1.9222  0.7501          |-                 |-
5       -0.0569  -0.0665   2.1345  0.8302          |                  |
6        0.0655   0.0453   2.4217  0.8771          |                  |
7       -0.0019  -0.0110   2.4219  0.9329          |                  |
8        0.0622   0.0507   2.6913  0.9522          |                  |
9       -0.0475  -0.0374   2.8517  0.9699          |                  |
10       0.1464   0.1377   4.4062  0.9272          |-                 |-
11      -0.0687  -0.0714   4.7557  0.9424          |                  |
12       0.1413   0.1451   6.2652  0.9021          |-                 |-
13      -0.0504  -0.0552   6.4617  0.9277          |                  |
14      -0.1019  -0.1633   7.2827  0.9233          |                 -|
15       0.0692   0.1251   7.6704  0.9363          |                  |-
16      -0.0107  -0.0208   7.6799  0.9578          |                  |
17      -0.0837  -1.0730   8.2748  0.9603          |          --------|
18       0.0083   0.4041   8.2808  0.9742          |                  |---
19      -0.0077  -0.0426   8.2861  0.9836          |                  |
20      -0.0827  -1.8153   8.9124  0.9839          |          --------|
21      -0.0338  -0.0956   9.0196  0.9891          |                  |
22      -0.0148  -0.2214   9.0409  0.9931          |                 -|
23      -0.0728  -2.1130   9.5676  0.9936          |          --------|
24      -0.0226  -0.5210   9.6199  0.9959          |              ----|
25      -0.0010  -0.3152     9.62  0.9976          |                --|
26       0.0843   2.9920   10.392  0.9972          |                  |--------
27      -0.0304   1.0337   10.496  0.9982          |                  |--------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.059               1                   0.8085
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.039               1                   0.8436
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
```

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of mlln_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      0.58
                  Prob > F =      0.6310

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   2853 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           69.08       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.49114     26.921      7.084  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    10.4960
 Prob > chi2(27)           =     0.9982

.
. drop residuo

.
pr(.15): regress    nbr2_d0 nbr2_d1 nbr2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9821 >= 0.1500  removing imacec_d1
p = 0.9486 >= 0.1500  removing lineastotales_d0
p = 0.9231 >= 0.1500  removing lineastotales_d1
p = 0.8513 >= 0.1500  removing lineastotales_d2
p = 0.8019 >= 0.1500  removing imacec_d0
p = 0.6694 >= 0.1500  removing internet_d1
p = 0.5693 >= 0.1500  removing nbr2_d2
p = 0.5743 >= 0.1500  removing arpu_d2
p = 0.2341 >= 0.1500  removing arpu_d1
p = 0.3693 >= 0.1500  removing nbr2_d1
p = 0.3176 >= 0.1500  removing internet_d2
p = 0.2036 >= 0.1500  removing imacec_d2
```

```
p = 0.2363 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =   40.65
       Model |  8.2312007     1   8.2312007           Prob > F      =  0.0000
    Residual | 11.1372203    55  .202494915           R-squared     =  0.4250
-------------+------------------------------           Adj R-squared =  0.4145
       Total | 19.3684211    56  .345864662           Root MSE      =  .44999

------------------------------------------------------------------------------
     nbr2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |  -.0159401   .0025001    -6.38   0.000    -.0209505   -.0109297
       _cons |   .0562677   .0600966     0.94   0.353    -.0641685    .1767039
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1625   0.1626   1.6384  0.2005          |-                 |-
2       -0.0145  -0.0417   1.6517  0.4379          |                  |
3       -0.1062  -0.0996    2.376  0.4981          |                  |
4       -0.0138   0.0200   2.3886  0.6647          |                  |
5       -0.0257  -0.0343   2.4325  0.7866          |                  |
6       -0.1297  -0.1534   3.5742  0.7341         -|                 -|
7       -0.0955  -0.0600   4.2055  0.7558          |                  |
8       -0.2227  -0.2532   7.7043  0.4629         -|                --|
9        0.0564   0.1075   7.9335  0.5409          |                  |
10      -0.0794  -0.1818   8.3966  0.5902          |                 -|
11      -0.0369  -0.0803   8.4989  0.6680          |                  |
12      -0.0365  -0.0604   8.6009  0.7366          |                  |
13       0.0923   0.0204   9.2669  0.7525          |                  |
14       0.0802  -0.0364   9.7814  0.7780          |                  |
15      -0.0598  -0.1645   10.074  0.8151          |                 -|
16       0.1264   0.1869   11.411  0.7834          |-                 |-
17      -0.0390  -0.1480   11.542  0.8271          |                 -|
18       0.0407  -0.0153   11.687  0.8630          |                  |
19       0.0220   0.0390   11.731  0.8968          |                  |
20      -0.0479  -0.1200   11.943  0.9180          |                  |
21      -0.0372   0.1009   12.074  0.9376          |                  |
22      -0.0322  -0.0665   12.174  0.9537          |                  |
23      -0.0204  -0.0735   12.216  0.9670          |                  |
24      -0.0670   0.0307   12.678  0.9711          |                  |
25       0.0874   0.0065   13.487  0.9700          |                  |
26       0.0943   0.2664   14.457  0.9665          |                  |--
27       0.0021  -0.3064   14.458  0.9764          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.460               1                   0.2269
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
```

```
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.216               1                   0.6423
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of nbr2_d0
       Ho:  model has no omitted variables
                  F(3, 52) =      0.51
                  Prob > F =      0.6771

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  136.2 Chi(2)  2.6e-30
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                        ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           24.44       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.62131     20.309      6.484  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    14.4578
 Prob > chi2(27)           =     0.9764

.
. drop residuo

.
pr(.15): regress    plna_d0 plna_d1 plna_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9415 >= 0.1500  removing internet_d2
p = 0.9206 >= 0.1500  removing arpu_d0
```

```
p = 0.8644 >= 0.1500  removing lineastotales_d1
p = 0.8564 >= 0.1500  removing arpu_d2
p = 0.7741 >= 0.1500  removing plna_d1
p = 0.7763 >= 0.1500  removing arpu_d1
p = 0.5014 >= 0.1500  removing imacec_d0
p = 0.4421 >= 0.1500  removing plna_d2
p = 0.4664 >= 0.1500  removing internet_d0
p = 0.4669 >= 0.1500  removing imacec_d1
p = 0.1996 >= 0.1500  removing lineastotales_d2
p = 0.3258 >= 0.1500  removing lineastotales_d0
p = 0.2926 >= 0.1500  removing imacec_d2
p = 0.2238 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    56) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  654.140351    56  11.6810777           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  654.140351    56  11.6810777           Root MSE      =  3.4178

------------------------------------------------------------------------------
     plna_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |    1.54386   .4526933     3.41   0.001     .6370061    2.450713
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0538   0.0558   .17991  0.6715          |                  |
2        0.0748   0.0750   .53301  0.7661          |                  |
3        0.0061  -0.0028   .53543  0.9110          |                  |
4       -0.0428  -0.0520   .65538  0.9567          |                  |
5        0.1656   0.1839   2.4823  0.7792          |-                 |-
6       -0.0057  -0.0201   2.4844  0.8702          |                  |
7        0.0228   0.0067   2.5203  0.9256          |                  |
8        0.0125   0.0240   2.5314  0.9603          |                  |
9        0.0174   0.0403   2.5532  0.9794          |                  |
10      -0.0604  -0.0963   2.8209  0.9853          |                  |
11      -0.0531  -0.0496   3.0325  0.9903          |                  |
12      -0.0216  -0.0097   3.0683  0.9950          |                  |
13      -0.0630  -0.0689    3.379  0.9962          |                  |
14      -0.1127  -0.1500    4.395  0.9926          |                 -|
15      -0.1002  -0.0980    5.216  0.9901          |                  |
16      -0.0345  -0.0248   5.3157  0.9939          |                  |
17      -0.0797  -0.1232   5.8595  0.9941          |                  |
18      -0.1316  -0.2199   7.3808  0.9865         -|                 -|
19      -0.0849  -0.1483   8.0298  0.9864          |                 -|
20       0.0028  -0.0760   8.0305  0.9917          |                  |
21       0.0192  -0.1490   8.0653  0.9949          |                 -|
22      -0.0293  -0.0726   8.1488  0.9967          |                  |
23       0.0546   0.1174   8.4468  0.9975          |                  |
24       0.0208   0.0219   8.4915  0.9985          |                  |
25       0.1601   0.1602   11.206  0.9919          |-                 |-
26       0.0148  -0.0591    11.23  0.9947          |                  |
27      -0.0053   0.0461   11.233  0.9967          |                  |

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.132               1                   0.7161
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.051               1                   0.8217
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1332 Chi(2)  5.e-290
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           58.81       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.62891     19.902      6.440  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.2329
 Prob > chi2(27)           =     0.9967

.
. drop residuo

.
pr(.15): regress    pmt2_d0 pmt2_d1 pmt2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
```

```
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.5876 >= 0.1500  removing internet_d0
p = 0.5306 >= 0.1500  removing internet_d1
p = 0.4818 >= 0.1500  removing arpu_d1
p = 0.4111 >= 0.1500  removing lineastotales_d2
p = 0.3903 >= 0.1500  removing imacec_d0
p = 0.1952 >= 0.1500  removing internet_d2
p = 0.2159 >= 0.1500  removing lineastotales_d0
p = 0.3366 >= 0.1500  removing lineastotales_d1
p = 0.2839 >= 0.1500  removing imacec_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =   94.00
       Model |  2560.99129     5  512.198257           Prob > F      =  0.0000
    Residual |  277.885907    51  5.44874328           R-squared     =  0.9021
-------------+------------------------------           Adj R-squared =  0.8925
       Total |  2838.87719    56  50.6942356           Root MSE      =  2.3343

------------------------------------------------------------------------------
     pmt2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     pmt2_d1 |   .0878837   .0464843     1.89   0.064    -.0054375    .1812048
     pmt2_d2 |   .4132299    .132312     3.12   0.003     .1476025    .6788573
     arpu_d0 |  -.2706411   .0131082   -20.65   0.000     -.296957   -.2443253
   imacec_d1 |   .1037315   .0459969     2.26   0.028     .0113887    .1960742
     arpu_d2 |   .1219176    .038944     3.13   0.003     .0437343    .2001009
       _cons |   .3351249   .3728498     0.90   0.373    -.4134023    1.083652
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0916   0.0919   .50369  0.4779          |                  |
2       -0.1027  -0.1128   1.1481  0.5632          |                  |
3       -0.0744  -0.0576   1.4928  0.6839          |                  |
4        0.0640   0.0746   1.7529  0.7811          |                  |
5        0.1113   0.0865   2.5534  0.7684          |                  |
6        0.0842   0.0683   3.0208  0.8062          |                  |
7        0.1617   0.2002   4.7801  0.6868          |-                 |-
8       -0.0997  -0.1573   5.4618  0.7073          |                 -|
9       -0.2457  -0.2148   9.6903  0.3761         -|                 -|
10       0.0713   0.1816   10.054  0.4358          |                  |-
11       0.0733  -0.1411   10.447  0.4907          |                 -|
12      -0.0171  -0.0230   10.469  0.5749          |                  |
13      -0.1082  -0.1009   11.364  0.5804          |                  |
14      -0.0217  -0.0172   11.401  0.6543          |                  |
15       0.0834   0.1794   11.957  0.6823          |                  |-
16       0.0712   0.1222   12.373  0.7179          |                  |
17      -0.0249  -0.1459   12.425  0.7737          |                 -|
18      -0.1228  -0.1783   13.726  0.7468          |                 -|
19      -0.1526  -0.2034   15.787  0.6714         -|                 -|
20      -0.0779  -0.3131   16.339  0.6954          |                --|
21       0.0030  -0.2053    16.34  0.7503          |                 -|
22       0.0727   0.1468   16.848  0.7717          |                  |-
23      -0.0967  -0.4441   17.773  0.7697          |               ---|
24      -0.2163  -0.4503   22.543  0.5469         -|               ---|
25      -0.0742   0.0613   23.122  0.5704          |                  |
```

```
26       0.0707  -0.3983   23.665  0.5951          |               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.768               1                   0.3808
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.066               1                   0.7974
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pmt2_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      5.79
                  Prob > F =      0.0018

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  10.71 Chi(2)  .0047
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.055         0.021            7.90       0.0192

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.96049      2.062      1.555  0.06000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    23.6651
 Prob > chi2(26)           =     0.5951
```

```
.
. drop residuo

.
pr(.15): regress    pmtt_d0 pmtt_d1 pmtt_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.6206 >= 0.1500  removing internet_d0
p = 0.6295 >= 0.1500  removing pmtt_d2
p = 0.6874 >= 0.1500  removing internet_d2
p = 0.4496 >= 0.1500  removing imacec_d0
p = 0.4269 >= 0.1500  removing lineastotales_d0
p = 0.2828 >= 0.1500  removing imacec_d2
p = 0.3867 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =   59.00
       Model |   5671381.5     7  810197.357           Prob > F      =  0.0000
    Residual |  672837.065    49  13731.3687           R-squared     =  0.8939
-------------+------------------------------           Adj R-squared =  0.8788
       Total |  6344218.56    56  113289.617           Root MSE      =  117.18

------------------------------------------------------------------------------
     pmtt_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     pmtt_d1 |   .2647442   .1026495     2.58   0.013     .0584623    .4710261
   imacec_d1 |    6.92159   2.444131     2.83   0.007     2.009926    11.83325
     arpu_d0 |  -12.48999   .7127343   -17.52   0.000    -13.92228   -11.05769
     arpu_d1 |   2.279499   1.425065     1.60   0.116    -.5842762    5.143275
     arpu_d2 |  -3.973721   .6601787    -6.02   0.000      -5.3004   -2.647042
lineastota~2 |   .0037082   .0014325     2.59   0.013     .0008295     .006587
lineastota~1 |  -.0035454   .0014054    -2.52   0.015    -.0063697   -.0007211
       _cons |   76.90314   22.40028     3.43   0.001     31.88809    121.9182
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1428   0.1444   1.2249  0.2684          |-                 |-
2       -0.0100  -0.0288    1.231  0.5404          |                  |
3        0.0266   0.0348   1.2751  0.7351          |                  |
4        0.1438   0.1378   2.5863  0.6292          |-                 |-
5       -0.1258  -0.1808   3.6106  0.6067         -|                 -|
6        0.1455   0.2214   5.0071  0.5429          |-                 |-
7       -0.0419  -0.1492   5.1251  0.6447          |                 -|
8       -0.2217  -0.2059   8.4974  0.3864         -|                 -|
9       -0.0447   0.0958   8.6377  0.4714          |                  |
10       0.1928   0.1483   11.296  0.3349          |-                 |-
11       0.0309   0.0267   11.366  0.4131          |                  |
12       0.0428   0.0658   11.503  0.4864          |                  |
13       0.0815  -0.0247    12.01  0.5268          |                  |
14      -0.0320   0.0097    12.09  0.5990          |                  |
15       0.0220   0.0914   12.129  0.6692          |                  |
16       0.0060  -0.2501   12.132  0.7348          |                --|
```

```
17      -0.0730  -0.0052    12.58  0.7638          |                  |
18      -0.1180  -0.0258   13.781  0.7432          |                  |
19      -0.0049  -0.0331   13.783  0.7962          |                  |
20      -0.0503   0.0593   14.014  0.8298          |                  |
21       0.0210   0.0837   14.055  0.8672          |                  |
22       0.0070  -0.1154    14.06  0.8993          |                  |
23      -0.0548  -0.0699   14.357  0.9162          |                  |
24      -0.0813  -0.1763    15.03  0.9199          |                 -|
25       0.0587   0.0901   15.392  0.9317          |                  |
26      -0.0161   0.2879    15.42  0.9492          |                  |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.386               1                   0.1224
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.852               1                   0.3559
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pmtt_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      2.43
                  Prob > F =      0.0776

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  32.91 Chi(2)  7.2e-08
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.004           16.00       0.0003

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.92221      4.059      3.011  0.00130
```

```
.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.4204
 Prob > chi2(26)           =     0.9492

.
. drop residuo

.
pr(.15): regress    poc2_d0 poc2_d1 poc2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9953 >= 0.1500  removing arpu_d2
p = 0.9249 >= 0.1500  removing imacec_d2
p = 0.9079 >= 0.1500  removing lineastotales_d0
p = 0.8754 >= 0.1500  removing internet_d0
p = 0.8184 >= 0.1500  removing imacec_d0
p = 0.7543 >= 0.1500  removing internet_d2
p = 0.7501 >= 0.1500  removing arpu_d1
p = 0.7518 >= 0.1500  removing arpu_d0
p = 0.6302 >= 0.1500  removing lineastotales_d1
p = 0.5573 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =    9.43
       Model |  .811121435     4  .202780359           Prob > F      =  0.0000
    Residual |  1.11870313    52  .021513522           R-squared     =  0.4203
-------------+------------------------------           Adj R-squared =  0.3757
       Total |  1.92982456    56  .034461153           Root MSE      =  .14667

------------------------------------------------------------------------------
     poc2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     poc2_d1 |   .7123037   .1226581     5.81   0.000     .4661722    .9584353
     poc2_d2 |  -.3565988   .1232015    -2.89   0.006    -.6038208   -.1093768
   imacec_d1 |  -.0067784   .0029272    -2.32   0.025    -.0126523   -.0009045
 internet_d1 |   1.19e-06   7.05e-07     1.69   0.096    -2.20e-07    2.61e-06
       _cons |   .0108706   .0217515     0.50   0.619    -.0327769    .0545181
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0968   0.0972   .56247  0.4533          |                  |
2       -0.1262  -0.1379   1.5364  0.4638         -|                 -|
3        0.1495   0.1836   2.9276  0.4029          |-                 |-
4        0.0137  -0.0499   2.9394  0.5680          |                  |
5       -0.0416   0.0141   3.0513  0.6921          |                  |
6       -0.0045  -0.0381   3.0527  0.8022          |                  |
7       -0.0136  -0.0071   3.0651  0.8789          |                  |
```

```
8       -0.0483  -0.0500   3.2252  0.9194          |                  |
9       -0.1029  -0.0965   3.9678  0.9135          |                  |
10       0.0522   0.0776   4.1624  0.9397          |                  |
11       0.0663   0.0275   4.4841  0.9536          |                  |
12      -0.1380  -0.1110   5.9066  0.9207         -|                  |
13       0.0258   0.0597   5.9575  0.9477          |                  |
14       0.0692  -0.0145   6.3319  0.9574          |                  |
15      -0.1095  -0.0692   7.2916  0.9490          |                  |
16      -0.0316  -0.0309   7.3734  0.9654          |                  |
17      -0.1019  -0.1575   8.2469  0.9610          |                 -|
18       0.0247   0.1011   8.2994  0.9738          |                  |
19      -0.0568  -0.1504   8.5844  0.9798          |                 -|
20      -0.1169  -0.0467    9.827  0.9712          |                  |
21      -0.0516  -0.1624   10.076  0.9779          |                 -|
22       0.0651   0.1320   10.482  0.9814          |                  |-
23       0.0491   0.0811   10.721  0.9859          |                  |
24      -0.0522  -0.0318   10.999  0.9890          |                  |
25       0.0201   0.0559   11.041  0.9927          |                  |
26       0.0477   0.1146   11.289  0.9945          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.497               1                   0.1141
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.144               1                   0.7044
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of poc2_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      4.73
                  Prob > F =      0.0056

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1659 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000          0.000          60.33       0.0000
```

```
.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z       Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.56863     22.507      6.692  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.2887
 Prob > chi2(26)           =     0.9945

.
. drop residuo

.
pr(.15): regress    prga_d0 prga_d1 prga_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9846 >= 0.1500  removing lineastotales_d1
p = 0.9373 >= 0.1500  removing arpu_d1
p = 0.9284 >= 0.1500  removing arpu_d2
p = 0.8748 >= 0.1500  removing imacec_d1
p = 0.7989 >= 0.1500  removing internet_d0
p = 0.7578 >= 0.1500  removing prga_d1
p = 0.5288 >= 0.1500  removing prga_d2
p = 0.4517 >= 0.1500  removing imacec_d0
p = 0.3168 >= 0.1500  removing imacec_d2
p = 0.2543 >= 0.1500  removing lineastotales_d2
p = 0.1875 >= 0.1500  removing internet_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   28.06
       Model |  4.28461615     3  1.42820538           Prob > F      =  0.0000
    Residual |  2.69783999    53  .050902641           R-squared     =  0.6136
-------------+------------------------------           Adj R-squared =  0.5918
       Total |  6.98245614    56  .124686717           Root MSE      =  .22562

------------------------------------------------------------------------------
     prga_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d1 |   2.16e-06   1.08e-06     2.00   0.050    -1.77e-09    4.32e-06
lineastota~0 |   4.81e-06   2.21e-06     2.17   0.034     3.69e-07    9.25e-06
     arpu_d0 |  -.0111729   .0012724    -8.78   0.000     -.013725   -.0086208
       _cons |  -.0643823   .0346544    -1.86   0.069    -.1338901    .0051256
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
```

```
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0680   0.0680   .28225  0.5952          |                  |
2       -0.0372  -0.0413    .3684  0.8318          |                  |
3        0.0331   0.0387   .43768  0.9324          |                  |
4        0.0238   0.0184   .47423  0.9760          |                  |
5        0.0167   0.0170   .49246  0.9924          |                  |
6       -0.0345  -0.0359     .572  0.9968          |                  |
7       -0.0344  -0.0314   .65272  0.9987          |                  |
8        0.2602   0.2629   5.3654  0.7179          |--                |--
9       -0.0486  -0.0883   5.5334  0.7856          |                  |
10      -0.0945  -0.0655   6.1803  0.7999          |                  |
11       0.0373   0.0330   6.2834  0.8538          |                  |
12       0.0508   0.0354   6.4788  0.8901          |                  |
13       0.0377   0.0303   6.5886  0.9221          |                  |
14       0.1280   0.1583   7.8845  0.8953          |-                 |-
15      -0.0357  -0.0460   7.9875  0.9243          |                  |
16      -0.2823  -0.4104   14.593  0.5547        --|               ---|
17      -0.0326   0.0528   14.683  0.6183          |                  |
18       0.0220   0.0443   14.725  0.6807          |                  |
19      -0.0183  -0.1145   14.755  0.7380          |                  |
20      -0.0062   0.2224   14.758  0.7901          |                  |-
21      -0.0423  -0.2453   14.927  0.8266          |                 -|
22       0.0745  -0.1579   15.463  0.8416          |                 -|
23      -0.0134   0.1219   15.481  0.8766          |                  |
24      -0.3241  -0.0896   26.229  0.3416        --|                  |
25       0.0146   0.1489   26.252  0.3943          |                  |-
26       0.0588   0.1399   26.627  0.4291          |                  |-
27      -0.0462  -0.6552   26.867  0.4710          |             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.194               1                   0.6594
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.220               1                   0.6389
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of prga_d0
       Ho:  model has no omitted variables
                  F(3, 50) =     13.53
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:    394 Chi(2)  2.7e-86
Jarque-Bera test for Ho: normality: (residuo)
```

```
.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          35.29       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z       Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.67420     17.236      6.125  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    26.8672
 Prob > chi2(27)           =     0.4710

.
. drop residuo

.
pr(.15): regress    pvr2_d0 pvr2_d1 pvr2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9372 >= 0.1500  removing internet_d2
p = 0.8776 >= 0.1500  removing lineastotales_d0
p = 0.7001 >= 0.1500  removing imacec_d1
p = 0.5639 >= 0.1500  removing imacec_d0
p = 0.3864 >= 0.1500  removing imacec_d2
p = 0.2738 >= 0.1500  removing internet_d0
p = 0.1636 >= 0.1500  removing arpu_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =  100.94
       Model |  24455.0555     7  3493.57936           Prob > F      =  0.0000
    Residual |  1695.92695    49  34.6107541           R-squared     =  0.9351
-------------+------------------------------           Adj R-squared =  0.9259
       Total |  26150.9825    56   466.98183           Root MSE      =  5.8831

------------------------------------------------------------------------------
     pvr2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     pvr2_d1 |   .1595508   .0414611     3.85   0.000     .0762317      .24287
     pvr2_d2 |   .4718994    .128052     3.69   0.001     .2145693    .7292294
     arpu_d0 |   -.812369   .0343585   -23.64   0.000    -.8814149    -.743323
lineastota~2 |   .0001797   .0000694     2.59   0.013     .0000401    .0003192
     arpu_d2 |   .4238232   .1152165     3.68   0.001     .1922871    .6553594
 internet_d1 |  -.0000434   .0000285    -1.52   0.134    -.0001008    .0000139
```

```
lineastota~1 |  -.0001876    .000069    -2.72   0.009    -.0003263   -.0000489
       _cons |   1.264503   1.140164     1.11   0.273    -1.026743    3.555749
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0429   0.0476   .11076  0.7393          |                  |
2        0.0429   0.0451   .22342  0.8943          |                  |
3       -0.1203  -0.1366   1.1247  0.7711          |                 -|
4        0.1819   0.2144   3.2244  0.5210          |-                 |-
5        0.0664   0.0316   3.5094  0.6220          |                  |
6        0.1198   0.1195   4.4558  0.6152          |                  |
7        0.0658   0.0890   4.7472  0.6908          |                  |
8       -0.0461  -0.1069    4.893  0.7690          |                  |
9       -0.1393  -0.1583   6.2523  0.7144         -|                 -|
10       0.1111   0.1602   7.1358  0.7126          |                  |-
11       0.0947   0.0259    7.791  0.7319          |                  |
12       0.0872   0.0888   8.3599  0.7564          |                  |
13      -0.0795  -0.0597   8.8434  0.7847          |                  |
14      -0.1277  -0.2191   10.119  0.7535         -|                 -|
15      -0.0371   0.0314   10.229  0.8051          |                  |
16      -0.0228  -0.1258   10.271  0.8521          |                 -|
17       0.0422   0.0348   10.421  0.8850          |                  |
18      -0.1302  -0.0408   11.883  0.8532         -|                  |
19      -0.1258  -0.1356   13.283  0.8238         -|                 -|
20      -0.1257  -0.0899   14.719  0.7922         -|                  |
21      -0.1375  -0.2333   16.486  0.7417         -|                 -|
22       0.0159  -0.1751   16.511  0.7898          |                 -|
23       0.1092   0.0956    17.69  0.7741          |                  |
24      -0.0334   0.0306   17.803  0.8124          |                  |
25      -0.2280  -0.2779   23.267  0.5620         -|                --|
26      -0.1204  -0.1289   24.839  0.5281          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.245               1                   0.6207
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.150               1                   0.6981
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pvr2_d0
```

```
       Ho:  model has no omitted variables
                  F(3, 46) =     10.20
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  72.37 Chi(2)  1.9e-16
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                      ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           20.54       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.90603      4.903      3.417  0.00032

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    24.8386
 Prob > chi2(26)           =     0.5281

.
. drop residuo

.
pr(.15): regress    pvrs_d0 pvrs_d1 pvrs_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9931 >= 0.1500  removing pvrs_d2
p = 0.9770 >= 0.1500  removing internet_d2
p = 0.9744 >= 0.1500  removing imacec_d0
p = 0.9561 >= 0.1500  removing internet_d1
p = 0.9324 >= 0.1500  removing lineastotales_d0
p = 0.6168 >= 0.1500  removing pvrs_d1
p = 0.5647 >= 0.1500  removing arpu_d1
p = 0.5625 >= 0.1500  removing imacec_d2
p = 0.2724 >= 0.1500  removing internet_d0
p = 0.1568 >= 0.1500  removing lineastotales_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =  130.81
       Model |  187056.159     4  46764.0396           Prob > F      =  0.0000
    Residual |  18589.4203    52  357.488853           R-squared     =  0.9096
```

```
-------------+------------------------------           Adj R-squared =  0.9027
       Total |  205645.579    56  3672.24248           Root MSE      =  18.907

------------------------------------------------------------------------------
     pvrs_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d2 |  -1.263326   .1044782   -12.09   0.000    -1.472977   -1.053675
lineastota~2 |   .0003535   .0001874     1.89   0.065    -.0000226    .0007295
     arpu_d0 |  -2.073126   .1052605   -19.70   0.000    -2.284347   -1.861906
   imacec_d1 |   .9809141   .3778046     2.60   0.012     .2227937    1.739035
       _cons |   16.41409   2.694444     6.09   0.000     11.00729    21.82089
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2578   0.2602   3.9924  0.0457          |--                |--
2       -0.1112  -0.1880   4.7479  0.0931          |                 -|
3       -0.1901  -0.1316   6.9975  0.0720         -|                 -|
4       -0.1003  -0.0232   7.6361  0.1059          |                  |
5       -0.0617  -0.0785   7.8821  0.1629          |                  |
6       -0.0067  -0.0018   7.8851  0.2466          |                  |
7       -0.1491  -0.2218   9.3797  0.2265         -|                 -|
8        0.0585   0.2195   9.6145  0.2931          |                  |-
9        0.2374   0.1175   13.564  0.1387          |-                 |
10       0.1425   0.0107   15.018  0.1314          |-                 |
11       0.1348   0.2212   16.347  0.1287          |-                 |-
12      -0.0076  -0.0484   16.351  0.1757          |                  |
13      -0.1658  -0.0696   18.452  0.1411         -|                  |
14      -0.1391  -0.0542   19.966  0.1312         -|                  |
15      -0.0152   0.1157   19.984  0.1725          |                  |
16       0.0521   0.0552   20.207  0.2111          |                  |
17       0.1194   0.1134   21.405  0.2087          |                  |
18      -0.0720  -0.2933   21.851  0.2386          |                --|
19      -0.0312   0.1623   21.938  0.2874          |                  |-
20       0.0304  -0.1258   22.022  0.3393          |                 -|
21       0.0981   0.3227   22.921  0.3482          |                  |--
22       0.0237  -0.2005   22.975  0.4032          |                 -|
23       0.0154   0.3315   22.998  0.4609          |                  |--
24      -0.0561   0.0170   23.319  0.5010          |                  |
25      -0.0908  -0.2228   24.186  0.5087          |                 -|
26      -0.0121   0.0295   24.201  0.5645          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          4.331               1                   0.0374
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          2.068               1                   0.1504
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pvrs_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      4.02
                  Prob > F =      0.0124

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  4.001 Chi(2)  .1353
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.067         0.193            4.97       0.0834

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.97347      1.384      0.699  0.24237

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    24.2014
 Prob > chi2(26)           =     0.5645

.
. drop residuo

.
pr(.15): regress    rfr2_d0 rfr2_d1 rfr2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2      lineastotales_d2
                      begin with full model
p = 0.9584 >= 0.1500  removing lineastotales_d0
p = 0.9177 >= 0.1500  removing imacec_d2
p = 0.6920 >= 0.1500  removing internet_d1
p = 0.6980 >= 0.1500  removing internet_d0
p = 0.6230 >= 0.1500  removing rfr2_d1
p = 0.5619 >= 0.1500  removing arpu_d1
```

```
p = 0.7907 >= 0.1500  removing rfr2_d2
