

Report for the Subsecretaría de Telecomunicaciones (Subtel)

Strategic review of broadband regulatory policy in Chile

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11 January 2010

Ref: 14233-26

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Workstream 2: Competition assessment

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Analysys Mason was commissioned to assist the Subtel with its strategic review of broadband regulatory options [1/2]

- Analysys Mason Limited ('Analysys Mason') was commissioned to assist the Subsecretaría de Telecomunicaciones, Ministerio de Transportes y Telecomunicaciones (Subtel) with its strategic review of the broadband regulatory options in Chile. The objectives of the review are twofold:
 - **strategic analysis of the current broadband regulatory policy** – assessing the status of the sector and identifying potential barriers to its development
 - **identification of potential measures or remedies, both within and between networks** – to strengthen broadband competition and enhance its coverage
- In order to draw our conclusions and recommendations, our work has been structured into three workstreams:
 - 1 BROADBAND GAP ANALYSIS**
 - Identify the differences between broadband and connectivity indicators in Chile and in the main OECD countries and Latin American countries, as well as the main differentiating factors relating to competition and regulation
 - The key indicators that must be taken into account for this analysis are provision of connectivity and other elements that may characterise the countries analysed
 - 2 COMPETITION ASSESSMENT**
 - Assessment of the national telecoms market in Chile
 - Assessment of the state of competition in the broadband market in Chile. Specifically, the objective is to understand the current state of the broadband market and its possible evolution in terms of competition, coverage and quality of service
 - Interviews with 12 key stakeholders in Chile to support our assessment
 - 3 REGULATORY COMPETITION OPTIONS**
 - Analysis of the service-based (within networks) and facilities-based (between networks) competition models
 - The international lessons on competition models must be analysed in the context of the Chilean market, taking into account findings from the previous workstreams in order to promote increased competition and coverage of broadband
 - Interviews with five key regulators and public bodies across the benchmarked countries
- The conclusions and recommendations presented herein are based on the work that Analysys Mason undertook under each of the workstreams above, as well as our extensive experience from previous assignments in Chile and worldwide
- We understand that not all recommendations lie within the domain of the Subtel
- The project spanned 15 weeks between July and October 2009

Competition seems to be delivering good results, but there are some issues that need to be dealt with [1/2]

| <i>Issue</i> | <i>Analysis</i> |
|--------------------|--|
| Penetration | <ul style="list-style-type: none"> • The level of broadband penetration in Chile seems reasonable <ul style="list-style-type: none"> ▸ Chile's broadband penetration is one of the highest among countries of similar economic conditions, although it is still far from OECD targets |
| Coverage | <ul style="list-style-type: none"> • Fixed broadband is unlikely to cover the whole country, and mobile broadband may well complement it <ul style="list-style-type: none"> ▸ Current broadband coverage stands at about 80% (fixed) – 80–88% of the population could have at least 1Mbit/s within 18 months as mobile broadband continues to be rolled out ▸ In some parts of the country, especially remote rural areas and less affluent urban areas (10–12% of the population), do not even have mobile coverage |
| Prices | <ul style="list-style-type: none"> • Broadband prices, although relatively high, are not unreasonable and appear to be declining <ul style="list-style-type: none"> ▸ Although broadband prices in Chile are still at the high end of OECD countries, recent trends suggest that absolute prices, and not only the price per Mbps, are declining due to increasing competition in both the fixed and mobile broadband market – while the price per Mbps has declined significantly over time, Telefónica Chile's* entry-level broadband prices started to decrease only recently ▸ The price of entry-level fixed broadband offers is expected to decrease further due to competition from mobile broadband operators and the introduction of naked broadband |
| Products | <ul style="list-style-type: none"> • Broadband speeds can be considered reasonable and they are increasing, but the fixed network structure could be a limiting factor in the medium term if there are no further investments <ul style="list-style-type: none"> ▸ Broadband data rates in Chile have been increasing significantly over the last two years, but they still lag behind most of the benchmarked countries. Competition has caused some products to be available nationwide ▸ Approximately 50% of households may not be able to have higher data rates (>6–8Mbit/s unless new investments in upgrading the networks are made, due to the quality and average length of the local loops) |
| Spectrum | <ul style="list-style-type: none"> • The allocation of low-frequency spectrum could allow better coverage and higher quality of mobile broadband <ul style="list-style-type: none"> ▸ Spectrum is not expected to be a limiting factor for the development of mobile broadband in the short term, although the current lack of low-frequency spectrum (below 1GHz) is not allowing operators to be as efficient as possible in increasing the coverage of their networks or improving quality of service (e.g. in-building penetration) |

Competition seems to be delivering good results, but there are some issues that need to be dealt with [2/2]

| Issue | Analysis |
|--|--|
| In-building wiring and exclusivity of access to buildings | <ul style="list-style-type: none"> • In-building wiring could be a barrier to broadband development, which can lead to mini-monopolies <ul style="list-style-type: none"> ▸ Many buildings need to be cabled by operators when providing the services, thus increasing the costs for operators – exclusivity could be a barrier to broadband development ▸ This issue could lead to exclusivity agreements between operators and landlords/building owners, which limit the customer's choice to select a provider, creating mini-monopolies in each building |
| Infrastructure sharing | <ul style="list-style-type: none"> • Operators' resistance to infrastructure sharing may be a barrier to mobile broadband coverage <ul style="list-style-type: none"> ▸ Mobile operators do not seem to be inclined towards collaborating with new entrants to share existing passive infrastructure. Operators' resistance to infrastructure sharing may be a barrier to mobile broadband coverage; in other countries, there are initiatives to incentivise infrastructure sharing |
| Facilitation of access network deployment | <ul style="list-style-type: none"> • Municipalities' excessive intervention can be a barrier to broadband development <ul style="list-style-type: none"> ▸ Town halls and municipalities seem to be putting up more barriers to the deployment of new infrastructure |
| International bandwidth costs | <ul style="list-style-type: none"> • International bandwidth costs have a significant impact on the final broadband prices <ul style="list-style-type: none"> ▸ The cost of international bandwidth can represent a significant proportion of the broadband cost structure |
| Extension of broadband coverage to remote rural areas | <ul style="list-style-type: none"> • The high operational costs of deploying broadband in remote rural areas is a barrier to extending broadband coverage in these areas <ul style="list-style-type: none"> ▸ The Chilean government has been supporting rural deployments, however, the high operational costs (opex) of deploying broadband in remote rural areas continues to be a barrier. Some operators also argue that the obligations are too stringent, making the business case very difficult even with subsidies |
| Wi-Fi connections | <ul style="list-style-type: none"> • Wi-Fi connections could help increase coverage and drive up penetration <ul style="list-style-type: none"> ▸ Around 50% of broadband customers in Chile could have Wi-Fi in their homes – customers could share the same connection and the corresponding costs. Operators have not yet looked at products for this |

Relative affordability and low awareness/perceived attractiveness of broadband seem to be holding take-up

| Issue | Analysis |
|--|---|
| Affordability | <ul style="list-style-type: none"> • Relative affordability has been an issue for a large part of the population in line with countries of similar GDP per capita <ul style="list-style-type: none"> ▸ In Chile, the price of entry-level broadband offers is relatively high compared to the country's income, which may represent a barrier to penetration growth ▸ Fixed broadband in Chile seems to represent a higher share of a household's income than in other OECD countries, although it is similar to other countries with comparable GDP per capita ▸ Moreover, broadband affordability varies across Chile, but overall affordability is lower than in countries with higher broadband penetration. This may require initiatives to be implemented regionally, although this may put at risk the national pricing policy currently in place in Chile |
| PC penetration | <ul style="list-style-type: none"> • Low PC penetration has been holding back penetration <ul style="list-style-type: none"> ▸ PC penetration in Chile is low, although mobile operators are beginning to finance notebooks bundled with mobile broadband services – this may help those that consider the price of notebooks to be a barrier |
| Interest in broadband services by potential customers | <ul style="list-style-type: none"> • In general, there is low awareness of the benefits of broadband by potential customers <ul style="list-style-type: none"> ▸ Low awareness and lack of knowledge of the benefits of broadband on the part of consumers is a main barrier to broadband take-up, although the Chilean government has launched initiatives to raise awareness of broadband among end users – local content development and education programmes are some of the key initiatives adopted in other countries to address this issue |
| Financing and customer lock-in | <ul style="list-style-type: none"> • The lack of customer lock-in mechanisms does not incentivise operators to offer more attractive financing/subsidies |
| Protection against debtors | <ul style="list-style-type: none"> • Considering broadband as a basic service does not incentivise operators to offer more attractive financing/subsidies <ul style="list-style-type: none"> ▸ Operators treat broadband as a basic service, and thus do not make use of measures to ensure payment (such as 'black listing' customers), which does not allow them to more aggressively lower entry barriers |

There is no need for a major regulatory change, but enhancing and accelerating some initiatives may help [1/2]

| Issue | Recommendations |
|------------------------------------|--|
| Application of regulatory remedies | <ul style="list-style-type: none"> • Review and enhance the current application of regulatory remedies with a focus on bitstream and naked broadband <ul style="list-style-type: none"> ▸ Given the existing high level of competition in the most attractive market segments, it is unclear that focusing more on an existing remedy such as local loop unbundling (LLU) will be beneficial in the case of Chile (in countries where LLU has been a success, for instance in some European countries, the focus of LLU has been on these segments). This seems to be in line with the fact that operators in Chile have not expressed significant interest in the existing LLU offer or requested pricing or procedural enhancements ▸ However, in those areas where there is not sufficient competition (e.g. 25–40% of households with a single fixed broadband provider), competition could be fostered further with the introduction of a bitstream product (including naked broadband, such as those available in countries like Spain) at sufficient margins, and the requirement for the dominant operator (expected to be Telefónica Chile in most of the country) to make available the equivalent wholesale input for every regulated retail service ▸ In the medium term, especially if low-frequency spectrum is released, we believe mobile broadband will be a real alternative for a proportion of the population, as experiences in other countries such as Austria have shown ▸ In addition to regulated tariffs, the definition of a clear reference offer for the regulated services and the involvement of the Subtel in operational issues are key to ensuring that the regulatory framework is effectively implemented, although industry involvement and the reinforcement of the Subtel's resources are also desirable. The combination of these aspects has proved useful in several countries like France and the UK ▸ Functional separation is another option, although it is a drastic and costly measure and may not always be the best solution to prevent anti-competitive behaviour ▸ Bitstream access has been priced in a variety of ways, including explicit retail-minus, cost-plus (based on long-run incremental costing (LRIC+) or fully allocated costing (FAC)), and also by the use of margin-squeeze tests from retail or other wholesale products ▸ Regulators in Europe (where bitstream has been more widely adopted) that have used top-down models to regulate wholesale access tariffs have often found that the results did not allow competition. A combination of a regulatory accounting system, a bottom-up model, and a margin-squeeze analysis may give a regulator the inputs needed to set prices at the right level and allow competition to develop |
| Spectrum | <ul style="list-style-type: none"> • Release additional spectrum for mobile broadband <ul style="list-style-type: none"> ▸ While actual spectrum limits are not a hindrance in terms of capacity, it would be convenient to make low-frequency (< 1GHz) spectrum available to operators to improve coverage and in-building penetration, already planned in Chile and in the great majority of the most advanced countries |

There is no need for a major regulatory change, but enhancing and accelerating some initiatives may help [2/2]

| <i>Issue</i> | <i>Recommendations</i> |
|----------------------------------|--|
| Infrastructure sharing | <ul style="list-style-type: none"> • Provide incentives to encourage infrastructure sharing <ul style="list-style-type: none"> ▸ Infrastructure sharing should be promoted and is probably worth the regulatory burden, as it would spur the deployment of advanced services. This is already taking place in most developed countries |
| In-building wiring | <ul style="list-style-type: none"> • Support in-building wiring <ul style="list-style-type: none"> ▸ Multi-tenant dwelling units (especially new builds) should provide non-discriminatory access to all operators, while obliging new buildings to provide minimum telecoms infrastructure |
| Access network deployment | <ul style="list-style-type: none"> • Develop a framework that facilitates access network deployments <ul style="list-style-type: none"> ▸ A framework that standardises and expedites rights-of-way permissions, ensures cost-based fees imposed for rights-of-way access, and centralises the process of obtaining municipal rights-of-way would help to remedy roadblocks. The state of Michigan is an example (see slide 36) |
| Unified licensing | <ul style="list-style-type: none"> • Establish a unified licence that allows the provision of all telecoms services <ul style="list-style-type: none"> ▸ A unified licence that allows the provision of all telecoms services greatly improves flexibility and allows adaptation to market conditions. For example, this is the case in Peru ▸ Separation of the licence for access to scarce resources, such as spectrum and numbers, from the licence to offer services will ensure that providers have the rights to access those scarce resources as needed |
| Remote rural coverage | <ul style="list-style-type: none"> • Subsidy plans to increase remote rural coverage should cover all deployment aspects and specify the right level of quality-of-service requirements <ul style="list-style-type: none"> ▸ Infrastructure sharing and a better co-ordination and management among government programmes such as the Fondo de Desarrollo de Telecomunicaciones (FDT) could be used as a tool to encourage existing operators to deploy their networks in more rural areas |
| Wi-Fi access | <ul style="list-style-type: none"> • Favour Wi-Fi access <ul style="list-style-type: none"> ▸ Sharing Wi-Fi among neighbours could increase Internet penetration in terms of usage in less affluent areas, although attention should be paid not to desincentivising those customers that would subscribe for a broadband connection otherwise |
| International bandwidth | <ul style="list-style-type: none"> • Facilitate a market solution to bring international bandwidth costs down <ul style="list-style-type: none"> ▸ Operators acknowledge that Chile is a small and remote market, which has an impact on prices. A possible remedy would be to encourage international content data network (CDN) players to enter the Chilean market or expand their service portfolio if they are already present |

Other initiatives require the Subtel to involve other government units and the industry

| Issue | Recommendations |
|--|---|
| Broadband affordability | <ul style="list-style-type: none"> • Increase broadband affordability among the most unfavoured segments of the population <ul style="list-style-type: none"> ▸ There are several ways in which broadband affordability could be enhanced by: <ul style="list-style-type: none"> - including broadband as a Universal Service Obligation (USO), e.g. Switzerland or Finland - creating a low-price service for those segments of the population that cannot afford it - offering direct subsidies to the low-end segments of the market |
| Interest in broadband services by potential customers | <ul style="list-style-type: none"> • Raise awareness of the benefits of broadband among the population <ul style="list-style-type: none"> ▸ In addition to the activities currently undertaken by the government to raise awareness of the benefits of broadband, there are several ways in which consumers could be incentivised to take up a broadband connection: <ul style="list-style-type: none"> - ensuring interoperability between the Chilean government sites and on-line tools/interfaces - offering coupons with discounts for consumers that can afford to take up a broadband connection but show no interest in doing so |
| PCs and notebooks | <ul style="list-style-type: none"> • Offer subsidies to buy a PC and/or grant public access to computers <ul style="list-style-type: none"> ▸ With PCs being still relatively too expensive for certain segments of the population, the government could encourage PC penetration by offering subsidies to buy a PC and/or grant public access to computers |
| Financing and customer lock-in | <ul style="list-style-type: none"> • Facilitate the positive debate about lock-in contracts <ul style="list-style-type: none"> ▸ The current burdens imposed on operators to lock-in contracts may deter them from offering more attractive financing/subsidies of devices |
| Protection against debtors | <ul style="list-style-type: none"> • Facilitate the debate around protection against debtors, allowing operators to use a 'black list' <ul style="list-style-type: none"> ▸ A clear positioning by the Subtel on the fact that broadband cannot be considered a basic service under the current regulation would give operators more certainty about their potential bad debt and allow them to more aggressively subsidise terminals (e.g. notebooks) |
| Content | <ul style="list-style-type: none"> • Facilitate the creation of a framework to foster the development and distribution of content <ul style="list-style-type: none"> ▸ A regulatory environment where content creators can feel comfortable to sell their rights to broadband operators to make such content available on-line helps increase the attractiveness of broadband to consumers through the development and delivery of content |