p = 0.6582 >= 0.1500  removing arpu_d2
p = 0.4674 >= 0.1500  removing imacec_d1
p = 0.4553 >= 0.1500  removing lineastotales_d1
p = 0.6434 >= 0.1500  removing lineastotales_d2
p = 0.2877 >= 0.1500  removing internet_d2
p = 0.2086 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =  188.41
       Model |  3.85663912     1  3.85663912           Prob > F      =  0.0000
    Residual |  1.12581702    55    .0204694           R-squared     =  0.7740
-------------+------------------------------           Adj R-squared =  0.7699
       Total |  4.98245614    56  .088972431           Root MSE      =  .14307

------------------------------------------------------------------------------
     rfr2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |   -.010911   .0007949   -13.73   0.000     -.012504   -.0093179
       _cons |  -.0159935   .0191071    -0.84   0.406     -.054285     .022298
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0310   0.2098   .05947  0.8073          |                 |-
2        0.0264   0.1833    .1035  0.9496          |                 |-
3        0.0272   0.2225   .15109  0.9851          |                 |-
4       -0.0323  -0.1186   .21938  0.9944          |                 |
5       -0.0306  -0.1473   .28161  0.9980          |                -|
6       -0.0040  -0.2679   .28267  0.9996          |               --|
7       -0.0121  -0.5905   .29278  0.9999          |             ----|
8       -0.0093  -0.3201   .29893  1.0000          |               --|
9        0.0005  -0.5768   .29895  1.0000          |             ----|
10      -0.0018  -0.4346   .29918  1.0000          |              ---|
11       0.0003  -0.4211   .29919  1.0000          |              ---|
12       0.0017  -0.0636   .29941  1.0000          |                 |
13      -0.0057  -0.3812   .30197  1.0000          |              ---|
14       0.0068  -0.3401   .30563  1.0000          |               --|
15       0.0108  -0.0360   .31514  1.0000          |                 |
16       0.0059  -0.2850   .31808  1.0000          |               --|
17      -0.0043  -0.5616   .31966  1.0000          |             ----|
18       0.0001  -0.9689   .31966  1.0000          |          -------|
19      -0.0018  -1.2729   .31994  1.0000          |         --------|
20      -0.0001   1.5891   .31994  1.0000          |                 |--------
21      -0.0006   1.1333   .31998  1.0000          |                 |--------
22      -0.0032   1.3786   .32095  1.0000          |                 |--------
23      -0.0113   0.1564   .33376  1.0000          |                 |-
24      -0.0033  -0.1192   .33486  1.0000          |                 |
25      -0.0037  -0.8837    .3363  1.0000          |          -------|
26      -0.0060   0.5659   .34017  1.0000          |                 |----
27      -0.0045  -0.1372    .3424  1.0000          |                -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
```

```
-------------+-----------------------------------------------------------
       1     |          0.091               1                   0.7623
-------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
-------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-----------------------------------------------------------
       1     |          0.008               1                   0.9296
-------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   3867 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           73.47       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.33052     35.905      7.711  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.3424
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
pr(.15): regress    rnhp_d0 rnhp_d1 rnhp_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9935 >= 0.1500  removing imacec_d2
p = 0.9827 >= 0.1500  removing arpu_d2
```

```
p = 0.8792 >= 0.1500  removing lineastotales_d1
p = 0.8519 >= 0.1500  removing rnhp_d2
p = 0.7268 >= 0.1500  removing arpu_d1
p = 0.6911 >= 0.1500  removing internet_d1
p = 0.6691 >= 0.1500  removing arpu_d0
p = 0.4700 >= 0.1500  removing imacec_d0
p = 0.3584 >= 0.1500  removing internet_d0
p = 0.4316 >= 0.1500  removing imacec_d1
p = 0.3328 >= 0.1500  removing lineastotales_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    8.07
       Model |  818.912843     3  272.970948           Prob > F      =  0.0002
    Residual |  1793.22751    53  33.8344813           R-squared     =  0.3135
-------------+------------------------------           Adj R-squared =  0.2746
       Total |  2612.14035    56  46.6453634           Root MSE      =  5.8167

------------------------------------------------------------------------------
     rnhp_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     rnhp_d1 |   .1815633   .1148763     1.58   0.120    -.0488494     .411976
 internet_d2 |  -.0001118   .0000275    -4.06   0.000     -.000167   -.0000566
lineastota~2 |   .0000924   .0000571     1.62   0.111    -.0000221    .0002068
       _cons |   2.684589   .9152651     2.93   0.005     .8487998    4.520379
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0057  -0.0057   .00193  0.9650          |                  |
2       -0.1063  -0.1064   .69314  0.7071          |                  |
3        0.2292   0.2298   3.9653  0.2652          |-                 |-
4       -0.0855  -0.1049   4.4289  0.3511          |                  |
5       -0.0172   0.0397   4.4482  0.4868          |                  |
6       -0.0366  -0.1251   4.5363  0.6045          |                 -|
7       -0.0355   0.0197    4.621  0.7061          |                  |
8       -0.1531  -0.2133   6.2297  0.6215         -|                 -|
9        0.0324   0.0952   6.3034  0.7092          |                  |
10      -0.0241  -0.1256   6.3451  0.7855          |                 -|
11      -0.0470   0.0673   6.5062  0.8375          |                  |
12       0.1735   0.0614   8.7559  0.7236          |-                 |
13      -0.1029  -0.0923   9.5657  0.7290          |                  |
14      -0.0071  -0.0183   9.5696  0.7929          |                  |
15       0.0693  -0.0361   9.9545  0.8226          |                  |
16      -0.1103  -0.1176   10.953  0.8124          |                  |
17      -0.0934  -0.2012   11.686  0.8187          |                 -|
18      -0.1302  -0.1820   13.149  0.7827         -|                 -|
19       0.0077  -0.0102   13.154  0.8306          |                  |
20       0.0347   0.0458   13.264  0.8658          |                  |
21       0.0418   0.1017   13.427  0.8929          |                  |
22      -0.0129   0.0310   13.443  0.9201          |                  |
23      -0.1040  -0.1557   14.514  0.9112          |                 -|
24       0.0551  -0.0762   14.824  0.9258          |                  |
25      -0.0907  -0.2513   15.687  0.9238          |                --|
26       0.0566   0.0235   16.035  0.9354          |                  |

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.006               1                   0.9376
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.060               1                   0.8070
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of rnhp_d0
       Ho:  model has no omitted variables
                  F(3, 50) =     76.78
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  856.7 Chi(2)  9.e-187
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          51.46       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.67111     17.160      6.109  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    16.0351
 Prob > chi2(26)           =     0.9354

.
. drop residuo
```

```
.
pr(.15): regress    tgl2_d0 tgl2_d1 tgl2_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9841 >= 0.1500  removing imacec_d2
p = 0.9624 >= 0.1500  removing imacec_d0
p = 0.9054 >= 0.1500  removing arpu_d1
p = 0.8923 >= 0.1500  removing arpu_d2
p = 0.8548 >= 0.1500  removing lineastotales_d1
p = 0.8465 >= 0.1500  removing tgl2_d1
p = 0.7966 >= 0.1500  removing internet_d2
p = 0.7436 >= 0.1500  removing internet_d1
p = 0.6342 >= 0.1500  removing imacec_d1
p = 0.5298 >= 0.1500  removing tgl2_d2
p = 0.4617 >= 0.1500  removing lineastotales_d2
p = 0.1508 >= 0.1500  removing lineastotales_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =   42.84
       Model |  1.22679257     2  .613396285           Prob > F      =  0.0000
    Residual |   .77320743    54  .014318656           R-squared     =  0.6134
-------------+------------------------------           Adj R-squared =  0.5991
       Total |           2    56  .035714286           Root MSE      =  .11966

------------------------------------------------------------------------------
     tgl2_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |  -.0053116   .0006663    -7.97   0.000    -.0066475   -.0039758
 internet_d0 |  -2.36e-06   5.66e-07    -4.16   0.000    -3.49e-06   -1.22e-06
       _cons |   .0139058   .0176096     0.79   0.433    -.0213994     .049211
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0488   0.0488   .14779  0.7007          |                  |
2        0.0416   0.0395   .25726  0.8793          |                  |
3        0.1909   0.1905   2.5985  0.4578          |-                 |-
4        0.0138   0.0003    2.611  0.6249          |                  |
5        0.0397   0.0305   2.7162  0.7436          |                  |
6       -0.0898  -0.1422   3.2643  0.7750          |                 -|
7        0.0502   0.0571    3.439  0.8416          |                  |
8       -0.0279  -0.0480   3.4938  0.8997          |                  |
9        0.0460   0.1153   3.6458  0.9331          |                  |
10      -0.0531  -0.0954   3.8526  0.9537          |                  |
11      -0.0253   0.0131   3.9006  0.9727          |                  |
12      -0.1569  -0.2505   5.7859  0.9265         -|                --|
13      -0.0515   0.0415   5.9932  0.9464          |                  |
14      -0.0059  -0.0429    5.996  0.9666          |                  |
15      -0.1597  -0.1107   8.0823  0.9204         -|                  |
16      -0.0089   0.0166   8.0889  0.9462          |                  |
17       0.0576   0.0847   8.3732  0.9579          |                  |
18      -0.0015   0.0057   8.3734  0.9725          |                  |
19       0.0228   0.0323   8.4202  0.9819          |                  |
20       0.0394   0.0738   8.5637  0.9874          |                  |
```

```
21       0.0265   0.0879   8.6301  0.9918          |                  |
22      -0.0105  -0.0039   8.6408  0.9950          |                  |
23      -0.0391  -0.0646   8.7938  0.9966          |                  |
24      -0.0886  -0.1347   9.6005  0.9960          |                 -|
25      -0.0130  -0.0036   9.6185  0.9976          |                  |
26      -0.0599  -0.0587    10.01  0.9980          |                  |
27      -0.0321  -0.0791   10.126  0.9987          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.075               1                   0.7837
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.065               1                   0.7981
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of tgl2_d0
       Ho:  model has no omitted variables
                  F(3, 51) =    309.31
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1855 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           62.70       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.56500     23.329      6.782  0.00000

.
. ***test Box-Ljung white noise
```

```
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    10.1260
 Prob > chi2(27)           =     0.9987

.
. drop residuo

.
pr(.15): regress    stgo_d0 stgo_d1 stgo_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9570 >= 0.1500  removing internet_d2
p = 0.9437 >= 0.1500  removing stgo_d2
p = 0.9500 >= 0.1500  removing arpu_d2
p = 0.9355 >= 0.1500  removing lineastotales_d2
p = 0.8744 >= 0.1500  removing lineastotales_d0
p = 0.8103 >= 0.1500  removing stgo_d1
p = 0.8454 >= 0.1500  removing arpu_d1
p = 0.6958 >= 0.1500  removing imacec_d1
p = 0.6106 >= 0.1500  removing imacec_d0
p = 0.2980 >= 0.1500  removing internet_d0
p = 0.3611 >= 0.1500  removing imacec_d2
p = 0.2260 >= 0.1500  removing lineastotales_d1
p = 0.2846 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =    9.86
       Model |  .901814036     1  .901814036           Prob > F      =  0.0027
    Residual |  5.02801053    55  .091418373           R-squared     =  0.1521
-------------+------------------------------           Adj R-squared =  0.1367
       Total |  5.92982456    56  .105889724           Root MSE      =  .30235

------------------------------------------------------------------------------
     stgo_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |   .0052761   .0016799     3.14   0.003     .0019096    .0086427
       _cons |  -.0188703   .0403794    -0.47   0.642    -.0997923    .0620518
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0188  -0.0188   .02189  0.8824          |                  |
2       -0.0031  -0.0034   .02249  0.9888          |                  |
3        0.0219   0.0218   .05326  0.9968          |                  |
4       -0.0536  -0.0528   .24121  0.9933          |                  |
5        0.0239   0.0222   .27936  0.9980          |                  |
6        0.0268   0.0270   .32798  0.9993          |                  |
7        0.0240   0.0275   .36786  0.9998          |                  |
8        0.0282   0.0258   .42401  0.9999          |                  |
9        0.0151   0.0178   .44034  1.0000          |                  |
10       0.0031   0.0046   .44104  1.0000          |                  |
```

```
11       0.0030   0.0048   .44172  1.0000          |                  |
12       0.0031   0.0051   .44246  1.0000          |                  |
13       0.0034   0.0059   .44339  1.0000          |                  |
14      -0.3955  -0.3962   12.952  0.5303       ---|               ---|
15       0.0098  -0.0046    12.96  0.6054          |                  |
16       0.0020  -0.0156    12.96  0.6757          |                  |
17      -0.0103  -0.0253   12.969  0.7382          |                  |
18       0.0257   0.0050   13.027  0.7899          |                  |
19      -0.0095  -0.0321   13.035  0.8368          |                  |
20      -0.0123  -0.0291   13.049  0.8753          |                  |
21      -0.0121  -0.0349   13.063  0.9064          |                  |
22      -0.0150  -0.0531   13.085  0.9308          |                  |
23      -0.0076  -0.0578   13.091  0.9500          |                  |
24      -0.0015   0.0022   13.091  0.9646          |                  |
25      -0.0020   0.0005   13.091  0.9754          |                  |
26      -0.0013   0.0016   13.092  0.9831          |                  |
27      -0.0025  -0.0013   13.092  0.9886          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.023               1                   0.8804
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.041               1                   0.8393
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of stgo_d0
       Ho:  model has no omitted variables
                  F(3, 52) =      0.29
                  Prob > F =      0.8333

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   3290 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000          0.000           65.86       0.0000

.
```

```
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     59    0.25265     40.081      7.948  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.0923
 Prob > chi2(27)           =     0.9886

.
. drop residuo

.
pr(.15): regress    chol_d0 chol_d1 chol_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9034 >= 0.1500  removing lineastotales_d1
p = 0.9207 >= 0.1500  removing imacec_d0
p = 0.8996 >= 0.1500  removing arpu_d0
p = 0.7544 >= 0.1500  removing arpu_d2
p = 0.7758 >= 0.1500  removing imacec_d1
p = 0.6487 >= 0.1500  removing internet_d1
p = 0.6104 >= 0.1500  removing internet_d2
p = 0.5569 >= 0.1500  removing arpu_d1
p = 0.4707 >= 0.1500  removing chol_d2
p = 0.4730 >= 0.1500  removing chol_d1
p = 0.3628 >= 0.1500  removing lineastotales_d0
p = 0.2208 >= 0.1500  removing imacec_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    5.88
       Model |  27.8536172     2  13.9268086           Prob > F      =  0.0049
    Residual |  127.865681    54  2.36788298           R-squared     =  0.1789
-------------+------------------------------           Adj R-squared =  0.1485
       Total |  155.719298    56  2.78070175           Root MSE      =  1.5388

------------------------------------------------------------------------------
     chol_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~2 |  -.0000365   .0000149    -2.45   0.018    -.0000664   -6.59e-06
 internet_d0 |    .000017   7.26e-06     2.34   0.023     2.40e-06    .0000315
       _cons |   .5419669   .2345451     2.31   0.025     .0717324    1.012201
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
```

```
1        0.0713   0.0715   .30552  0.5804          |                  |
2       -0.0949  -0.1010   .85572  0.6519          |                  |
3        0.0543   0.0713   1.0395  0.7917          |                  |
4        0.2188   0.2066   4.0767  0.3957          |-                 |-
5        0.1771   0.1734    6.105  0.2961          |-                 |-
6       -0.0419  -0.0213   6.2209  0.3989          |                  |
7       -0.0218  -0.0077    6.253  0.5105          |                  |
8        0.0098  -0.0630   6.2596  0.6182          |                  |
9        0.1164   0.0540   7.2087  0.6154          |                  |
10       0.1076   0.1060   8.0368  0.6252          |                  |
11      -0.1197  -0.1162   9.0852  0.6140          |                  |
12      -0.0509  -0.0178   9.2788  0.6790          |                  |
13      -0.0907  -0.1874   9.9078  0.7015          |                 -|
14       0.0313  -0.0198   9.9842  0.7633          |                  |
15      -0.2233  -0.3088   13.976  0.5273         -|                --|
16      -0.0656   0.0525   14.329  0.5742          |                  |
17      -0.0901  -0.1347   15.012  0.5946          |                 -|
18      -0.0525   0.0333    15.25  0.6447          |                  |
19      -0.0062   0.0070   15.253  0.7064          |                  |
20      -0.2127  -0.2628   19.367  0.4981         -|                --|
21       0.0786   0.2640   19.945  0.5248          |                  |--
22      -0.0079  -0.1254   19.951  0.5861          |                 -|
23      -0.0421   0.2355   20.126  0.6343          |                  |-
24      -0.1200  -0.2271   21.592  0.6036          |                 -|
25      -0.1044   0.0917   22.738  0.5929          |                  |
26       0.0546  -0.2678   23.061  0.6295          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.293               1                   0.5885
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.021               1                   0.8853
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chol_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      1.56
                  Prob > F =      0.2114

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  153.8 Chi(2)  4.0e-34
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
```

```
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           30.10       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.81428      9.690      4.881  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    23.0614
 Prob > chi2(26)           =     0.6295

.
. drop residuo

.
pr(.15): regress    te_d0   te_d1   te_d2           arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9823 >= 0.1500  removing lineastotales_d1
p = 0.9388 >= 0.1500  removing imacec_d0
p = 0.7947 >= 0.1500  removing imacec_d1
p = 0.7987 >= 0.1500  removing internet_d2
p = 0.6979 >= 0.1500  removing internet_d1
p = 0.7105 >= 0.1500  removing lineastotales_d0
p = 0.6144 >= 0.1500  removing te_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =   78.86
       Model |  8105871.2     7   1157981.6            Prob > F      =  0.0000
    Residual |  719500.803    49  14683.6899           R-squared     =  0.9185
-------------+------------------------------           Adj R-squared =  0.9068
       Total |    8825372    56  157595.929            Root MSE      =  121.18

------------------------------------------------------------------------------
       te_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       te_d1 |   .2466717   .0848648     2.91   0.005     .0761296    .4172138
lineastota~2 |   .0036556   .0012147     3.01   0.004     .0012147    .0060966
     arpu_d0 |  -14.96373   .7086974   -21.11   0.000    -16.38791   -13.53955
     arpu_d1 |   3.211891   1.425557     2.25   0.029     .3471268    6.076654
     arpu_d2 |  -5.437106   .6851196    -7.94   0.000    -6.813905   -4.060306
 internet_d0 |    .001134     .00059     1.92   0.060    -.0000517    .0023197
   imacec_d2 |   -4.35064   2.423986    -1.79   0.079    -9.221822    .5205423
       _cons |   71.52465    22.6523     3.16   0.003     26.00316    117.0461
------------------------------------------------------------------------------
```

```
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1590   0.1609   1.5188  0.2178          |-                 |-
2        0.0280   0.0091   1.5667  0.4569          |                  |
3        0.0284   0.0257   1.6171  0.6555          |                  |
4       -0.0573  -0.0826   1.8257  0.7678          |                  |
5       -0.2339  -0.2467   5.3635  0.3731         -|                 -|
6       -0.1003  -0.0180   6.0271  0.4202          |                  |
7        0.0206   0.1098   6.0557  0.5333          |                  |
8       -0.2048  -0.2510   8.9332  0.3480         -|                --|
9       -0.1315  -0.1606   10.145  0.3389         -|                 -|
10      -0.1076  -0.1823   10.974  0.3595          |                 -|
11      -0.1406  -0.1580    12.42  0.3329         -|                 -|
12      -0.0826  -0.0132    12.93  0.3742          |                  |
13       0.0758   0.0917   13.369  0.4197          |                  |
14       0.1437   0.0071   14.985  0.3792          |-                 |
15       0.0454  -0.1479   15.149  0.4407          |                 -|
16       0.1009  -0.0698   15.984  0.4541          |                  |
17       0.0401  -0.2196   16.119  0.5154          |                 -|
18      -0.0787  -0.3594   16.652  0.5471          |                --|
19      -0.0894  -0.3071   17.359  0.5655          |                --|
20      -0.0914  -0.2490   18.119  0.5796          |                 -|
21      -0.0302  -0.2871   18.204  0.6360          |                --|
22       0.0987  -0.1629   19.141  0.6366          |                 -|
23       0.1520   0.0242   21.427  0.5550          |-                 |
24       0.0561  -0.4999   21.748  0.5943          |               ---|
25       0.1174  -0.2694   23.198  0.5660          |                --|
26      -0.0080  -0.5818   23.205  0.6213          |              ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.262               1                   0.1326
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.341               1                   0.5590
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of te_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      2.22
                  Prob > F =      0.0985
```

```
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  5.774 Chi(2)  .0558
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.031         0.147           6.25       0.0439

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.96813      1.663      1.093  0.13720

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    23.2046
 Prob > chi2(26)           =     0.6213

.
. drop residuo

.
pr(.15): regress    atlh_d0 atlh_d1 atlh_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.7729 >= 0.1500  removing internet_d0
p = 0.4900 >= 0.1500  removing atlh_d2
p = 0.4821 >= 0.1500  removing imacec_d0
p = 0.3344 >= 0.1500  removing lineastotales_d0
p = 0.2452 >= 0.1500  removing arpu_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  9,    47) =   30.44
       Model |  739.143705     9  82.1270784           Prob > F      =  0.0000
    Residual |  126.786119    47  2.69757701           R-squared     =  0.8536
-------------+------------------------------           Adj R-squared =  0.8255
       Total |  865.929825    56  15.4630326           Root MSE      =  1.6424

------------------------------------------------------------------------------
     atlh_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     atlh_d1 |   .6130442   .1185337     5.17   0.000     .3745852    .8515033
   imacec_d2 |   .0724965   .0394048     1.84   0.072    -.0067758    .1517688
```

```
     arpu_d0 |  -.1461694   .0101018   -14.47   0.000    -.1664916   -.1258472
     arpu_d1 |   .0800283    .018812     4.25   0.000     .0421835    .1178732
   imacec_d1 |   .0781913   .0377257     2.07   0.044     .0022969    .1540857
lineastota~2 |   .0000582   .0000209     2.78   0.008     .0000161    .0001003
 internet_d2 |   .0000135   8.07e-06     1.67   0.101    -2.73e-06    .0000298
lineastota~1 |   -.000058   .0000213    -2.73   0.009    -.0001009   -.0000152
 internet_d1 |  -.0000181   8.86e-06    -2.04   0.047    -.0000359   -2.66e-07
       _cons |   .1409651     .31908     0.44   0.661    -.5009411    .7828712
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0224   0.0225   .03008  0.8623          |                  |
2       -0.0528  -0.0545   .20029  0.9047          |                  |
3       -0.0218  -0.0188   .22997  0.9726          |                  |
4       -0.1738  -0.1822   2.1477  0.7086         -|                 -|
5        0.2071   0.2364   4.9213  0.4256          |-                 |-
6        0.2181   0.1898   8.0568  0.2340          |-                 |-
7       -0.2045  -0.2354    10.87  0.1444         -|                 -|
8        0.0744   0.1207   11.249  0.1880          |                  |
9        0.0107   0.0683   11.257  0.2585          |                  |
10       0.0776   0.1116   11.688  0.3065          |                  |
11       0.0625  -0.1447   11.973  0.3657          |                 -|
12      -0.2084  -0.2249   15.218  0.2298         -|                 -|
13      -0.0697   0.0328   15.588  0.2721          |                  |
14       0.0650   0.0310   15.919  0.3183          |                  |
15       0.1061   0.1325   16.821  0.3297          |                  |-
16       0.2571   0.2544   22.242  0.1355          |--                |--
17      -0.2002  -0.2714    25.61  0.0819         -|                --|
18      -0.0872  -0.0266   26.266  0.0938          |                  |
19      -0.0302  -0.0876   26.347  0.1208          |                  |
20      -0.1996  -0.3434   29.969  0.0704         -|                --|
21       0.1227  -0.1683   31.375  0.0676          |                 -|
22      -0.0641  -0.3080    31.77  0.0814          |                --|
23      -0.2397  -0.1570   37.453  0.0291         -|                 -|
24       0.0342  -0.3692   37.573  0.0383          |                --|
25      -0.1065  -0.5995   38.766  0.0389          |              ----|
26      -0.0407   0.0267   38.946  0.0493          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.070               1                   0.7908
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.368               1                   0.5442
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of atlh_d0
       Ho:  model has no omitted variables
                  F(3, 44) =      2.21
                  Prob > F =      0.0998

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  6.836 Chi(2)  .0328
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.022         0.120            6.94       0.0311

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95871      2.154      1.649  0.04954

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    38.9456
 Prob > chi2(26)           =     0.0493

.
. drop residuo

.
pr(.15): regress    chos_d0 chos_d1 chos_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9627 >= 0.1500  removing chos_d1
p = 0.8572 >= 0.1500  removing lineastotales_d1
p = 0.8596 >= 0.1500  removing imacec_d0
p = 0.7645 >= 0.1500  removing internet_d1
p = 0.7057 >= 0.1500  removing internet_d0
p = 0.6728 >= 0.1500  removing lineastotales_d0
p = 0.5609 >= 0.1500  removing imacec_d2
p = 0.3820 >= 0.1500  removing imacec_d1
p = 0.2955 >= 0.1500  removing arpu_d2
```

```
p = 0.3284 >= 0.1500  removing arpu_d1
p = 0.2536 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   32.08
       Model |  113.310551     3  37.7701838           Prob > F      =  0.0000
    Residual |  62.4087468    53  1.17752352           R-squared     =  0.6448
-------------+------------------------------           Adj R-squared =  0.6247
       Total |  175.719298    56  3.13784461           Root MSE      =  1.0851

------------------------------------------------------------------------------
      chos_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d2 |  -9.23e-06   5.11e-06    -1.80   0.077    -.0000195    1.03e-06
     chos_d2 |  -.1568645   .0822325    -1.91   0.062     -.321802    .0080729
     arpu_d0 |   -.056341    .006042    -9.32   0.000    -.0684596   -.0442224
       _cons |   .6214765    .164526     3.78   0.000     .2914793    .9514738
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0268   0.0270   .04308  0.8356          |                  |
2       -0.0675  -0.0727    .3217  0.8514          |                  |
3        0.1343   0.1448   1.4449  0.6951          |-                 |-
4        0.0051  -0.0063   1.4465  0.8361          |                  |
5        0.1477   0.1830   2.8566  0.7221          |-                 |-
6        0.0656   0.0393   3.1406  0.7910          |                  |
7        0.0294   0.0692   3.1987  0.8660          |                  |
8        0.0496   0.0100   3.3675  0.9092          |                  |
9       -0.0030  -0.0268   3.3682  0.9479          |                  |
10       0.1353   0.1115   4.6777  0.9116          |-                 |
11      -0.1243  -0.2359   5.8071  0.8859          |                 -|
12      -0.0849  -0.0823   6.3457  0.8977          |                  |
13       0.0510  -0.0334   6.5445  0.9241          |                  |
14      -0.0477  -0.0540   6.7224  0.9449          |                  |
15       0.0776   0.1104    7.205  0.9517          |                  |
16       0.0204   0.0321   7.2393  0.9684          |                  |
17       0.0019   0.1188   7.2395  0.9802          |                  |
18      -0.0084  -0.0585   7.2456  0.9879          |                  |
19      -0.1594  -0.1956   9.4955  0.9643         -|                 -|
20      -0.0948  -0.2023   10.313  0.9621          |                 -|
21      -0.0526  -0.1027   10.571  0.9705          |                  |
22      -0.1363  -0.1093   12.355  0.9496         -|                  |
23       0.0032  -0.0576   12.356  0.9646          |                  |
24      -0.0333   0.0620   12.469  0.9741          |                  |
25      -0.1765  -0.2995   15.744  0.9222         -|                --|
26      -0.0644  -0.0964   16.194  0.9314          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.044               1                   0.8336
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         1.014               1                    0.3140
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of chos_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      1.77
                  Prob > F =      0.1640

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  9.558 Chi(2)  .0084
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.009         0.082            8.55       0.0139

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.95430      2.385      1.868  0.03091

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    16.1940
 Prob > chi2(26)           =     0.9314

.
. drop residuo

.
pr(.15): regress    cnrp_d0 cnrp_d1 cnrp_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
```

```
p = 0.8218 >= 0.1500  removing internet_d0
p = 0.5247 >= 0.1500  removing imacec_d0
p = 0.4624 >= 0.1500  removing lineastotales_d0
p = 0.3466 >= 0.1500  removing internet_d1
p = 0.2789 >= 0.1500  removing internet_d2
p = 0.2958 >= 0.1500  removing imacec_d2
p = 0.3894 >= 0.1500  removing lineastotales_d1
p = 0.2433 >= 0.1500  removing lineastotales_d2
p = 0.1851 >= 0.1500  removing imacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =  350.70
       Model |  .954689092     5  .190937818           Prob > F      =  0.0000
    Residual |  .027767048    51  .000544452           R-squared     =  0.9717
-------------+------------------------------           Adj R-squared =  0.9690
       Total |   .98245614    56   .01754386           Root MSE      =  .02333

------------------------------------------------------------------------------
     cnrp_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     cnrp_d1 |   -.631691   .2836297    -2.23   0.030    -1.201102   -.0622806
     cnrp_d2 |   .9973767   .3218717     3.10   0.003     .3511924    1.643561
     arpu_d0 |   -.004442   .0003779   -11.76   0.000    -.0052007   -.0036834
     arpu_d1 |  -.0042794   .0017886    -2.39   0.020    -.0078701   -.0006886
     arpu_d2 |   .0057907   .0017916     3.23   0.002     .0021938    .0093875
       _cons |    .000758   .0032348     0.23   0.816    -.0057361    .0072521
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.2590  -0.2590   4.0273  0.0448        --|                --|
2        0.0342  -0.0789   4.0987  0.1288          |                  |
3       -0.3328  -0.4493   10.998  0.0117        --|               ---|
4        0.2440   0.2051   14.774  0.0052          |-                 |-
5       -0.2280  -0.2691   18.136  0.0028         -|                --|
6        0.0577  -0.0231   18.356  0.0054          |                  |
7       -0.0385  -0.0974   18.456  0.0101          |                  |
8        0.1171  -0.0071   19.397  0.0129          |                  |
9       -0.0032   0.0023   19.398  0.0220          |                  |
10      -0.0107  -0.0444   19.406  0.0354          |                  |
11      -0.0175  -0.0188   19.428  0.0538          |                  |
12       0.0103   0.0194   19.436  0.0785          |                  |
13       0.0205  -0.0226   19.468  0.1093          |                  |
14      -0.0048   0.0043    19.47  0.1477          |                  |
15      -0.0102  -0.0462   19.479  0.1929          |                  |
16      -0.0193  -0.1323   19.509  0.2431          |                 -|
17      -0.0079  -0.0710   19.514  0.2998          |                  |
18       0.0232  -0.0070   19.561  0.3581          |                  |
19       0.0203   0.0388   19.597  0.4192          |                  |
20      -0.0161  -0.1138   19.621  0.4819          |                  |
21       0.0043   0.0016   19.623  0.5453          |                  |
22      -0.0019   0.0068   19.623  0.6066          |                  |
23      -0.0313  -0.0439    19.72  0.6587          |                  |
24      -0.0288   0.0740   19.805  0.7078          |                  |
25       0.0555   0.1496   20.128  0.7401          |                  |-
26       0.0060   0.2079   20.132  0.7853          |                  |-
```