Executive summary

Analysis and recommendations

Analysis: supply side

Analysis: demand side

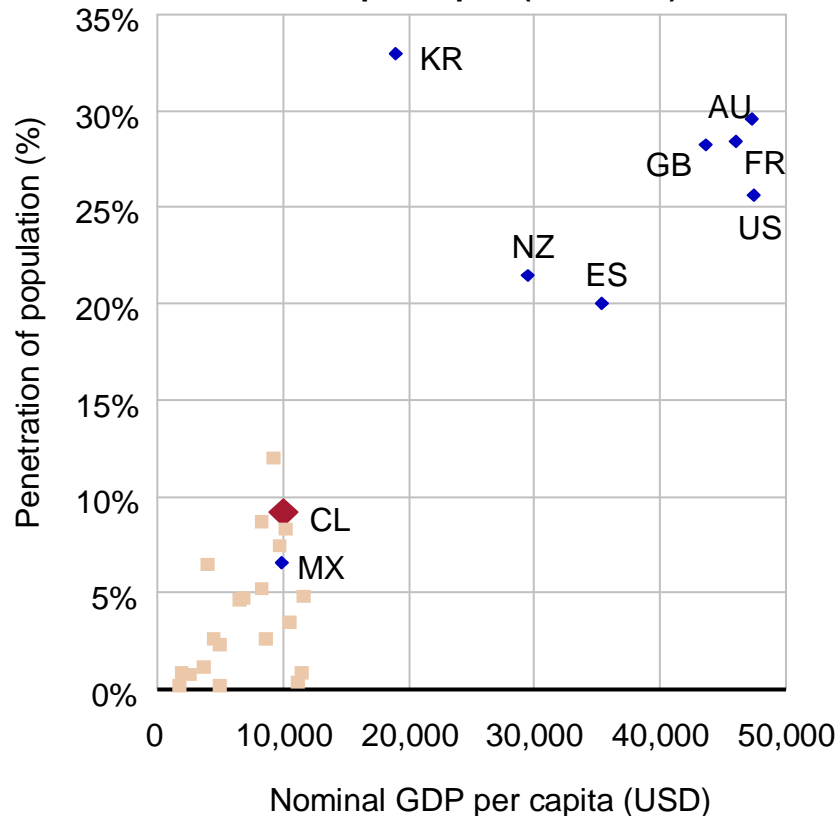
Recommendations: supply side

Recommendations: demand side

Annexes

Chile's broadband penetration is one of the highest among countries of similar economic conditions

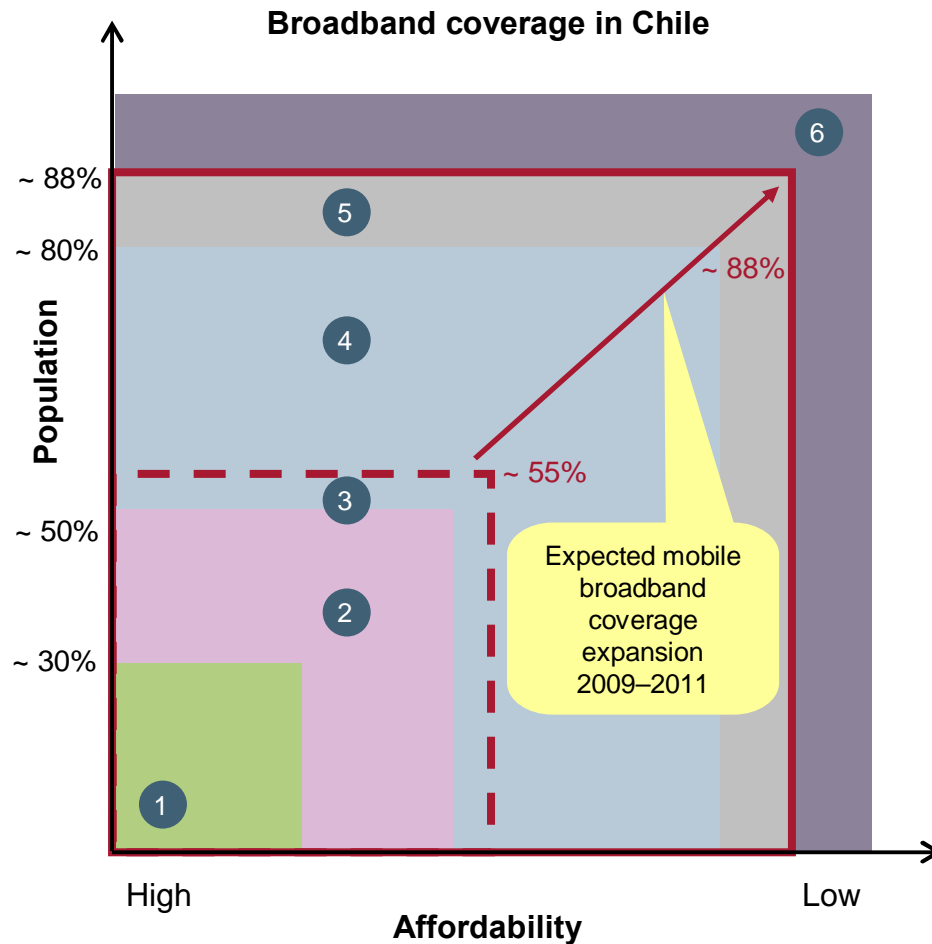
(Fixed and mobile) broadband penetration vs. GDP per capita (end 2008)



- Chile's (fixed and mobile) broadband penetration (at 9.2% in 2008) is one of the highest among countries of similar economic conditions, only behind Romania (12% penetration in 2008)
- Chile is also clearly ahead of the other Latin American countries, closely followed by Argentina (8.7% penetration in 2008)
- With regard to the benchmarked countries, Chile, while having a higher broadband penetration than Mexico, fails to attain the levels of success of other countries in the benchmark:
 - Chile's broadband penetration is the second lowest after Mexico

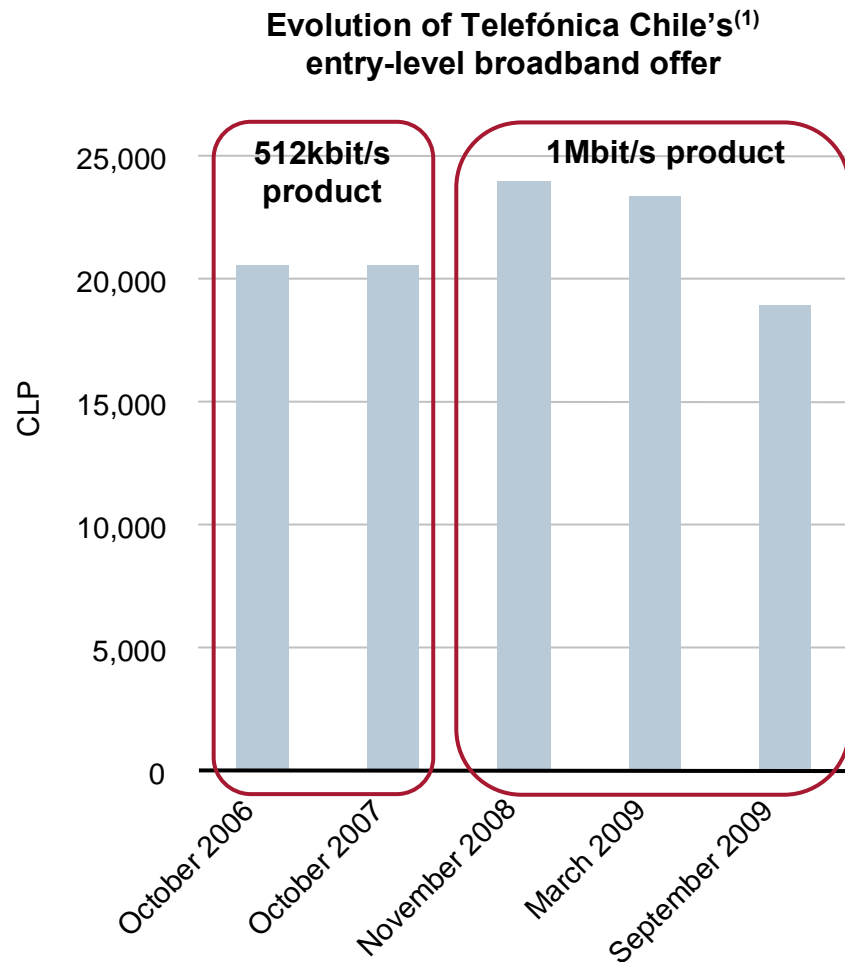
◆ Chile ◆ Benchmark ■ Latin America and countries of similar GDP per capita

A combination of mobile and fixed will ensure broadband competition of at least 1Mbit/s within 18 months (88% of households)



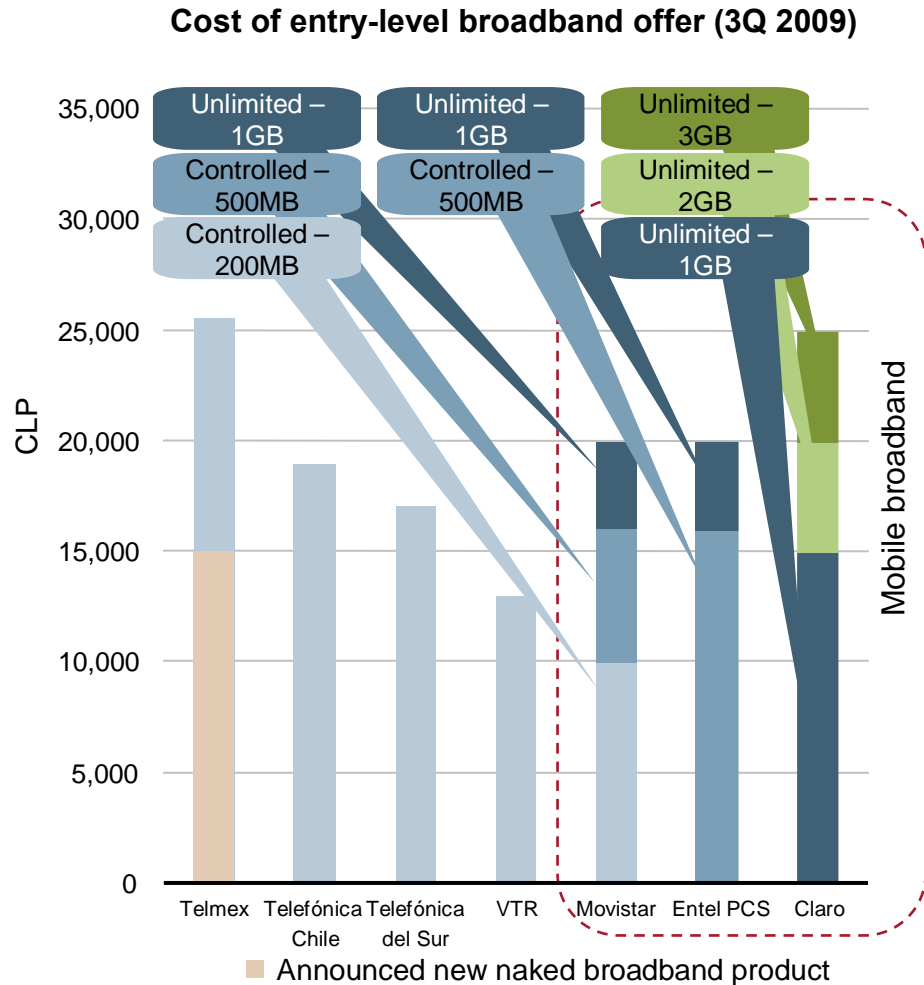
- In Chile, 20% of households are not covered by fixed broadband networks, affecting both low-income urban areas and remote rural areas
- When it comes to broadband coverage, Chile can be divided into six different areas:
 - **Area 1** – three or more fixed broadband operators (20–30% of households)
 - **Area 2** – two fixed broadband operators only (VTR and Telefónica Chile in most of the country and other two operators in certain regions, e.g. Telsur and Telefónica Chile in Regions X, XI and XIV) (20% of households)
 - **Area 3** – Telefónica Chile is the only fixed broadband operator, against which mobile broadband operators compete (5–10% of households)
 - **Area 4** – Telefónica Chile is the only broadband operator (20–30% of households)
 - **Area 5** – not covered by any fixed broadband operator (20% of households)
 - **Area 6** – there is not even mobile coverage (10–12% of households)
- The boundaries of these areas are changing. For instance, Areas 1 and 2 are expanding due to the continuous rollout of Telmex's and VTR's networks, while the boundaries of Areas 3 and 4 are becoming narrower as Telefónica Chile does not seem to be expanding its coverage
- At present, mobile broadband operators cover 50–60% of the population (most probably overlapping with Area 1, Area 2 and partly Area 4), effectively competing with fixed broadband operators
- Mobile broadband coverage is expected to reach 88–90% of the population within 18 months to match the current mobile voice coverage. This will still leave 8–10% of the population without broadband coverage
- It is not clear that market forces and operators will develop next-generation networks to cover the vast majority of the population in the short to medium term. This may require a separate study to assess the case for government intervention

While the price per Mbps has decreased significantly over time, the dominant operator's entry-level prices started to decline only recently



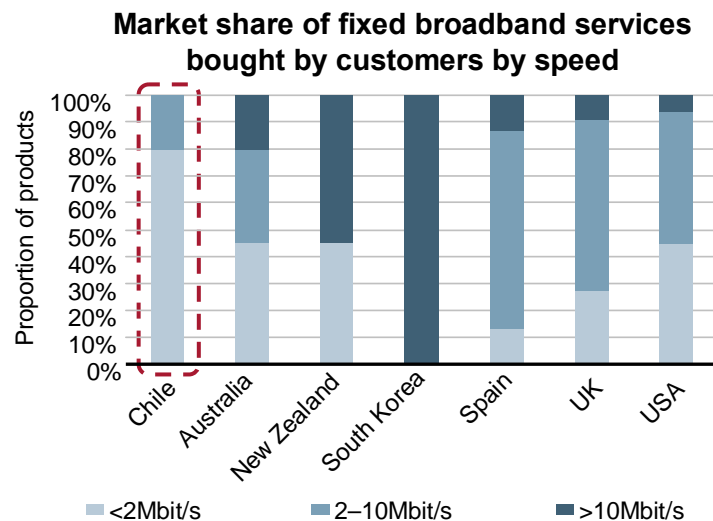
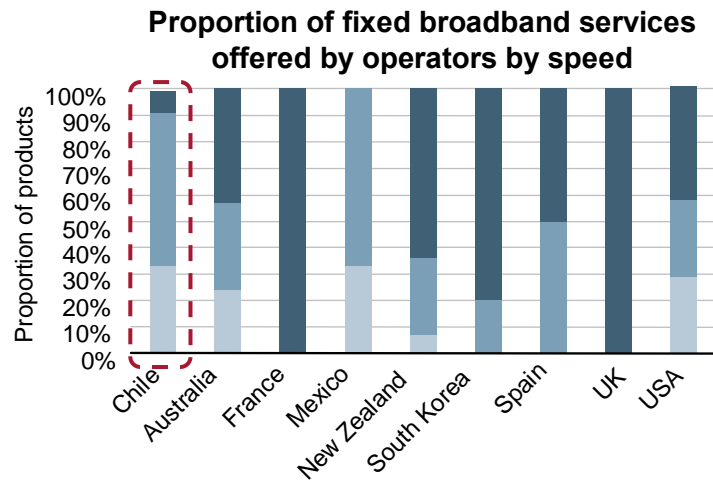
- According to various sources, despite claims to the contrary from fixed broadband operators, the absolute price of entry-level broadband products has not started to fall until recently. However, this does not seem to have affected Telefónica Chile significantly:
 - in fact, when Telefónica Chile discontinued its 300kbit/s product (headline rate 512kbit/s) in 2008, its entry-level product of 600kbit/s (headline rate of 1Mbit/s) was priced higher
 - although there is increasing pressure from competitors offering entry-level prices as low as CLP12 500 for 1Mbit/s in certain areas, this seems yet to have a material impact on Telefónica Chile's national prices
- However, it is true that the price per Mbps has followed a downward trend based on three duplications of speeds (eight-time increase):
 - these speed increases alone translate into more than an 80% decrease in the price per Mbps over the last 12–18 months

Entry-level prices have started to decrease fuelled by naked broadband products and competition from mobile broadband



- Since 2007 when Telefónica Chile abandoned its regional pricing policy, all major fixed broadband operators have followed a national pricing policy, which to some extent has made competition available to those parts of the country that are covered by fixed broadband networks
- However, even though Telefónica Chile has decreased its prices over the past few years, they are still among the highest, as it is probably trying to strike a balance between highly competing areas (30–50% of households) and those where Telefónica Chile is the only operator
- Competition from mobile broadband has prompted fixed operators to increase their data rates, which has effectively caused the price per Mbps to fall
- Mobile broadband prices are comparable to those of the entry-level fixed broadband products, although the ‘unlimited’ products usually come capped with a certain traffic volume, after which the data rate falls to, typically, 128kbit/s

Chile's broadband data rates have been increasing but still lag behind most of the benchmarked countries



- Chile's broadband data rates have been increasing but still lag behind most of the benchmarked countries, although better than in other Latin American countries such as Mexico
- Chile has seen a significant increase in broadband data rates (three duplications of speeds, representing an eight-time increase)
- Competition has caused that the same products (data rates) are available nationwide even in those areas covered only by the dominant operator
- The quality of the copper lines in terms of average length to exchanges (about 3km) may significantly limit the 'coverage' indicator at which these high speeds can be offered:
 - perhaps 50% of households may not be able to have higher data rates unless new investments in upgrading the networks are made
- Mobile broadband services offer comparable data rates to the fixed broadband products:
 - the 700kbit/s that mobile broadband operators tend to advertise correspond to peak headline rates of 1.8Mbit/s
 - these data rates are comparable with those of the most common fixed broadband products

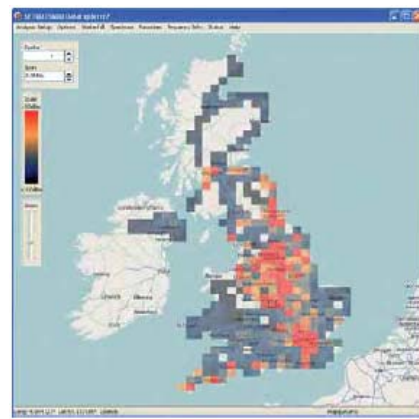
Spectrum does not seem to be a limiting factor for the development of mobile broadband in the short term ...

3G frequency usage in the UK

First carrier used in most places



Second carrier used in densely-populated areas



Third carrier barely used



- Movistar has 25MHz and 30MHz of spectrum in the 850MHz and 1900MHz bands, respectively, i.e. 55MHz of spectrum in total
- Entel PCS has 60MHz of spectrum in the 1900MHz band: currently, 40MHz for voice and 20MHz for data
- Claro has 25MHz of spectrum in the 850MHz band and 30MHz of spectrum in the 1900MHz band
- Nextel Chile has acquired two blocks of 2×15MHz each (i.e. 60MHz) and VTR one block of 2×15MHz (i.e. 30MHz)
- Mobile operators can use their spectrum in a flexible way to accommodate voice and data traffic demands
- Most European operators hold 2G and 3G spectrum, many of them have less spectrum than the Chilean operators. There is a growing trend towards the migration of 2G traffic onto 3G networks, which have usually been designed and deployed in such a way that a single 5MHz carrier may be enough to satisfy all voice demand. Thus, it is expected that spectrum demand will be driven by the increase in data traffic
- Most European 3G operators have two or three carriers of 5MHz (i.e. a maximum of 30MHz for FDD* UMTS):
 - mobile operators in the EU have not yet exhausted their 2.1GHz allocations
 - as per the example of the 3G spectrum usage in the UK, it seems that mobile operators are only using the second carrier in large cities and on main transport routes, while third carriers only appear to be used for testing purposes
- It seems that a 60MHz cap on the amount of spectrum to be held by a single operator does not entail a heavy burden for mobile operators in terms of capacity in the short to medium term

... although the allocation of low-frequency spectrum could allow operators to ensure greater coverage

Impact of frequency on base station densities

| Base stations per km ² | UMTS900 | UMTS1800 | UMTS2100 |
|-----------------------------------|---------|----------|----------|
| Suburban | 0.017 | 0.027 | 0.037 |
| Remote/rural | 0.008 | 0.013 | 0.018 |

- At present, the spectrum holdings of mobile operators in Chile are not the best mix of low (700MHz and 900MHz) and high (above 1GHz) frequency to achieve good coverage and capacity except for, perhaps, Claro and Movistar:
 - low-frequency spectrum offers superior propagation characteristics compared to spectrum at 1800+ MHz, so it is primarily used for coverage and to increase in-building penetration
 - spectrum at 1800MHz and above is primarily used for capacity
- A country with the geographical and demographic characteristics of Chile could benefit from granting mobile operators spectrum in the low-frequency bands to increase coverage and improve in-building reach

Other supply-side aspects [1/2]

- **In-building wiring** – in-building wiring could be a barrier to broadband development, which can lead to mini-monopolies:
 - many buildings need to be cabled by operators when providing the services, thus increasing the costs for operators – exclusivity could be a barrier to broadband development
 - this issue could lead to exclusivity agreements between operators and landlords/building owners, which limit the customer's choice to select a provider, creating mini-monopolies in each building
- **Infrastructure sharing** – operators' resistance to infrastructure sharing may be a barrier to mobile broadband coverage:
 - existing mobile operators are generally against mandated sharing of infrastructure (in particular site co-location)
 - new mobile operators have expressed their dissatisfaction regarding the problems they face when deploying their networks, especially regarding municipalities' intervention and the lack of collaboration for co-location from existing mobile operators
- **Facilitation of access network deployment** – municipalities' excessive intervention can be a barrier to broadband development:
 - there is also the specific issue that operators have brought to our attention that town halls and municipalities are putting up an increasing number of barriers to the deployment of new infrastructure, be it fixed (e.g. access to ducts, permits to carry out works) or mobile (e.g. installation of new masts)
 - mobile operators have complained about the potential implementation of a new law whereby neighbours are required to be consulted upon when new antennas are deployed. According to the operators, this could hinder the development of mobile networks

Other supply-side aspects [2/2]

- **International bandwidth costs** – international bandwidth costs have a significant impact on the final broadband prices:
 - broadband operators have expressed dissatisfaction with the fact that international bandwidth costs can represent a significant proportion of their broadband cost structure, although they admit that it may have to do with the size of the Chilean market
- **Extension of broadband coverage to remote rural areas** – the high operational costs of deploying broadband in remote rural areas is a barrier to extending broadband coverage into these areas:
 - over one million people live in remote or rural areas which are not covered by broadband networks; the high maintenance costs and opex that operators would have to incur in covering these areas could deter them from doing so
- Chile already has the FDT for public support of rural deployments:
 - it uses 'reverse auction' to provide coverage to rural areas
 - operators are of the opinion that quality-of-service commitments for deployment under the FDT are too high, e.g. bandwidth, latency
- **Wi-Fi connections** – could help increase coverage and drive up penetration:
 - around 50% of broadband customers in Chile could have Wi-Fi in their homes
 - there seems to be limited information about whether or not some households are sharing their Wi-Fi connections

Executive summary

Analysis and recommendations

Analysis: supply side

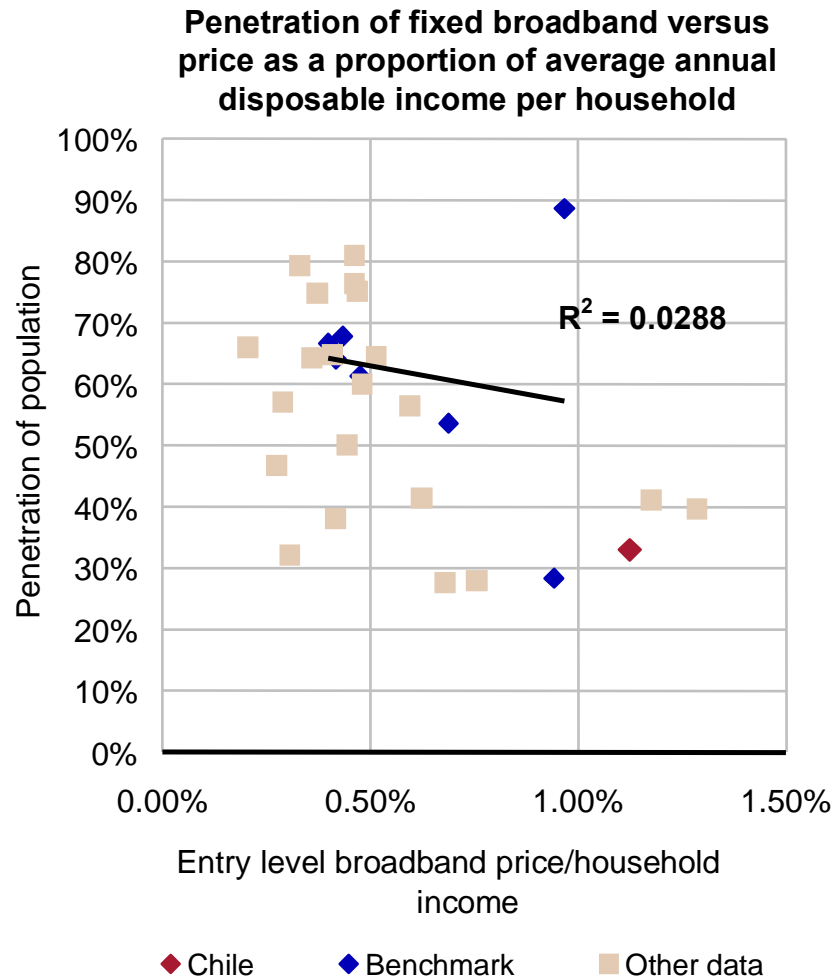
Analysis: demand side

Recommendations: supply side

Recommendations: demand side

Annexes

The price of entry-level broadband offers in Chile is relatively high compared to the country's income



- According to a survey published by the Subtel in June 2009,⁽¹⁾ 28.9% of the participants that do not have Internet at home claim that its excessive pricing is the main reason for not having taken up a broadband connection
- International benchmarks appear to suggest that the price of broadband ceases to be a barrier to high penetration at 0.5%
- With the exception of South Korea, none of the benchmarked countries has a broadband penetration higher than 50%, with price as a proportion of the average annual disposable income per household being greater than 0.7%
- The price of broadband in Chile as a proportion of income (at 1.12%) may be sufficiently high so as to prevent penetration from increasing beyond current levels

Chile's relatively high-price entry-level broadband offer may pose a barrier to penetration growth

- Chile's relatively high-price entry-level broadband (1.12% of the average annual disposable income per household) may represent a barrier to penetration growth:
 - there appears to be a strong correlation between average annual disposable income per household and fixed broadband penetration – Chile versus benchmarks and among Chile's regions
 - Chile's entry-level broadband offers are highly priced relative to its income
- Moreover, Internet affordability seems to be an issue:
 - based on international comparisons, the current entry-level price of fixed broadband is CLP12 500 per month, which represents an affordability index of over 0.7% for 80% of Chilean households
 - broadband affordability varies across Chile's regions, but the affordability index is below the nation's average in four regions, namely Antofagasta, Atacama, Magallanes and Región Metropolitana
 - when mobile broadband at CLP9500 per month is included in the analysis, the affordability index improves significantly, with only two regions falling below the 0.7% mark
 - the nation's average stands at 0.9%
 - even if the entry-level broadband price were to be at the lowest of the OECD benchmarked countries, the affordability index would decline to reach the 0.7% mark for the whole country

The price of fixed broadband in Chile seems to represent a higher share of a household's income than in other OECD countries

| | Annual average disposable income per household (USD) | Quintile 1 | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 | Total |
|-----------------|--|------------|------------|------------|------------|------------|-------|
| Hungary | 17,670 | 2.6% | 1.7% | 1.4% | 1.1% | 0.6% | 1.2% |
| Poland | 23,794 | 2.0% | 1.3% | 1.0% | 0.7% | 0.3% | 0.8% |
| Slovak Republic | 24,754 | 1.4% | 1.0% | 0.8% | 0.6% | 0.4% | 0.7% |
| Chile | 25,559 | 3.4% | 2.0% | 1.4% | 1.0% | 0.5% | 1.1% |
| Czech Republic | 25,651 | 2.7% | 1.8% | 1.5% | 1.2% | 0.7% | 1.3% |
| Mexico | 27,401 | 4.2% | 2.1% | 1.4% | 0.9% | 0.4% | 0.9% |
| Turkey | 29,887 | 1.0% | 0.5% | 0.4% | 0.3% | 0.1% | 0.3% |
| Korea | 33,693 | 3.2% | 1.6% | 1.1% | 0.8% | 0.5% | 1.0% |
| New Zealand | 42,578 | 2.6% | 1.1% | 0.6% | 0.4% | 0.2% | 0.5% |
| Portugal | 42,909 | 1.9% | 1.1% | 0.8% | 0.6% | 0.3% | 0.6% |
| Sweden | 50,368 | 0.8% | 0.5% | 0.4% | 0.3% | 0.2% | 0.4% |
| Finland | 56,534 | 1.2% | 0.8% | 0.6% | 0.5% | 0.3% | 0.5% |
| Netherlands | 58,007 | 1.1% | 0.7% | 0.5% | 0.4% | 0.2% | 0.5% |
| Spain | 59,830 | 1.8% | 1.1% | 0.8% | 0.6% | 0.4% | 0.7% |
| Germany | 60,081 | 1.8% | 1.0% | 0.7% | 0.5% | 0.3% | 0.6% |
| Average OECD | 61,021 | 1.7% | 0.9% | 0.6% | 0.4% | 0.2% | 0.5% |
| Greece | 61,093 | 1.4% | 0.7% | 0.5% | 0.4% | 0.2% | 0.4% |
| Japan | 61,586 | 1.5% | 0.8% | 0.6% | 0.4% | 0.2% | 0.5% |
| United Kingdom | 63,480 | 1.8% | 0.8% | 0.5% | 0.3% | 0.2% | 0.4% |
| Italy | 65,115 | 0.8% | 0.5% | 0.4% | 0.3% | 0.1% | 0.3% |
| Belgium | 66,455 | 1.1% | 0.6% | 0.5% | 0.3% | 0.2% | 0.4% |
| Canada | 68,442 | 1.7% | 0.9% | 0.6% | 0.4% | 0.2% | 0.5% |
| France | 69,563 | 1.0% | 0.6% | 0.4% | 0.3% | 0.2% | 0.4% |
| Australia | 69,979 | 1.9% | 0.9% | 0.5% | 0.4% | 0.2% | 0.4% |
| Denmark | 71,507 | 1.2% | 0.6% | 0.4% | 0.3% | 0.2% | 0.3% |
| Austria | 73,496 | 1.0% | 0.6% | 0.5% | 0.4% | 0.2% | 0.4% |
| Ireland | 87,540 | 1.1% | 0.5% | 0.4% | 0.2% | 0.1% | 0.3% |
| United States | 87,654 | 1.2% | 0.5% | 0.3% | 0.2% | 0.1% | 0.2% |
| Switzerland | 89,755 | 1.1% | 0.6% | 0.4% | 0.3% | 0.2% | 0.4% |
| Norway | 91,673 | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