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |         21.574               1                   0.0000
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.276               1                   0.2587
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  883.7 Chi(2)  1.e-192
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          42.39       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.53105     24.467      6.871  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.1320
 Prob > chi2(26)           =     0.7853

.
. drop residuo

.
pr(.15): regress    crrl_d0 crrl_d1 crrl_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
```

```
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9758 >= 0.1500  removing imacec_d2
p = 0.9579 >= 0.1500  removing arpu_d1
p = 0.7846 >= 0.1500  removing lineastotales_d0
p = 0.6549 >= 0.1500  removing lineastotales_d2
p = 0.6573 >= 0.1500  removing internet_d1
p = 0.6883 >= 0.1500  removing arpu_d0
p = 0.5913 >= 0.1500  removing imacec_d1
p = 0.5428 >= 0.1500  removing arpu_d2
p = 0.3348 >= 0.1500  removing imacec_d0
p = 0.3882 >= 0.1500  removing crrl_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   24.87
       Model |  380.563266     4  95.1408164           Prob > F      =  0.0000
    Residual |  198.910419    52  3.82520036           R-squared     =  0.6567
-------------+------------------------------           Adj R-squared =  0.6303
       Total |  579.473684    56  10.3477444           Root MSE      =  1.9558

------------------------------------------------------------------------------
     crrl_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     crrl_d1 |   .7529514   .0824898     9.13   0.000     .5874235    .9184794
 internet_d0 |   .0000216   9.26e-06     2.33   0.024     3.01e-06    .0000402
 internet_d2 |    .000016   9.31e-06     1.72   0.091    -2.67e-06    .0000347
lineastota~1 |   .0000285    .000019     1.50   0.140    -9.67e-06    .0000666
       _cons |  -.0938417   .3460335    -0.27   0.787    -.7882088    .6005254
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1012  -0.1062   .61462  0.4331          |                  |
2        0.0311   0.0252    .6736  0.7141          |                  |
3       -0.0657  -0.0634   .94218  0.8152          |                  |
4       -0.0986  -0.1250   1.5596  0.8160          |                  |
5        0.1604   0.1639   3.2234  0.6656          |-                 |-
6        0.1121   0.1724   4.0527  0.6696          |                  |-
7       -0.1080  -0.1502   4.8374  0.6798          |                 -|
8        0.0464   0.0088   4.9852  0.7592          |                  |
9       -0.0386   0.1035   5.0898  0.8264          |                  |
10       0.1027   0.1811   5.8438  0.8282          |                  |-
11       0.0290  -0.0726   5.9052  0.8796          |                  |
12       0.0165  -0.0641   5.9255  0.9198          |                  |
13       0.0875   0.2640   6.5105  0.9256          |                  |--
14      -0.1303   0.1258   7.8382  0.8976         -|                  |-
15       0.1856   0.7610   10.598  0.7805          |-                 |------
16       0.0175   0.6145   10.623  0.8321          |                  |----
17      -0.0851  -0.5337   11.232  0.8442          |              ----|
18      -0.0056  -0.1161   11.235  0.8841          |                  |
19      -0.0097   0.6684   11.243  0.9154          |                  |-----
20      -0.0858  -0.5326   11.912  0.9191          |              ----|
21       0.0380  -0.3838   12.047  0.9383          |               ---|
22      -0.0298   0.6320   12.132  0.9546          |                  |-----
23      -0.0740  -0.8372   12.673  0.9587          |            ------|
```

```
24       0.0864   1.0863   13.434  0.9584          |                  |--------
25      -0.0697   0.7779   13.945  0.9627          |                  |------
26       0.1366   2.6452   15.968  0.9370          |-                 |--------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.953               1                   0.3289
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.159               1                   0.6900
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of crrl_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      2.16
                  Prob > F =      0.1041

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  154.6 Chi(2)  2.7e-34
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          29.03       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.83997      8.349      4.561  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
```

```
 Portmanteau (Q) statistic =    15.9683
 Prob > chi2(26)           =     0.9370

.
. drop residuo

.
pr(.15): regress    flco_d0 flco_d1 flco_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9790 >= 0.1500  removing arpu_d1
p = 0.9137 >= 0.1500  removing arpu_d0
p = 0.9185 >= 0.1500  removing lineastotales_d1
p = 0.9060 >= 0.1500  removing internet_d2
p = 0.7110 >= 0.1500  removing arpu_d2
p = 0.6205 >= 0.1500  removing flco_d2
p = 0.4627 >= 0.1500  removing flco_d1
p = 0.5332 >= 0.1500  removing lineastotales_d2
p = 0.3925 >= 0.1500  removing lineastotales_d0
p = 0.3662 >= 0.1500  removing internet_d0
p = 0.2848 >= 0.1500  removing internet_d1
p = 0.2228 >= 0.1500  removing imacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    2.25
       Model |  .153681956     2  .076840978           Prob > F      =  0.1155
    Residual |  1.84631804    54  .034191075           R-squared     =  0.0768
-------------+------------------------------           Adj R-squared =  0.0426
       Total |           2    56  .035714286           Root MSE      =  .18491

------------------------------------------------------------------------------
     flco_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d2 |  -.0057649   .0036348    -1.59   0.119    -.0130524    .0015225
   imacec_d0 |  -.0060859   .0038302    -1.59   0.118    -.0137649    .0015932
       _cons |   .0043581   .0245814     0.18   0.860    -.0449246    .0536408
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0438   0.0439   .11533  0.7342          |                  |
2       -0.0615  -0.0639   .34685  0.8408          |                  |
3        0.0129   0.0192   .35715  0.9489          |                  |
4        0.0291   0.0236   .41104  0.9816          |                  |
5       -0.0321  -0.0330    .4776  0.9929          |                  |
6       -0.4438  -0.4431   13.466  0.0362       ---|               ---|
7       -0.0471  -0.0163   13.615  0.0585          |                  |
8        0.0649   0.0204   13.904  0.0843          |                  |
9       -0.0299  -0.0234   13.967  0.1235          |                  |
10      -0.0045   0.0191   13.968  0.1745          |                  |
11       0.0306   0.0098   14.036  0.2310          |                  |
12      -0.0621  -0.3308   14.325  0.2804          |                --|
13       0.0204  -0.0615   14.357  0.3492          |                  |
14      -0.0644  -0.2743   14.681  0.4003          |                --|
```

```
15       0.0363   0.1110   14.787  0.4669          |                  |
16       0.0054  -0.0671   14.789  0.5401          |                  |
17      -0.0216   0.0856   14.828  0.6079          |                  |
18       0.0789  -0.6669   15.365  0.6367          |             -----|
19      -0.0451  -0.8482   15.546  0.6873          |            ------|
20       0.0255   0.0721   15.605  0.7408          |                  |
21      -0.0475  -1.5037   15.816  0.7799          |          --------|
22       0.0028  -1.9571   15.817  0.8249          |          --------|
23      -0.0134  -4.5533   15.834  0.8623          |          --------|
24      -0.0106  -0.8757   15.846  0.8936          |           -------|
25       0.0288   1.6898   15.933  0.9168          |                  |--------
26      -0.0225  -0.6208   15.988  0.9365          |              ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.112               1                   0.7379
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.061               1                   0.8042
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of flco_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      2.70
                  Prob > F =      0.0554

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1078 Chi(2)  7.e-235
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-----------------------------------------------------
     residuo |      0.855         0.000          24.29       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V           z     Prob>z
```

```
-------------+---------------------------------------------------
     residuo |     57    0.48108     27.075      7.089  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.9878
 Prob > chi2(26)           =     0.9365

.
. drop residuo

.
pr(.15): regress    ftrn_d0 ftrn_d1 ftrn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8966 >= 0.1500  removing ftrn_d1
p = 0.8861 >= 0.1500  removing imacec_d2
p = 0.5722 >= 0.1500  removing internet_d0
p = 0.5182 >= 0.1500  removing lineastotales_d1
p = 0.4344 >= 0.1500  removing imacec_d0
p = 0.3991 >= 0.1500  removing internet_d1
p = 0.3391 >= 0.1500  removing internet_d2
p = 0.2432 >= 0.1500  removing arpu_d1
p = 0.4045 >= 0.1500  removing arpu_d2
p = 0.1775 >= 0.1500  removing lineastotales_d0
p = 0.3646 >= 0.1500  removing lineastotales_d2
p = 0.2643 >= 0.1500  removing ftrn_d2
p = 0.1799 >= 0.1500  removing imacec_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  1,    55) =   95.97
       Model |  1651.02419     1  1651.02419           Prob > F      =  0.0000
    Residual |  946.238971    55  17.2043449           R-squared     =  0.6357
-------------+------------------------------           Adj R-squared =  0.6291
       Total |  2597.26316    56  46.3796992           Root MSE      =  4.1478

------------------------------------------------------------------------------
     ftrn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     arpu_d0 |  -.2257538    .023045    -9.80   0.000    -.2719371   -.1795706
       _cons |   3.674514   .5539387     6.63   0.000     2.564396    4.784632
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0465   0.0471   .13397  0.7144          |                  |
2        0.1528   0.1535   1.6073  0.4477          |-                 |-
3        0.3679   0.3796   10.304  0.0161          |--                |---
4       -0.0240  -0.0635   10.342  0.0350          |                  |
5        0.1762   0.1025    12.41  0.0296          |-                 |
```

```
6        0.2593   0.3024   16.975  0.0094          |--                |--
7       -0.0321  -0.0230   17.047  0.0171          |                  |
8        0.2050   0.2100   20.012  0.0103          |-                 |-
9        0.0125  -0.1098   20.024  0.0178          |                  |
10      -0.0653  -0.1273   20.337  0.0262          |                 -|
11      -0.0245  -0.2617   20.382  0.0404          |                --|
12      -0.1427  -0.3948   21.941  0.0382         -|               ---|
13      -0.1426  -0.5232   23.532  0.0357         -|              ----|
14      -0.0779  -0.3347   24.017  0.0456          |                --|
15      -0.0922  -0.3681   24.713  0.0539          |                --|
16      -0.0885  -0.2734   25.368  0.0636          |                --|
17      -0.0116   0.2398    25.38  0.0865          |                  |-
18      -0.1881  -0.1911   28.485  0.0551         -|                 -|
19      -0.0978   0.0446   29.345  0.0608          |                  |
20      -0.1116  -0.0593   30.494  0.0622          |                  |
21      -0.1318  -0.4828   32.139  0.0567         -|               ---|
22      -0.0137  -0.1017   32.158  0.0747          |                  |
23      -0.0904  -0.6011   32.974  0.0815          |              ----|
24       0.0398   0.0563   33.137  0.1012          |                  |
25      -0.0313  -0.3131   33.241  0.1252          |                --|
26      -0.1112  -0.7777    34.59  0.1208          |            ------|
27       0.0781   0.6782   35.275  0.1320          |                  |-----

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.137               1                   0.7117
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.748               1                   0.3871
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of ftrn_d0
       Ho:  model has no omitted variables
                  F(3, 52) =      1.69
                  Prob > F =      0.1816


.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  27.84 Chi(2)  9.0e-07
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
```

```
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.007          15.13       0.0005

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.88799      6.007      3.861  0.00006

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    35.2755
 Prob > chi2(27)           =     0.1320

.
. drop residuo

.
pr(.15): regress    lanc_d0 lanc_d1 lanc_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9608 >= 0.1500  removing imacec_d1
p = 0.9603 >= 0.1500  removing lineastotales_d0
p = 0.7038 >= 0.1500  removing lineastotales_d1
p = 0.6098 >= 0.1500  removing arpu_d2
p = 0.5460 >= 0.1500  removing internet_d2
p = 0.6095 >= 0.1500  removing lanc_d1
p = 0.4802 >= 0.1500  removing imacec_d2
p = 0.3829 >= 0.1500  removing internet_d0
p = 0.1801 >= 0.1500  removing arpu_d1
p = 0.1684 >= 0.1500  removing lanc_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =    8.26
       Model |  294.623162     4  73.6557904           Prob > F      =  0.0000
    Residual |  463.938242    52  8.92188927           R-squared     =  0.3884
-------------+------------------------------           Adj R-squared =  0.3414
       Total |  758.561404    56  13.5457393           Root MSE      =   2.987

------------------------------------------------------------------------------
     lanc_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d1 |   .0000238   .0000143     1.67   0.102    -4.86e-06    .0000525
lineastota~2 |   .0000671   .0000295     2.27   0.027     7.84e-06    .0001263
     arpu_d0 |  -.0852542   .0168423    -5.06   0.000    -.1190507   -.0514577
   imacec_d0 |  -.1214304   .0626778    -1.94   0.058    -.2472026    .0043417
       _cons |   3.418957    .461277     7.41   0.000     2.493337    4.344577
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1223   0.1263   .89807  0.3433          |                  |-
2        0.0650   0.0563   1.1568  0.5608          |                  |
3        0.2900   0.2970   6.3946  0.0939          |--                |--
4        0.0499   0.0162   6.5528  0.1615          |                  |
5        0.0192   0.0121   6.5765  0.2541          |                  |
6        0.0812  -0.0052    7.011  0.3198          |                  |
7       -0.1360  -0.2128   8.2556  0.3106         -|                 -|
8        0.1213   0.1419   9.2661  0.3204          |                  |-
9       -0.0756  -0.2107   9.6665  0.3782          |                 -|
10      -0.1000   0.0976   10.382  0.4077          |                  |
11       0.0166  -0.1479   10.402  0.4947          |                 -|
12      -0.0089   0.1070   10.407  0.5803          |                  |
13      -0.2084  -0.3814   13.726  0.3934         -|               ---|
14      -0.1085  -0.1604   14.647  0.4027          |                 -|
15      -0.0106   0.1255   14.656  0.4765          |                  |-
16      -0.1344  -0.2438   16.137  0.4434         -|                 -|
17      -0.2170  -0.3487   20.095  0.2694         -|                --|
18      -0.0937   0.0258   20.851  0.2870          |                  |
19       0.0268   0.5968   20.915  0.3415          |                  |----
20      -0.1070  -0.6507   21.956  0.3429          |             -----|
21      -0.0810  -0.2022   22.568  0.3674          |                 -|
22      -0.0936  -0.3359    23.41  0.3789          |                --|
23      -0.0810  -0.0034   24.059  0.4005          |                  |
24      -0.0010   0.8017   24.059  0.4582          |                  |------
25      -0.1289  -0.7006   25.805  0.4181         -|             -----|
26      -0.0925  -0.6733   26.733  0.4234          |             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.920               1                   0.3374
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.640               1                   0.1042
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of lanc_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      0.47
                  Prob > F =      0.7068

.
. ***test jarque bera
. jb6 residuo
```

```
Jarque-Bera normality test:  .0781 Chi(2)  .9617
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.952         0.945            0.01       0.9958

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.98842      0.604     -1.083  0.86056

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    26.7330
 Prob > chi2(26)           =     0.4234

.
. drop residuo

.
pr(.15): regress    llfn_d0 llfn_d1 llfn_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9904 >= 0.1500  removing lineastotales_d1
p = 0.9571 >= 0.1500  removing arpu_d2
p = 0.9369 >= 0.1500  removing arpu_d1
p = 0.9243 >= 0.1500  removing imacec_d2
p = 0.7938 >= 0.1500  removing internet_d0
p = 0.8258 >= 0.1500  removing lineastotales_d0
p = 0.7938 >= 0.1500  removing lineastotales_d2
p = 0.7591 >= 0.1500  removing internet_d2
p = 0.6313 >= 0.1500  removing arpu_d0
p = 0.3124 >= 0.1500  removing llfn_d2
p = 0.2866 >= 0.1500  removing imacec_d0
p = 0.2339 >= 0.1500  removing internet_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    3.95
       Model |  .729182211     2  .364591105           Prob > F      =  0.0252
    Residual |  4.99011604    54  .092409556           R-squared     =  0.1275
-------------+------------------------------           Adj R-squared =  0.0952
       Total |  5.71929825    56  .102130326           Root MSE      =  .30399