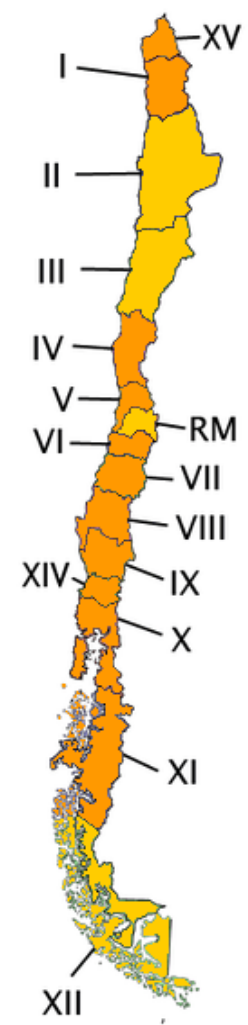
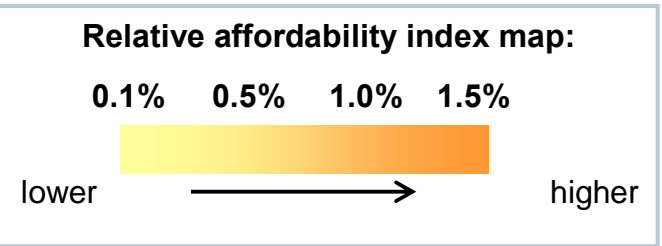
The affordability index in Chile is in the range of those in countries of similar income per household

Broadband affordability varies across Chile, but the average affordability index is close to, or higher than, 1%

Broadband affordability index by income quintile – Price = CLP12 500 per month

| Región | I | II | III | IV | V | Total |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| XV | 3.5% | 2.1% | 1.4% | 1.2% | 0.6% | 1.2% |
| I | 2.4% | 1.7% | 1.1% | 0.9% | 0.7% | 1.1% |
| II | 1.9% | 1.3% | 1.0% | 0.8% | 0.5% | 0.9% |
| III | 2.7% | 1.5% | 1.1% | 0.8% | 0.6% | 1.0% |
| IV | 3.7% | 2.1% | 1.7% | 1.4% | 0.7% | 1.4% |
| V | 3.1% | 2.0% | 1.6% | 1.2% | 0.7% | 1.3% |
| VI | 3.3% | 2.1% | 1.7% | 1.3% | 0.7% | 1.4% |
| VII | 4.4% | 2.7% | 1.9% | 1.5% | 0.8% | 1.6% |
| VIII | 4.9% | 2.6% | 1.9% | 1.4% | 0.7% | 1.5% |
| IX | 6.0% | 2.9% | 2.0% | 1.5% | 0.7% | 1.6% |
| XIV | 4.5% | 2.8% | 2.0% | 1.5% | 0.7% | 1.6% |
| X | 3.8% | 2.1% | 1.5% | 1.1% | 0.6% | 1.3% |
| XI | 3.4% | 1.7% | 1.4% | 0.9% | 0.7% | 1.2% |
| XII | 2.5% | 1.6% | 1.2% | 0.8% | 0.5% | 1.0% |
| RM/XIII | 2.6% | 1.6% | 1.1% | 0.8% | 0.4% | 0.9% |
| Total país | 3.4% | 2.0% | 1.4% | 1.0% | 0.5% | 1.1% |
| OECD average | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

- Broadband is most affordable in Región Metropolitana and Antofagasta (relative affordability index of 0.9%)
- Comparatively low income levels in Maule, La Araucanía and Los Ríos make the relative affordability of broadband high (relative affordability index of 1.6%)



Other demand-side issues [1/2]

- **PC penetration** – low PC penetration also seems to be holding back broadband penetration:
 - PC penetration in Chile is low, although mobile operators are beginning to finance notebooks bundled with mobile broadband services
 - according to a survey published by the Subtel in June 2009,⁽¹⁾ 39.5% of Chilean households do not have a computer or a notebook, mostly concentrated in the lower-income quintiles (44.5% in QIII, 60.5% in QII and 72.5% in QI)
 - the prices of PCs and notebooks are comparable with other countries in our benchmark, with notebooks being retailed at around USD300–350
 - Movistar, Entel PCS and Claro have started to bundle mobile broadband with notebooks, generally under a leasing contract and the commitment from the customer to remain with the company for a certain period of time (18 or 24 months)
- **Interest in broadband services by potential customers** – in general, there is low awareness of the benefits of broadband among potential customers:
 - according to a survey published by the Subtel in June 2009,⁽¹⁾ 47.9% of non-Internet users do not know how to use the Internet and are not aware of its benefits, while 39.8% is not interested in it
 - the Chilean government has launched a number of initiatives to raise awareness of broadband among consumers and the need to have Internet access. Among these initiatives, there is the requirement to pay certain taxes on-line, the introduction of chilecompra.cl for procurement processes, other e-government initiatives, and projects to increase IT literacy such as e-learning or broadband to libraries

Other demand-side issues [2/2]

- **Financing and customer lock-in** – the lack of customer lock-in mechanisms does not incentivise operators to offer more attractive financing/subsidies:
 - operators have expressed their dissatisfaction about the lack of lock-in mechanisms, i.e. the possibility to sign up customers for a certain period of time
 - in their view, the lack of lock-in mechanisms causes high levels of churn and subscriber acquisition costs (SAC), thus reducing the operators' ability to adopt a more aggressive approach in certain areas such as handset subsidisation and other financing alternatives
- **Protection against debtors** – considering broadband as a basic service does not incentivise operators to offer more attractive financing/subsidies:
 - users of basic telecoms services such as telephony cannot be black-listed if they discontinue payment of their telephone bills
 - even though broadband is not considered a basic service, operators claim that they are treating it as such out of carefulness

Executive summary

Analysis and recommendations

Analysis: supply side

Analysis: demand side

Recommendations: supply side

Recommendations: demand side

Annexes

In terms of competition within networks, each option will have a different impact in the Chilean broadband market

Overview of the main regulatory remedies available to the Subtel

| | <i>Penetration</i> | <i>Coverage</i> | <i>Data rates</i> | <i>Effect on prices</i> | <i>Advantages</i> | <i>Disadvantages</i> |
|------------------------|--------------------|-----------------|-------------------|-------------------------|--|---|
| Full LLU | | | | | <ul style="list-style-type: none"> It allows alternative operators to introduce higher data rate products and more innovative services (e.g. IPTV) than the incumbent at lower prices | <ul style="list-style-type: none"> Higher data rate offers limited by the physical capabilities of the incumbent's network It can disincentivise operators from investing in their own access infrastructure |
| Line sharing | | | | | <ul style="list-style-type: none"> It allows alternative operators to introduce higher data rate services than the incumbent at lower prices | <ul style="list-style-type: none"> Higher data rate offers limited by the physical capabilities of the incumbent's network It can disincentivise operators from investing in their own access infrastructure It still requires that the customer has a telephone line rented from the incumbent |
| Bitstream | | | | | <ul style="list-style-type: none"> When implemented with a sufficient margin for alternative operators, it could lead to customers having a better/wider choice of service providers More competition can create more awareness through advertising Easier to implement than unbundling and less disruptive for the incumbent | <ul style="list-style-type: none"> It does not increase the available broadband data rates as bitstream products are usually designed to replicate the incumbent's retail products Current wholesale bitstream services in many countries are not adapted (either technically or economically) to provide advanced services |
| Naked bitstream | | | | | <ul style="list-style-type: none"> It has all the advantages of bitstream without the requirement to have a telephone line with the incumbent Easier to implement than unbundling and less disruptive for the incumbent | <ul style="list-style-type: none"> It does not increase the available broadband data rates as bitstream products are usually designed to replicate the incumbent's retail products Current wholesale bitstream services in many countries are not adapted (either technically or economically) to provide advanced services |

- None of the alternative remedies based on competition within networks will solve the current coverage issues
- LLU may offer a competitive advantage in terms of data rates, but given the quality of the dominant operator's network it is likely that it will not bring large benefits in the long term
- Bitstream and naked DSL could lead to greater competition in the broadband market and higher penetration

The application of regulatory remedies needs to be carefully evaluated [1/3]

- **Application of regulatory remedies** – review and enhance the current application of regulatory remedies with a focus on bitstream and naked broadband:
 - for **Area 1**, where there are at least three fixed broadband operators, **LLU-based remedies will not bring about any benefit** given the amount of competition and will probably result in cherry picking. Traditionally, LLU-based remedies have been applied in countries and areas where there was not sufficient competition between players with their own access networks
 - the operators' uniform broadband pricing policies are, to some extent, extending the benefits of competition to **Areas 2, 3 and 4**. The presence of mobile broadband operators is undoubtedly helping to drive down prices while spurring data rate increases. For those reasons, **LLU-based remedies will not be as beneficial**
 - the price of fixed broadband in **Areas 2, 3 and 4** are, on average, not as low as in Area 1, mainly due to Telefónica Chile's policy of keeping prices higher on average to take advantage of its dominant position in Areas 3 and 4. In this case, a **bitstream product available in certain areas, preferably a naked bitstream product**, could help to:
 - allow fixed alternative operators to obtain sufficient margins and therefore incentivise their market entry
 - increase broadband awareness among consumers in these areas as alternative operators will invest in marketing to advertise their products
 - consequently, for those areas where there is not sufficient competition, we recommend that:
 - a bitstream product be made available for which the Subtel ensures that there is enough margin between retail and wholesale services such that an efficient entrant can make a reasonable return on investment
 - bitstream access has been priced in a variety of ways, including explicit retail-minus, cost-plus (based on LRIC+ or FAC), and also by the use of margin-squeeze tests from retail or other wholesale products
 - a combination of a regulatory accounting system, a bottom-up model and a margin-squeeze analysis may give a regulator the inputs needed to set prices at the right level and allow competition to develop
 - the Subtel requires the dominant operator to make the equivalent wholesale input available (in terms of functionality and quality of service) for every regulated retail service that it offers, at the same time as making the retail service available to consumers

The application of regulatory remedies needs to be carefully evaluated [2/3]

- Setting tariffs for regulated prices is not sufficient. The following is also necessary:
 - a clear reference offer for the regulated service
 - as the experience in several European countries such as France and the UK has shown, the Subtel should have the determination to get deeply involved in operational issues to avoid being called up for litigation (on an *ex post* basis); this will also be crucial for the Subtel to ensure that the regulatory framework is effectively implemented
 - a pro-active approach to enforcing regulation entails that the regulator must have not only the appropriate regulatory tools, but also the resources to perform its duties
 - industry involvement is also highly desirable:
 - in the UK, for instance, the Office of the Telecoms Adjudicator (OTA) was set up in 2004 to serve as an industry forum to discuss practical aspects of regulation or related to reference offers that require multilateral agreements
 - it was charged with policing the day-to-day issues arising out of the UK's functional separation regime. However, this is only partly true: the OTA could have policed a non-functional separation regime, insisting on compliance with certain delivery terms for local loops, even if Openreach did not exist as such. Furthermore, the OTA focused only on local loops; the equivalence of inputs for other wholesale services (in particular, wholesale calls and wholesale line rental) were not directly included in OTA's terms of reference
- The more complex the wholesale remedy, the more useful are the aforementioned points. Nonetheless we are of the opinion that they should be taken into account when dealing with the recommendations made herein regarding bitstream and naked bitstream services

The application of regulatory remedies needs to be carefully evaluated [3/3]

- Functional separation is another remedy at the disposal of regulators. It is a very drastic measure that *requires a vertically integrated operator to establish a business unit to service its upstream wholesale customers which is separate from its own downstream operations.*⁽¹⁾
 - different stakeholders usually have different views on which parts of the business should be put under the new internal wholesale unit, e.g. only the legacy copper access network, the backhaul network, the next-generation access (NGA) network
 - effectively, the ERG⁽¹⁾ notes that functional separation may not always be the best solution to such potential anti-competitive behaviour:
 - *“It is however necessary to take into account carefully, the implementation costs that in some cases could exceed the expected benefits. Therefore, before deciding the implementation of FS in a particular market, the NRA must carefully evaluate the particular costs and benefits of such a measure, given the fact that FS is a remedy very difficult to reverse once it has been implemented.”* [page 8]
- Functional separation has been implemented in very few occasions and it is not clear that the cost-benefit analysis is positive. Given that functional separation is such a drastic measure, it is advisable that a country’s regulator, if it decides that more intervention is required, explores first the full implementation of other less drastic measures, e.g. accompanying remedies like LLU with clear reference offers and strong determination to make it work

Recommendations – other supply-side aspects [1/6]

- **Spectrum** – release additional spectrum for mobile broadband:
 - while actual spectrum limits are not a hindrance in terms of capacity, it would be convenient to make low-frequency (< 1GHz) spectrum available to operators to improve coverage and in-building penetration; this is already planned in Chile and in the great majority of the most advanced countries
 - sufficient spectrum should be allocated to operators so that there is enough capacity to enable the development and provision of advanced services
 - the 60MHz cap on the amount of spectrum to be held by a single operator does not entail a heavy burden for mobile operators in terms of capacity in the short to medium term
 - however, capex and opex are broadly proportional to the number of sites in the access network: deploying UMTS at 700–800MHz has a significant impact on an operator's business case. We estimate that between 40–50% fewer base stations are required at those frequencies compared with a similar deployment at 2100MHz
 - accordingly, the 900MHz bands will be re-farmed for 3G use across much of the European Union (EU). Equally, it is likely that in many European countries such as the UK, France, Spain, Sweden or Norway, part of the digital dividend spectrum will be used for mobile services, in particular for mobile broadband services
 - in Chile, only Movistar and Claro have spectrum below 1GHz; thus, it would be convenient to make low-frequency spectrum available, especially from the digital dividend in the 700MHz, in order to improve coverage and in-building penetration
 - in terms of Long Term Evolution (LTE), the main band currently being considered for standardised deployment is the 2.5GHz band. It is still premature to anticipate what band it will be standardised since LTE has not yet been ratified by the 3rd Generation Partnership Project (3GPP). It is also worth noting that LTE will offer increased spectrum flexibility compared with UMTS, with spectrum lots as small as 1.5MHz (and as large as 20MHz) supported. We anticipate that operators will require at least 2x15MHz of spectrum to deploy the highest-speed NGA services
 - the 2.6GHz band has been harmonised across Europe for its use for mobile broadband services, and auctions are expected to take place in 2009 and 2010

Recommendations – other supply-side aspects [2/6]