------------------------------------------------------------------------------
     llfn_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
    llfn_d1 |   .1933513   .1296856     1.49   0.142    -.0666526    .4533552
  imacec_d1 |   .0159297   .0060591     2.63   0.011     .0037818    .0280775
      _cons |   .0490163   .0415066     1.18   0.243    -.0341994     .132232
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0286   0.0286   .04995  0.8231          |                  |
2       -0.1255  -0.1270   1.0285  0.5979         -|                 -|
3       -0.1001  -0.0943   1.6627  0.6453          |                  |
4       -0.0142  -0.0262   1.6757  0.7951          |                  |
5       -0.0022  -0.0273    1.676  0.8919          |                  |
6        0.0166   0.0012   1.6945  0.9455          |                  |
7       -0.0229  -0.0334   1.7302  0.9733          |                  |
8       -0.0901  -0.0949   2.2947  0.9706          |                  |
9        0.2346   0.2410   6.2041  0.7193          |-                 |-
10       0.2659   0.2517   11.329  0.3325          |--                |--
11      -0.0364   0.0003   11.427  0.4082          |                  |
12      -0.2053  -0.1286   14.615  0.2632         -|                 -|
13       0.0373   0.1080   14.722  0.3250          |                  |
14      -0.0604  -0.0833    15.01  0.3775          |                  |
15      -0.0989  -0.1590   15.801  0.3954          |                 -|
16      -0.0133  -0.0552   15.816  0.4659          |                  |
17      -0.0288  -0.0322   15.887  0.5319          |                  |
18       0.0010  -0.0571   15.887  0.6004          |                  |
19      -0.0201  -0.2370   15.923  0.6624          |                 -|
20      -0.0319  -0.2021   16.016  0.7156          |                 -|
21      -0.1150  -0.1056    17.26  0.6952          |                  |
22      -0.0579  -0.1832   17.584  0.7304          |                 -|
23       0.0641  -0.1397   17.992  0.7579          |                 -|
24      -0.1705  -0.6024   20.969  0.6406         -|              ----|
25      -0.0319  -0.3792   21.076  0.6884          |               ---|
26      -0.0107  -0.2724   21.088  0.7374          |                --|
27      -0.0001  -0.3969   21.088  0.7821          |               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.421               1                   0.5166
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.162               1                   0.6876
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
```

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of llfn_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      0.29
                  Prob > F =      0.8312


.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  813.2 Chi(2)  3.e-177
Jarque-Bera test for Ho: normality: (residuo)


.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           52.56       0.0000


.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.55484     23.551      6.796  0.00000


.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    21.0884
 Prob > chi2(27)           =     0.7821


.
. drop residuo


.
pr(.15): regress    llgs_d0 llgs_d1 llgs_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9867 >= 0.1500  removing imacec_d0
p = 0.9733 >= 0.1500  removing internet_d2
p = 0.9322 >= 0.1500  removing lineastotales_d2
p = 0.7358 >= 0.1500  removing lineastotales_d1
p = 0.6386 >= 0.1500  removing internet_d0
p = 0.6412 >= 0.1500  removing imacec_d1
p = 0.4688 >= 0.1500  removing arpu_d2
p = 0.5088 >= 0.1500  removing llgs_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =   17.71
       Model |  1903.95444     6   317.32574           Prob > F      =  0.0000
```

```
    Residual |  896.080649    50   17.921613           R-squared     =  0.6800
-------------+------------------------------           Adj R-squared =  0.6416
       Total |  2800.03509    56  50.0006266           Root MSE      =  4.2334

------------------------------------------------------------------------------
     llgs_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     llgs_d1 |   .5115025   .1145011     4.47   0.000     .2815203    .7414846
   imacec_d2 |  -.1716879   .0915638    -1.88   0.067    -.3555992    .0122234
     arpu_d0 |  -.2137769   .0248364    -8.61   0.000    -.2636623   -.1638915
     arpu_d1 |   .0657052   .0325424     2.02   0.049      .000342    .1310685
lineastota~0 |   .0001033   .0000431     2.40   0.020     .0000167    .0001899
 internet_d1 |   .0000412    .000022     1.88   0.067    -2.92e-06    .0000854
       _cons |   1.374435   .8662118     1.59   0.119    -.3654029    3.114272
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1166  -0.1191   .81631  0.3663          |                  |
2        0.1177   0.1094   1.6628  0.4354          |                  |
3        0.0036   0.0281   1.6637  0.6450          |                  |
4        0.2219   0.2201    4.788  0.3097          |-                 |-
5        0.0807   0.1395   5.2093  0.3909          |                  |-
6        0.1504   0.1952   6.7001  0.3495          |-                 |-
7       -0.1608  -0.2723   8.4386  0.2955         -|                --|
8        0.0243  -0.1951   8.4792  0.3881          |                 -|
9        0.1371   0.2114    9.796  0.3673          |-                 |-
10       0.0139   0.0207   9.8097  0.4573          |                  |
11      -0.0552  -0.3174   10.032  0.5275          |                --|
12      -0.0476   0.0177   10.202  0.5983          |                  |
13      -0.0855  -0.2751    10.76  0.6309          |                --|
14       0.0919   0.1914    11.42  0.6528          |                  |-
15       0.0508   0.1539   11.626  0.7071          |                  |-
16       0.0109   0.2975   11.636  0.7686          |                  |--
17      -0.0568  -0.0240   11.907  0.8057          |                  |
18       0.0940   0.2930   12.669  0.8108          |                  |--
19      -0.0463  -0.1726   12.859  0.8457          |                 -|
20      -0.1099  -0.6658   13.956  0.8327          |             -----|
21       0.0159   0.0721    13.98  0.8705          |                  |
22      -0.0351   0.1393   14.098  0.8980          |                  |-
23      -0.0061  -0.1622   14.102  0.9239          |                 -|
24      -0.0182   0.0874   14.136  0.9435          |                  |
25      -0.1945  -1.2885   18.113  0.8376         -|          --------|
26       0.1355  -0.7254   20.104  0.7866          |-            -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.883               1                   0.1700
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
```

```
----------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+--------------------------------------------------------------
       1     |          0.150               1                   0.6983
----------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of llgs_d0
       Ho:  model has no omitted variables
                  F(3, 47) =      1.75
                  Prob > F =      0.1697

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  15.89 Chi(2)  3.5e-04
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.004         0.022           11.13       0.0038

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.94591      2.822      2.230  0.01289

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.1042
 Prob > chi2(26)           =     0.7866

.
. drop residuo

.
pr(.15): regress    mafi_d0 mafi_d1 mafi_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0       internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2    imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9622 >= 0.1500  removing lineastotales_d2
p = 0.8055 >= 0.1500  removing arpu_d2
p = 0.5449 >= 0.1500  removing mafi_d2
```

```
p = 0.4886 >= 0.1500  removing arpu_d1
p = 0.5086 >= 0.1500  removing arpu_d0
p = 0.3504 >= 0.1500  removing lineastotales_d0
p = 0.3933 >= 0.1500  removing imacec_d1
p = 0.5041 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =    5.31
       Model |  122.251743     6  20.3752905           Prob > F      =  0.0003
    Residual |  191.958784    50  3.83917567           R-squared     =  0.3891
-------------+------------------------------           Adj R-squared =  0.3158
       Total |  314.210526    56  5.61090226           Root MSE      =  1.9594

------------------------------------------------------------------------------
     mafi_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mafi_d1 |   .5967228   .1242594     4.80   0.000     .3471405     .846305
 internet_d2 |  -.0000183   9.42e-06    -1.94   0.057    -.0000372    5.99e-07
 internet_d1 |   .0000275   .0000103     2.66   0.011     6.70e-06    .0000482
lineastota~1 |   .0000381   .0000196     1.94   0.058    -1.40e-06    .0000775
   imacec_d2 |   -.104791   .0434995    -2.41   0.020    -.1921622   -.0174197
 internet_d0 |  -.0000218   9.59e-06    -2.27   0.027     -.000041   -2.52e-06
       _cons |   .5775737   .3903971     1.48   0.145     -.206562    1.361709
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0583  -0.0659   .20433  0.6512          |                  |
2       -0.0020  -0.0108   .20458  0.9028          |                  |
3       -0.0902  -0.1115   .71097  0.8706          |                  |
4        0.1869   0.2039   2.9268  0.5701          |-                 |-
5        0.0356   0.0861   3.0087  0.6986          |                  |
6       -0.0858  -0.1019   3.4942  0.7447          |                  |
7       -0.0596  -0.0669   3.7329  0.8100          |                  |
8       -0.0197  -0.1081   3.7594  0.8782          |                  |
9       -0.0847  -0.1483   4.2623  0.8933          |                 -|
10       0.0179   0.0714   4.2853  0.9336          |                  |
11       0.0990   0.2189   5.0024  0.9310          |                  |-
12       0.0666   0.1324   5.3337  0.9459          |                  |-
13       0.0287   0.0705   5.3966  0.9654          |                  |
14       0.0252   0.0346   5.4463  0.9786          |                  |
15      -0.0316  -0.2086   5.5262  0.9867          |                 -|
16       0.0215  -0.0995   5.5642  0.9922          |                  |
17       0.0766   0.1571   6.0569  0.9928          |                  |-
18      -0.1229  -0.1638   7.3595  0.9867          |                 -|
19      -0.1887  -0.3302   10.512  0.9392         -|                --|
20      -0.0171   0.1163   10.538  0.9573          |                  |
21      -0.0624  -0.3348   10.902  0.9647          |                --|
22       0.1005   0.1826   11.872  0.9600          |                  |-
23      -0.1085   0.1607   13.036  0.9512          |                  |-
24       0.0597   0.0027   13.399  0.9591          |                  |
25       0.0009  -0.0045   13.399  0.9712          |                  |
26       0.0007   0.1855   13.399  0.9801          |                  |-

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
```

```
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.535               1                   0.4647
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.016               1                   0.8993
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of mafi_d0
       Ho:  model has no omitted variables
                  F(3, 47) =      0.88
                  Prob > F =      0.4591

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .6038 Chi(2)  .7394
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.400         0.611           1.00       0.6062

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.98646      0.706     -0.747  0.77259

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.3994
 Prob > chi2(26)           =     0.9801

.
. drop residuo

.
```

```
pr(.15): regress    mhin_d0 mhin_d1 mhin_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9830 >= 0.1500  removing imacec_d1
p = 0.8537 >= 0.1500  removing mhin_d1
p = 0.7288 >= 0.1500  removing arpu_d1
p = 0.7284 >= 0.1500  removing internet_d1
p = 0.6065 >= 0.1500  removing imacec_d0
p = 0.6421 >= 0.1500  removing lineastotales_d1
p = 0.6582 >= 0.1500  removing lineastotales_d0
p = 0.3405 >= 0.1500  removing imacec_d2
p = 0.2540 >= 0.1500  removing internet_d2
p = 0.2585 >= 0.1500  removing arpu_d2
p = 0.1680 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    4.43
       Model |  2.17883732     3  .726279107           Prob > F      =  0.0075
    Residual |  8.69835566    53  .164119918           R-squared     =  0.2003
-------------+------------------------------           Adj R-squared =  0.1550
       Total |   10.877193    56  .194235589           Root MSE      =  .40512

------------------------------------------------------------------------------
     mhin_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 internet_d0 |   3.70e-06   1.92e-06     1.93   0.059    -1.41e-07    7.54e-06
     mhin_d2 |   .2739204   .1228856     2.23   0.030     .0274431    .5203977
     arpu_d0 |  -.0052781   .0022567    -2.34   0.023    -.0098044   -.0007517
       _cons |   .0381873    .062173     0.61   0.542    -.0865161    .1628906
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0233  -0.0233    .0326  0.8567          |                  |
2        0.0850   0.0847   .47479  0.7887          |                  |
3        0.2645   0.2727   4.8309  0.1846          |--                |--
4       -0.0483  -0.0401   4.9792  0.2894          |                  |
5       -0.0693  -0.1304   5.2902  0.3815          |                 -|
6        0.1843   0.1275   7.5293  0.2747          |-                 |-
7       -0.0729  -0.0208   7.8864  0.3427          |                  |
8        0.0694   0.0892   8.2166  0.4126          |                  |
9        0.0151  -0.0647   8.2327  0.5109          |                  |
10      -0.0674  -0.0643   8.5573  0.5746          |                  |
11       0.0047  -0.0064   8.5589  0.6625          |                  |
12       0.2205   0.2515   12.194  0.4302          |-                 |--
13      -0.1079  -0.0722   13.083  0.4414          |                  |
14      -0.2230  -0.4282   16.971  0.2577         -|               ---|
15       0.0264  -0.0994   17.027  0.3173          |                  |
16      -0.2503  -0.1344   22.164  0.1380        --|                 -|
17      -0.1181   0.1812   23.337  0.1386          |                  |-
18      -0.0219  -0.0009   23.379  0.1765          |                  |
19      -0.0286   0.0103   23.451  0.2181          |                  |
20      -0.0454  -0.0093   23.638  0.2585          |                  |
21      -0.1248  -0.3748   25.093  0.2431          |                --|
```

```
22      -0.0449   0.0903   25.287  0.2836          |                  |
23      -0.0011   0.0720   25.287  0.3357          |                  |
24      -0.0214   0.0148   25.334  0.3878          |                  |
25       0.0061   0.1340   25.337  0.4436          |                  |-
26      -0.0507   0.1195   25.616  0.4843          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.033               1                   0.8554
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.005               1                   0.9448
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of mhin_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      5.68
                  Prob > F =      0.0020

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  73.28 Chi(2)  1.2e-16
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           22.59       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.75521     12.772      5.474  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo
```

```
Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    25.6163
 Prob > chi2(26)           =     0.4843

.
. drop residuo

.
pr(.15): regress    mlns_d0 mlns_d1 mlns_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9312 >= 0.1500  removing arpu_d0
p = 0.8801 >= 0.1500  removing lineastotales_d2
p = 0.7919 >= 0.1500  removing arpu_d1
p = 0.6736 >= 0.1500  removing internet_d0
p = 0.7196 >= 0.1500  removing arpu_d2
p = 0.7067 >= 0.1500  removing lineastotales_d0
p = 0.4885 >= 0.1500  removing mlns_d1
p = 0.4858 >= 0.1500  removing imacec_d1
p = 0.2707 >= 0.1500  removing lineastotales_d1
p = 0.1879 >= 0.1500  removing imacec_d2
p = 0.3577 >= 0.1500  removing internet_d1
p = 0.1804 >= 0.1500  removing internet_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =    2.66
       Model |  .691215578     2  .345607789           Prob > F      =  0.0794
    Residual |  7.02808267    54  .130149679           R-squared     =  0.0895
-------------+------------------------------           Adj R-squared =  0.0558
       Total |  7.71929825    56  .137844612           Root MSE      =  .36076

------------------------------------------------------------------------------
     mlns_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d0 |   .0123424   .0074179     1.66   0.102    -.0025297    .0272144
     mlns_d2 |   -.287566   .1819915    -1.58   0.120     -.652437     .077305
       _cons |   .0768538   .0482549     1.59   0.117    -.0198914    .1735991
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0603  -0.1194   .21807  0.6405          |                  |
2        0.0109   0.0081   .22533  0.8934          |                  |
3       -0.0279  -0.0454   .27365  0.9649          |                  |
4       -0.0080  -0.0234   .27774  0.9912          |                  |
5       -0.0202  -0.0408   .30414  0.9976          |                  |
6        0.1076   0.2161   1.0669  0.9829          |                  |-
7       -0.0285  -0.0024   1.1214  0.9926          |                  |
8        0.0187   0.0160   1.1453  0.9972          |                  |
9       -0.1398  -0.2647   2.5149  0.9805         -|                --|
10       0.0331   0.0419   2.5931  0.9894          |                  |
11      -0.1705  -0.3312   4.7195  0.9440         -|                --|
12      -0.0182  -0.1797   4.7442  0.9660          |                 -|
```

```
13       0.0546   0.1230   4.9724  0.9758          |                  |
14       0.2598   0.7918    10.25  0.7437          |--                |------
15      -0.0167   0.2314   10.273  0.8023          |                  |-
16      -0.0112  -0.1355   10.283  0.8515          |                 -|
17      -0.1188  -0.1422    11.47  0.8311          |                 -|
18       0.0626   0.2885   11.807  0.8570          |                  |--
19       0.0762   0.2097   12.321  0.8714          |                  |-
20       0.2684   0.8044   18.869  0.5303          |--                |------
21      -0.0516   0.0275   19.118  0.5776          |                  |
22       0.0334   0.6427   19.226  0.6314          |                  |-----
23       0.0015   0.2447   19.226  0.6880          |                  |-
24      -0.0402   0.3232   19.391  0.7309          |                  |--
25      -0.0606   0.2575   19.777  0.7584          |                  |--
26      -0.0269   0.4631   19.856  0.7983          |                  |---

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.413               1                   0.5203
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.227               1                   0.6339
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of mlns_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      1.02
                  Prob > F =      0.3920

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  492.8 Chi(2)  1.e-107
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          44.44       0.0000

.
. ***test Shapiro Wilk
. swilk residuo
```

```
                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.59048     21.367     6.580  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    19.8557
 Prob > chi2(26)           =     0.7983

.
. drop residuo

.
pr(.15): regress    mlue_d0 mlue_d1 mlue_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8414 >= 0.1500  removing imacec_d0
p = 0.8108 >= 0.1500  removing arpu_d1
p = 0.7852 >= 0.1500  removing imacec_d2
p = 0.7978 >= 0.1500  removing lineastotales_d1
p = 0.4383 >= 0.1500  removing lineastotales_d0
p = 0.5040 >= 0.1500  removing imacec_d1
p = 0.4954 >= 0.1500  removing internet_d0
p = 0.2876 >= 0.1500  removing mlue_d1
p = 0.3699 >= 0.1500  removing internet_d1
p = 0.4304 >= 0.1500  removing arpu_d2
p = 0.3553 >= 0.1500  removing internet_d2
p = 0.3688 >= 0.1500  removing mlue_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  2,    54) =  147.06
       Model |  114.489285     2  57.2446423           Prob > F      =  0.0000
    Residual |  21.0194872    54  .389249764           R-squared     =  0.8449
-------------+------------------------------           Adj R-squared =  0.8391
       Total |  135.508772    56   2.4197995           Root MSE      =   .6239

------------------------------------------------------------------------------
     mlue_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~2 |   9.93e-06   6.05e-06     1.64   0.107    -2.20e-06    .0000221
     arpu_d0 |  -.0594171   .0034695   -17.13   0.000     -.066373   -.0524613
       _cons |   .0536857   .0877407     0.61   0.543    -.1222238    .2295952
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1474   0.1475   1.3044  0.2534          |-                 |-
2        0.0937   0.0765   1.8417  0.3982          |                  |
3        0.2241   0.2130   4.9691  0.1741          |-                 |-
```

```
4        0.0248  -0.0542   5.0081  0.2865          |                  |
5        0.0435   0.0170   5.1303  0.4002          |                  |
6        0.1589   0.1131   6.7942  0.3403          |-                 |
7        0.0234   0.0095   6.8309  0.4467          |                  |
8       -0.0072  -0.0413   6.8345  0.5546          |                  |
9        0.1435   0.1043   8.2773  0.5065          |-                 |
10      -0.0230  -0.0656   8.3153  0.5981          |                  |
11      -0.1378  -0.1714   9.7026  0.5573         -|                 -|
12       0.1320   0.1177   11.004  0.5286          |-                 |
13       0.0463   0.0820   11.168  0.5967          |                  |
14       0.0419   0.1336   11.305  0.6619          |                  |-
15       0.1404   0.1013   12.883  0.6113          |-                 |
16       0.0385   0.0196   13.005  0.6724          |                  |
17       0.1241   0.2733   14.299  0.6458          |                  |--
18      -0.0097  -0.1684   14.308  0.7088          |                 -|
19      -0.0498  -0.0505   14.527  0.7521          |                  |
20      -0.1068  -0.0322   15.564  0.7433          |                  |
21      -0.0847  -0.0521   16.234  0.7563          |                  |
22      -0.0540   0.0863   16.515  0.7895          |                  |
23      -0.0566  -0.0118   16.832  0.8174          |                  |
24       0.0036   0.2144   16.833  0.8557          |                  |-
25      -0.0465  -0.0454   17.061  0.8796          |                  |
26      -0.1030   0.0950   18.212  0.8679          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.354               1                   0.2446
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.009               1                   0.9231
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of mlue_d0
       Ho:  model has no omitted variables
                  F(3, 51) =      3.32
                  Prob > F =      0.0271

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  9.003 Chi(2)  .0111
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
```

```
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.083         0.027           7.11       0.0285

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.90224      5.100      3.502  0.00023

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    18.2116
 Prob > chi2(26)           =     0.8679

.
. drop residuo

.
pr(.15): regress    nbla_d0 nbla_d1         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9444 >= 0.1500  removing imacec_d1
p = 0.9095 >= 0.1500  removing lineastotales_d1
p = 0.9295 >= 0.1500  removing arpu_d0
p = 0.9232 >= 0.1500  removing internet_d1
p = 0.9152 >= 0.1500  removing lineastotales_d0
p = 0.8960 >= 0.1500  removing arpu_d1
p = 0.8684 >= 0.1500  removing arpu_d2
p = 0.7872 >= 0.1500  removing internet_d0
p = 0.5880 >= 0.1500  removing lineastotales_d2
p = 0.4778 >= 0.1500  removing imacec_d2
p = 0.3785 >= 0.1500  removing imacec_d0
p = 0.2849 >= 0.1500  removing nbla_d1
p = 0.2210 >= 0.1500  removing internet_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  0,    56) =    0.00
       Model |           0     0           .           Prob > F      =       .
    Residual |  5805.92982    56  103.677318           R-squared     =  0.0000
-------------+------------------------------           Adj R-squared =  0.0000
       Total |  5805.92982    56  103.677318           Root MSE      =  10.182

------------------------------------------------------------------------------
     nbla_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _cons |   1.964912   1.348666     1.46   0.151    -.7367906    4.666615
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0167  -1.2465   .01729  0.8954          |          --------|
2       -0.0231  -1.4987   .05111  0.9748          |          --------|
3       -0.0079  -0.0755   .05515  0.9966          |                  |
4       -0.0060  -0.4466   .05747  0.9996          |               ---|
5       -0.0217  -1.3687   .08891  0.9999          |          --------|
6       -0.0110   0.4794   .09707  1.0000          |                  |---
7       -0.0106  -0.8135   .10478  1.0000          |            ------|
8       -0.0384  -3.4037   .20859  1.0000          |          --------|
9       -0.0161   0.4956    .2272  1.0000          |                  |---
10      -0.0014  -0.3570   .22734  1.0000          |                --|
11       0.0269   4.4193   .28149  1.0000          |                  |--------
12       0.0130   2.9959   .29434  1.0000          |                  |--------
13      -0.0020   3.2935   .29465  1.0000          |                  |--------
14      -0.0033   0.9158   .29552  1.0000          |                  |-------
15      -0.0157  -3.5778   .31556  1.0000          |          --------|
16       0.0118   2.3892   .32715  1.0000          |                  |--------
17       0.0376   5.6309    .4483  1.0000          |                  |--------
18      -0.0168  -0.8804   .47295  1.0000          |           -------|
19      -0.0189   1.1619   .50524  1.0000          |                  |--------
20       0.0081   3.4446   .51131  1.0000          |                  |--------
21      -0.0032  -5.6827    .5123  1.0000          |          --------|
22      -0.0173  -6.3718    .5414  1.0000          |          --------|
23      -0.0052   0.4821    .5441  1.0000          |                  |---
24       0.0067  -2.7551   .54874  1.0000          |          --------|
25      -0.0060  -4.6565   .55253  1.0000          |          --------|
26      -0.0192  -2.9731    .5927  1.0000          |          --------|
27       0.0211   1.1552   .64265  1.0000          |                  |--------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.267               1                   0.2602
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          4.632               1                   0.0314
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. *estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   7315 Chi(2)      0
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
```

```
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000               .       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     59    0.20930     42.406      8.069  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.6427
 Prob > chi2(27)           =     1.0000

.
. drop residuo

.
pr(.15): regress    pchy_d0 pchy_d1 pchy_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9353 >= 0.1500  removing internet_d0
p = 0.9036 >= 0.1500  removing arpu_d2
p = 0.8859 >= 0.1500  removing pchy_d2
p = 0.6782 >= 0.1500  removing arpu_d0
p = 0.5065 >= 0.1500  removing imacec_d0
p = 0.5183 >= 0.1500  removing imacec_d1
p = 0.4451 >= 0.1500  removing pchy_d1
p = 0.3809 >= 0.1500  removing arpu_d1
p = 0.3837 >= 0.1500  removing lineastotales_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =    2.78
       Model |  .796968539     5  .159393708           Prob > F      =  0.0269
    Residual |  2.92232971    51  .057300582           R-squared     =  0.2143
-------------+------------------------------           Adj R-squared =  0.1372
       Total |  3.71929825    56   .06641604           Root MSE      =  .23938

------------------------------------------------------------------------------
     pchy_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~0 |  -4.02e-06   2.65e-06    -1.52   0.135    -9.34e-06    1.29e-06
 internet_d2 |   2.03e-06   1.14e-06     1.78   0.080    -2.54e-07    4.31e-06
lineastota~2 |   5.47e-06   2.62e-06     2.09   0.042     2.12e-07    .0000107
 internet_d1 |   2.09e-06   1.23e-06     1.71   0.094    -3.70e-07    4.55e-06
   imacec_d2 |  -.0138375   .0051506    -2.69   0.010    -.0241779   -.0034972
       _cons |   .0183248   .0403271     0.45   0.651    -.0626353    .0992849
------------------------------------------------------------------------------
```

```
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0485   0.0486   .14132  0.7070          |                  |
2       -0.0061  -0.0085   .14359  0.9307          |                  |
3        0.2600   0.2642   4.3534  0.2257          |--                |--
4       -0.0173  -0.0458   4.3723  0.3580          |                  |
5       -0.1530  -0.1539   5.8866  0.3174         -|                 -|
6       -0.0963  -0.1725   6.4978  0.3698          |                 -|
7        0.1740   0.2310   8.5333  0.2879          |-                 |-
8       -0.0868  -0.0279   9.0507  0.3380          |                  |
9       -0.1116  -0.0631   9.9239  0.3567          |                  |
10       0.1239  -0.0214   11.023  0.3557          |                  |
11       0.0096   0.0340    11.03  0.4408          |                  |
12      -0.1785  -0.1278   13.412  0.3398         -|                 -|
13      -0.0554  -0.0848   13.646  0.3992          |                  |
14       0.0501  -0.0324   13.842  0.4616          |                  |
15      -0.1859  -0.1181   16.608  0.3428         -|                  |
16      -0.1011  -0.0171   17.446  0.3573          |                  |
17      -0.0744  -0.2543   17.912  0.3944          |                --|
18      -0.0329  -0.0535   18.006  0.4553          |                  |
19      -0.0242   0.0440   18.057  0.5186          |                  |
20      -0.0491   0.0396   18.276  0.5692          |                  |
21       0.1528  -0.0538   20.456  0.4926          |-                 |
22      -0.0241  -0.0372   20.512  0.5511          |                  |
23       0.0122   0.1641   20.526  0.6100          |                  |-
24       0.0797  -0.0459   21.174  0.6284          |                  |
25      -0.0537  -0.1654   21.477  0.6657          |                 -|
26      -0.1118  -0.5973   22.833  0.6424          |              ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.140               1                   0.7083
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.530               1                   0.4665
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pchy_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      5.99
                  Prob > F =      0.0015
```

```
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  110.2 Chi(2)  1.2e-24
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           29.76       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.72928     14.125      5.691  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.8330
 Prob > chi2(26)           =     0.6424

.
. drop residuo

.
pr(.15): regress    plch_d0 plch_d1 plch_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8604 >= 0.1500  removing arpu_d1
p = 0.8160 >= 0.1500  removing lineastotales_d2
p = 0.7317 >= 0.1500  removing plch_d2
p = 0.6777 >= 0.1500  removing internet_d2
p = 0.6163 >= 0.1500  removing internet_d1
p = 0.6052 >= 0.1500  removing imacec_d2
p = 0.5678 >= 0.1500  removing arpu_d2
p = 0.5687 >= 0.1500  removing arpu_d0
p = 0.4330 >= 0.1500  removing internet_d0
p = 0.1769 >= 0.1500  removing plch_d1
p = 0.1577 >= 0.1500  removing lineastotales_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =    4.37
       Model |  .960673873     3  .320224624           Prob > F      =  0.0080
    Residual |  3.88143139    53  .073234555           R-squared     =  0.1984
-------------+------------------------------           Adj R-squared =  0.1530
       Total |  4.84210526    56  .086466165           Root MSE      =  .27062
```

```
------------------------------------------------------------------------------
     plch_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~0 |   5.47e-06   2.71e-06     2.02   0.048     3.81e-08    .0000109
   imacec_d1 |  -.0165888   .0057542    -2.88   0.006    -.0281303   -.0050474
   imacec_d0 |  -.0156204   .0059636    -2.62   0.011    -.0275819   -.0036588
       _cons |   .0414932   .0376115     1.10   0.275     -.033946    .1169323
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1414   0.1415   1.2208  0.2692          |-                 |-
2        0.1217   0.1043   2.1418  0.3427          |                  |
3        0.1628   0.1366   3.8179  0.2818          |-                 |-
4        0.0195  -0.0310   3.8424  0.4278          |                  |
5        0.1541   0.1308   5.4024  0.3688          |-                 |-
6        0.1878   0.1466   7.7616  0.2561          |-                 |-
7       -0.0417  -0.1097   7.8805  0.3432          |                  |
8        0.0178  -0.0393   7.9025  0.4431          |                  |
9       -0.0970  -0.1625   8.5708  0.4778          |                 -|
10      -0.1491  -0.1693   10.182  0.4246         -|                 -|
11       0.1706   0.2276   12.337  0.3389          |-                 |-
12      -0.1676  -0.2768   14.462  0.2722         -|                --|
13      -0.1396  -0.1029    15.97  0.2508         -|                  |
14       0.0399   0.1125   16.096  0.3076          |                  |
15      -0.1807  -0.1284    18.74  0.2258         -|                 -|
16       0.1029   0.2135   19.617  0.2380          |                  |-
17       0.0017  -0.1782   19.617  0.2943          |                 -|
18      -0.1645  -0.1617   21.971  0.2333         -|                 -|
19      -0.0914  -0.1721   22.716  0.2501          |                 -|
20      -0.1067  -0.2739   23.759  0.2531          |                --|
21      -0.0524   0.2033   24.018  0.2922          |                  |-
22      -0.0368  -0.3622   24.149  0.3395          |                --|
23      -0.1342  -0.1746    25.94  0.3037         -|                 -|
24      -0.1548  -0.7529   28.395  0.2438         -|            ------|
25      -0.0944  -0.7986   29.335  0.2502          |            ------|
26      -0.2164   0.0650   34.425  0.1246         -|                  |
27       0.0034   0.8281   34.427  0.1540          |                  |------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.112               1                   0.2916
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.834               1                   0.3611
---------------------------------------------------------------------------
```

```
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of plch_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      1.49
                  Prob > F =      0.2286


.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  55.08 Chi(2)  1.1e-12
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.000           18.20       0.0001

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     58    0.80275     10.435      5.045  0.00000

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    34.4267
 Prob > chi2(27)           =     0.1540

.
. drop residuo

.
pr(.15): regress    pllc_d0 pllc_d1 pllc_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9184 >= 0.1500  removing internet_d1
p = 0.8730 >= 0.1500  removing internet_d2
p = 0.8542 >= 0.1500  removing arpu_d2
p = 0.7374 >= 0.1500  removing imacec_d0
p = 0.5811 >= 0.1500  removing internet_d0
p = 0.6356 >= 0.1500  removing lineastotales_d0
p = 0.5124 >= 0.1500  removing lineastotales_d2
p = 0.3683 >= 0.1500  removing imacec_d2
```

```
p = 0.4021 >= 0.1500  removing pllc_d1

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  5,    51) =   11.96
       Model |  1306.03727     5  261.207453           Prob > F      =  0.0000
    Residual |  1114.20835    51  21.8472225           R-squared     =  0.5396
-------------+------------------------------           Adj R-squared =  0.4945
       Total |  2420.24561    56  43.2186717           Root MSE      =  4.6741

------------------------------------------------------------------------------
     pllc_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_d1 |   .2040604   .0919649     2.22   0.031     .0194331    .3886877
     pllc_d2 |   .1805674   .0957276     1.89   0.065    -.0116138    .3727486
     arpu_d0 |  -.1329002   .0266983    -4.98   0.000    -.1864992   -.0793013
     arpu_d1 |  -.1045309   .0261257    -4.00   0.000    -.1569805   -.0520813
lineastota~1 |   .0001207    .000047     2.57   0.013     .0000264     .000215
       _cons |   3.731576    .867969     4.30   0.000     1.989056    5.474096
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1519   0.1519   1.3863  0.2390          |-                 |-
2       -0.0475  -0.0747   1.5243  0.4667          |                  |
3       -0.0987  -0.0852   2.1304  0.5458          |                  |
4       -0.0017   0.0286   2.1306  0.7117          |                  |
5        0.1905   0.1977   4.4773  0.4829          |-                 |-
6       -0.0667  -0.1550   4.7709  0.5735          |                 -|
7       -0.2111  -0.1912   7.7669  0.3536         -|                 -|
8       -0.0575   0.0351   7.9939  0.4341          |                  |
9        0.0304   0.0246   8.0587  0.5282          |                  |
10       0.1329   0.0556   9.3216  0.5019          |-                 |
11       0.0027  -0.0044   9.3221  0.5922          |                  |
12      -0.1625  -0.1319   11.295  0.5038         -|                 -|
13       0.1100   0.2596   12.219  0.5097          |                  |--
14      -0.0446  -0.3892   12.375  0.5762          |               ---|
15      -0.0055  -0.0701   12.377  0.6503          |                  |
16      -0.0943  -0.5080   13.106  0.6650          |              ----|
17      -0.1801  -0.4598   15.833  0.5357         -|               ---|
18       0.0085  -0.1381   15.839  0.6038          |                 -|
19      -0.0342  -0.8838   15.942  0.6611          |           -------|
20       0.0236  -0.1507   15.993  0.7171          |                 -|
21       0.1551   0.0004    18.24  0.6338          |-                 |
22       0.0485   0.0191   18.466  0.6780          |                  |
23       0.1183   1.3367   19.851  0.6509          |                  |--------
24      -0.0967  -1.1355   20.804  0.6502          |          --------|
25      -0.0741   0.4983   21.382  0.6711          |                  |---
26       0.1176   1.0402   22.881  0.6396          |                  |--------

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.337               1                   0.2476
---------------------------------------------------------------------------
```

```
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.494               1                   0.4821
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pllc_d0
       Ho:  model has no omitted variables
                  F(3, 48) =      1.17
                  Prob > F =      0.3321

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  24.48 Chi(2)  4.8e-06
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.029         0.003           11.13       0.0038

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.93832      3.218      2.512  0.00601

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    22.8814
 Prob > chi2(26)           =     0.6396

.
. drop residuo

.
pr(.15): regress    pngp_d0 pngp_d1 pngp_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
```

```
                      begin with full model
p = 0.9881 >= 0.1500  removing imacec_d1
p = 0.9860 >= 0.1500  removing lineastotales_d1
p = 0.8697 >= 0.1500  removing pngp_d2
p = 0.9512 >= 0.1500  removing arpu_d2
p = 0.6138 >= 0.1500  removing imacec_d0
p = 0.5434 >= 0.1500  removing internet_d2
p = 0.4625 >= 0.1500  removing internet_d0
p = 0.5070 >= 0.1500  removing lineastotales_d0
p = 0.3122 >= 0.1500  removing arpu_d1
p = 0.1744 >= 0.1500  removing imacec_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  4,    52) =   74.68
       Model |   12650.211     4  3162.55275           Prob > F      =  0.0000
    Residual |  2202.03461    52  42.3468194           R-squared     =  0.8517
-------------+------------------------------           Adj R-squared =  0.8403
       Total |  14852.2456    56  265.218672           Root MSE      =  6.5074

------------------------------------------------------------------------------
     pngp_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     pngp_d1 |   .1065058   .0543602     1.96   0.055    -.0025759    .2155874
 internet_d1 |   .0000628   .0000311     2.02   0.049     3.16e-07    .0001253
     arpu_d0 |  -.6340585   .0367916   -17.23   0.000    -.7078862   -.5602307
lineastota~2 |   .0001013   .0000635     1.59   0.117    -.0000262    .0002288
       _cons |   4.099498   1.129859     3.63   0.001      1.83227    6.366726
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0465   0.0527   .13005  0.7184          |                  |
2       -0.0266  -0.0320   .17315  0.9171          |                  |
3        0.0076   0.0124   .17676  0.9813          |                  |
4       -0.0852  -0.1023   .63706  0.9589          |                  |
5       -0.0697  -0.0863   .95131  0.9664          |                  |
6        0.0368   0.0499   1.0404  0.9840          |                  |
7       -0.0916  -0.1268    1.605  0.9785          |                 -|
8       -0.2746  -0.3557   6.7818  0.5603        --|                --|
9        0.1405   0.2674   8.1649  0.5176          |-                 |--
10       0.1495   0.2255   9.7639  0.4614          |-                 |-
11      -0.1071  -0.2277   10.602  0.4772          |                 -|
12      -0.0062  -0.1108   10.605  0.5631          |                  |
13      -0.1007  -0.1707    11.38  0.5790          |                 -|
14       0.1097   0.2870    12.32  0.5806          |                  |--
15       0.0409  -0.1404   12.454  0.6444          |                 -|
16       0.0827   0.0339   13.015  0.6716          |                  |
17      -0.0470   0.0513   13.201  0.7226          |                  |
18      -0.0532   0.0133   13.445  0.7645          |                  |
19      -0.0447  -0.2858   13.622  0.8053          |                --|
20      -0.0360  -0.1175    13.74  0.8434          |                  |
21       0.0397   0.1858   13.886  0.8744          |                  |-
22      -0.1047  -0.0253   14.939  0.8648          |                  |
23       0.0079  -0.1245   14.946  0.8966          |                  |
24      -0.0596  -0.5090   15.307  0.9114          |              ----|
25      -0.1412  -0.5632   17.401  0.8667         -|              ----|
26      -0.0442  -0.5576   17.614  0.8894          |              ----|
```

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.193               1                   0.6602
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.008               1                   0.9289
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of pngp_d0
       Ho:  model has no omitted variables
                  F(3, 49) =      3.04
                  Prob > F =      0.0375

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  1.932 Chi(2)  .3805
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-----------------------------------------------------
     residuo |      0.520         0.133            2.80       0.2465

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.97630      1.237      0.456  0.32411

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.6138
 Prob > chi2(26)           =     0.8894
```

```
.
. drop residuo

.
pr(.15): regress    prop_d0 prop_d1 prop_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.8732 >= 0.1500  removing prop_d2
p = 0.6295 >= 0.1500  removing lineastotales_d2
p = 0.6381 >= 0.1500  removing internet_d2
p = 0.4389 >= 0.1500  removing imacec_d1
p = 0.2588 >= 0.1500  removing lineastotales_d0
p = 0.3508 >= 0.1500  removing lineastotales_d1
p = 0.1669 >= 0.1500  removing imacec_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =  101.67
       Model |  1568.83035     7  224.118622           Prob > F      =  0.0000
    Residual |  108.011753    49  2.20432149           R-squared     =  0.9356
-------------+------------------------------           Adj R-squared =  0.9264
       Total |  1676.84211    56   29.943609           Root MSE      =  1.4847

------------------------------------------------------------------------------
     prop_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     prop_d1 |   .2520565   .1293083     1.95   0.057    -.0077982    .5119112
   imacec_d2 |   .0744765   .0319663     2.33   0.024     .0102378    .1387152
     arpu_d0 |   -.224786   .0093686   -23.99   0.000    -.2436129   -.2059591
     arpu_d1 |   .0567858   .0294025     1.93   0.059    -.0023008    .1158723
     arpu_d2 |   -.023034   .0083792    -2.75   0.008    -.0398726   -.0061955
 internet_d0 |   .0000171   7.33e-06     2.34   0.024     2.39e-06    .0000319
 internet_d1 |   -.000023   7.81e-06    -2.94   0.005    -.0000387   -7.30e-06
       _cons |    .228119   .2506852     0.91   0.367    -.2756518    .7318898
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1120  -0.1119   .75283  0.3856          |                  |
2        0.0217   0.0047   .78159  0.6765          |                  |
3       -0.0588  -0.0619   .99669  0.8021          |                  |
4        0.0082   0.0110    1.001  0.9096          |                  |
5        0.0519   0.0553   1.1753  0.9472          |                  |
6        0.1621   0.1775   2.9088  0.8202          |-                 |-
7        0.0141   0.0362   2.9222  0.8921          |                  |
8        0.0574   0.0569   3.1485  0.9247          |                  |
9        0.0201   0.0404   3.1768  0.9569          |                  |
10      -0.0143  -0.0241   3.1913  0.9766          |                  |
11      -0.0042   0.0050   3.1926  0.9879          |                  |
12       0.1469   0.1401   4.8047  0.9642          |-                 |-
13      -0.1321  -0.1668   6.1374  0.9410         -|                 -|
14       0.2161   0.2423   9.7888  0.7775          |-                 |-
15       0.1626   0.2088   11.906  0.6861          |-                 |-
16      -0.0132   0.0303    11.92  0.7495          |                  |
17      -0.0753  -0.0357   12.396  0.7756          |                  |
```

```
18      -0.1143  -0.2487   13.524  0.7596          |                -|
19      -0.0065   0.0202   13.527  0.8105          |                 |
20       0.0177  -0.0648   13.556  0.8523          |                 |
21      -0.0151  -0.1463   13.577  0.8871          |                -|
22      -0.1041  -0.3438   14.618  0.8781          |               --|
23      -0.0750  -0.3426   15.174  0.8883          |               --|
24       0.0877   0.0892   15.958  0.8896          |                 |
25      -0.1029  -0.0157   17.071  0.8792          |                 |
26       0.0276  -0.2407   17.154  0.9044          |                -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.602               1                   0.1068
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.763               1                   0.1842
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of prop_d0
       Ho:  model has no omitted variables
                  F(3, 46) =     13.22
                  Prob > F =      0.0000

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  25.94 Chi(2)  2.3e-06
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.009         0.003          12.43       0.0020

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.94661      2.785      2.201  0.01385
```

```
.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.1535
 Prob > chi2(26)           =     0.9044

.
. drop residuo

.
pr(.15): regress    reum_d0 reum_d1 reum_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.6521 >= 0.1500  removing imacec_d0
p = 0.6181 >= 0.1500  removing imacec_d1
p = 0.5921 >= 0.1500  removing lineastotales_d1
p = 0.4968 >= 0.1500  removing internet_d1
p = 0.4069 >= 0.1500  removing arpu_d1
p = 0.4110 >= 0.1500  removing lineastotales_d0
p = 0.4291 >= 0.1500  removing reum_d2
p = 0.7633 >= 0.1500  removing arpu_d2
p = 0.2965 >= 0.1500  removing internet_d0
p = 0.1530 >= 0.1500  removing internet_d2
p = 0.1543 >= 0.1500  removing lineastotales_d2

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  3,    53) =   29.38
       Model |  97.1183738     3  32.3727913           Prob > F      =  0.0000
    Residual |  58.3903981    53  1.10170562           R-squared     =  0.6245
-------------+------------------------------           Adj R-squared =  0.6033
       Total |  155.508772    56  2.77694236           Root MSE      =  1.0496

------------------------------------------------------------------------------
     reum_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     reum_d1 |   .1787655   .0842459     2.12   0.039     .0097896    .3477414
   imacec_d2 |   .0385081   .0206427     1.87   0.068    -.0028959    .0799121
     arpu_d0 |  -.0540246   .0058812    -9.19   0.000    -.0658207   -.0422284
       _cons |   .3203358   .1500656     2.13   0.037     .0193424    .6213292
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0437   0.0438   .11477  0.7348          |                  |
2       -0.0435  -0.0462   .23037  0.8912          |                  |
3        0.0322   0.0382   .29495  0.9610          |                  |
4       -0.0842  -0.0959   .74497  0.9457          |                  |
5       -0.0683  -0.0584   1.0468  0.9587          |                  |
6        0.1713   0.1784   2.9827  0.8110          |-                 |-
7        0.1721   0.1771   4.9737  0.6632          |-                 |-
8       -0.0731  -0.0764   5.3408  0.7206          |                  |
```