- **Infrastructure sharing** – provide incentives to encourage infrastructure sharing:
 - infrastructure sharing should be promoted and is probably worth the regulatory burden, as it would spur deployment of advanced services. This is already taking place in most developed countries
 - there are a variety of ways to promote infrastructure sharing for new deployments such as mandatory joint access to government property, use of the universal access fund, or facilitation of sharing of infrastructure through non-profit entities or public–private partnerships, which would raise capital, deploy infrastructure, and operate the infrastructure
 - the opportunity afforded by infrastructure sharing to spur deployment of advanced services is probably worth the regulatory burden of managing the implementations. In particular, encouragement of infrastructure sharing between wireless operators will be one of the most significant sharing policies that the Subtel can implement to spur universal provision of broadband services
 - in terms of sharing of mobile infrastructure, passive infrastructure sharing is much more common in emerging markets
 - for mobile network operators, sharing of sites or of the radio access network (RAN) represents a unique opportunity to save costs. We believe that site/RAN sharing could find three applications in the Chilean market:
 - *firstly*, it could be used as a tool to encourage existing operators to deploy their networks in more rural areas, where the business case is unfavourable. Governmental authorities could play an active role in this, for example, by creating an infrastructure provider (also commonly referred to as tower company)
 - another way the government could facilitate site/RAN sharing would be by creating an independent body that facilitates the implementation of site/RAN sharing between operators. In the UK, intervention by the Office of the Deputy Prime Minister led to the formation of the MNO Association (MOA). The MOA facilitates the co-ordination of different operators when sharing infrastructure
 - *secondly*, it could facilitate the deployment of the two operators that recently acquired a mobile licence
 - *thirdly*, site sharing in Chile is likely to be critical for the deployment of 4G networks. Some believe that the only business case in favour of LTE will be closely associated with RAN/site sharing. This is due to the high backhaul capacity and core network requirements for each of the sites which could be shared in a site/RAN sharing scenario

Recommendations – other supply-side aspects [3/6]

- **In-building wiring** – support in-building wiring:
 - non-discriminatory access to all operators should be provided in multi-tenant dwelling units (especially new builds and condominiums), while obliging that new buildings provide a minimum telecoms infrastructure such as ducts and cables:
 - it should not be allowed to have exclusive agreements with any single telecoms operators in multi-tenant dwelling units (especially new builds), but non-discriminatory access should be provided to all operators in order to establish a more level-playing field and allow consumers in these buildings to benefit from competition
 - If competitors are denied access to multi-tenant dwellings due to technical reasons, i.e. there is simply no room for further infrastructure deployment, then effective bitstream access policies are the most generally applicable solution to grant alternative operators access to customers in these buildings
 - if, on the other hand, competitors are not granted access to these buildings due to anti-competitive behaviour by the operator that has cabled the building, then a framework will need to be developed whereby operators are granted access to buildings in a non-discriminatory manner. Such framework would potentially include the measures referenced above such as prohibiting exclusive contracts between building owners and operators
 - for new buildings, some approaches can be useful: for instance, in Spain the ICT law mandates the provision of minimum telecoms infrastructure in buildings (including ducts, cables and common spaces); in France, the operator that first cables a building with fibre is obliged to provide access to other operators at an aggregation point

Recommendations – other supply-side aspects [4/6]

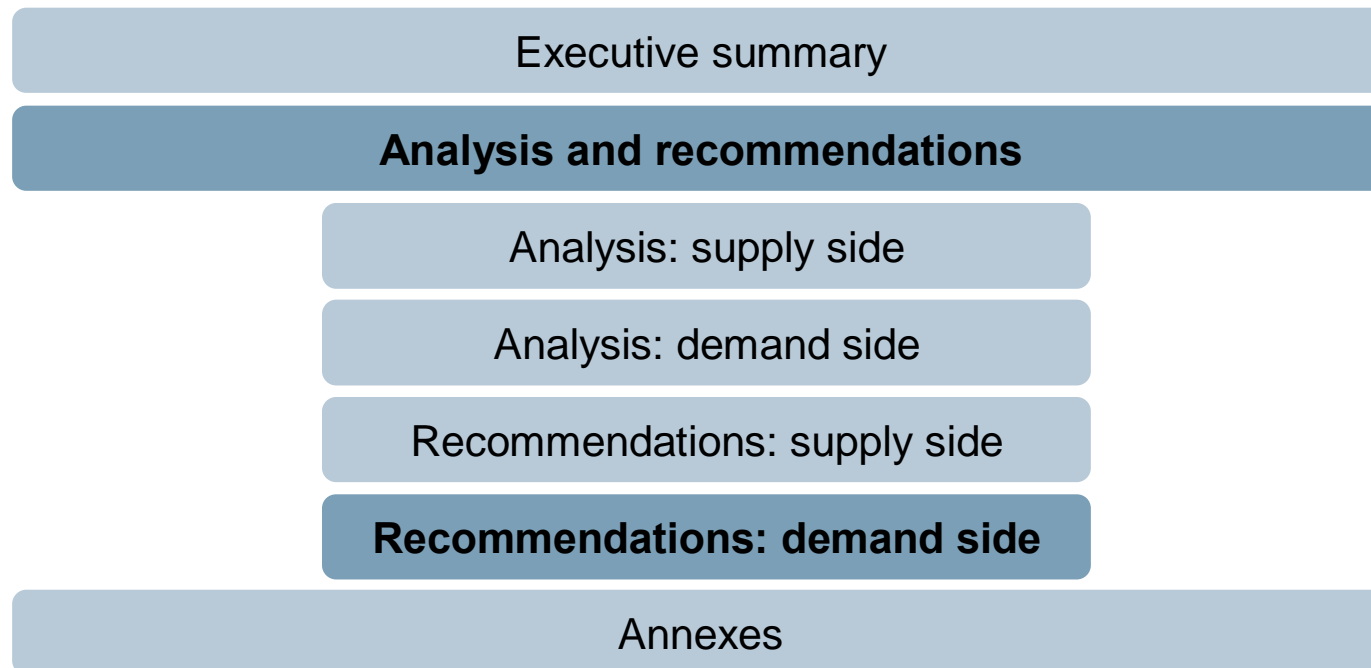
- **Access network deployment** – develop a framework that facilitates access network deployments:
 - a framework that standardises and expedites rights-of-way permissions, ensures cost-based fees imposed for rights-of-way access and centralises the process of obtaining municipal rights-of-way would help to remedy roadblocks:
 - a framework should be put in place that has the following characteristics:
 - it should standardise and expedite rights-of-way permissions to ensure cost- and time-effective site deployments
 - it should ensure that the fees imposed for rights-of-way access are determined on a reasonable cost basis
 - it should centralise the process of obtaining municipal rights-of-way, which provides operators with a much more streamlined and effective method for obtaining permits
 - for instance, Michigan policymakers determined that one of the main impediments to infrastructure investment in cities and towns was the inconsistent and burdensome rights-of-way procedures and fees being imposed by municipalities. To deal with this issue, the Metropolitan Extension Telecommunications Rights-of-Way Oversight Act (METRO Act)¹ was passed. The METRO Act eliminated the disparities in rights-of-way access charges and ensured that the access fees are relatively low and based on cost; it also set a maximum permissible permit delay for municipalities in Michigan. In addition, it created the METRO Authority to administer the new system, thus anticipating any enforcement problems
- **Unified licensing** – a unified licence that allows the provision of all telecoms services:
 - separation of the licence for access to scarce resources, such as spectrum and numbers, from the licence to offer services will ensure that providers have the rights to access those scarce resources as needed
 - any needed legislation governing service provision should be established in regulation and not in the licence itself

Recommendations – other supply-side aspects [5/6]

- **Remote rural coverage** – subsidy plans to increase remote rural coverage should cover all deployment aspects and specify the right level of quality-of-service requirements:
 - infrastructure sharing and a better co-ordination and management among government programmes such as the FDT could be used as a tool to encourage existing operators to deploy their networks in more rural areas
 - Chile already has a governmental programme of funding for the deployment of networks in rural areas, the so-called FDT. From what we understand, the Chilean government has implemented or is willing to implement different ways to increase the impact of such funds, such as setting more realistic quality-of-service targets for the areas to be covered
- **Wi-Fi access** – favour Wi-Fi access:
 - sharing Wi-Fi among neighbours could increase Internet penetration and usage in less affluent areas, although attention should be paid to designing products that do not disincentivise those customers that would subscribe to a broadband connection otherwise

Recommendations – other supply-side aspects [6/6]

- **International bandwidth costs** – facilitate a market solution to bring international bandwidth costs down:
 - although some operators have expressed dissatisfaction that international bandwidth costs, they acknowledge that the small size and remoteness of Chile has an impact on prices. A possible remedy would be to encourage international CDN players to enter the Chilean market or expand their service portfolio if they are already present
 - prices for transit capacity are determined on a local basis by:
 - the number of competing providers that offer international gateway access
 - the total available capacity of links into a country
 - the cost of underlying regional facilities (i.e. transport, landing stations, earth stations)
 - a possible remedy would be to encourage international content data network (CDN) players to enter the Chilean market or expand their service portfolio if they are already present. These players can offer a variety of services:
 - for instance, Akamai offers a service to smaller Internet service providers (ISPs) to help them reduce their transit costs. It provides free servers and deploys them in the ISPs' data centres in exchange for free rack space and bandwidth. Under this deal, Akamai will cache the traffic of its content customers (who are the paying customers) to reduce traffic. Akamai estimates that this accounts for about 20% of web traffic. Six ISPs in Chile have signed up to this service
 - under the second arrangement, which Akamai calls private CDN, the customer is the ISP, which pays Akamai to cache any or all of the traffic that the ISP chooses. Since this covers non-Akamai content, it can reduce traffic much further. It seems that no ISPs in Chile have yet signed up to this service



Recommendations – demand-side aspects [1/4]

- **Broadband affordability** – there are several tools available to the Chilean authorities in order to increase the affordability of broadband:
 - include broadband as a USO, as it was done in Switzerland⁽¹⁾ and more recently in Finland
 - Switzerland has considered broadband as part of its USO since 1 January 2008. Swisscom AG, the historical incumbent operator, is responsible for providing the service. Speeds will attain a minimum of 600/100kbit/s with an upper price of CHF69 – excluding VAT. The upper-price limit will be re-examined in 2010
 - Finland declared broadband services as part of its USO in October 2009. Telecoms companies are required to offer all citizens Internet connections of at least 1Mbit/s – and are expected to increase to 100Mbit/s by 2015
 - create a low-price service for those segments of the population that cannot afford it
 - offer direct subsidies to the low-end segments of the market, such as
 - the CARDALES five-year broadband development plan in Uruguay; it was launched in 2009 with the aim to provide telephone, Internet and cable TV connectivity to all households in the country while providing subsidized tariffs to the lower-income households that have no access to such technologies
 - the subsidies provided by the Egyptian government to the incumbent operator to allow the latter to offer an entry-level broadband connection at low prices for low-income households, and 1Mbit/s connections with 5Gb caps for LE100 (USD18)

Recommendations – demand-side aspects [2/4]

- **Interest in broadband services by potential customers** – in addition to the activities currently being undertaken by the government to raise awareness of the benefits of broadband, there are several ways in which consumers could be incentivised to take up a broadband connection:
 - Chile's public administration has been very active in raising awareness of broadband among consumers, helping to increase IT literacy and facilitating the use of on-line services by promoting e-government initiatives
 - an on-going initiative to ensure interoperability between the different Chilean government sites and on-line tools is another step in the direction of incentivising the use of Internet
 - another tool to promote the take-up of broadband services could be the use of coupons for consumers to get a discount for a period of time, e.g. six months, so that they have a chance to try it, and then trust that a good number of them will keep the service and pay for it

Recommendations – demand-side aspects [3/4]

- **PCs and notebooks** – PCs are still relatively expensive for certain segments of the population; thus, the government could encourage PC penetration by offering subsidies to buy a PC and/or grant public access to computers:
 - broadband penetration is related to PC penetration: as a limitation (people without a PC are unlikely to buy broadband); as a stimulus (those people with a PC are, in the end, quite likely to buy it as it increases the PC capabilities)
 - new devices such as capable games consoles and smartphones (especially those with Wi-Fi as well as 3G capabilities) may be slowly changing this correlation (i.e. people without a PC may still buy Internet access)
 - alternatively, people who find that broadband could give them access to services, products or resources they value, such as IM, VoIP, IPTV and online games, will then buy a PC to get access to these services
 - therefore, if the government decides to intervene, it could act on both sides of the correlation, i.e. it could increase PC penetration to foster broadband take-up, whilst increasing awareness of the benefits of broadband and the services it enables so that those that can afford to buy a PC do so in order to get access to broadband services. Other measures could be considered for those people who cannot afford broadband
 - the prices of PCs and notebooks in Chile are comparable to international levels, but they are still too high for certain segments of the population
 - mobile operators have started to finance notebooks when purchased with a mobile broadband connection
 - for those segments of the population that cannot afford a PC, the government could encourage PC penetration by offering subsidies to buy a low-cost PC or grant public access to computers. For instance, Belgium implemented an initiative called 'PC privé', a subsidised PC purchase scheme whereby people who buy a PC are able to claim a VAT refund

Recommendations – demand-side aspects [4/4]

- **Financing and customer lock-in** – the lack of lock-in mechanisms does not incentivise operators to offer more attractive finance/subsidies to acquire a higher number of subscribers:
 - the current burdens to sign up a customer for a certain period of time may deter operators from financing access devices (PCs and notebooks) more aggressively
- **Protection against debtors** – a clear positioning by the Subtel on the fact that broadband cannot be considered a basic service under the current regulation would give operators more certainty about their potential bad debt and allow them to more aggressively subsidise terminals (e.g. notebooks)
- **Content** – in order to increase the attractiveness of broadband to consumers through the development and delivery of content, this could be done through a regulatory environment where content creators can feel comfortable to sell their rights to broadband operators to make that content available on-line

Executive summary

Analysis and recommendations

Annexes

Workstream 1: Broadband gap analysis

Workstream 2: Competition assessment

Workstream 3: Regulatory competition options

Workstream 1: Broadband gap analysis

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Broadband GAP analysis is the first of three workstreams

1

BROADBAND GAP ANALYSIS

- Identify the differences between broadband and connectivity indicators in Chile and in the main OECD and Latin American countries, as well as the main differentiating factors relating to competition and regulation
- The key indicators that must be taken into account for this analysis are provision of connectivity and other elements that may characterise the countries analysed

2

COMPETITION ASSESSMENT

- Assessment of the telecoms market in Chile
- Assessment of the state of competition in the broadband market in Chile. Specifically, the objective is to understand the current state of the broadband market and its possible evolution in terms of competition, coverage and quality of service

3

REGULATORY COMPETITION OPTIONS

- Analysis of the service-based (within networks) and facilities-based (between networks) competition models
- The international lessons on competition models must be analysed in the context of the Chilean market, taking into account findings from the previous workstreams in order to promote increased competition and coverage of broadband



Key objectives

- Share the initial diagnosis based on a series of key elements and indicators
- Identify and discuss the current broadband GAP relative to selected OECD and Latin American countries, and its potential evolution, similarities and differences with Chile
- Initial views about different regulatory measures and remedies, and successes in selected key countries

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Preliminary diagnosis of the broadband situation in Chile

– key elements of the debate [1/3]

Elements of debate: information available at the beginning of the project

- **Coverage and penetration** – there seems to be wide consensus on the current level of broadband coverage and penetration in Chile, but is this sufficient? How does it compare to other countries? How important is it to achieve the public-policy objectives?:
 - broadband coverage (homes passed) is about 70–75% of households; it is driven by ADSL coverage (approximately 70–75% of households, whereas cable is about 50% of households; it is assumed that there is wide overlap between the two)
 - broadband penetration (homes connected) at 8.2% of the population (31% or more of households) at the end of 2008 is lower than in other more advanced countries, and so it may be considered to be in line with expectations for a country like Chile (e.g. taking into account macro indicators in terms of wealth, education, PC density)
 - penetration varies across population segments: addressing the current demand issues (e.g. PC penetration, low awareness of the benefits and applications of broadband) seems to be crucial to drive up penetration
- **Quality of service (speed)** – broadband networks in Chile currently offer sufficient quality of service in terms of speed, although this could be limited to a limited number of households:
 - current established technologies (ADSL and cable) include offers with downstream speeds up to 8Mbit/s and 12Mbit/s; this seems reasonable for most applications despite the fact that other more advanced countries are focusing on more advanced networks. 3G offers up to 700kbit/s. Fibre-to-the-home (FTTH) service is available in a couple of small high-income areas in Santiago
 - the quality of the copper lines in terms of the average length to exchanges (about 3km) may significantly limit the ‘coverage’ indicator at which these high speeds can be offered

Preliminary diagnosis of the broadband situation in Chile – key elements of the debate [2/3]

Elements of debate: information available at the beginning of the project

- **Affordability of prices** – there seems to be an open debate about whether broadband prices are affordable and competitive:
 - the minimum prices of broadband (PPP) seem to compare well with international benchmarks (Gomez Lobos)⁽¹⁾
 - the broadband price per Mbps is higher than the OECD average, but similar to other Latin American countries (Gomez Lobos,⁽¹⁾ BCG'08)⁽²⁾ – although this may refer to different speeds, confirming that per-unit capacity prices decrease as available speeds increase
 - broadband prices seem reasonable from an economic assessment point of view (Jorge Quiroz)⁽³⁾
 - Telefónica Chile's broadband prices seem to have significant margin 'built in' that would allow for lower prices (interpretation of findings included in Informe Synex⁽⁴⁾ e Informe Agostini Saavedra)⁽⁵⁾

(1) "Situación de Chile en Materia de Precios de la Banda Ancha", Jorge Quiroz C Consultores Asociados, disponible en <http://www.paisdigital.org/>

(2) "Un ejercicio comparativo de las tarifas de Banda Ancha entre Chile y otros países del Mundo", Andrés Gómez-Lobo Echeñique, disponible en <http://econ.uchile.cl/>

(3) "Estudio de competitividad del sector telecomunicaciones", Boston Consulting Group, disponible en <http://www.acti.cl/>

(4) "Estudio de asignación de ingresos en paquetización de servicios", Synex ingenieros y consultores

(5) "La Práctica de Paquetizaciones en Telecomunicaciones", Claudio Agostini y Eduardo Saavedra, disponible en <http://www.tdlc.cl/>

Preliminary diagnosis of the broadband situation in Chile

– key elements of the debate [3/3]

Elements of debate: information available at the beginning of the project

- **Effective competition** – there seems to be an open debate about whether or not the broadband (and fixed) market is competitive enough based on different arguments and compared to other international countries:
 - ▶ however, so far the analyses, diagnosis and debates have been focused more on the level of competition in the fixed telephony and mobile markets than on the broadband market
 - ▶ according to some of the operators interviewed, Telefónica Chile has significant market power (SMP) in the fixed market that it tends to transfer into the broadband market, based on its coverage and penetration
 - this may be more a bundling issue – 90% of Telefónica Chile’s current broadband connections are bundled with telephony; 100% of its current offer is bundled together with its telephony service
 - ▶ the Tribunal de Defensa de la Libre Competencia (TDCL) suggests moving towards resale and unbundling based on the premise that whilst there is increasing competition *between* networks, there is probably not enough competition *within* networks
 - this is based on the view that the fixed telephony market is characterised by high sunk costs and economies of scale, making investment in new networks inefficient in certain geographical markets as it would not allow operators to offer competitive prices to consumers and still make a return, given the high costs and the limited demand
 - ▶ the Subtel believes that competition in the broadband market is increasing, that there is a growing number of operators in this market and a wider range of broadband offers, whilst broadband prices have been declining in line with some benchmarked countries

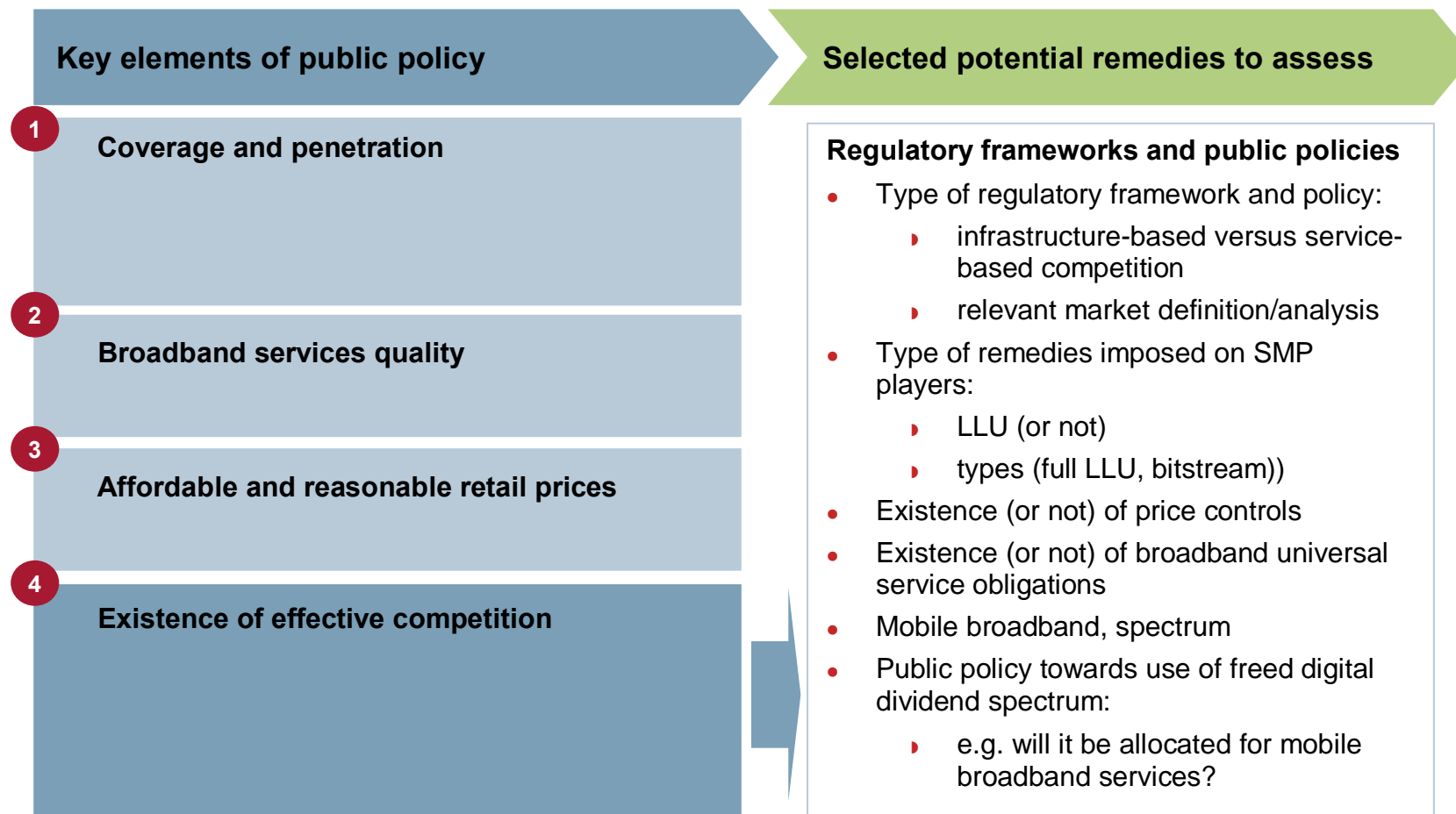
Diagnosis of the current situation that will influence the criteria to assess key elements of broadband public policy

| Preliminary diagnosis of the current situation | Key objectives of public policy |
|--|--|
| <ul style="list-style-type: none">• Reasonable coverage compared to international standards, including significant differences• Lower penetration that may be explained by demand issues (e.g. income, education) | 1 Coverage and penetration |
| <ul style="list-style-type: none">• Reasonable maximum speeds are offered• Lower average speeds than those in other OECD countries | 2 Quality of broadband services |
| <ul style="list-style-type: none">• There is an open debate about whether or not retail prices are reasonable | 3 Affordable and reasonable retail prices |
| <ul style="list-style-type: none">• There is an open debate about whether or not there is enough competition | 4 Existence of effective competition |

The diagnosis will have a direct impact on the key public-policy elements and assessment criteria ...

| Key objectives of public policy | Key implications, research indicators and assessment criteria |
|---|--|
| <p>1 Coverage and penetration</p> | <ul style="list-style-type: none"> • Broad national coverage • Differences in regional coverage • Rural/urban coverage, at the national level or within regions • Penetration by demographic/income segments |
| <p>2 Quality of broadband services</p> | <ul style="list-style-type: none"> • Speed likely to be an important indicator • Quality of copper lines (e.g. average length) |
| <p>3 Affordable and reasonable retail prices</p> | <ul style="list-style-type: none"> • Retail price comparison |
| <p>4 Existence of effective competition</p> | <ul style="list-style-type: none"> • Important to double check the potential criteria to assess the level of competition and relevant indicators (e.g. HHI) • Evolution of the number of competitors/HHI • Evolution of penetration over time • Evolution of prices over time • Evolution of the absolute level of investment, proportion of revenues |

... as well as on the potential remedies that we may want to focus/consider for Chile



A number of countries have been considered to be more relevant for this study

| <i>Country</i> | <i>Comments</i> | <i>Interest</i> |
|--------------------|--|-----------------|
| USA | <ul style="list-style-type: none"> Broadband model based on competition between networks (ADSL and cable). The government appears to have launched a new initiative to digitise the country and increase the digital coverage and services offered – important to assess any potential policy changes to date | High |
| UK | <ul style="list-style-type: none"> Unique ‘functional separation’ model (Openreach) that appears to have fostered competition, but does not seem profitable in the medium to long term due to lack of investment | High |
| France | <ul style="list-style-type: none"> Competition within networks (unbundling) more ‘orthodox’ and pure | High |
| Spain | <ul style="list-style-type: none"> EU country with a GDP per capita closer to Chile. Although broadband penetration in Spain has not reached the level of its Western European peers, it will be interesting to review some of its policies. The CMT does not impose unbundling on Telefonica’s fibre plans, but Telefonica is obliged to maintain open its civil works ducts | High |
| Australia | <ul style="list-style-type: none"> Similar to Chile in terms of the coverage challenges imposed by its geography (extension and density), with positive results. In early 2009, Australia announced an investment plan to build a next-generation network (FTTx) with 90% population covered | High |
| New Zealand | <ul style="list-style-type: none"> Similar to Chile in terms of the coverage challenges imposed by its geography, with positive results | High |
| Mexico | <ul style="list-style-type: none"> Interesting as a Latin American country; also an OECD member | High |
| Korea | <ul style="list-style-type: none"> Success story with a different approach to traditional models (EU unbundling and US network competition). Korea invested significantly in high-speed networks (over USD2 billion between 1995–2005), reaching high penetration levels of 80% of households. The network is now privately managed | High |
| Other | <ul style="list-style-type: none"> To the extent possible, review development to date in the broadband market and identify future potential initiatives in some countries where wireless technologies (3G, WiMAX, LTE, etc.) have been significantly important (due to geography, costs, etc.): <ul style="list-style-type: none"> ▸ Could wireless broadband compete with fixed broadband? ▸ What could one expect in terms of speeds/performance? ▸ Are there options to have a mix of fixed/wireless broadband services? | Medium |

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Initial focus of the benchmarking exercise – quantitative and qualitative indicators

- **Country indicators:**

- population
- households
- size km²
- urban distribution
- income distribution
- GDP per capita
- PC penetration
- telecoms spent

- **Success/key indicators:**

- consumer side: broadband coverage, broadband penetration, data rates (and penetration thereof), level of prices, etc.
- other indicators: penetration versus GDP, share of wallet, private investments, etc.

- **Competitive indicators/landscape:**

- number of platforms, number of operators with own infrastructure, number of operators with wholesale access, etc.
- market shares: retail, wholesale by product, etc.

- **Regulatory framework/public intervention:**

- type of regulatory intervention and policy: service-based, infrastructure-based, no intervention
- type of remedies imposed on SMP players (e.g. LLU, bitstream, naked DSL) and rationale
- application of regulatory measures to platforms and rationale
- existence (or not) of price controls, price-setting mechanisms: fully allocated costing (FAC), long-run incremental costing (LRIC), historical cost accounting (HCA), current cost accounting (CCA), etc.
- existence (or not) of broadband universal service obligations
- mobile broadband, spectrum, public policy towards use of freed digital dividend spectrum (e.g. will it be allocated for mobile broadband services?)
- public or mixed private/public investment initiatives