```
9        0.1146   0.1536   6.2613  0.7135          |                 |-
10      -0.0709  -0.0791   6.6213  0.7606          |                 |
11      -0.1049  -0.0240   7.4261  0.7636          |                 |
12      -0.0371  -0.0829   7.5292  0.8208          |                 |
13      -0.0006  -0.0325   7.5292  0.8729          |                 |
14       0.1602   0.2707   9.5358  0.7953          |-                |--
15       0.0295  -0.0248   9.6053  0.8438          |                 |
16       0.0461   0.0596   9.7799  0.8779          |                 |
17      -0.0371   0.0474   9.8957  0.9079          |                 |
18      -0.1714  -0.1610    12.43  0.8242         -|                -|
19      -0.1372  -0.0499   14.096  0.7781         -|                 |
20       0.0826   0.0396   14.716  0.7924          |                 |
21      -0.0487  -0.2108   14.938  0.8261          |                -|
22      -0.0067   0.1236   14.942  0.8647          |                 |
23       0.0681  -0.1934     15.4  0.8797          |                -|
24      -0.1002  -0.1323   16.424  0.8722          |                -|
25      -0.0819   0.2963   17.129  0.8771          |                 |--
26      -0.1191  -1.1228   18.667  0.8502          |         --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.184               1                   0.6683
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.025               1                   0.3114
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of reum_d0
       Ho:  model has no omitted variables
                  F(3, 50) =      0.75
                  Prob > F =      0.5264

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  63.38 Chi(2)  1.7e-14
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000          0.000          21.10       0.0000
```

```
.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+--------------------------------------------------
     residuo |     57    0.89664      5.393      3.621  0.00015

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    18.6667
 Prob > chi2(26)           =     0.8502

.
. drop residuo

.
pr(.15): regress    sjmq_d0 sjmq_d1 sjmq_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0      lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9719 >= 0.1500  removing sjmq_d2
p = 0.8788 >= 0.1500  removing arpu_d2
p = 0.7116 >= 0.1500  removing lineastotales_d0
p = 0.5342 >= 0.1500  removing lineastotales_d1
p = 0.6117 >= 0.1500  removing imacec_d0
p = 0.5967 >= 0.1500  removing arpu_d1
p = 0.4378 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  7,    49) =   22.47
       Model |  2840.8585     7  405.836928           Prob > F      =  0.0000
    Residual |  885.071329    49  18.0626802           R-squared     =  0.7625
-------------+------------------------------           Adj R-squared =  0.7285
       Total |  3725.92982    56  66.5344612           Root MSE      =    4.25

------------------------------------------------------------------------------
     sjmq_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     sjmq_d1 |   .1294563   .0711615     1.82   0.075    -.0135482    .2724607
lineastota~2 |   .0001276   .0000426     3.00   0.004     .0000421    .0002132
     arpu_d0 |  -.2879262   .0241664   -11.91   0.000    -.3364905    -.239362
 internet_d1 |   .0000568   .0000223     2.55   0.014      .000012    .0001017
   imacec_d2 |  -.1786764   .0986571    -1.81   0.076    -.3769352    .0195824
 internet_d2 |    .000041   .0000203     2.02   0.049     2.14e-07    .0000817
   imacec_d1 |   .1363886   .0915139     1.49   0.143    -.0475154    .3202927
       _cons |   2.315451   .8544122     2.71   0.009     .5984456    4.032457
------------------------------------------------------------------------------

. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
```

```
--------------------------------------------------------------------------------
1       -0.0717  -0.0732   .30912  0.5782          |                  |
2        0.0087   0.0043   .31377  0.8548          |                  |
3       -0.0392  -0.0456   .40923  0.9383          |                  |
4        0.0471   0.0558   .54994  0.9685          |                  |
5        0.1071   0.1246    1.292  0.9358          |                  |
6       -0.0090   0.0208   1.2973  0.9718          |                  |
7       -0.1466  -0.2051   2.7427  0.9077         -|                 -|
8        0.0891   0.1616   3.2873  0.9151          |                  |-
9        0.1534   0.2845   4.9364  0.8398          |-                 |--
10       0.0650   0.2186   5.2391  0.8746          |                  |-
11      -0.1518  -0.1855   6.9235  0.8052         -|                 -|
12      -0.1140  -0.2121   7.8944  0.7933          |                 -|
13      -0.0553  -0.2515   8.1279  0.8352          |                --|
14       0.1382   0.1306   9.6219  0.7893          |-                 |-
15      -0.0815  -0.1765   10.154  0.8100          |                 -|
16      -0.0628  -0.0463   10.477  0.8406          |                  |
17      -0.0867  -0.1858   11.109  0.8509          |                 -|
18       0.0131  -0.1456   11.124  0.8890          |                 -|
19       0.1284   0.2678   12.582  0.8592          |-                 |--
20       0.0336   0.4499   12.685  0.8905          |                  |---
21      -0.0355   0.5090   12.803  0.9154          |                  |----
22      -0.0469  -0.1467   13.014  0.9328          |                 -|
23       0.1283   0.0611   14.642  0.9070          |-                 |
24       0.0226   0.2702   14.694  0.9294          |                  |--
25      -0.1020   0.1788   15.787  0.9210          |                  |-
26       0.0161   0.0747   15.816  0.9405          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.426               1                   0.5139
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.117               1                   0.2907
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of sjmq_d0
       Ho:  model has no omitted variables
                  F(3, 46) =      0.48
                  Prob > F =      0.6959

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  2.035 Chi(2)  .3614
Jarque-Bera test for Ho: normality: (residuo)

.
```

```
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.146         0.399            2.97       0.2270

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.98238      0.919     -0.181  0.57195

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.8156
 Prob > chi2(26)           =     0.9405

.
. drop residuo

.
pr(.15): regress    vldv_d0 vldv_d1 vldv_d2         arpu_d0 arpu_d1 arpu_d2
internet_d0     im
> acec_d0       lineastotales_d0        internet_d1     imacec_d1
lineastotales_d1        inte
> rnet_d2     imacec_d2       lineastotales_d2
                      begin with full model
p = 0.9875 >= 0.1500  removing vldv_d1
p = 0.8838 >= 0.1500  removing vldv_d2
p = 0.8906 >= 0.1500  removing internet_d2
p = 0.7832 >= 0.1500  removing internet_d1
p = 0.7725 >= 0.1500  removing imacec_d2
p = 0.6906 >= 0.1500  removing arpu_d1
p = 0.6153 >= 0.1500  removing lineastotales_d0
p = 0.3553 >= 0.1500  removing internet_d0

      Source |       SS       df       MS              Number of obs =      57
-------------+------------------------------           F(  6,    50) =   90.06
       Model |  5441353.21     6  906892.202           Prob > F      =  0.0000
    Residual |  503511.001    50    10070.22           R-squared     =  0.9153
-------------+------------------------------           Adj R-squared =  0.9051
       Total |  5944864.21    56  106158.289           Root MSE      =  100.35

------------------------------------------------------------------------------
     vldv_d0 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
lineastota~2 |   .0026491   .0012299     2.15   0.036     .0001788    .0051194
   imacec_d1 |     6.0273   2.133201     2.83   0.007     1.742639    10.31196
     arpu_d0 |  -12.20891   .5700525   -21.42   0.000     -13.3539   -11.06393
lineastota~1 |  -.0019533   .0012423    -1.57   0.122    -.0044486    .0005421
     arpu_d2 |  -3.657301   .5579021    -6.56   0.000     -4.77788   -2.536721
   imacec_d0 |   3.626949    2.34576     1.55   0.128    -1.084649    8.338546
       _cons |   124.5097   14.56775     8.55   0.000     95.24952    153.7699
```

```
------------------------------------------------------------------------------

.
. predict residuo, residuals
(3 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0209   0.0212   .02635  0.8710          |                  |
2       -0.0325  -0.0328   .09084  0.9556          |                  |
3        0.0411   0.0454   .19605  0.9782          |                  |
4       -0.0360  -0.0428   .27811  0.9912          |                  |
5        0.0133   0.0198   .28952  0.9978          |                  |
6        0.0358   0.0350   .37383  0.9991          |                  |
7       -0.2023  -0.2405   3.1258  0.8731         -|                 -|
8       -0.2195  -0.2482   6.4314  0.5990         -|                 -|
9       -0.0564  -0.0349   6.6543  0.6731          |                  |
10      -0.0228  -0.0037   6.6917  0.7542          |                  |
11       0.1132   0.1205   7.6288  0.7461          |                  |
12       0.0296   0.0073   7.6945  0.8085          |                  |
13       0.1035   0.1845   8.5126  0.8087          |                  |-
14       0.0664   0.1093   8.8579  0.8400          |                  |
15      -0.0957  -0.2701   9.5906  0.8447          |                --|
16      -0.0202  -0.2354   9.6242  0.8855          |                 -|
17      -0.0099  -0.0414   9.6324  0.9183          |                  |
18      -0.0991  -0.1240   10.479  0.9152          |                  |
19      -0.0843  -0.1398   11.108  0.9202          |                 -|
20      -0.0940  -0.0314    11.91  0.9191          |                  |
21      -0.0752   0.0784   12.439  0.9270          |                  |
22      -0.0155  -0.0970   12.462  0.9471          |                  |
23       0.0468  -0.0137   12.679  0.9586          |                  |
24       0.0348   0.0134   12.802  0.9693          |                  |
25       0.0854  -0.0697   13.568  0.9687          |                  |
26      -0.0293  -0.9385   13.661  0.9772          |           -------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.031               1                   0.8592
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.839               1                   0.3597
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **test ramsey
. estat ovtest

Ramsey RESET test using powers of the fitted values of vldv_d0
       Ho:  model has no omitted variables
```

```
                 F(3, 47) =      3.83
                 Prob > F =      0.0155

.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  15.23 Chi(2)  4.9e-04
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                       ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.004         0.027           11.01       0.0041

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     57    0.93658      3.309      2.572  0.00506

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.6614
 Prob > chi2(26)           =     0.9772

.
. drop residuo

.
.
.
end of do-file

. exit, clear
. **************************
```

Anexo 3: Estimaciones de Traficos por Línea

```
.
.  regress    slmsalonnet_zp45        slmsalonnet_zp45_t1     slmsalonnet_zp45_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2
                      begin with full model
```

```
p = 0.9738 >= 0.1500  removing preciorealslm_t1
p = 0.7950 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6486 >= 0.1500  removing preciorealtramolocal_t2
p = 0.4179 >= 0.1500  removing slmsalonnet_zp45_t1
p = 0.4794 >= 0.1500  removing cargofijorealtelsur_t
p = 0.3690 >= 0.1500  removing preciorealtramolocal_t1
p = 0.3786 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.3235 >= 0.1500  removing preciorealtramolocal_t
p = 0.1382 >= 0.1500  removing imacec_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =   26.47
       Model |  2300.19844     5  460.039688           Prob > F      =  0.0000
    Residual |  486.539818    28  17.3764221           R-squared     =  0.8254
-------------+------------------------------           Adj R-squared =  0.7942
       Total |  2786.73826    33  84.4466138           Root MSE      =  4.1685

------------------------------------------------------------------------------
slmsalonn~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t2 |  -1.620795   .8903319    -1.82   0.079    -3.444557    .2029673
slmsalonne.. |   .7313917   .0964626     7.58   0.000      .533797    .9289864
    imacec_t |   .2530959   .1305616     1.94   0.063    -.0143474    .5205391
preciore~m_t |   1.112199   .6309063     1.76   0.089    -.1801538    2.404552
   imacec_t2 |  -.3403013   .1180992    -2.88   0.008    -.5822166    -.098386
       _cons |   48.78324   35.81889     1.36   0.184    -24.58843    122.1549
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1134  -0.1137   .47685  0.4899          |                  |
2        0.0804   0.0694   .72433  0.6962          |                  |
3       -0.0371  -0.0213   .77862  0.8546          |                  |
4       -0.3149  -0.3424   4.8249  0.3057        --|                --|
5       -0.0110  -0.0978     4.83  0.4370          |                  |
6       -0.1240  -0.0932   5.5026  0.4811          |                  |
7        0.0925   0.0548   5.8905  0.5526          |                  |
8       -0.0667  -0.1814   6.0997  0.6361          |                 -|
9       -0.0703  -0.2387   6.3415  0.7053          |                 -|
10      -0.1193  -0.3523   7.0673  0.7191          |                --|
11      -0.0343  -0.2455   7.1299  0.7885          |                 -|
12       0.0942  -0.3054   7.6241  0.8138          |                --|
13       0.0301  -1.3448    7.677  0.8640          |          --------|
14       0.1088  -1.1227   8.4012  0.8674          |          --------|
15       0.0840   0.0735   8.8556  0.8849          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.507               1                   0.4764
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
```

```
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.045               1                   0.8324
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  149.1 Chi(2)  4.2e-33
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                     ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           26.22       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.77784      7.757      4.269  0.00001

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     8.8556
 Prob > chi2(15)           =     0.8849

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    slmsalonnet_zp63        slmsalonnet_zp63_t1     slmsalonnet_zp63_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
```

```
p = 0.9198 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8379 >= 0.1500  removing slmsalonnet_zp63_t1
p = 0.7604 >= 0.1500  removing preciorealslm_t2
p = 0.5168 >= 0.1500  removing preciorealslm_t1
p = 0.4171 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.1440 >= 0.1500  removing preciorealtramolocal_t1
p = 0.6617 >= 0.1500  removing preciorealslm_t
p = 0.3357 >= 0.1500  removing preciorealtramolocal_t2
p = 0.5003 >= 0.1500  removing preciorealtramolocal_t
p = 0.1666 >= 0.1500  removing preciorealca_t
p = 0.1945 >= 0.1500  removing cargofijorealtelsur_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   15.48
       Model |  6365.29759     4  1591.3244           Prob > F      =  0.0000
    Residual |  2981.57119    29   102.8128           R-squared     =  0.6810
-------------+------------------------------           Adj R-squared =  0.6370
       Total |  9346.86878    33  283.238448           Root MSE      =   10.14

------------------------------------------------------------------------------
slmsalonn~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_t2 |   .5749463   .3539493     1.62   0.115    -.1489612    1.298854
slmsalonne.. |   .6265435    .120131     5.22   0.000      .380848    .8722391
    imacec_t |  -.7121512    .312936    -2.28   0.030    -1.352177   -.0721253
   imacec_t1 |  -.7672512   .3147455    -2.44   0.021    -1.410978   -.1235245
       _cons |   149.3297   57.22204     2.61   0.014     32.29747    266.3619
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2480   0.2512   2.2814  0.1309          |-                 |--
2        0.0680   0.0057   2.4585  0.2925          |                  |
3       -0.1498  -0.1888   3.3444  0.3415         -|                 -|
4       -0.3772  -0.3528   9.1505  0.0574       ---|                --|
5       -0.1981  -0.0288   10.807  0.0554         -|                  |
6       -0.2825  -0.2385   14.296  0.0265        --|                 -|
7       -0.2872  -0.4183   18.036  0.0118        --|               ---|
8        0.0861   0.0033   18.385  0.0185          |                  |
9        0.1173  -0.1764   19.059  0.0247          |                 -|
10       0.3295  -0.0887   24.596  0.0062          |--                |
11       0.2443  -0.1908   27.773  0.0035          |-                -|
12      -0.0562  -0.9055   27.948  0.0056          |           -------|
13       0.0158   0.9558   27.963  0.0092          |                  |-------
14      -0.0533  -0.9795   28.137  0.0136          |           -------|
15      -0.1173  -1.9923   29.023  0.0160          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.197               1                   0.1383
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.807               1                   0.3689
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  20.26 Chi(2)  4.0e-05
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.002         0.009           12.71       0.0017

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.90846      3.196      2.421  0.00773

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    29.0227
 Prob > chi2(15)           =     0.0160

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    slmsalonnet_zp64        slmsalonnet_zp64_t1     slmsalonnet_zp64_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
```

```
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.8343 >= 0.1500  removing preciorealtramolocal_t2
p = 0.6795 >= 0.1500  removing slmsalonnet_zp64_t1
p = 0.5974 >= 0.1500  removing preciorealslm_t2
p = 0.6592 >= 0.1500  removing preciorealslm_t1
p = 0.3198 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.1585 >= 0.1500  removing preciorealtramolocal_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  9,    24) =    7.46
       Model |  5127.3232     9  569.702578           Prob > F      =  0.0000
    Residual | 1832.43165    24  76.3513189           R-squared     =  0.7367
-------------+------------------------------           Adj R-squared =  0.6380
       Total | 6959.75485    33  210.901662           Root MSE      =  8.7379

------------------------------------------------------------------------------
slmsalonn~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~a_t |   649.5225   345.1859     1.88   0.072    -62.90618    1361.951
slmsalonne.. |   .6010098   .1616366     3.72   0.001     .2674083    .9346113
    imacec_t |  -1.025412   .3590123    -2.86   0.009    -1.766377   -.2844474
   imacec_t1 |    -.73367   .3202897    -2.29   0.031    -1.394715   -.0726246
   imacec_t2 |   1.051338   .3336704     3.15   0.004     .3626759    1.739999
cargofijor~t |  -.1259962   .0769361    -1.64   0.115    -.2847845    .0327921
cargofijor~1 |  -.0586427   .0261551    -2.24   0.034    -.1126241   -.0046613
preciore~l_t |  -389.0186   192.6606    -2.02   0.055    -786.6505    8.613366
preciore~m_t |    79.6137   43.04358     1.85   0.077    -9.223875    168.4513
       _cons |   384.4324   180.2612     2.13   0.043     12.39168    756.4732
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1258   0.1259   .58707  0.4436          |-                 |-
2        0.1380   0.1260   1.3156  0.5180          |-                 |-
3       -0.2863  -0.3409   4.5528  0.2076        --|                --|
4       -0.1481  -0.1288   5.4475  0.2444         -|                 -|
5       -0.2129  -0.0795   7.3613  0.1951         -|                  |
6       -0.1291  -0.1408   8.0896  0.2316         -|                 -|
7       -0.1500  -0.0991   8.3118  0.3059          |                  |
8        0.1343   0.0922   9.1608  0.3289          |-                 |
9        0.0012  -0.1158   9.1609  0.4226          |                  |
10       0.0691  -0.0990   9.4047  0.4942          |                  |
11      -0.1055  -0.1194   9.9974  0.5306          |                  |
12      -0.1483  -0.2581   11.221  0.5101         -|                --|
13      -0.0230   0.1494   11.252  0.5897          |                  |-
14      -0.0715  -0.5360   11.565  0.6412          |              ----|
15      -0.0547  -1.0544   11.758  0.6973          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.578              1                   0.4469
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.055              1                   0.8140
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  19.66 Chi(2)  5.4e-05
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.007         0.006          11.76       0.0028

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.92487      2.623      2.010  0.02223

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.7576
 Prob > chi2(15)           =     0.6973

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
. drop residuo

.
.
.  regress    slmsalonnet_zp65        slmsalonnet_zp65_t1     slmsalonnet_zp65_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
```

```
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9906 >= 0.1500  removing slmsalonnet_zp65_t1
p = 0.8485 >= 0.1500  removing imacec_t2
p = 0.6481 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7011 >= 0.1500  removing preciorealslm_t2
p = 0.2593 >= 0.1500  removing preciorealslm_t
p = 0.2434 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.4243 >= 0.1500  removing imacec_t1
p = 0.2805 >= 0.1500  removing cargofijorealtelsur_t
p = 0.8942 >= 0.1500  removing preciorealtramolocal_t
p = 0.7411 >= 0.1500  removing preciorealca_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =    9.19
       Model |  8362.2089     5  1672.44178           Prob > F      =  0.0000
    Residual |  5094.33202    28  181.940429           R-squared     =  0.6214
-------------+------------------------------           Adj R-squared =  0.5538
       Total |  13456.5409    33  407.773967           Root MSE      =  13.489

------------------------------------------------------------------------------
slmsalonn~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t1 |   99.97373   55.31087     1.81   0.081    -13.32545    213.2729
slmsalonne.. |   .3009172   .1687654     1.78   0.085     -.044783    .6466175
   imacec_t  |  -.7817231   .4081957    -1.92   0.066    -1.617874    .0544279
precior~l_t1 |  -119.6091   65.74067    -1.82   0.080    -254.2728    15.05451
precior~l_t2 |  -21.87963   12.29937    -1.78   0.086    -47.07376    3.314496
       _cons |   171.8073   108.7412     1.58   0.125     -50.9389    394.5534
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0792   0.0794    .2325  0.6297          |                  |
2        0.1354   0.1313   .93344  0.6271          |-                 |-
3       -0.0537  -0.0826   1.0473  0.7898          |                  |
4       -0.1762  -0.2157   2.3136  0.6783         -|                 -|
5       -0.3484  -0.3456   7.4363  0.1902        --|                --|
6       -0.1669  -0.0949   8.6536  0.1940         -|                  |
7       -0.2328  -0.1106    11.11  0.1339         -|                  |
8        0.1190   0.2242   11.776  0.1615          |                  |-
9        0.0765   0.0451   12.062  0.2098          |                  |
10       0.1767  -0.0957   13.655  0.1893          |-                 |
11       0.1509   0.0335   14.868  0.1886          |-                 |
12      -0.1704  -0.8153   16.483  0.1701         -|            ------|
13      -0.1500  -0.4546   17.067  0.1963          |               ---|
14      -0.1140  -0.3200   17.863  0.2131          |                --|
15      -0.1390  -0.4706   19.108  0.2089         -|               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.221              1                   0.6380
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.637              1                   0.4247
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  24.44 Chi(2)  4.9e-06
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.007          14.26       0.0008

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.87177      4.477      3.124  0.00089

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    19.1075
 Prob > chi2(15)           =     0.2089

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
. drop residuo

.
.
.
.  regress    slmsaloffnet_zp45       slmsaloffnet_zp45_t1    slmsaloffnet_zp45_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
```

```
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9965 >= 0.1500  removing preciorealtramolocal_t
p = 0.8537 >= 0.1500  removing preciorealslm_t2
p = 0.8308 >= 0.1500  removing imacec_t1
p = 0.6934 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6345 >= 0.1500  removing imacec_t2
p = 0.4485 >= 0.1500  removing slmsaloffnet_zp45_t1
p = 0.5366 >= 0.1500  removing preciorealtramolocal_t2
p = 0.4263 >= 0.1500  removing imacec_t
p = 0.3896 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.2360 >= 0.1500  removing preciorealtramolocal_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =   23.04
       Model |  7542.03165     5  1508.40633           Prob > F      =  0.0000
    Residual |   1832.8421    28  65.4586463           R-squared     =  0.8045
-------------+------------------------------           Adj R-squared =  0.7696
       Total |  9374.87374    33  284.087083           Root MSE      =  8.0907

------------------------------------------------------------------------------
slmsaloff~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t1 |  -16.58202    6.64945    -2.49   0.019     -30.2028   -2.961236
slmsaloffn.. |    .563718   .1456623     3.87   0.001     .2653422    .8620937
preciore~a_t |  -294.1258   115.9745    -2.54   0.017    -531.6888   -56.56272
cargofijor~t |   .0924886   .0382912     2.42   0.022     .0140526    .1709246
preciore~m_t |   102.9673    40.0726     2.57   0.016     20.88231    185.0523
       _cons |  -126.1071   68.34787    -1.85   0.076    -266.1113    13.89721
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0418  -0.0416    .0647  0.7992          |                 |
2       -0.2297  -0.2334   2.0822  0.3531         -|                -|
3        0.1594   0.1264   3.0858  0.3786          |-                |-
4        0.0590   0.0058   3.2279  0.5204          |                 |
5       -0.2273  -0.1727   5.4078  0.3682         -|                -|
6       -0.0834  -0.1309   5.7116  0.4563          |                -|
7        0.3515   0.2664   11.312  0.1256          |--               |--
8        0.0012   0.0606   11.312  0.1846          |                 |
9       -0.4255  -0.3605   20.174  0.0169       ---|               --|
10       0.1710   0.0580   21.666  0.0169          |-                |
11       0.0813  -0.0768   22.017  0.0242          |                 |
12      -0.2369  -0.0954   25.141  0.0142         -|                 |
13      -0.0046   0.0338   25.142  0.0221          |                 |
14       0.1222  -0.1258   26.056  0.0255          |                -|
15      -0.1637  -0.5170   27.783  0.0230         -|             ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.061               1                   0.8046
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.310               1                   0.5780
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  6.376 Chi(2)  .0413
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.893         0.020            5.24       0.0727

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.95111      1.707      1.114  0.13254

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    27.7826
 Prob > chi2(15)           =     0.0230

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    slmsaloffnet_zp63       slmsaloffnet_zp63_t1    slmsaloffnet_zp63_t2
im
```

```
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9792 >= 0.1500  removing preciorealtramolocal_t2
p = 0.9411 >= 0.1500  removing slmsaloffnet_zp63_t1
p = 0.8850 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.4982 >= 0.1500  removing preciorealslm_t2
p = 0.8062 >= 0.1500  removing preciorealslm_t1
p = 0.1697 >= 0.1500  removing imacec_t1
p = 0.3395 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1817 >= 0.1500  removing imacec_t2
p = 0.1277 >= 0.1500  removing preciorealslm_t
p = 0.3629 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.3426 >= 0.1500  removing cargofijorealtelsur_t
p = 0.3141 >= 0.1500  removing preciorealtramolocal_t
p = 0.5906 >= 0.1500  removing preciorealca_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    31) =    8.43
       Model |  78.7624243     2  39.3812122           Prob > F      =  0.0012
    Residual |  144.795957    31  4.67083732           R-squared     =  0.3523
-------------+------------------------------           Adj R-squared =  0.3105
       Total |  223.558381    33   6.7744964           Root MSE      =  2.1612

------------------------------------------------------------------------------
slmsaloff~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    imacec_t |   -.127046    .059482    -2.14   0.041    -.2483603   -.0057317
slmsaloffn.. |   .4272202   .1272607     3.36   0.002     .1676704      .68677
       _cons |   26.16025   7.863637     3.33   0.002     10.12226    42.19825
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1709   0.1712    1.083  0.2980          |-                 |-
2        0.2267   0.2033   3.0493  0.2177          |-                 |-
3        0.0580  -0.0121   3.1823  0.3644          |                  |
4       -0.1500  -0.2195   4.0999  0.3926         -|                 -|
5        0.0037   0.0471   4.1005  0.5350          |                  |
6       -0.1061  -0.0272   4.5929  0.5970          |                  |
7        0.0220   0.0627   4.6148  0.7069          |                  |
8       -0.1379  -0.1636   5.5097  0.7020         -|                 -|
9       -0.1577  -0.1628   6.7276  0.6655         -|                 -|
10       0.0396   0.1569   6.8075  0.7435          |                  |-
11      -0.1565  -0.0761   8.1107  0.7034         -|                  |
12       0.0048  -0.1522    8.112  0.7763          |                 -|
13      -0.0996  -0.4062   8.6904  0.7959          |               ---|
14      -0.1721  -0.7124   10.503  0.7245         -|             -----|
15      -0.1892  -0.8120   12.809  0.6170         -|            ------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
```

```
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.026               1                   0.3110
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.358               1                   0.5495
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  47.97 Chi(2)  3.8e-11
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.001          17.84       0.0001

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.85435      5.086      3.389  0.00035

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    12.8095
 Prob > chi2(15)           =     0.6170

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
```

```
.  regress    slmsaloffnet_zp64       slmsaloffnet_zp64_t1    slmsaloffnet_zp64_t2
imace
> c_t  imacec_t1        imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
, noconstant
                      begin with full model
p = 0.9117 >= 0.1500  removing preciorealslm_t2
p = 0.8208 >= 0.1500  removing cargofijorealtelsur_t
p = 0.8111 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8278 >= 0.1500  removing preciorealslm_t
p = 0.5619 >= 0.1500  removing imacec_t
p = 0.5361 >= 0.1500  removing imacec_t1
p = 0.3873 >= 0.1500  removing slmsaloffnet_zp64_t1
p = 0.4786 >= 0.1500  removing preciorealtramolocal_t2
p = 0.1347 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.3867 >= 0.1500  removing preciorealtramolocal_t
p = 0.2506 >= 0.1500  removing preciorealca_t
p = 0.3984 >= 0.1500  removing preciorealslm_t1
p = 0.8345 >= 0.1500  removing preciorealtramolocal_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    32) =  842.63
       Model |  14178.7847     2  7089.39234           Prob > F      =  0.0000
    Residual |  269.229564    32  8.41342386           R-squared     =  0.9814
-------------+------------------------------           Adj R-squared =  0.9802
       Total |  14448.0142    34  424.941595           Root MSE      =  2.9006

------------------------------------------------------------------------------
slmsaloff~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_t2 |   .1023146   .0214803     4.76   0.000     .0585607    .1460686
slmsaloffn.. |   .3824167   .1252089     3.05   0.005     .1273746    .6374589
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1863   0.1864   1.2879  0.2564          |-                 |-
2       -0.0527  -0.0898   1.3943  0.4980          |                  |
3       -0.0813  -0.0559   1.6552  0.6469          |                  |
4        0.0386   0.0609    1.716  0.7878          |                  |
5       -0.2449  -0.2884   4.2484  0.5142         -|                --|
6       -0.1998  -0.1238   5.9931  0.4240         -|                  |
7       -0.0307  -0.0213   6.0359  0.5356          |                  |
8       -0.0270  -0.1354   6.0703  0.6394          |                 -|
9       -0.0975  -0.0926   6.5357  0.6853          |                  |
10       0.0902   0.1142   6.9504  0.7301          |                  |
11      -0.0466  -0.2164   7.0657  0.7937          |                 -|
12       0.0173  -0.0016   7.0823  0.8521          |                  |
13      -0.1205  -0.2240   7.9287  0.8482          |                 -|
14      -0.0875  -0.2810    8.397  0.8676          |                --|
15      -0.2318  -0.6304    11.86  0.6896         -|             -----|

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.204               1                   0.2725
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.767               1                   0.3813
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.
. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  13.49 Chi(2)  .0012
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.047         0.009            8.98       0.0112

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.91955      2.809      2.152  0.01569

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.8599
 Prob > chi2(15)           =     0.6896