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Country indicators

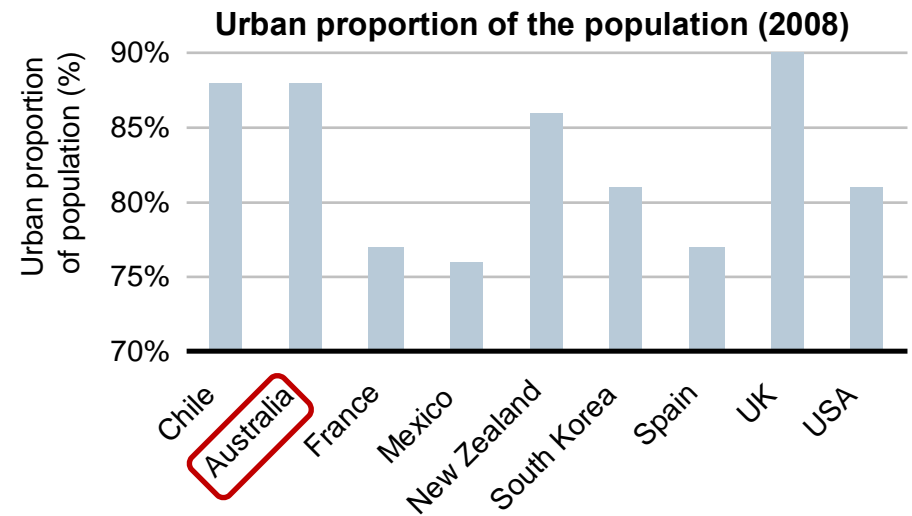
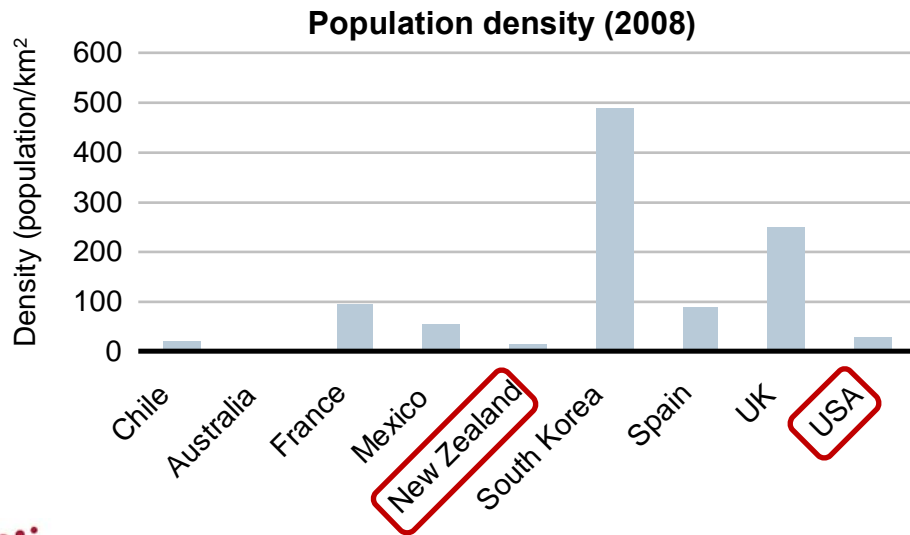
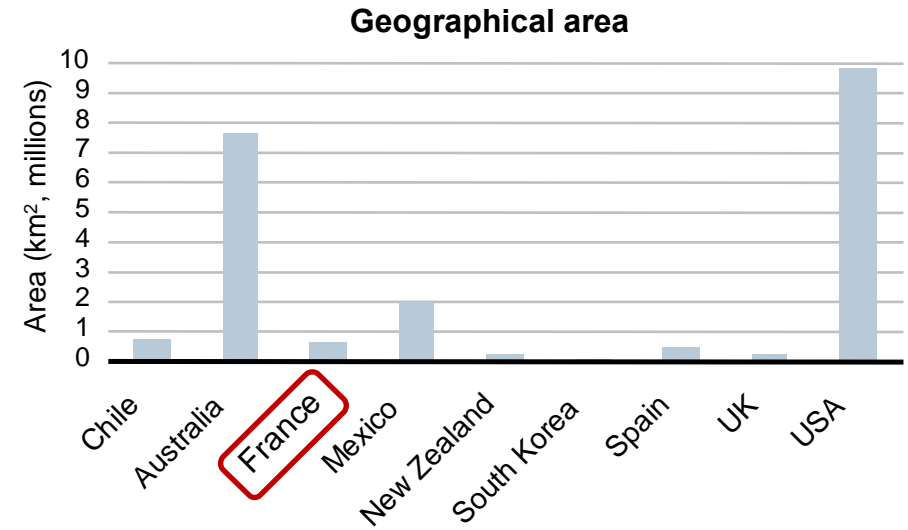
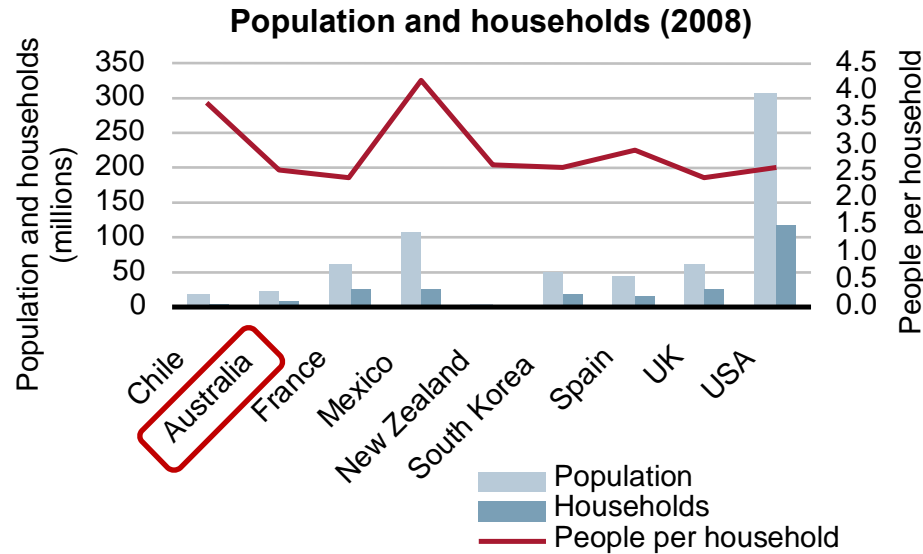
Success indicators

Competition indicators

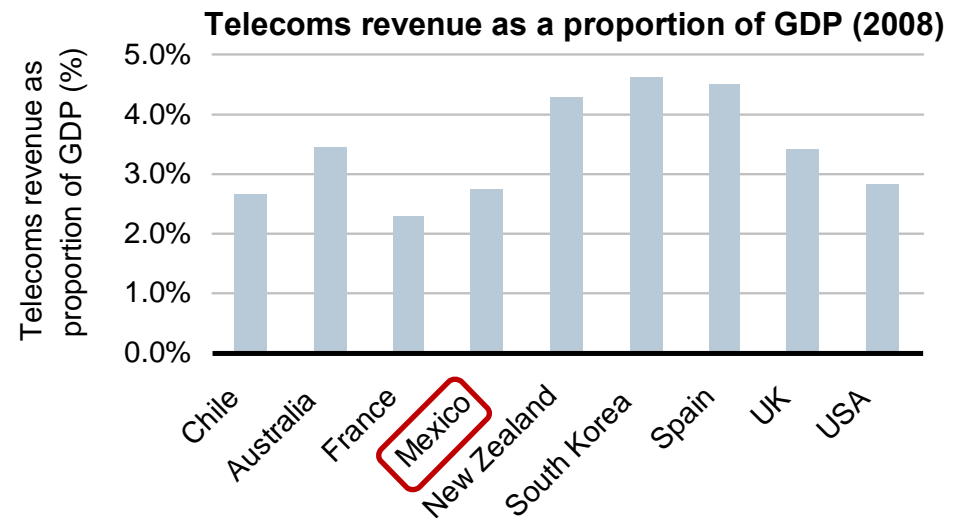
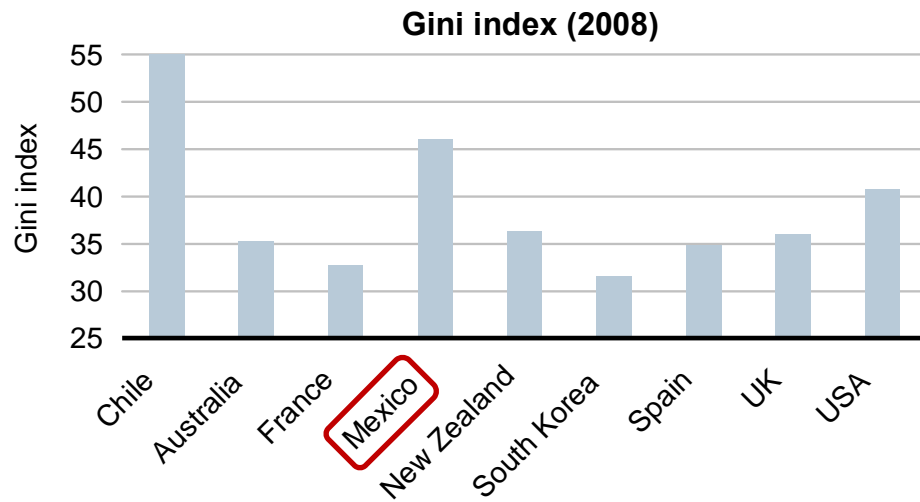
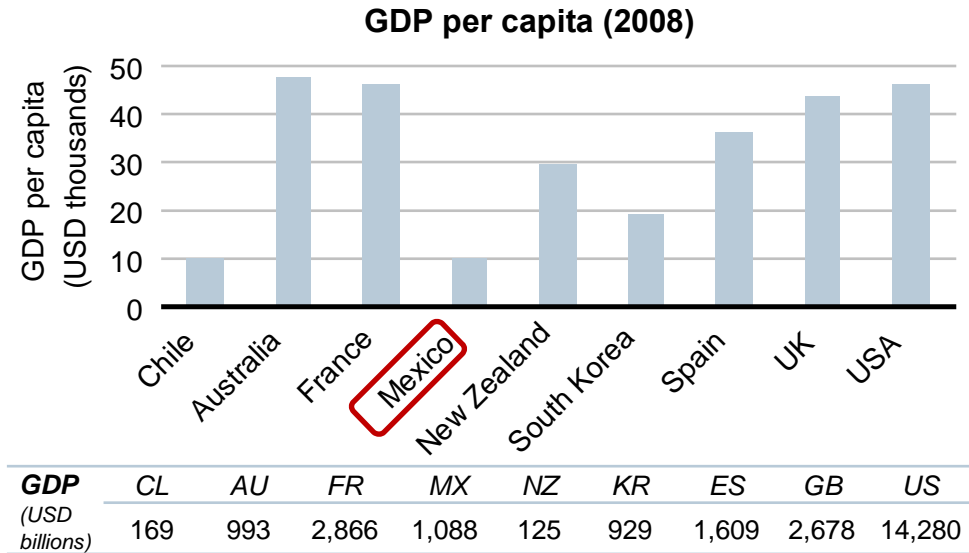
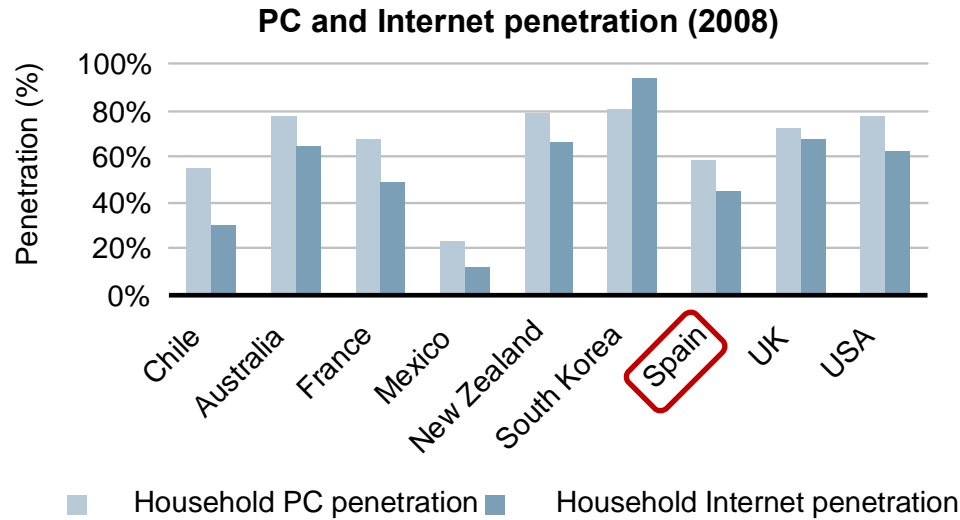
Regulatory framework/public intervention

GAP and selected correlation analysis

Macro-economic indicators [1/2]



Macro-economic indicators [2/2]



Introduction

Background: key public policy objectives and criteria

Broadband GAP research and analysis

Country indicators

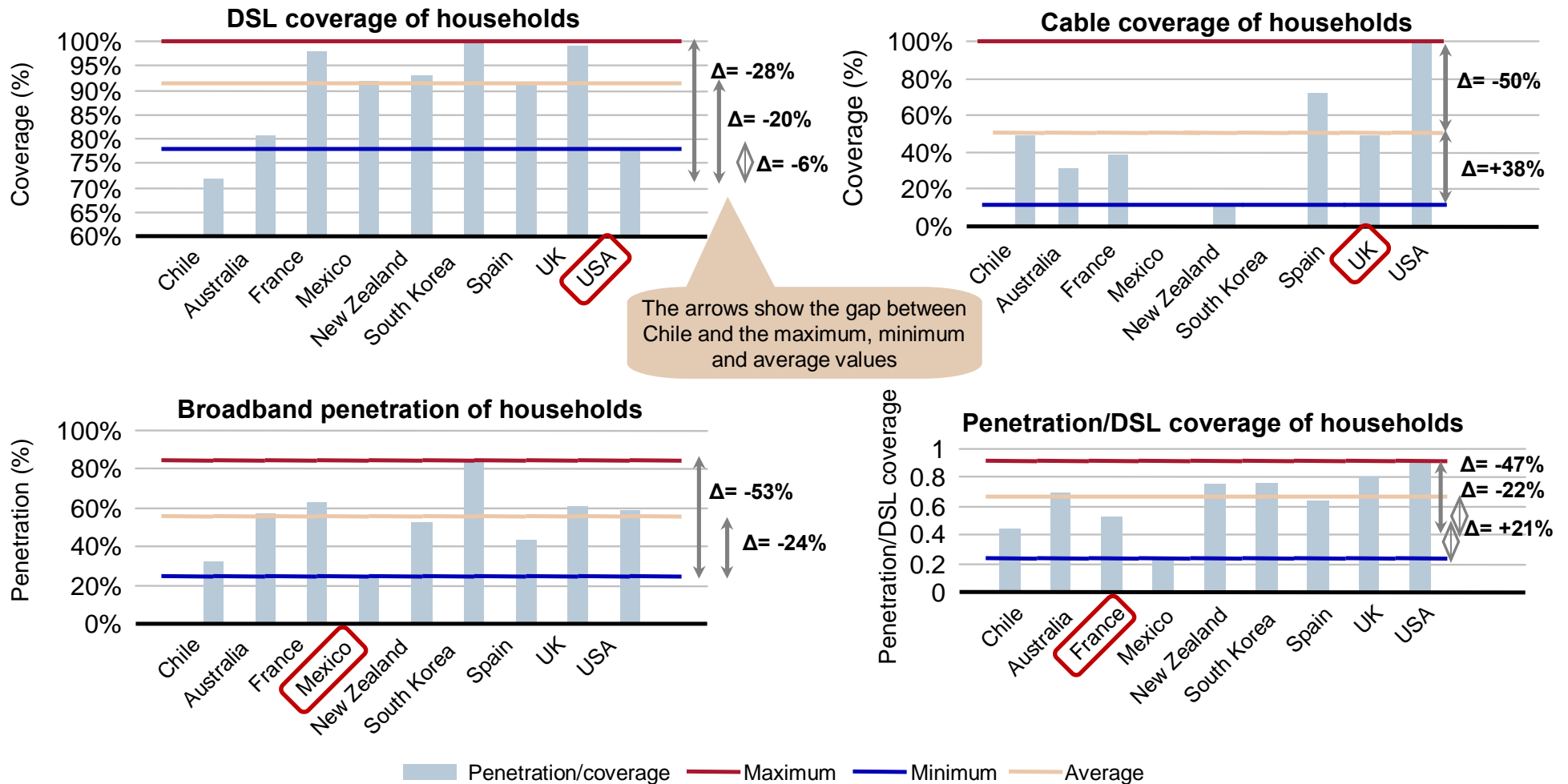
Success indicators

Competition indicators

Regulatory framework/public intervention

GAP and selected correlation analysis

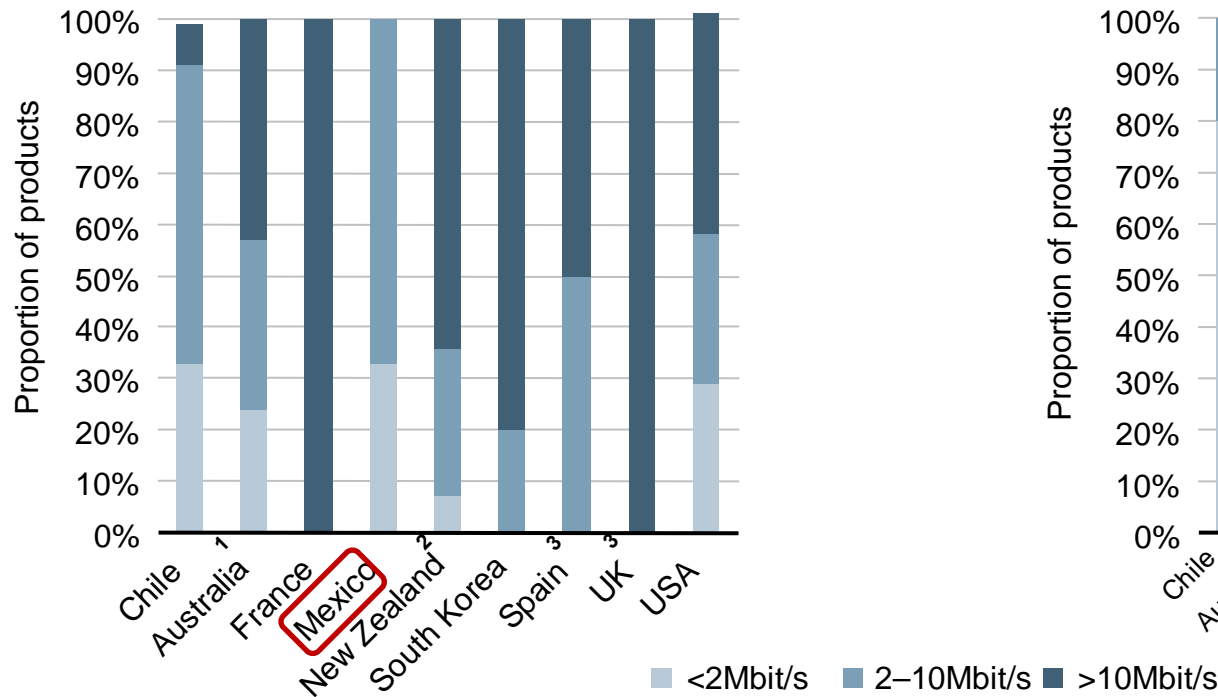
Success/key indicators [1/3]