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo
```

```
.
.  regress    slmsaloffnet_zp65       slmsaloffnet_zp65_t1    slmsaloffnet_zp65_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t     ,
noconstant
                      begin with full model
p = 0.8835 >= 0.1500  removing cargofijorealtelsur_t
p = 0.8941 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.8653 >= 0.1500  removing preciorealslm_t
p = 0.8307 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.7104 >= 0.1500  removing imacec_t1
p = 0.3994 >= 0.1500  removing preciorealtramolocal_t2
p = 0.1079 >= 0.1500  removing slmsaloffnet_zp65_t1
p = 0.2859 >= 0.1500  removing preciorealtramolocal_t
p = 0.4340 >= 0.1500  removing preciorealslm_t1
p = 0.8060 >= 0.1500  removing preciorealtramolocal_t1
p = 0.3509 >= 0.1500  removing preciorealca_t
p = 0.4240 >= 0.1500  removing preciorealslm_t2

      Source |       SS       df       MS           Number of obs =      34
-------------+------------------------------        F(  3,    31) =  707.03
       Model |  15285.7753     3  5095.25844        Prob > F      =  0.0000
    Residual |  223.404304    31  7.20659044        R-squared     =  0.9856
-------------+------------------------------        Adj R-squared =  0.9842
       Total |  15509.1796    34  456.152342        Root MSE      =  2.6845

------------------------------------------------------------------------------
slmsaloff~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_t2 |   .1761013   .0599234     2.94   0.006     .0538867    .2983158
slmsaloffn.. |   .6553243   .1475124     4.44   0.000     .3544708    .9561779
    imacec_t |  -.1169544   .0687686    -1.70   0.099    -.2572089    .0233002
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.3151   0.3260   3.6822  0.0550          |--                |--
2        0.2723   0.1942   6.5174  0.0384          |--                |-
3        0.1365  -0.0002   7.2535  0.0642          |-                 |
4       -0.2515  -0.4187   9.8337  0.0433        --|               ---|
5       -0.3058  -0.2679    13.78  0.0171        --|                --|
6       -0.3640  -0.1292   19.571  0.0033        --|                 -|
7       -0.3390  -0.0226   24.782  0.0008        --|                  |
8       -0.1399   0.1085   25.704  0.0012         -|                  |
9       -0.0758  -0.0882   25.985  0.0021          |                  |
10       0.1085   0.0118   26.586  0.0030          |                  |
11       0.0756  -0.3346    26.89  0.0048          |                --|
12       0.0370  -0.7856   26.967  0.0078          |            ------|
13       0.0605  -0.5806    27.18  0.0118          |              ----|
14      -0.0991  -0.8447    27.78  0.0152          |            ------|
15      -0.0151  -0.3033   27.795  0.0229          |                --|

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.915               1                   0.0478
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.137               1                   0.7111
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  5.719 Chi(2)  .0573
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.057         0.065            6.43       0.0402

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.95309      1.638      1.028  0.15192

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    27.7952
 Prob > chi2(15)           =     0.0229

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo
```

```
.
.
.
.  regress    calocalentrada_zp45     calocalentrada_zp45_t1
calocalentrada_zp45_t2  im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t   if
calocalentrada_zp45>
> 0, noconstant
                      begin with full model
p = 0.9860 >= 0.1500  removing preciorealca_t
p = 0.8376 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6778 >= 0.1500  removing cargofijorealtelsur_t
p = 0.5477 >= 0.1500  removing preciorealslm_t
p = 0.9203 >= 0.1500  removing preciorealtramolocal_t
p = 0.4846 >= 0.1500  removing preciorealtramolocal_t2
p = 0.3674 >= 0.1500  removing imacec_t2
p = 0.4523 >= 0.1500  removing imacec_t
p = 0.3604 >= 0.1500  removing preciorealslm_t2
p = 0.2952 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.3589 >= 0.1500  removing calocalentrada_zp45_t2
p = 0.2045 >= 0.1500  removing preciorealtramolocal_t1
p = 0.5167 >= 0.1500  removing preciorealslm_t1

      Source |       SS       df       MS              Number of obs =      26
-------------+------------------------------           F(  2,    24) =  248.16
       Model |  229608.876     2  114804.438           Prob > F      =  0.0000
    Residual |  11102.8277    24   462.61782           R-squared     =  0.9539
-------------+------------------------------           Adj R-squared =  0.9500
       Total |  240711.704    26  9258.14246           Root MSE      =  21.509

------------------------------------------------------------------------------
calocalen~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caloca~45_t1 |    .516037   .1314289     3.93   0.001     .2447811    .7872928
   imacec_t1 |   .3769404   .0998531     3.77   0.001     .1708537    .5830272
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.4076   0.4114    6.328  0.0119          |---               |---
2        0.4892   0.4084    15.72  0.0004          |---               |---
3        0.4027   0.2373   22.283  0.0001          |---               |-
4        0.3670   0.1684   27.909  0.0000          |--                |-
5        0.2228  -0.0236   30.052  0.0000          |-                 |
6        0.2104   0.0196   32.029  0.0000          |-                 |
7        0.1234   0.0033   32.733  0.0000          |                  |
8        0.0588  -0.0119   32.899  0.0001          |                  |
9       -0.0139  -0.0190   32.909  0.0001          |                  |
10      -0.0405   0.0268   32.994  0.0003          |                  |
11      -0.0635   0.1476   33.211  0.0005          |                  |-
12      -0.1889  -0.1730   35.219  0.0004         -|                 -|
13      -0.0617  -0.2920   35.444  0.0007          |                --|
```

```
14      -0.1532  -0.1393   36.892  0.0008         -|                  -|
15      -0.1340  -0.1097   38.054  0.0009         -|                   |

. estat bgodfrey

Number of gaps in sample:  1

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          9.339               1                   0.0022
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm

Number of gaps in sample:  1
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.609               1                   0.0575
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .6359 Chi(2)  .7276
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                       ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.370         0.726            0.98       0.6136

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     35    0.89041      3.911      2.847  0.00221

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    38.0541
 Prob > chi2(15)           =     0.0009
```

```
.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
. drop residuo

.
.  regress    calocalentrada_zp63     calocalentrada_zp63_t1
calocalentrada_zp63_t2  im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9665 >= 0.1500  removing preciorealslm_t2
p = 0.9372 >= 0.1500  removing calocalentrada_zp63_t1
p = 0.8609 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6271 >= 0.1500  removing preciorealtramolocal_t2
p = 0.7352 >= 0.1500  removing preciorealslm_t1
p = 0.5698 >= 0.1500  removing preciorealtramolocal_t1
p = 0.3445 >= 0.1500  removing imacec_t1
p = 0.3060 >= 0.1500  removing preciorealslm_t
p = 0.5841 >= 0.1500  removing cargofijorealtelsur_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  6,    27) =    8.24
       Model |  396.088724     6  66.0147873           Prob > F      =  0.0000
    Residual |  216.375055    27  8.01389091           R-squared     =  0.6467
-------------+------------------------------           Adj R-squared =  0.5682
       Total |  612.463778    33  18.5595084           Root MSE      =  2.8309

------------------------------------------------------------------------------
calocalen~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~l_t |   -70.9375   29.83478    -2.38   0.025    -132.1534   -9.721591
calocal~3_t2 |   .5493476   .1514888     3.63   0.001     .2385184    .8601769
    imacec_t | -.2637507   .0941968    -2.80   0.009    -.4570266   -.0704747
preciore~a_t |   162.3055   68.63382     2.36   0.025     21.4805    303.1304
   imacec_t2 |   .1712694   .0990576     1.73   0.095     -.03198    .3745187
cargofijor~t | -.0420396   .0187721    -2.24   0.034    -.0805568   -.0035224
       _cons |    94.8787   44.63508     2.13   0.043     3.295077    186.4623
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0556   0.0557   .11478  0.7348          |                  |
2        0.1681   0.1659    1.196  0.5499          |-                 |-
3        0.1331   0.1218   1.8957  0.5943          |-                 |
4       -0.1443  -0.1877   2.7452  0.6013         -|                 -|
5       -0.0372  -0.0732   2.8036  0.7302          |                  |
6       -0.2589  -0.2435   5.7339  0.4536        --|                 -|
7       -0.0643   0.0016   5.9214  0.5490          |                  |
8       -0.1707  -0.1162   7.2933  0.5053         -|                  |
9       -0.2445  -0.2635   10.221  0.3329         -|                --|
10      -0.0049  -0.0507   10.222  0.4212          |                  |
```

```
11      -0.1283  -0.0664   11.098  0.4350         -|                |
12      -0.1174  -0.2636   11.865  0.4566          |              --|
13      -0.0143  -0.0896   11.877  0.5377          |                |
14       0.0007  -0.4751   11.877  0.6162          |             ---|
15      -0.1020  -1.6605   12.548  0.6372          |         --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.110               1                   0.7398
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.194               1                   0.6598
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  109.5 Chi(2)  1.7e-24
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          23.55       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.81422      6.487      3.896  0.00005

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    12.5476
 Prob > chi2(15)           =     0.6372

.
```

```
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    calocalentrada_zp64     calocalentrada_zp64_t1
calocalentrada_zp64_t2
>       imacec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  carg
> ofijorealtelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtram
> olocal_t   preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9300 >= 0.1500  removing preciorealtramolocal_t2
p = 0.8241 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7238 >= 0.1500  removing imacec_t2
p = 0.5304 >= 0.1500  removing preciorealslm_t2
p = 0.6013 >= 0.1500  removing preciorealslm_t1
p = 0.5698 >= 0.1500  removing calocalentrada_zp64_t1
p = 0.4509 >= 0.1500  removing preciorealtramolocal_t1
p = 0.3299 >= 0.1500  removing imacec_t1
p = 0.1882 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.4790 >= 0.1500  removing preciorealslm_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =    8.72
       Model |  323.468093     5  64.6936186           Prob > F      =  0.0000
    Residual |  207.627364    28    7.415263           R-squared     =  0.6091
-------------+------------------------------           Adj R-squared =  0.5392
       Total |  531.095457    33  16.0938017           Root MSE      =  2.7231

------------------------------------------------------------------------------
calocalen~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~l_t |  -72.38535   28.99886    -2.50   0.019    -131.7868   -12.98388
calocal~4_t2 |    .512327    .141914     3.61   0.001     .2216292    .8030247
    imacec_t |    -.23172   .0899096    -2.58   0.016    -.4158913   -.0475486
preciore~a_t |   164.1993   66.90705     2.45   0.021     27.14645    301.2522
cargofijor~t |  -.0410582   .0183916    -2.23   0.034    -.0787317   -.0033846
       _cons |   114.5602    41.3674     2.77   0.010     29.82291    199.2975
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1086  -0.1100   .43749  0.5083          |                  |
2        0.2209   0.2117   2.3038  0.3160          |-                 |-
3        0.0382   0.0902   2.3614  0.5009          |                  |
4       -0.1852  -0.2306   3.7602  0.4394         -|                 -|
5        0.1236   0.0637   4.4054  0.4926          |                  |
6       -0.1902  -0.0912   5.9868  0.4247         -|                  |
7        0.1273   0.0926   6.7214  0.4585          |-                 |
```

```
8       -0.2646  -0.2802   10.017  0.2638        --|               --|
9       -0.2812  -0.4765   13.888  0.1264        --|              ---|
10      -0.0034  -0.0596   13.889  0.1781          |                 |
11      -0.3247  -0.1280   19.498  0.0527        --|                -|
12       0.0981  -0.1364   20.033  0.0665          |                -|
13      -0.0053   0.3968   20.034  0.0944          |                 |---
14       0.0093  -0.3921    20.04  0.1289          |              ---|
15      -0.0743  -1.1320   20.395  0.1573          |         --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.424               1                   0.5150
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.275               1                   0.5998
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  47.27 Chi(2)  5.4e-11
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.002         0.001          16.26       0.0003

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.87156      4.485      3.127  0.00088

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.3952
```

```
 Prob > chi2(15)          =     0.1573

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress   calocalentrada_zp65    calocalentrada_zp65_t1
calocalentrada_zp65_t2  im
> acec_t  imacec_t1    imacec_t2      cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1     preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
, noconstant
                      begin with full model
p = 0.8980 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7373 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6019 >= 0.1500  removing imacec_t1
p = 0.6899 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.4565 >= 0.1500  removing preciorealslm_t
p = 0.4046 >= 0.1500  removing preciorealtramolocal_t2
p = 0.1501 >= 0.1500  removing calocalentrada_zp65_t1
p = 0.2853 >= 0.1500  removing preciorealtramolocal_t
p = 0.2006 >= 0.1500  removing preciorealca_t
p = 0.3118 >= 0.1500  removing preciorealtramolocal_t1
p = 0.6998 >= 0.1500  removing preciorealslm_t1
p = 0.5118 >= 0.1500  removing preciorealslm_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    31) =  671.82
       Model |  21654.4602     3  7218.1534            Prob > F      =  0.0000
    Residual |  333.067744    31  10.7441208           R-squared     =  0.9849
-------------+------------------------------           Adj R-squared =  0.9834
       Total |  21987.5279    34  646.691998           Root MSE      =  3.2778

------------------------------------------------------------------------------
calocalen~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   imacec_t2 |   .2373212   .0724733     3.27   0.003      .089511    .3851314
caloca~65_t2 |   .7413225   .1306118     5.68   0.000      .474938    1.007707
    imacec_t |  -.1827846   .0794022    -2.30   0.028    -.3447264   -.0208429
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2888   0.2966   3.0929  0.0786          |--                |--
2        0.2593   0.1939    5.664  0.0589          |--                |-
3        0.2272   0.1244   7.7021  0.0526          |-                 |
4       -0.1558  -0.3491   8.6928  0.0693         -|               --|
5       -0.1927  -0.2263   10.259  0.0682         -|                -|
6       -0.2874  -0.1929    13.87  0.0311        --|                -|
```

```
7       -0.2328   0.0668   16.326  0.0223         -|                  |
8       -0.1572   0.0763   17.489  0.0254         -|                  |
9       -0.1090  -0.0608   18.071  0.0344          |                  |
10       0.1137   0.1696   18.729  0.0438          |                  |-
11       0.0189  -0.1059   18.748  0.0658          |                  |
12      -0.0404  -0.7990   18.839  0.0925          |            ------|
13       0.0346  -0.3688   18.909  0.1260          |                --|
14      -0.1084  -0.5125   19.628  0.1423          |              ----|
15      -0.0721   0.2562   19.963  0.1734          |                  |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          3.285               1                   0.0699
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.038               1                   0.8459
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  8.952 Chi(2)  .0114
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.055         0.023            7.69       0.0213

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.94572      1.895      1.332  0.09137

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
```

```
 Portmanteau (Q) statistic =    19.9630
 Prob > chi2(15)           =     0.1734

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    tramolocalfm_zp45       tramolocalfm_zp45_t1    tramolocalfm_zp45_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.8674 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.8234 >= 0.1500  removing preciorealtramolocal_t2
p = 0.7674 >= 0.1500  removing tramolocalfm_zp45_t1
p = 0.7716 >= 0.1500  removing tramolocalfm_zp45_t2
p = 0.7564 >= 0.1500  removing imacec_t1
p = 0.5529 >= 0.1500  removing imacec_t2
p = 0.4891 >= 0.1500  removing preciorealslm_t1
p = 0.5083 >= 0.1500  removing imacec_t
p = 0.3985 >= 0.1500  removing preciorealca_t
p = 0.2250 >= 0.1500  removing preciorealtramolocal_t
p = 0.8072 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1425 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.5170 >= 0.1500  removing preciorealslm_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    31) =   16.35
       Model |  144.504832     2  72.2524161           Prob > F      =  0.0000
    Residual |  136.963748    31  4.41818543           R-squared     =  0.5134
-------------+------------------------------           Adj R-squared =  0.4820
       Total |   281.46858    33  8.52935092           Root MSE      =  2.1019

------------------------------------------------------------------------------
tramoloca~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~m_t |   1.515415   .5328959     2.84   0.008     .4285665    2.602263
cargofijor~t |  -.0060346   .0014895    -4.05   0.000    -.0090723   -.0029968
       _cons |   27.79059   7.185667     3.87   0.001     13.13533    42.44586
------------------------------------------------------------------------------

. predict residuo, residuals

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2109   0.2124   1.7393  0.1872          |-                 |-
2        0.2145   0.1868   3.5906  0.1661          |-                 |-
3        0.1884   0.1411    5.062  0.1673          |-                 |-
4        0.1076   0.0531    5.557  0.2348          |                  |
```

```
5        0.0436  -0.0004   5.6409  0.3427          |                  |
6        0.1036   0.0968   6.1302  0.4088          |                  |
7        0.1076   0.1340   6.6761  0.4634          |                  |-
8       -0.0281  -0.1622   6.7146  0.5677          |                 -|
9        0.0217   0.0210   6.7385  0.6643          |                  |
10      -0.0464   0.0098   6.8519  0.7394          |                  |
11      -0.1585  -0.1092   8.2268  0.6929         -|                  |
12      -0.1547  -0.0373   9.5901  0.6519         -|                  |
13      -0.1317  -0.0287   10.621  0.6425         -|                  |
14      -0.2827  -0.2350   15.592  0.3389        --|                 -|
15      -0.1856  -0.0639   17.836  0.2714         -|                  |
16      -0.2127  -0.1665   20.931  0.1812         -|                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.749               1                   0.3866
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.391               1                   0.5320
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  12.37 Chi(2)  .0021
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+---------------------------------------------------------
     residuo |      0.008         0.026            9.89       0.0071

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+---------------------------------------------------
     residuo |     36    0.91793      2.993      2.292  0.01095

.
. ***test Box-Ljung white noise
. wntestq residuo
```

```
Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.9315
 Prob > chi2(16)           =     0.1812

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    tramolocalfm_zp63       tramolocalfm_zp63_t1    tramolocalfm_zp63_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9847 >= 0.1500  removing preciorealtramolocal_t1
p = 0.9704 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8829 >= 0.1500  removing imacec_t1
p = 0.8343 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.8019 >= 0.1500  removing imacec_t
p = 0.6611 >= 0.1500  removing tramolocalfm_zp63_t1
p = 0.6233 >= 0.1500  removing preciorealslm_t2
p = 0.4156 >= 0.1500  removing tramolocalfm_zp63_t2
p = 0.5191 >= 0.1500  removing preciorealtramolocal_t2
p = 0.3935 >= 0.1500  removing imacec_t2
p = 0.3438 >= 0.1500  removing preciorealca_t
p = 0.3179 >= 0.1500  removing cargofijorealtelsur_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =   19.82
       Model |  67.0533125     3  22.3511042           Prob > F      =  0.0000
    Residual |  33.8325314    30  1.12775105           R-squared     =  0.6646
-------------+------------------------------           Adj R-squared =  0.6311
       Total |  100.885844    33  3.05714679           Root MSE      =   1.062

------------------------------------------------------------------------------
tramoloca~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t1 |   -3.97779   .6585593    -6.04   0.000    -5.322748   -2.632833
preciore~l_t |  -28.71901   4.128613    -6.96   0.000    -37.15076   -20.28726
preciore~m_t |   24.27491   3.542273     6.85   0.000     17.04062     31.5092
       _cons |   15.35696   4.389852     3.50   0.001     6.391688    24.32224
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1234   0.1244   .57964  0.4465          |                  |
2        0.1607   0.1521   1.5925  0.4510          |-                 |-
```

```
3       -0.0420  -0.0772   1.6639  0.6450          |                  |
4       -0.0307  -0.0335   1.7033  0.7901          |                  |
5       -0.1694  -0.1422   2.9419  0.7089         -|                 -|
6       -0.0880  -0.0603   3.2879  0.7719          |                  |
7        0.0179   0.0830   3.3028  0.8557          |                  |
8        0.0802   0.0970   3.6114  0.8904          |                  |
9       -0.0480  -0.1163   3.7263  0.9285          |                  |
10      -0.1291  -0.2581   4.5894  0.9169         -|                --|
11      -0.0517  -0.0980   4.7339  0.9434          |                  |
12      -0.1539  -0.3365   6.0672  0.9127         -|                --|
13      -0.1987  -0.3556   8.3908  0.8172         -|                --|
14      -0.1604  -0.8280   9.9784  0.7638         -|            ------|
15       0.1177  -0.1512   10.875  0.7614          |                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.401               1                   0.5266
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.217               1                   0.1365
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  1.029 Chi(2)  .5977
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.400         0.582            1.07       0.5864

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     35    0.97617      0.851     -0.338  0.63214

.
. ***test Box-Ljung white noise
```

```
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    10.8748
 Prob > chi2(15)           =     0.7614

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    tramolocalfm_zp64       tramolocalfm_zp64_t1    tramolocalfm_zp64_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
, noconstant
                      begin with full model
p = 0.9128 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7723 >= 0.1500  removing preciorealslm_t1
p = 0.8262 >= 0.1500  removing preciorealslm_t2
p = 0.7549 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.8778 >= 0.1500  removing preciorealca_t
p = 0.7677 >= 0.1500  removing imacec_t2
p = 0.5991 >= 0.1500  removing tramolocalfm_zp64_t2
p = 0.1956 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6055 >= 0.1500  removing preciorealtramolocal_t2
p = 0.1973 >= 0.1500  removing preciorealtramolocal_t1
p = 0.5127 >= 0.1500  removing preciorealtramolocal_t
p = 0.6207 >= 0.1500  removing preciorealslm_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    31) = 1439.00
       Model |   14128.924     3  4709.64132           Prob > F      =  0.0000
    Residual |  101.458635    31   3.2728592           R-squared     =  0.9929
-------------+------------------------------           Adj R-squared =  0.9922
       Total |  14230.3826    34  418.540665           Root MSE      =  1.8091

------------------------------------------------------------------------------
tramoloca~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
tramolo~4_t1 |   .9166784   .0568629    16.12   0.000     .8007057    1.032651
   imacec_t1 |   .1105476   .0447776     2.47   0.019     .0192231    .2018722
    imacec_t |  -.0994088   .0461309    -2.15   0.039    -.1934935   -.0053242
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
```

```
-------------------------------------------------------------------------------
1       -0.2613  -0.2613    2.601  0.1068        --|                --|
2        0.0825   0.0087   2.8682  0.2383          |                  |
3       -0.1029  -0.0876    3.297  0.3481          |                  |
4        0.0048  -0.0589    3.298  0.5093          |                  |
5       -0.0980  -0.1249   3.7128  0.5915          |                  |
6        0.1166   0.0388   4.3201  0.6334          |                  |
7       -0.1363  -0.1237   5.1789  0.6381         -|                  |
8       -0.1605  -0.2889   6.4146  0.6009         -|                --|
9        0.1595   0.0586   7.6815  0.5665          |-                 |
10       0.0711   0.1686   7.9432  0.6344          |                  |-
11      -0.0679  -0.1755    8.192  0.6960          |                 -|
12      -0.0162  -0.3385   8.2068  0.7688          |                --|
13       0.0055  -0.0478   8.2086  0.8298          |                  |
14      -0.0411  -0.0540   8.3126  0.8724          |                  |
15       0.0822   0.0620   8.7498  0.8902          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.984               1                   0.0841
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          6.336               1                   0.0118
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  12.25 Chi(2)  .0022
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.526         0.007            6.88       0.0320

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     35    0.92772      2.580      1.978  0.02395
```

```
.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     8.7498
 Prob > chi2(15)           =     0.8902

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    tramolocalfm_zp65       tramolocalfm_zp65_t1    tramolocalfm_zp65_t2
im
> acec_t  imacec_t1     imacec_t2       cargofijorealtelsur_t
cargofijorealtelsur_t1  cargofijorea
> ltelsur_t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t
>    preciorealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
, noconstant
                      begin with full model
p = 0.9240 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.7639 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7067 >= 0.1500  removing preciorealslm_t1
p = 0.5907 >= 0.1500  removing cargofijorealtelsur_t
p = 0.6639 >= 0.1500  removing imacec_t2
p = 0.4903 >= 0.1500  removing preciorealslm_t2
p = 0.5272 >= 0.1500  removing preciorealca_t
p = 0.6457 >= 0.1500  removing preciorealtramolocal_t1
p = 0.5576 >= 0.1500  removing preciorealtramolocal_t2
p = 0.5483 >= 0.1500  removing preciorealtramolocal_t
p = 0.9863 >= 0.1500  removing preciorealslm_t
p = 0.1639 >= 0.1500  removing imacec_t
p = 0.2159 >= 0.1500  removing imacec_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    32) = 2133.89
       Model |  35758.7936     2  17879.3968           Prob > F      =  0.0000
    Residual |  268.120771    32   8.3787741           R-squared     =  0.9926
-------------+------------------------------           Adj R-squared =  0.9921
       Total |  36026.9144    34  1059.61513           Root MSE      =  2.8946

------------------------------------------------------------------------------
tramoloca~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
tramol~65_t1 |   .4034892   .1448363     2.79   0.009     .1084672    .6985112
tramol~65_t2 |   .5647753   .1423325     3.97   0.000     .2748536    .8546971
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
```

```
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.1403  -0.1404   .73005  0.3929          -|                 -|
2       -0.1497  -0.1818   1.5876  0.4521          -|                 -|
3        0.1028   0.0512   2.0049  0.5714           |                  |
4       -0.1477  -0.1648   2.8948  0.5756          -|                 -|
5       -0.0032  -0.0249   2.8952  0.7161           |                  |
6        0.3104   0.2896   7.1079  0.3110           |--                |--
7       -0.1557  -0.0343   8.2068  0.3147          -|                  |
8       -0.1810  -0.1635   9.7491  0.2831          -|                 -|
9        0.2731   0.1967   13.401  0.1453           |--                |-
10      -0.0671   0.0596   13.631  0.1905           |                  |
11      -0.2587  -0.8509   17.192  0.1023         --|            ------|
12       0.0819  -0.3548   17.566  0.1295           |                --|
13      -0.0496   0.1929   17.709  0.1689           |                  |-
14      -0.1010  -0.1669   18.333  0.1920           |                 -|
15       0.2031  -0.1289   20.991  0.1371           |-                -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.025               1                   0.1547
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.000               1                   1.0000
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  29.19 Chi(2)  4.6e-07
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.005         0.002          13.41       0.0012

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
```

```
     residuo |     34    0.90101      3.456      2.584  0.00488

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.9905
 Prob > chi2(15)           =     0.1371

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress    camovfijo_zp45  camovfijo_zp45_t1       camovfijo_zp45_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9605 >= 0.1500  removing imacec_t2
p = 0.5495 >= 0.1500  removing preciorealtramolocal_t2
p = 0.7410 >= 0.1500  removing preciorealslm_t2
p = 0.3613 >= 0.1500  removing imacec_t
p = 0.4810 >= 0.1500  removing preciorealslm_t1
p = 0.4870 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6049 >= 0.1500  removing cargofijorealtelsur_t
p = 0.5958 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1389 >= 0.1500  removing imacec_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  6,    27) =   14.45
       Model |  2842.12252     6  473.687087           Prob > F      =  0.0000
    Residual |  884.847553    27  32.7721316           R-squared     =  0.7626
-------------+------------------------------           Adj R-squared =  0.7098
       Total |  3726.97007    33  112.938487           Root MSE      =  5.7247

------------------------------------------------------------------------------
camovfijo~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
camovf~45_t1 |     .39497   .1639685     2.41   0.023     .0585344    .7314056
camovf~45_t2 |   .3444055   .1635032     2.11   0.045     .0089247    .6798863
preciore~l_t |   122.1384   59.13732     2.07   0.049     .7986592    243.4782
cargofijor~1 |   .0362992   .0129707     2.80   0.009     .0096856    .0629128
preciore~a_t |  -141.7469   59.87679    -2.37   0.025    -264.6039   -18.88984
preciore~m_t |  -42.25881   23.53247    -1.80   0.084    -90.54344    6.025826
       _cons |  -52.25642   25.68232    -2.03   0.052    -104.9522     .439336
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo
```

```
                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0098   0.0094   .00356  0.9524          |                  |
2        0.0256   0.0258   .02855  0.9858          |                  |
3        0.0557   0.0566   .15103  0.9851          |                  |
4       -0.1613  -0.1729   1.2125  0.8760         -|                 -|
5       -0.0057  -0.0019   1.2139  0.9435          |                  |
6       -0.0755  -0.0866   1.4629  0.9619          |                  |
7       -0.0528  -0.0372   1.5893  0.9791          |                  |
8        0.1390   0.1867   2.4984  0.9618          |-                 |-
9       -0.1971  -0.2512    4.401  0.8831         -|                --|
10      -0.3264  -0.5828   9.8358  0.4550        --|              ----|
11      -0.1110  -0.2846   10.492  0.4868          |                --|
12      -0.2129  -0.5106   13.014  0.3680         -|              ----|
13      -0.0476  -0.3851   13.146  0.4366          |               ---|
14       0.0334  -0.3366   13.215  0.5097          |                --|
15       0.2095   0.2756   16.042  0.3792          |-                 |--

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.011               1                   0.9168
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.087               1                   0.7686
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  1.892 Chi(2)  .3883
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+---------------------------------------------------------
     residuo |      0.128         0.647            2.73       0.2547

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
```

```
    Variable |    Obs       W           V         z     Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.95480      1.578      0.951  0.17081

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    16.0423
 Prob > chi2(15)           =     0.3792

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    camovfijo_zp63  camovfijo_zp63_t1       camovfijo_zp63_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t             ,
noconstant
                      begin with full model
p = 0.9436 >= 0.1500  removing preciorealslm_t1
p = 0.7873 >= 0.1500  removing camovfijo_zp63_t2
p = 0.6727 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6234 >= 0.1500  removing imacec_t1
p = 0.5254 >= 0.1500  removing camovfijo_zp63_t1
p = 0.4798 >= 0.1500  removing preciorealtramolocal_t
p = 0.3400 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.0844 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1845 >= 0.1500  removing preciorealtramolocal_t2
p = 0.3128 >= 0.1500  removing preciorealslm_t
p = 0.1152 >= 0.1500  removing imacec_t2
p = 0.3006 >= 0.1500  removing imacec_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    31) =  850.04
       Model |  82570.8047     3  27523.6016           Prob > F      =  0.0000
    Residual |  1003.75335    31  32.3791404           R-squared     =  0.9880
-------------+------------------------------           Adj R-squared =  0.9868
       Total |   83574.558    34  2458.07524           Root MSE      =  5.6903

------------------------------------------------------------------------------
camovfijo~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t2 |   1.525243   .6999671     2.18   0.037      .097651    2.952836
cargofijor~t |  -.0154035   .0060146    -2.56   0.016    -.0276703   -.0031368
preciore~a_t |   11.12545   5.703906     1.95   0.060    -.5077408    22.75865
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)
```

```
. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1367   0.1424    .6935  0.4050          |-                 |-
2        0.2371   0.2413    2.843  0.2414          |-                 |-
3       -0.0653  -0.1301   3.0112  0.3899          |                 -|
4       -0.1290  -0.1782   3.6896  0.4496         -|                 -|
5       -0.0540   0.0364   3.8129  0.5767          |                  |
6        0.0530   0.1700   3.9358  0.6854          |                  |-
7        0.0327   0.0312   3.9842  0.7816          |                  |
8        0.0483  -0.0281   4.0943  0.8485          |                  |
9       -0.1449  -0.2139   5.1222  0.8235         -|                 -|
10      -0.3825  -0.6012   12.586  0.2478       ---|              ----|
11      -0.2076  -0.4502   14.879  0.1881         -|               ---|
12      -0.1985  -0.3182   17.071  0.1469         -|                --|
13      -0.0539  -0.7121    17.24  0.1886          |             -----|
14       0.0154  -1.0833   17.255  0.2429          |          --------|
15       0.0361  -0.7113   17.339  0.2990          |             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.680               1                   0.4096
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          5.175               1                   0.0229
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  1.539 Chi(2)  .4633
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.908         0.062           3.78       0.1509

.
. ***test Shapiro Wilk
. swilk residuo
```

```
                  Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z       Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.96412      1.253     0.470   0.31921

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    17.3385
 Prob > chi2(15)           =     0.2990

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    camovfijo_zp64  camovfijo_zp64_t1       camovfijo_zp64_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9077 >= 0.1500  removing preciorealtramolocal_t
p = 0.8366 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7615 >= 0.1500  removing preciorealtramolocal_t1
p = 0.7271 >= 0.1500  removing preciorealslm_t
p = 0.7880 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7090 >= 0.1500  removing preciorealca_t
p = 0.6603 >= 0.1500  removing preciorealtramolocal_t2
p = 0.6164 >= 0.1500  removing preciorealslm_t2
p = 0.5905 >= 0.1500  removing imacec_t2
p = 0.5879 >= 0.1500  removing imacec_t1
p = 0.4080 >= 0.1500  removing camovfijo_zp64_t1
p = 0.1474 >= 0.1500  removing camovfijo_zp64_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =    5.51
       Model |  336.745536     3  112.248512           Prob > F      =  0.0039
    Residual |   611.12267    30  20.3707557           R-squared     =  0.3553
-------------+------------------------------           Adj R-squared =  0.2908
       Total |  947.868206    33   28.723279           Root MSE      =  4.5134

------------------------------------------------------------------------------
camovfijo~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t1 |   2.922768   1.044297     2.80   0.009     .7900288    5.055507
cargofijor~2 |  -.0068012   .0030392    -2.24   0.033    -.0130081   -.0005943
    imacec_t |  -.2921669   .1283294    -2.28   0.030    -.5542504   -.0300833
       _cons |   50.30219   22.24361     2.26   0.031     4.874676    95.72971
------------------------------------------------------------------------------
```

```
. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.2057  -0.2069    1.569  0.2104          -|                  -|
2        0.2723   0.2410   4.4044  0.1106           |--                 |-
3       -0.3998  -0.3583   10.714  0.0134        ---|                 --|
4       -0.1753  -0.4715   11.968  0.0176          -|                ---|
5       -0.1401  -0.1943   12.797  0.0254          -|                  -|
6        0.0946   0.0626   13.188  0.0401           |                   |
7        0.0859  -0.0005   13.523  0.0604           |                   |
8        0.2924   0.2727   17.547  0.0249           |--                 |--
9       -0.0606   0.0534   17.727  0.0385           |                   |
10      -0.0951  -0.4004   18.188  0.0519           |                ---|
11      -0.1741  -0.3239   19.801  0.0481          -|                 --|
12      -0.0597   0.1907   19.999  0.0671           |                   |-
13       0.0099  -0.2957   20.005  0.0951           |                 --|
14       0.1659   0.7630    21.69  0.0852           |-                  |------
15       0.0011   0.1213    21.69  0.1162           |                   |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.467               1                   0.2258
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          6.867               1                   0.0088
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   1.39 Chi(2)   .499
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.390         0.173            2.81       0.2456

.
```

```
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.96717      1.146      0.284  0.38805

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    21.6905
 Prob > chi2(15)           =     0.1162

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    camovfijo_zp65  camovfijo_zp65_t1       camovfijo_zp65_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
                      begin with full model
p = 0.9530 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7040 >= 0.1500  removing preciorealslm_t
p = 0.4950 >= 0.1500  removing preciorealslm_t2
p = 0.4023 >= 0.1500  removing preciorealtramolocal_t2
p = 0.3236 >= 0.1500  removing imacec_t1
p = 0.5021 >= 0.1500  removing preciorealtramolocal_t1
p = 0.3791 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6373 >= 0.1500  removing preciorealtramolocal_t
p = 0.9043 >= 0.1500  removing preciorealca_t
p = 0.2717 >= 0.1500  removing imacec_t
p = 0.2199 >= 0.1500  removing camovfijo_zp65_t2
p = 0.2887 >= 0.1500  removing imacec_t2
p = 0.2557 >= 0.1500  removing cargofijorealtelsur_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    31) =    5.47
       Model |  238.232432     2  119.116216           Prob > F      =  0.0092
    Residual |  674.640675    31  21.7626024           R-squared     =  0.2610
-------------+------------------------------           Adj R-squared =  0.2133
       Total |  912.873107    33  27.6628214           Root MSE      =   4.665

------------------------------------------------------------------------------
camovfijo~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
camovf~65_t1 |  -.3878834   .1637402    -2.37   0.024    -.7218339    -.053933
precior~m_t1 |   1.106628   .3773573     2.93   0.006      .337003    1.876254
       _cons |   28.77938    16.9264     1.70   0.099    -5.742253      63.301
------------------------------------------------------------------------------
```

```
. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0774   0.0781    .2282  0.6329          |                  |
2        0.1014   0.0968   .63145  0.7293          |                  |
3       -0.3544  -0.3791   5.7155  0.1263        --|               ---|
4       -0.4389  -0.4606   13.764  0.0081       ---|               ---|
5       -0.2329  -0.2397   16.106  0.0065         -|                 -|
6        0.1468   0.1775   17.068  0.0090          |-                 |-
7        0.1561  -0.0676   18.195  0.0111          |-                 |
8        0.2287  -0.2616   20.704  0.0080          |-               --|
9       -0.0006  -0.2751   20.704  0.0140          |                --|
10      -0.1355  -0.2952   21.655  0.0170         -|                --|
11      -0.0980  -0.1444   22.174  0.0231          |                 -|
12       0.0267   0.1030   22.214  0.0352          |                  |
13       0.1799   0.6871    24.12  0.0300          |-                 |-----
14       0.0963   0.3154   24.692  0.0377          |                  |--
15       0.0201   0.0551   24.718  0.0539          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.341               1                   0.2469
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.051               1                   0.8220
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   12.7 Chi(2)  .0017
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.019          0.016            9.47       0.0088
```

```
.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     35    0.91858      2.906      2.227  0.01298

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    24.7177
 Prob > chi2(15)           =     0.0539

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress   caldisal_zp45   caldisal_zp45_t1        caldisal_zp45_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9940 >= 0.1500  removing preciorealldn_t
p = 0.9540 >= 0.1500  removing preciorealldi_t
p = 0.8534 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7936 >= 0.1500  removing imacec_t2
p = 0.9253 >= 0.1500  removing preciorealldn_t2
p = 0.8159 >= 0.1500  removing preciorealtramolocal_t1
p = 0.4841 >= 0.1500  removing preciorealldi_t2
p = 0.5477 >= 0.1500  removing imacec_t
p = 0.4674 >= 0.1500  removing preciorealslm_t2
p = 0.3280 >= 0.1500  removing preciorealtramolocal_t
p = 0.3695 >= 0.1500  removing imacec_t1
p = 0.4324 >= 0.1500  removing preciorealtramolocal_t2
p = 0.2739 >= 0.1500  removing preciorealldi_t1
p = 0.1866 >= 0.1500  removing preciorealldn_t1

      Source |       SS       df       MS            Number of obs =      34
-------------+------------------------------         F(  7,    26) =   23.48
       Model |  2.77343251     7  .396204644         Prob > F      =  0.0000
    Residual |  .438717887    26  .016873765         R-squared     =  0.8634
-------------+------------------------------         Adj R-squared =  0.8266
       Total |  3.21215039    33  .097337891         Root MSE      =   .1299

------------------------------------------------------------------------------
caldisal_~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
caldis~45_t1 |   .3958883   .1634716     2.42   0.023     .0598676    .7319091
caldis~45_t2 |   .5227777     .16845     3.10   0.005     .1765238    .8690317
precior~m_t1 |   .3187389   .1547738     2.06   0.050     .0005967    .6368811
cargofijor~2 |  -.0002362   .0001374    -1.72   0.098    -.0005187    .0000463
preciore~a_t |   3.971479   2.185684     1.82   0.081    -.5212584    8.464217
cargofijor~t |  -.0012456   .0007101    -1.75   0.091    -.0027052    .0002139
preciore~m_t |  -1.411382   .7631662    -1.85   0.076    -2.980093    .1573284
       _cons |   2.051621   1.281006     1.60   0.121    -.5815239    4.684766
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0155  -0.0160   .00891  0.9248          |                  |
2       -0.0025  -0.0018   .00914  0.9954          |                  |
3       -0.2677  -0.2870   2.8377  0.4173        --|                --|
4       -0.0453  -0.0626   2.9212  0.5711          |                  |
5       -0.1247  -0.1602   3.5772  0.6117          |                 -|
6       -0.0058  -0.1048   3.5787  0.7335          |                  |
7        0.1338   0.1221   4.3899  0.7339          |-                 |
8        0.0658   0.0089   4.5935  0.8000          |                  |
9       -0.2838  -0.4023   8.5373  0.4810        --|               ---|
10      -0.0058   0.0255    8.539  0.5763          |                  |
11      -0.1675  -0.2275   10.032  0.5276         -|                 -|
12       0.2192   0.0760   12.704  0.3909          |-                 |
13      -0.0173  -0.0318   12.722  0.4695          |                  |
14       0.0031  -2.2894   12.722  0.5485          |          --------|
15      -0.1093  -2.3940   13.491  0.5644          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.026               1                   0.8725
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.191               1                   0.6618
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  80.05 Chi(2)  4.2e-18
Jarque-Bera test for Ho: normality: (residuo)
```

```
.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                    ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          20.25       0.0000


.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.82861      5.984      3.728  0.00010

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.4912
 Prob > chi2(15)           =     0.5644

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldisal_zp63   caldisal_zp63_t1        caldisal_zp63_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi_
> t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2 ,
noconstant
                      begin with full model
p = 0.9366 >= 0.1500  removing preciorealldn_t2
p = 0.9107 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.8870 >= 0.1500  removing preciorealslm_t2
p = 0.7657 >= 0.1500  removing preciorealslm_t
p = 0.6887 >= 0.1500  removing cargofijorealtelsur_t
p = 0.5966 >= 0.1500  removing preciorealtramolocal_t2
p = 0.5537 >= 0.1500  removing preciorealldi_t1
p = 0.4050 >= 0.1500  removing preciorealldi_t
p = 0.3725 >= 0.1500  removing imacec_t1
p = 0.2946 >= 0.1500  removing imacec_t2
p = 0.2301 >= 0.1500  removing preciorealldn_t1
p = 0.3713 >= 0.1500  removing imacec_t
p = 0.1943 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6281 >= 0.1500  removing preciorealtramolocal_t1
```

```
p = 0.5811 >= 0.1500  removing preciorealslm_t1
p = 0.3832 >= 0.1500  removing preciorealca_t
p = 0.6882 >= 0.1500  removing preciorealtramolocal_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    30) =  629.74
       Model |  120.994889     4  30.2487222           Prob > F      =  0.0000
    Residual |  1.44101265    30  .048033755           R-squared     =  0.9882
-------------+------------------------------           Adj R-squared =  0.9867
       Total |  122.435901    34  3.60105592           Root MSE      =  .21917

------------------------------------------------------------------------------
caldisal_~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldisa~3_t1 |   .5101751   .1426318     3.58   0.001     .2188822    .8014681
caldisa~3_t2 |   .3884797   .1363485     2.85   0.008     .1100189    .6669406
preciore~n_t |   .0446016   .0139656     3.19   0.003     .0160801     .073123
precior~i_t2 |  -.0100678   .0036271    -2.78   0.009    -.0174753   -.0026604
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1280   0.1279   .60772  0.4356          |-                 |-
2        0.1850   0.1743   1.9162  0.3836          |-                 |-
3       -0.4301  -0.4964   9.2198  0.0265       ---|               ---|
4       -0.3023  -0.3043   12.949  0.0115        --|                --|
5       -0.1771   0.0994   14.272  0.0140         -|                  |
6       -0.0804  -0.2275   14.555  0.0240          |                 -|
7        0.0675  -0.3152   14.761  0.0392          |                --|
8       -0.0163  -0.1725   14.774  0.0637          |                 -|
9        0.0191  -0.1508   14.792  0.0968          |                 -|
10       0.2137   0.3775    17.12  0.0718          |-                 |---
11       0.0686  -0.1817    17.37  0.0974          |                 -|
12       0.2755  -0.1117   21.593  0.0423          |--                |
13      -0.0376   0.1572   21.675  0.0606          |                  |-
14      -0.0647  -1.6845   21.932  0.1500          |          --------|
15      -0.2761  -0.7374   26.842  0.0301        --|             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.450               1                   0.2285
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.421               1                   0.5163
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  6.831 Chi(2)  .0329
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.096         0.033           6.63       0.0364

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.94990      1.749      1.165  0.12191

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    26.8417
 Prob > chi2(15)           =     0.0301

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress    caldisal_zp64   caldisal_zp64_t1        caldisal_zp64_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.8218 >= 0.1500  removing preciorealldn_t1
p = 0.7979 >= 0.1500  removing preciorealtramolocal_t2
p = 0.7569 >= 0.1500  removing caldisal_zp64_t1
p = 0.5030 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.5947 >= 0.1500  removing cargofijorealtelsur_t1
```

```
p = 0.3134 >= 0.1500  removing preciorealldn_t
p = 0.2854 >= 0.1500  removing preciorealldi_t
p = 0.2623 >= 0.1500  removing imacec_t2
p = 0.5636 >= 0.1500  removing preciorealldn_t2
p = 0.4244 >= 0.1500  removing imacec_t1
p = 0.4071 >= 0.1500  removing preciorealslm_t1
p = 0.4798 >= 0.1500  removing preciorealtramolocal_t1
p = 0.4970 >= 0.1500  removing preciorealslm_t
p = 0.3860 >= 0.1500  removing preciorealtramolocal_t
p = 0.1992 >= 0.1500  removing preciorealldi_t1
p = 0.0926 >= 0.1500  removing imacec_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  5,    28) =   23.60
       Model |  12.4154729     5  2.48309458           Prob > F      =  0.0000
    Residual |  2.94590854    28  .105211019           R-squared     =  0.8082
-------------+------------------------------           Adj R-squared =  0.7740
       Total |  15.3613815    33  .465496408           Root MSE      =  .32436

------------------------------------------------------------------------------
caldisal_~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~a_t |   1.279962   .3992209     3.21   0.003     .4621955    2.097729
caldisa~4_t2 |   .7274608   .0966937     7.52   0.000     .5293928    .9255288
cargofijor~t |  -.0016648   .0004802    -3.47   0.002    -.0026485   -.0006811
precior~i_t2 |  -.0219803   .0071512    -3.07   0.005    -.0366288   -.0073318
precior~m_t2 |  -.1380145   .0694159    -1.99   0.057    -.2802066    .0041775
       _cons |   11.16913   3.260075     3.43   0.002     4.491167    17.84709
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1349   0.1354   .67478  0.4114          |-                 |-
2       -0.1403  -0.1639   1.4282  0.4896         -|                 -|
3        0.0072   0.0527   1.4303  0.6984          |                  |
4       -0.2532  -0.3044   4.0458  0.3998        --|                --|
5       -0.1606  -0.0979   5.1349  0.3996         -|                  |
6        0.1477   0.0971   6.0887  0.4133          |-                 |
7        0.1332   0.1168   6.8928  0.4401          |-                 |
8       -0.1767  -0.3179   8.3628  0.3989         -|                --|
9       -0.2023  -0.1921   10.367  0.3216         -|                 -|
10      -0.1917  -0.2279   12.241  0.2692         -|                 -|
11      -0.0515   0.0037   12.382  0.3356          |                  |
12       0.1544   0.1344   13.708  0.3197          |-                 |-
13       0.0532  -0.2055   13.874  0.3828          |                 -|
14       0.0195  -0.1785   13.897  0.4574          |                 -|
15      -0.1752  -0.4439   15.874  0.3905         -|               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.677               1                   0.4107
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.000               1                   0.9915
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .4776 Chi(2)  .7876
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.468         0.893            0.57       0.7538

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.98837      0.406     -1.877  0.96976

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    15.8738
 Prob > chi2(15)           =     0.3905

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldisal_zp65   caldisal_zp65_t1 caldisal_zp65_t2 imacec_t  imacec_t1
im
> acec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_t2  preciorealsl
> m_t   preciorealslm_t1      preciorealslm_t2       preciorealtramolocal_t
preciorealtramolocal_
```

```
> t1        preciorealtramolocal_t2 preciorealca_t     preciorealldi_t
preciorealldi_t1 preciorealld
> i_t2 precioreallldn_t precioreallldn_t1 precioreallldn_t2 , noconstant
                      begin with full model
p = 0.9999 >= 0.1500  removing preciorealslm_t
p = 0.9730 >= 0.1500  removing preciorealtramolocal_t2
p = 0.9330 >= 0.1500  removing preciorealldn_t2
p = 0.8050 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.7957 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7243 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.5039 >= 0.1500  removing preciorealldi_t1
p = 0.5400 >= 0.1500  removing preciorealldi_t
p = 0.2105 >= 0.1500  removing caldisal_zp65_t2
p = 0.1691 >= 0.1500  removing imacec_t2
p = 0.2404 >= 0.1500  removing preciorealldi_t2
p = 0.1288 >= 0.1500  removing preciorealca_t
p = 0.4784 >= 0.1500  removing preciorealslm_t2
p = 0.6570 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1085 >= 0.1500  removing preciorealtramolocal_t
p = 0.1362 >= 0.1500  removing preciorealslm_t1
p = 0.0815 >= 0.1500  removing imacec_t
p = 0.6212 >= 0.1500  removing imacec_t1
p = 0.2019 >= 0.1500  removing preciorealldn_t1
p = 0.0859 >= 0.1500  removing preciorealldn_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  1,    33) = 1432.18
       Model |  283.740918     1  283.740918           Prob > F      =  0.0000
    Residual |   6.5379049    33   .19811833           R-squared     =  0.9775
-------------+------------------------------           Adj R-squared =  0.9768
       Total |  290.278822    34  8.53761243           Root MSE      =   .4451

------------------------------------------------------------------------------
caldisal_~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldis~65_t1 |   .9394881   .0248252    37.84   0.000     .8889808    .9899953
------------------------------------------------------------------------------

. predict residuo, residuals
(1 missing value generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.2494  -0.2494    2.369  0.1238         -|                 -|
2        0.4547   0.4146   10.482  0.0053          |---              |---
3       -0.3156  -0.1812   14.513  0.0023        --|                 -|
4       -0.0153  -0.3501   14.523  0.0058          |                --|
5       -0.2663  -0.1500   17.585  0.0035        --|                  |
6       -0.0835  -0.0713   17.896  0.0065          |                  |
7       -0.0959  -0.0455   18.322  0.0106          |                  |
8        0.0760   0.0754   18.599  0.0172          |                  |
9        0.0036   0.0206   18.599  0.0288          |                  |
10       0.1272   0.0622   19.437  0.0350          |-                 |
11      -0.0246  -0.0093    19.47  0.0532          |                  |
12       0.1050   0.1284   20.091  0.0654          |                  |-
13      -0.0522   0.1505   20.252  0.0891          |                  |-
14      -0.0906  -0.4123   20.757  0.1080          |               ---|
15      -0.0437  -0.2383   20.881  0.1407          |                 -|

. estat bgodfrey
```

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          2.259               1                   0.1329
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.683               1                   0.4087
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   2.98 Chi(2)  .2254
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                   ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.269         0.086            4.30       0.1164

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     35    0.92375      2.721      2.090  0.01832

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.8811
 Prob > chi2(15)           =     0.1407

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo
```

```
.
.
.
.  regress    caldient_zp45   caldient_zp45_t1 caldient_zp45_t2       imacec_t
imacec_t
> 1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_t2  prec
> iorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preciorealtra
> molocal_t1        preciorealtramolocal_t2 preciorealca_t     preciorealldi_t
preciorealldi_t1 prec
> iorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9847 >= 0.1500  removing imacec_t1
p = 0.9708 >= 0.1500  removing preciorealtramolocal_t1
p = 0.9268 >= 0.1500  removing imacec_t
p = 0.9058 >= 0.1500  removing preciorealldi_t2
p = 0.9142 >= 0.1500  removing preciorealldn_t1
p = 0.8951 >= 0.1500  removing preciorealslm_t2
p = 0.8345 >= 0.1500  removing preciorealslm_t1
p = 0.8214 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7088 >= 0.1500  removing preciorealldi_t1
p = 0.5892 >= 0.1500  removing preciorealldn_t
p = 0.5643 >= 0.1500  removing caldient_zp45_t1
p = 0.2196 >= 0.1500  removing preciorealslm_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  9,    24) =    5.97
       Model |  28.6389488     9  3.18210542           Prob > F      =  0.0002
    Residual |  12.7947269    24  .533113619           R-squared     =  0.6912
-------------+------------------------------           Adj R-squared =  0.5754
       Total |  41.4336756    33  1.25556593           Root MSE      =  .73015

------------------------------------------------------------------------------
caldient_~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~i_t |   .0421519   .0258635     1.63   0.116    -.0112278    .0955316
caldie~45_t2 |   .5144544   .1452048     3.54   0.002     .2147663    .8141424
preciore~l_t |  -35.30866   15.14684    -2.33   0.028     -66.5702   -4.047121
precior~n_t2 |  -.2115005   .0797977    -2.65   0.014    -.3761948   -.0468061
   imacec_t2 |  -.0571899   .0324648    -1.76   0.091    -.1241939    .0098141
cargofijor~t |   -.018354   .0082366    -2.23   0.035    -.0353536   -.0013545
precior~l_t2 |    1.81452    .837439     2.17   0.040     .0861312     3.54291
cargofijor~2 |   -.004666   .0020737    -2.25   0.034     -.008946    -.000386
preciore~a_t |   78.92509    34.2507     2.30   0.030     8.235119    149.6151
       _cons |   50.65273   17.03916     2.97   0.007     15.48563    85.81983
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0347   0.0348   .04463  0.8327          |                  |
2       -0.0277  -0.0285   .07393  0.9637          |                  |
3       -0.1667  -0.1664   1.1705  0.7601         -|                 -|
4       -0.1883  -0.1857   2.6177  0.6237         -|                 -|
5        0.0046   0.0053   2.6186  0.7585          |                  |
6        0.0493   0.0196   2.7249  0.8425          |                  |
```

```
7       -0.0079  -0.0789   2.7277  0.9090          |                 |
8       -0.0040  -0.0419   2.7284  0.9502          |                 |
9       -0.1553  -0.1630   3.9094  0.9173         -|                -|
10      -0.1314  -0.1669   4.7899  0.9048         -|                -|
11      -0.0536  -0.1227   4.9428  0.9339          |                 |
12      -0.0414  -0.1675   5.0383  0.9567          |                -|
13      -0.0024  -0.5907   5.0386  0.9743          |             ----|
14       0.1184   0.0648   5.8969  0.9690          |                 |
15      -0.0876  -2.3234   6.3916  0.9724          |         --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.045               1                   0.8315
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.008               1                   0.9291
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  129.4 Chi(2)  8.1e-29
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                    ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          24.98       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.80568      6.785      3.990  0.00003

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
```

```
 Portmanteau (Q) statistic =     6.3916
 Prob > chi2(15)           =     0.9724

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldient_zp63   caldient_zp63_t1        caldient_zp63_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi_
> t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9951 >= 0.1500  removing preciorealldn_t
p = 0.9847 >= 0.1500  removing preciorealldi_t2
p = 0.9888 >= 0.1500  removing imacec_t
p = 0.9789 >= 0.1500  removing preciorealldi_t1
p = 0.9606 >= 0.1500  removing preciorealtramolocal_t2
p = 0.9482 >= 0.1500  removing preciorealslm_t2
p = 0.8837 >= 0.1500  removing imacec_t1
p = 0.8529 >= 0.1500  removing preciorealldn_t1
p = 0.6908 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6712 >= 0.1500  removing preciorealslm_t
p = 0.5671 >= 0.1500  removing imacec_t2
p = 0.6594 >= 0.1500  removing caldient_zp63_t1
p = 0.2870 >= 0.1500  removing preciorealtramolocal_t1
p = 0.4424 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.3661 >= 0.1500  removing preciorealca_t
p = 0.8598 >= 0.1500  removing preciorealtramolocal_t
p = 0.2177 >= 0.1500  removing preciorealldi_t
p = 0.2387 >= 0.1500  removing preciorealldn_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =   19.37
       Model |  30.3403604     3  10.1134535           Prob > F      =  0.0000
    Residual |  15.6646343    30  .522154477           R-squared     =  0.6595
-------------+------------------------------           Adj R-squared =  0.6255
       Total |  46.0049947    33  1.39409075           Root MSE      =   .7226

------------------------------------------------------------------------------
caldient_~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t1 |   .3028718   .1354656     2.24   0.033     .0262141    .5795296
caldien~3_t2 |   .3487287   .1694285     2.06   0.048     .0027094    .6947479
cargofijor~t |  -.0012905   .0003527    -3.66   0.001    -.0020109   -.0005701
       _cons |   8.903077   4.680498     1.90   0.067    -.6557747    18.46193
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo
```

```
                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0481  -0.0483   .08599  0.7693          |                  |
2        0.0775   0.0764   .31588  0.8539          |                  |
3       -0.0839  -0.0783   .59394  0.8978          |                  |
4       -0.2547  -0.2800   3.2404  0.5184        --|                --|
5       -0.0467  -0.0702   3.3322  0.6489          |                  |
6       -0.0670  -0.0470   3.5282  0.7402          |                  |
7        0.0338  -0.0196     3.58  0.8267          |                  |
8        0.0977   0.0262   4.0292  0.8545          |                  |
9       -0.1587  -0.2312   5.2625  0.8108         -|                 -|
10      -0.0026  -0.0930   5.2629  0.8729          |                  |
11      -0.1050  -0.1307   5.8495  0.8832          |                 -|
12      -0.0265  -0.1418   5.8887  0.9216          |                 -|
13       0.0620   0.0178   6.1127  0.9420          |                  |
14       0.0721  -0.0761   6.4312  0.9544          |                  |
15      -0.1240  -1.4668   7.4212  0.9449          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.084               1                   0.7723
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.156               1                   0.6928
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  45.81 Chi(2)  1.1e-10
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.001         0.001          17.24       0.0002

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V           z     Prob>z
```

```
-------------+--------------------------------------------------
     residuo |     34    0.87671      4.305      3.042  0.00118

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     7.4212
 Prob > chi2(15)           =     0.9449

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress    caldient_zp64   caldient_zp64_t1        caldient_zp64_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9422 >= 0.1500  removing preciorealtramolocal_t1
p = 0.9525 >= 0.1500  removing preciorealslm_t1
p = 0.8669 >= 0.1500  removing preciorealslm_t2
p = 0.8534 >= 0.1500  removing imacec_t1
p = 0.7559 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6001 >= 0.1500  removing imacec_t2
p = 0.6058 >= 0.1500  removing preciorealldi_t2
p = 0.5048 >= 0.1500  removing imacec_t
p = 0.6973 >= 0.1500  removing preciorealldn_t
p = 0.5863 >= 0.1500  removing preciorealtramolocal_t2
p = 0.4511 >= 0.1500  removing caldient_zp64_t1
p = 0.3957 >= 0.1500  removing preciorealldn_t1
p = 0.3001 >= 0.1500  removing preciorealldn_t2
p = 0.2937 >= 0.1500  removing preciorealldi_t
p = 0.2604 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.3180 >= 0.1500  removing cargofijorealtelsur_t
p = 0.8560 >= 0.1500  removing preciorealca_t
p = 0.3123 >= 0.1500  removing preciorealldi_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =   13.87
       Model |  19.5459702     3  6.51532339           Prob > F      =  0.0000
    Residual |  14.0972535    30  .469908449           R-squared     =  0.5810
-------------+------------------------------           Adj R-squared =  0.5391
       Total |  33.6432236    33  1.01949163           Root MSE      =   .6855

------------------------------------------------------------------------------
caldient_~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~m_t |   2.240997   .9226153     2.43   0.021     .3567652    4.125229
```

```
caldien~4_t2 |    .445267   .1670041     2.67   0.012     .1041992    .7863348
preciore~l_t |  -3.209282   1.254574    -2.56   0.016    -5.771464   -.6471007
       _cons |   5.067252   4.065925     1.25   0.222    -3.236475    13.37098
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0645  -0.0649   .15445  0.6943          |                  |
2        0.1303   0.1285    .8037  0.6691          |-                 |-
3       -0.1168  -0.1091   1.3427  0.7190          |                  |
4       -0.3114  -0.3704   5.2987  0.2580        --|                --|
5       -0.0998  -0.1410   5.7192  0.3345          |                 -|
6       -0.1662  -0.1401   6.9266  0.3277         -|                 -|
7        0.0461  -0.0441    7.023  0.4265          |                  |
8        0.0688  -0.0467   7.2459  0.5104          |                  |
9       -0.1512  -0.4522   8.3655  0.4978         -|               ---|
10       0.1832  -0.0749   10.077  0.4337          |-                 |
11      -0.0114   0.0213   10.084  0.5228          |                  |
12       0.0621  -0.2760   10.299  0.5898          |                --|
13      -0.0258  -0.3505   10.338  0.6661          |                --|
14       0.0349  -0.0164   10.412  0.7315          |                  |
15      -0.1120  -1.2174    11.22  0.7369          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.159               1                   0.6902
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.129               1                   0.7192
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  78.04 Chi(2)  1.1e-17
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                ------- joint ------
```

```
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000          20.37       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.83652      5.708      3.630  0.00014

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.2197
 Prob > chi2(15)           =     0.7369

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldient_zp65   caldient_zp65_t1        caldient_zp65_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9260 >= 0.1500  removing preciorealldi_t1
p = 0.9083 >= 0.1500  removing preciorealslm_t2
p = 0.9166 >= 0.1500  removing preciorealldn_t
p = 0.8827 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8527 >= 0.1500  removing preciorealldi_t2
p = 0.8603 >= 0.1500  removing imacec_t2
p = 0.8135 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6312 >= 0.1500  removing imacec_t
p = 0.7158 >= 0.1500  removing imacec_t1
p = 0.6695 >= 0.1500  removing preciorealldn_t1
p = 0.5027 >= 0.1500  removing caldient_zp65_t1
p = 0.3639 >= 0.1500  removing preciorealslm_t1
p = 0.2728 >= 0.1500  removing preciorealtramolocal_t1
p = 0.4067 >= 0.1500  removing preciorealslm_t
p = 0.7658 >= 0.1500  removing preciorealtramolocal_t2
p = 0.3236 >= 0.1500  removing preciorealtramolocal_t
p = 0.6662 >= 0.1500  removing preciorealca_t
p = 0.2228 >= 0.1500  removing preciorealldi_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  3,    30) =   11.54
```

```
       Model |  18.9222066     3   6.3074022           Prob > F      =  0.0000
    Residual |  16.4017065    30  .546723552           R-squared     =  0.5357
-------------+------------------------------           Adj R-squared =  0.4892
       Total |  35.3239132    33  1.07042161           Root MSE      =  .73941

------------------------------------------------------------------------------
caldient_~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
cargofijor~t |  -.0008348   .0002596    -3.22   0.003    -.0013649   -.0003047
caldie~65_t2 |   .3453522   .1746997     1.98   0.057    -.0114322    .7021365
precior~n_t2 |  -.0847577    .047674    -1.78   0.086     -.182121    .0126057
       _cons |    19.0695   5.563345     3.43   0.002     7.707639    30.43137
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0509   0.0510   .09624  0.7564          |                  |
2        0.0701   0.0683   .28422  0.8675          |                  |
3       -0.0940  -0.1035   .63333  0.8888          |                  |
4       -0.1309  -0.1355   1.3325  0.8558         -|                 -|
5       -0.1454  -0.1314   2.2243  0.8173         -|                 -|
6       -0.0959  -0.0903   2.6263  0.8541          |                  |
7       -0.2171  -0.2495   4.7636  0.6888         -|                 -|
8       -0.0202  -0.0655   4.7827  0.7805          |                  |
9       -0.2549  -0.4165   7.9637  0.5378        --|               ---|
10       0.0270  -0.2445    8.001  0.6287          |                 -|
11       0.1987   0.1733   10.103  0.5211          |-                 |-
12       0.0624  -0.2096    10.32  0.5879          |                 -|
13       0.0582  -0.0669   10.518  0.6511          |                  |
14       0.0237  -0.8183   10.552  0.7208          |            ------|
15      -0.0312  -1.4135   10.615  0.7794          |          --------|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.095               1                   0.7574
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.322               1                   0.5703
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
```

```
Jarque-Bera normality test:  75.83 Chi(2)  3.4e-17
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.000         0.000           21.40       0.0000

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.83504      5.760      3.648  0.00013

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    10.6147
 Prob > chi2(15)           =     0.7794

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress    caldnsal_zp45   caldnsal_zp45_t1        caldnsal_zp45_t2
imacec_t
>  imacec_t1    imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2 ,
noconstant
                      begin with full model
p = 0.9835 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8817 >= 0.1500  removing preciorealtramolocal_t2
p = 0.7448 >= 0.1500  removing preciorealldi_t
p = 0.7442 >= 0.1500  removing preciorealldn_t1
p = 0.5916 >= 0.1500  removing preciorealslm_t2
p = 0.4136 >= 0.1500  removing imacec_t1
p = 0.5072 >= 0.1500  removing imacec_t2
p = 0.2963 >= 0.1500  removing preciorealslm_t
p = 0.4343 >= 0.1500  removing preciorealldi_t2
p = 0.3896 >= 0.1500  removing cargofijorealtelsur_t1
```

```
p = 0.2703 >= 0.1500  removing preciorealldn_t
p = 0.2268 >= 0.1500  removing imacec_t
p = 0.1322 >= 0.1500  removing preciorealslm_t1
p = 0.7619 >= 0.1500  removing preciorealtramolocal_t1
p = 0.1397 >= 0.1500  removing precioreallldi_t1
p = 0.3976 >= 0.1500  removing cargofijorealtelsur_t
p = 0.5221 >= 0.1500  removing preciorealtramolocal_t
p = 0.9653 >= 0.1500  removing preciorealca_t
p = 0.1621 >= 0.1500  removing preciorealldn_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    32) = 2182.22
       Model |  24389.7846     2  12194.8923           Prob > F      =  0.0000
    Residual |  178.825422    32  5.58829443           R-squared     =  0.9927
-------------+------------------------------           Adj R-squared =  0.9923
       Total |    24568.61    34  722.606177           Root MSE      =   2.364

------------------------------------------------------------------------------
caldnsal_~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldns~45_t1 |   .3152832   .1324724     2.38   0.023     .0454458    .5851206
caldns~45_t2 |   .6436959   .1294856     4.97   0.000     .3799425    .9074493
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0440  -0.0440   .07188  0.7886          |                  |
2       -0.0852  -0.0876   .34932  0.8397          |                  |
3        0.1362   0.1274   1.0817  0.7815          |-                 |-
4        0.1710   0.1806    2.275  0.6853          |-                 |-
5       -0.2332  -0.2111   4.5704  0.4705         -|                 -|
6       -0.1208  -0.1692   5.2087  0.5173          |                 -|
7        0.1479   0.0257      6.2  0.5166          |-                 |
8        0.1364   0.1928   7.0755  0.5285          |-                 |-
9       -0.3457  -0.2226   12.927  0.1660        --|                 -|
10       0.0750  -0.0174   13.213  0.2120          |                  |
11       0.1930   0.1142   15.196  0.1737          |-                 |
12      -0.0846   0.1500   15.594  0.2106          |                  |
13      -0.2704  -0.5189   19.854  0.0989        --|              ----|
14       0.0005  -0.4160   19.854  0.1348          |               ---|
15      -0.0783  -0.2605   20.249  0.1626          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.137               1                   0.7112
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.346              1                   0.5566
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  8.261 Chi(2)  .0161
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.334         0.015            6.26      0.0438

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.94449      1.938      1.379  0.08396

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    20.2493
 Prob > chi2(15)           =     0.1626

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldnsal_zp63   caldnsal_zp63_t1        caldnsal_zp63_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9943 >= 0.1500  removing preciorealldi_t2
p = 0.9619 >= 0.1500  removing preciorealtramolocal_t2
```

```
p = 0.8844 >= 0.1500  removing preciorealldn_t2
p = 0.7749 >= 0.1500  removing imacec_t1
p = 0.5734 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.5292 >= 0.1500  removing preciorealldi_t
p = 0.6464 >= 0.1500  removing imacec_t2
p = 0.4935 >= 0.1500  removing caldnsal_zp63_t1
p = 0.6645 >= 0.1500  removing preciorealldn_t
p = 0.6168 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.4775 >= 0.1500  removing preciorealslm_t1
p = 0.3088 >= 0.1500  removing preciorealldn_t1
p = 0.3645 >= 0.1500  removing imacec_t
p = 0.2385 >= 0.1500  removing preciorealtramolocal_t1
p = 0.2591 >= 0.1500  removing cargofijorealtelsur_t
p = 0.6597 >= 0.1500  removing preciorealca_t
p = 0.2299 >= 0.1500  removing preciorealldi_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   34.96
       Model |  1885.35376     4   471.33844           Prob > F      =  0.0000
    Residual |  391.016053    29  13.4833122           R-squared     =  0.8282
-------------+------------------------------           Adj R-squared =  0.8045
       Total |  2276.36981    33  68.9809035           Root MSE      =   3.672

------------------------------------------------------------------------------
caldnsal_~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~m_t2 |  -2.220158    1.05649    -2.10   0.044    -4.380922   -.0593942
caldnsa~3_t2 |   .7144224   .1096419     6.52   0.000     .4901795    .9386652
preciore~m_t |   14.36165   7.559127     1.90   0.067    -1.098498     29.8218
preciore~l_t |  -18.11166   9.730983    -1.86   0.073    -38.01375    1.790434
       _cons |   38.62577   22.83388     1.69   0.101    -8.074765    85.32631
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1260   0.1261   .58882  0.4429          |-                 |-
2        0.0338   0.0191   .63247  0.7289          |                  |
3        0.0273   0.0211   .66188  0.8821          |                  |
4       -0.2919  -0.3320   4.1383  0.3876        --|                --|
5       -0.1901  -0.1361    5.663  0.3404         -|                 -|
6       -0.0064   0.0387   5.6648  0.4618          |                  |
7        0.0416   0.0936   5.7431  0.5700          |                  |
8       -0.1878  -0.3396   7.4042  0.4937         -|                --|
9       -0.1594  -0.4511   8.6477  0.4704         -|               ---|
10       0.0469   0.1903   8.7598  0.5550          |                  |-
11      -0.2054  -0.0237   11.005  0.4428         -|                  |
12       0.0820  -0.2988   11.379  0.4967          |                --|
13       0.1049  -0.2978    12.02  0.5260          |                --|
14       0.0271  -0.1858   12.065  0.6011          |                 -|
15      -0.1213  -0.6354   13.014  0.6012          |             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
```

```
       1     |          0.566               1                   0.4520
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.823               1                   0.3643
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  5.006 Chi(2)  .0818
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.283         0.038            5.29      0.0711

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W           V         z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.95385      1.612      0.994  0.16002

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.0137
 Prob > chi2(15)           =     0.6012

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
```

```
.  regress    caldnsal_zp64   caldnsal_zp64_t1        caldnsal_zp64_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1        preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2 ,
noconstant
                      begin with full model
p = 0.9562 >= 0.1500  removing imacec_t1
p = 0.9085 >= 0.1500  removing preciorealtramolocal_t1
p = 0.9410 >= 0.1500  removing preciorealtramolocal_t2
p = 0.8214 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7787 >= 0.1500  removing preciorealldi_t
p = 0.8291 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7662 >= 0.1500  removing imacec_t
p = 0.8044 >= 0.1500  removing preciorealldn_t2
p = 0.6983 >= 0.1500  removing imacec_t2
p = 0.6265 >= 0.1500  removing caldnsal_zp64_t1
p = 0.3060 >= 0.1500  removing preciorealldn_t
p = 0.4154 >= 0.1500  removing preciorealslm_t2
p = 0.7817 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.4187 >= 0.1500  removing preciorealldi_t2
p = 0.5438 >= 0.1500  removing preciorealldi_t1
p = 0.1396 >= 0.1500  removing preciorealldn_t1
p = 0.4650 >= 0.1500  removing preciorealca_t
p = 0.1265 >= 0.1500  removing preciorealslm_t1
p = 0.5707 >= 0.1500  removing preciorealtramolocal_t
p = 0.2019 >= 0.1500  removing preciorealslm_t

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  1,    33) = 4780.35
       Model |  44246.8663     1  44246.8663           Prob > F      =  0.0000
    Residual |  305.447778    33  9.25599328           R-squared     =  0.9931
-------------+------------------------------           Adj R-squared =  0.9929
       Total |  44552.3141    34  1310.36218           Root MSE      =  3.0424

------------------------------------------------------------------------------
caldnsal_~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldnsa~4_t2 |   .9608753   .0138975    69.14   0.000     .9326006      .98915
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0704   0.0703   .18358  0.6683          |                  |
2       -0.0439  -0.0491   .25714  0.8794          |                  |
3        0.1028   0.1107   .67465  0.8792          |                  |
4       -0.4027  -0.4340   7.2897  0.1213       ---|               ---|
5       -0.1610  -0.0863   8.3834  0.1363         -|                  |
6        0.0935   0.0665   8.7658  0.1872          |                  |
7        0.0446   0.1600   8.8558  0.2632          |                  |-
8       -0.1007  -0.2763   9.3331  0.3150          |                --|
9        0.0371  -0.1336   9.4006  0.4011          |                 -|
10      -0.0239   0.0214   9.4296  0.4919          |                  |
```

```
11      -0.0717   0.2620   9.7033  0.5573          |                  |--
12       0.1044   0.0082    10.31  0.5888          |                  |
13       0.0130  -0.3311    10.32  0.6676          |                --|
14      -0.0924  -0.2989   10.842  0.6984          |                --|
15      -0.1553  -0.1342   12.397  0.6488         -|                 -|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.175               1                   0.6756
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.361               1                   0.5477
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  .1579 Chi(2)  .9241
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                        ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.654         0.562            0.56       0.7573

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W           V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.98090      0.667     -0.844  0.80059

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    12.3967
 Prob > chi2(15)           =     0.6488

.
```

```
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldnsal_zp65   caldnsal_zp65_t1        caldnsal_zp65_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.8098 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.7608 >= 0.1500  removing imacec_t1
p = 0.7371 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6028 >= 0.1500  removing preciorealslm_t2
p = 0.5518 >= 0.1500  removing preciorealldi_t1
p = 0.6201 >= 0.1500  removing preciorealldn_t2
p = 0.4815 >= 0.1500  removing imacec_t2
p = 0.4411 >= 0.1500  removing preciorealslm_t1
p = 0.5463 >= 0.1500  removing caldnsal_zp65_t1
p = 0.4024 >= 0.1500  removing preciorealldi_t
p = 0.4478 >= 0.1500  removing preciorealldi_t2
p = 0.2683 >= 0.1500  removing preciorealldn_t
p = 0.1363 >= 0.1500  removing preciorealldn_t1
p = 0.2324 >= 0.1500  removing imacec_t
p = 0.4180 >= 0.1500  removing cargofijorealtelsur_t
p = 0.2108 >= 0.1500  removing preciorealca_t
p = 0.1525 >= 0.1500  removing preciorealtramolocal_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    29) =   34.54
       Model |  2263.55798     4  565.889496           Prob > F      =  0.0000
    Residual |  475.171015    29  16.3852074           R-squared     =  0.8265
-------------+------------------------------           Adj R-squared =  0.8026
       Total |    2738.729    33  82.9917878           Root MSE      =  4.0479

------------------------------------------------------------------------------
caldnsal_~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
preciore~l_t |    -19.796   10.64239    -1.86   0.073    -41.56212    1.970127
caldns~65_t2 |   .7116963   .1152114     6.18   0.000     .4760625    .9473301
precior~l_t2 |   -3.13703   1.611629    -1.95   0.061    -6.433181    .1591213
preciore~m_t |   15.58134    8.30095     1.88   0.071     -1.39601    32.55869
       _cons |   37.63452   24.02357     1.57   0.128     -11.4992    86.76825
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.1255   0.1257   .58377  0.4448           |-                 |-
```

```
2        0.0498   0.0354   .67845  0.7123          |                  |
3        0.0669   0.0598   .85498  0.8363          |                  |
4       -0.2900  -0.3468   4.2865  0.3686        --|                --|
5       -0.1683  -0.1269   5.4823  0.3599         -|                 -|
6        0.0063   0.0872   5.4841  0.4834          |                  |
7       -0.0623  -0.0012   5.6599  0.5800          |                  |
8       -0.1587  -0.2815   6.8456  0.5534         -|                --|
9       -0.1479  -0.4182    7.916  0.5426         -|               ---|
10      -0.0044   0.0887    7.917  0.6369          |                  |
11      -0.1392   0.0144   8.9479  0.6267         -|                  |
12       0.1374   0.0170   9.9981  0.6161          |-                 |
13       0.0998  -0.2301   10.578  0.6461          |                 -|
14      -0.0145  -0.3400   10.591  0.7178          |                --|
15      -0.1037  -0.5152   11.283  0.7323          |              ----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.566               1                   0.4519
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.024               1                   0.3117
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  3.012 Chi(2)  .2218
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.097         0.188            4.55       0.1027

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V           z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.96710      1.149      0.289  0.38623

.
```

```
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    11.2834
 Prob > chi2(15)           =     0.7323

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.  regress    caldnent_zp45   caldnent_zp45_t1        caldnent_zp45_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9594 >= 0.1500  removing preciorealldi_t
p = 0.9441 >= 0.1500  removing imacec_t2
p = 0.9286 >= 0.1500  removing preciorealtramolocal_t2
p = 0.8848 >= 0.1500  removing preciorealslm_t1
p = 0.8118 >= 0.1500  removing imacec_t1
p = 0.7344 >= 0.1500  removing preciorealslm_t2
p = 0.7739 >= 0.1500  removing caldnent_zp45_t1
p = 0.7651 >= 0.1500  removing preciorealldi_t2
p = 0.5260 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6545 >= 0.1500  removing preciorealldn_t2
p = 0.4957 >= 0.1500  removing preciorealldn_t1
p = 0.4983 >= 0.1500  removing imacec_t
p = 0.5836 >= 0.1500  removing preciorealtramolocal_t1
p = 0.2369 >= 0.1500  removing preciorealldn_t
p = 0.1308 >= 0.1500  removing cargofijorealtelsur_t
p = 0.3475 >= 0.1500  removing preciorealldi_t1
p = 0.1970 >= 0.1500  removing preciorealca_t
p = 0.4621 >= 0.1500  removing preciorealtramolocal_t
p = 0.2502 >= 0.1500  removing preciorealslm_t
p = 0.3185 >= 0.1500  removing cargofijorealtelsur_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  1,    32) =  102.73
       Model |  564.264061     1  564.264061           Prob > F      =  0.0000
    Residual |  175.765301    32  5.49266565           R-squared     =  0.7625
-------------+------------------------------           Adj R-squared =  0.7551
       Total |  740.029362    33  22.4251322           Root MSE      =  2.3436

------------------------------------------------------------------------------
caldnent_~45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldne~45_t2 |   .7933826   .0782768    10.14   0.000      .633938    .9528272
       _cons |   5.434449   2.416904     2.25   0.032      .511377    10.35752
```

```
--------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0518   0.0526   .09955  0.7524          |                  |
2       -0.1755  -0.1784   1.2776  0.5279         -|                 -|
3       -0.0248  -0.0100   1.3019  0.7287          |                  |
4       -0.2267  -0.2807   3.3994  0.4933         -|                --|
5       -0.0477  -0.0505   3.4953  0.6241          |                  |
6        0.1058  -0.0236   3.9846  0.6788          |                  |
7        0.1921   0.1672   5.6574  0.5803          |-                 |-
8       -0.0184  -0.0673   5.6734  0.6838          |                  |
9       -0.3250  -0.3209   10.845  0.2865        --|                --|
10      -0.1206  -0.1443   11.587  0.3136          |                 -|
11      -0.0103  -0.1343   11.593  0.3950          |                 -|
12      -0.0272  -0.1937   11.634  0.4755          |                 -|
13       0.0720  -0.2332   11.936  0.5329          |                 -|
14       0.0432  -0.2166    12.05  0.6023          |                 -|
15      -0.0518  -0.3719   12.223  0.6621          |                --|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.093               1                   0.7600
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.515               1                   0.4728
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:   9.01 Chi(2)  .0111
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.124         0.017            7.15       0.0280
```

```
.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.93855      2.146      1.591  0.05581

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    12.2233
 Prob > chi2(15)           =     0.6621

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldnent_zp63   caldnent_zp63_t1        caldnent_zp63_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2 ,
noconstant
                      begin with full model
p = 0.9997 >= 0.1500  removing preciorealtramolocal_t1
p = 0.9837 >= 0.1500  removing preciorealldi_t
p = 0.9846 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.9841 >= 0.1500  removing preciorealslm_t2
p = 0.9648 >= 0.1500  removing imacec_t
p = 0.8925 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.8865 >= 0.1500  removing preciorealldi_t2
p = 0.8458 >= 0.1500  removing preciorealldn_t
p = 0.8245 >= 0.1500  removing imacec_t1
p = 0.6583 >= 0.1500  removing preciorealldn_t1
p = 0.7141 >= 0.1500  removing preciorealslm_t1
p = 0.4058 >= 0.1500  removing preciorealldn_t2
p = 0.6635 >= 0.1500  removing imacec_t2
p = 0.7452 >= 0.1500  removing cargofijorealtelsur_t
p = 0.7233 >= 0.1500  removing preciorealca_t
p = 0.4352 >= 0.1500  removing preciorealtramolocal_t
p = 0.2779 >= 0.1500  removing caldnent_zp63_t1
p = 0.1687 >= 0.1500  removing preciorealslm_t
p = 0.6492 >= 0.1500  removing preciorealtramolocal_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  2,    32) = 2367.43
       Model |  72349.2701     2  36174.6351           Prob > F      =  0.0000
```

```
    Residual |  488.963558    32  15.2801112           R-squared     =  0.9933
-------------+------------------------------           Adj R-squared =  0.9929
       Total |  72838.2337    34  2142.30099           Root MSE      =   3.909

------------------------------------------------------------------------------
caldnent_~63 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~i_t1 |   .0640384   .0296314     2.16   0.038     .0036812    .1243957
caldnen~3_t2 |   .7381947    .102721     7.19   0.000     .5289588    .9474306
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.2187   0.2189   1.7741  0.1829          |-                 |-
2       -0.0243  -0.0730   1.7967  0.4072          |                  |
3       -0.0551  -0.0268   1.9168  0.5899          |                  |
4       -0.2695  -0.2682   4.8796  0.2999        --|                --|
5       -0.1692  -0.0866   6.0879  0.2978         -|                  |
6        0.0157  -0.0024   6.0987  0.4122          |                  |
7        0.0973   0.0543   6.5278  0.4796          |                  |
8       -0.1119  -0.2330   7.1168  0.5241          |                 -|
9       -0.2086  -0.3073    9.248  0.4147         -|                --|
10       0.0120   0.0738   9.2553  0.5081          |                  |
11      -0.0682  -0.0351   9.5029  0.5756          |                  |
12      -0.0017  -0.1245   9.5031  0.6595          |                  |
13       0.1092  -0.0676   10.199  0.6776          |                  |
14      -0.0649  -0.4414   10.456  0.7281          |               ---|
15      -0.2197  -0.7129   13.565  0.5587         -|             -----|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.692               1                   0.1933
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.400               1                   0.5273
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  29.07 Chi(2)  4.9e-07
Jarque-Bera test for Ho: normality: (residuo)
```

```
.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.012         0.002           12.64       0.0018

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.88670      3.956      2.866  0.00208

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    13.5652
 Prob > chi2(15)           =     0.5587

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.  regress    caldnent_zp64   caldnent_zp64_t1        caldnent_zp64_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2
                      begin with full model
p = 0.9985 >= 0.1500  removing imacec_t1
p = 0.7810 >= 0.1500  removing preciorealldi_t2
p = 0.7483 >= 0.1500  removing preciorealldi_t
p = 0.7468 >= 0.1500  removing cargofijorealtelsur_t1
p = 0.6683 >= 0.1500  removing preciorealldn_t2
p = 0.7154 >= 0.1500  removing preciorealtramolocal_t2
p = 0.6869 >= 0.1500  removing preciorealldi_t1
p = 0.4099 >= 0.1500  removing imacec_t2
p = 0.1580 >= 0.1500  removing preciorealslm_t2
p = 0.4480 >= 0.1500  removing preciorealslm_t1
p = 0.3824 >= 0.1500  removing caldnent_zp64_t1
p = 0.3272 >= 0.1500  removing preciorealldn_t
p = 0.2635 >= 0.1500  removing preciorealldn_t1
p = 0.4363 >= 0.1500  removing cargofijorealtelsur_t
```

```
p = 0.5762 >= 0.1500  removing imacec_t
p = 0.3234 >= 0.1500  removing preciorealtramolocal_t1
p = 0.4375 >= 0.1500  removing preciorealca_t
p = 0.1849 >= 0.1500  removing preciorealtramolocal_t
p = 0.2006 >= 0.1500  removing preciorealslm_t
p = 0.2604 >= 0.1500  removing cargofijorealtelsur_t2

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  1,    32) =   67.82
       Model |  821.288513     1  821.288513           Prob > F      =  0.0000
    Residual |   387.49876    32  12.1093363           R-squared     =  0.6794
-------------+------------------------------           Adj R-squared =  0.6694
       Total |  1208.78727    33  36.6299174           Root MSE      =  3.4798

------------------------------------------------------------------------------
caldnent_~64 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
caldnen~4_t2 |   .7851134   .0953333     8.24   0.000     .5909258     .979301
       _cons |   8.623818   4.296866     2.01   0.053     -.128611    17.37625
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0721   0.0720   .19281  0.6606          |                  |
2       -0.0469  -0.0519   .27679  0.8708          |                  |
3       -0.0451  -0.0373   .35698  0.9490          |                  |
4       -0.3757  -0.3919   6.1162  0.1906       ---|               ---|
5       -0.0128  -0.0116   6.1231  0.2944          |                  |
6        0.2173   0.1725   8.1878  0.2247          |-                 |-
7        0.1537   0.1617   9.2594  0.2346          |-                 |-
8       -0.1416  -0.3297   10.203  0.2511         -|                --|
9       -0.2233  -0.5834   12.643  0.1794         -|              ----|
10      -0.1403  -0.1632   13.647  0.1897         -|                 -|
11      -0.1538   0.2154   14.907  0.1868         -|                  |-
12       0.1317  -0.1753   15.871  0.1972          |-                -|
13       0.2000  -0.2794   18.202  0.1500          |-               --|
14      -0.0081  -0.3493   18.206  0.1976          |                --|
15      -0.1091  -0.3779   18.972  0.2150          |               ---|

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.181               1                   0.6702
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          1.669               1                   0.1963
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

```
.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  3.576 Chi(2)  .1673
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                 ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.977         0.045            4.19      0.1232

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs       W          V          z     Prob>z
-------------+--------------------------------------------------
     residuo |     34    0.94122      2.052      1.498  0.06705

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    18.9722
 Prob > chi2(15)           =     0.2150

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.  regress    caldnent_zp65   caldnent_zp65_t1        caldnent_zp65_t2
imacec_t
> imacec_t1     imacec_t2       cargofijorealtelsur_t   cargofijorealtelsur_t1
cargofijorealtelsur_
> t2  preciorealslm_t   preciorealslm_t1      preciorealslm_t2
preciorealtramolocal_t   preci
> orealtramolocal_t1       preciorealtramolocal_t2 preciorealca_t
preciorealldi_t preciorealldi
> _t1 preciorealldi_t2 preciorealldn_t preciorealldn_t1 preciorealldn_t2 ,
noconstant
                      begin with full model
p = 0.9339 >= 0.1500  removing preciorealslm_t1
p = 0.9340 >= 0.1500  removing preciorealslm_t2
p = 0.9243 >= 0.1500  removing caldnent_zp65_t1
p = 0.7931 >= 0.1500  removing cargofijorealtelsur_t1
```

```
p = 0.7698 >= 0.1500  removing imacec_t1
p = 0.5991 >= 0.1500  removing preciorealldn_t
p = 0.6598 >= 0.1500  removing preciorealldi_t1
p = 0.4035 >= 0.1500  removing preciorealldi_t2
p = 0.5011 >= 0.1500  removing cargofijorealtelsur_t2
p = 0.6211 >= 0.1500  removing preciorealldn_t2
p = 0.4953 >= 0.1500  removing imacec_t
p = 0.3590 >= 0.1500  removing imacec_t2
p = 0.3733 >= 0.1500  removing cargofijorealtelsur_t
p = 0.4283 >= 0.1500  removing preciorealldi_t
p = 0.1295 >= 0.1500  removing preciorealtramolocal_t2
p = 0.2819 >= 0.1500  removing preciorealca_t
p = 0.3812 >= 0.1500  removing preciorealldn_t1

      Source |       SS       df       MS              Number of obs =      34
-------------+------------------------------           F(  4,    30) =  861.81
       Model |  45005.7845     4  11251.4461           Prob > F      =  0.0000
    Residual |  391.667972    30  13.0555991           R-squared     =  0.9914
-------------+------------------------------           Adj R-squared =  0.9902
       Total |  45397.4525    34  1335.21919           Root MSE      =  3.6133

------------------------------------------------------------------------------
caldnent_~65 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
precior~l_t1 |  -5.131215    3.20614    -1.60   0.120    -11.67903    1.416596
caldne~65_t2 |   .6558787   .1393659     4.71   0.000     .3712555    .9405019
preciore~l_t |  -26.18285   13.67491    -1.91   0.065    -54.11074    1.745038
preciore~m_t |   22.32228    11.7721     1.90   0.068    -1.719553    46.36411
------------------------------------------------------------------------------

. predict residuo, residuals
(2 missing values generated)

. corrgram residuo

                                          -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.0789   0.0883   .23104  0.6308          |                  |
2        0.0333   0.0312   .27356  0.8722          |                  |
3        0.1776   0.1990   1.5187  0.6780          |-                 |-
4       -0.2216  -0.2799   3.5225  0.4745         -|                --|
5       -0.0786  -0.0559   3.7833  0.5810          |                  |
6        0.0941   0.1339   4.1703  0.6536          |                  |-
7       -0.0411   0.0434   4.2469  0.7509          |                  |
8       -0.0605  -0.1431   4.4189  0.8175          |                 -|
9       -0.1859  -0.4978   6.1111  0.7287         -|               ---|
10      -0.1837  -0.1784   7.8315  0.6453         -|                 -|
11      -0.1951   0.2314   9.8572  0.5433         -|                  |-
12      -0.1802  -0.2146   11.664  0.4731         -|                 -|
13       0.0128  -0.4568   11.673  0.5546          |               ---|
14      -0.1344  -1.0780   12.779  0.5440         -|          --------|
15      -0.0389   0.1228   12.876  0.6118          |                  |

. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.244               1                   0.6212
---------------------------------------------------------------------------
                        H0: no serial correlation
```

```
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
---------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-------------------------------------------------------------
       1     |          0.437               1                   0.5086
---------------------------------------------------------------------------
         H0: no ARCH effects      vs.  H1: ARCH(p) disturbance

.

. **estat ovtest
.
. ***test jarque bera
. jb6 residuo
Jarque-Bera normality test:  6.783 Chi(2)  .0337
Jarque-Bera test for Ho: normality: (residuo)

.
. ***test Smirnov Kolmogorov
. sktest residuo

                   Skewness/Kurtosis tests for Normality
                                                  ------- joint ------
    Variable |  Pr(Skewness)   Pr(Kurtosis)  adj chi2(2)    Prob>chi2
-------------+-------------------------------------------------------
     residuo |      0.103         0.033           6.57       0.0375

.
. ***test Shapiro Wilk
. swilk residuo

                   Shapiro-Wilk W test for normal data
    Variable |    Obs        W          V          z     Prob>z
-------------+-------------------------------------------------
     residuo |     34    0.93587      2.239      1.680  0.04649

.
. ***test Box-Ljung white noise
. wntestq residuo

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =    12.8763
 Prob > chi2(15)           =     0.6118

.
. ***test Bartlett ruido blanco
. *wntestb residuo
.
.
.
.
. drop residuo

.
.
.
.
end of do-file

. exit, clear
```