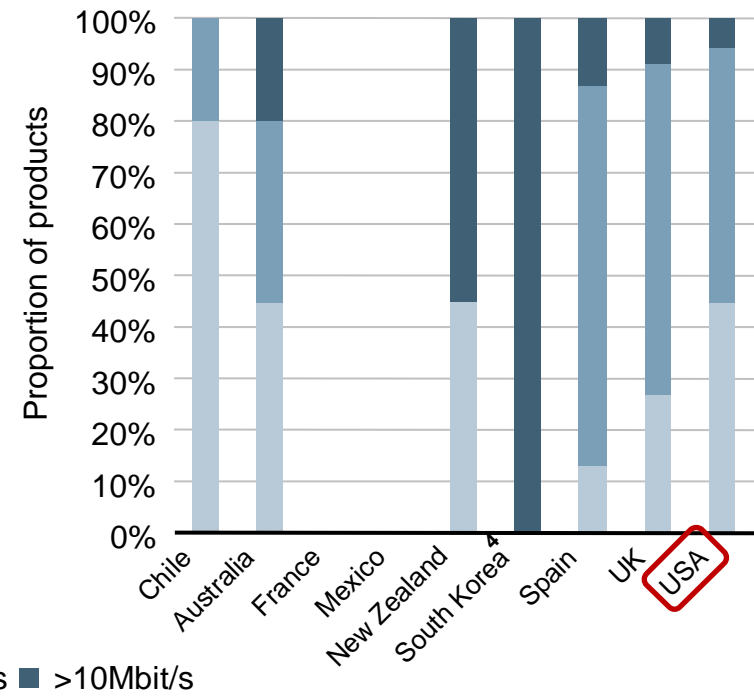
- Chile's DSL coverage is the lowest among the benchmarked group in terms of percentage of homes passed, followed by the USA, whereas its cable coverage is in line with the average of the benchmarked group at a similar level as the UK. Chile's overall broadband penetration is only higher than in México

Success/key indicators [2/3]

Plans offered by download speed (2009)



Market share of download speeds (2008)



• Mexico has the most similar distribution of broadband products per downstream data rate, with the majority of offers concentrated in the 2–10Mbit/s band and still a significant proportion (>30%) below 2Mbit/s

¹ All products have caps that can go from 200Mb to 100Gb. Set-up fees
² All products have caps that can go from 500Mb to 120Gb. Set-up fees
³ Low number of products with usage caps
⁴ 45% of lines are below 512kbit/s with the majority over 55% 2Mbit/s
⁴ South Korea estimate as the vast majority of lines are >10Mbit/s

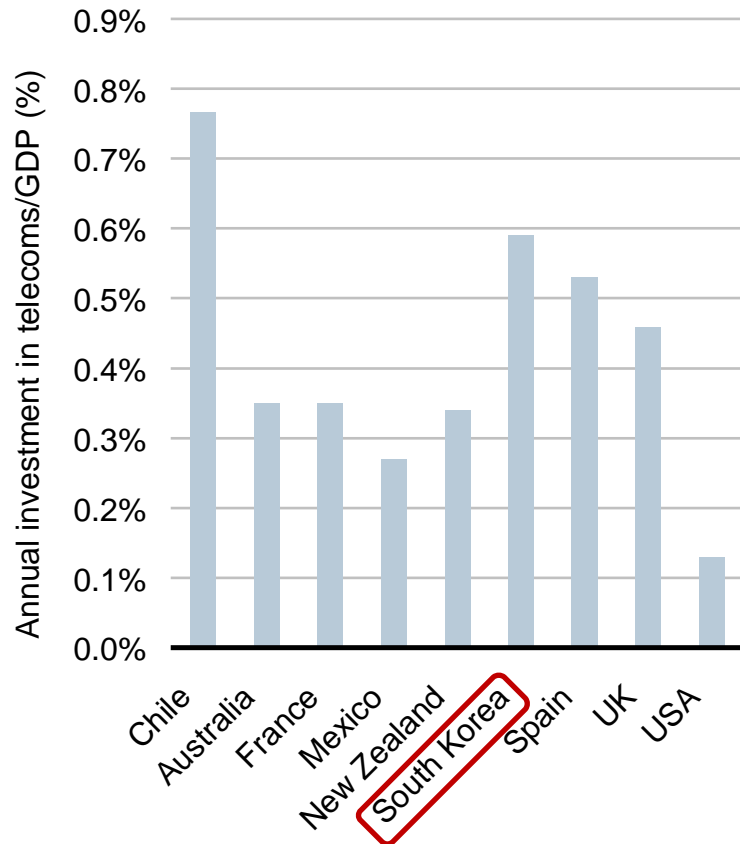


Sources: Euromonitor, NRAs

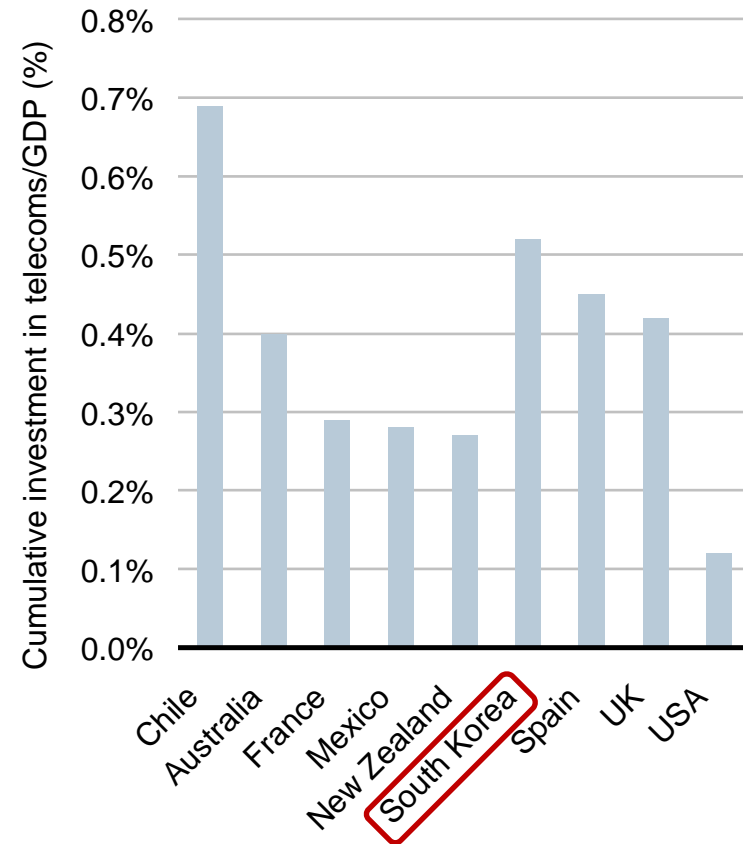
 Most similar country to Chile for the particular criterion Ref: 14233-26

Success/key indicators [3/3]

Capital investment in telecoms /GDP (2008)



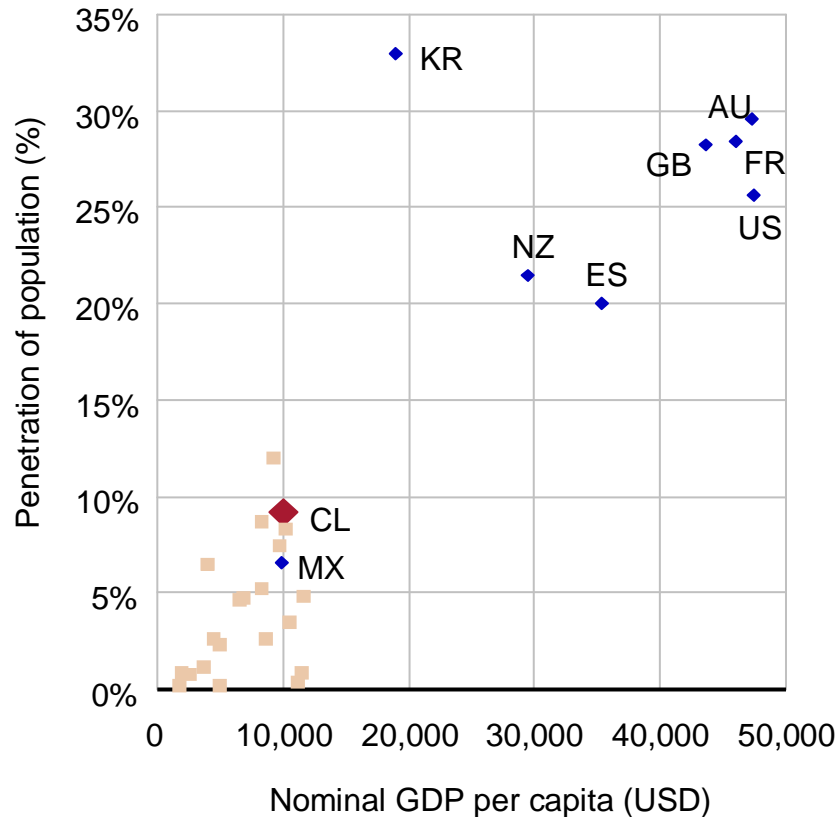
Cumulative capital investment in telecoms/GDP (2003–2008)



Capital investment in telecoms as a proportion of GDP seems to be very high in Chile, only comparable to South Korea, and well above the other benchmarked countries

Chile's broadband penetration is one of the highest among countries of similar economic conditions

Broadband penetration vs. GDP per capita (end 2008)

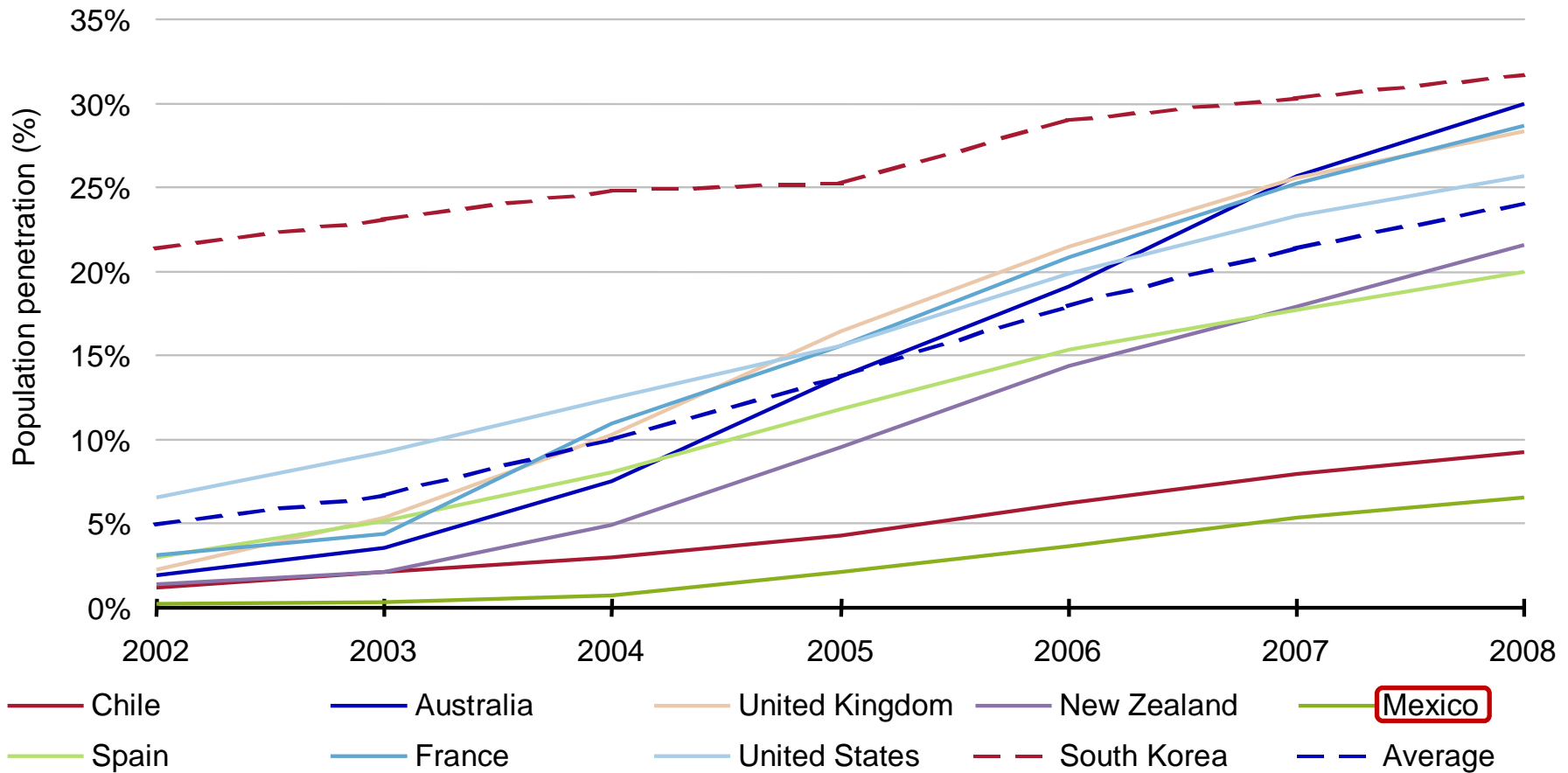


- Chile's (fixed and mobile) broadband penetration (at 9.2% in 2008) is one of the highest among countries of similar economic conditions, only behind Romania (12% penetration in 2008)
- Chile is also clearly ahead of the other Latin American countries, closely followed by Argentina (8.7% penetration in 2008)
- With regard to the benchmarked countries, Chile, while having a higher broadband penetration than Mexico, fails to attain the levels of success of other countries in the benchmark:
 - Chile's broadband penetration is the second lowest after Mexico

◆ Chile ◆ Benchmark ■ Latin America and countries of similar GDP per capita

Broadband penetration in Chile continues to lag behind that of the benchmarked countries

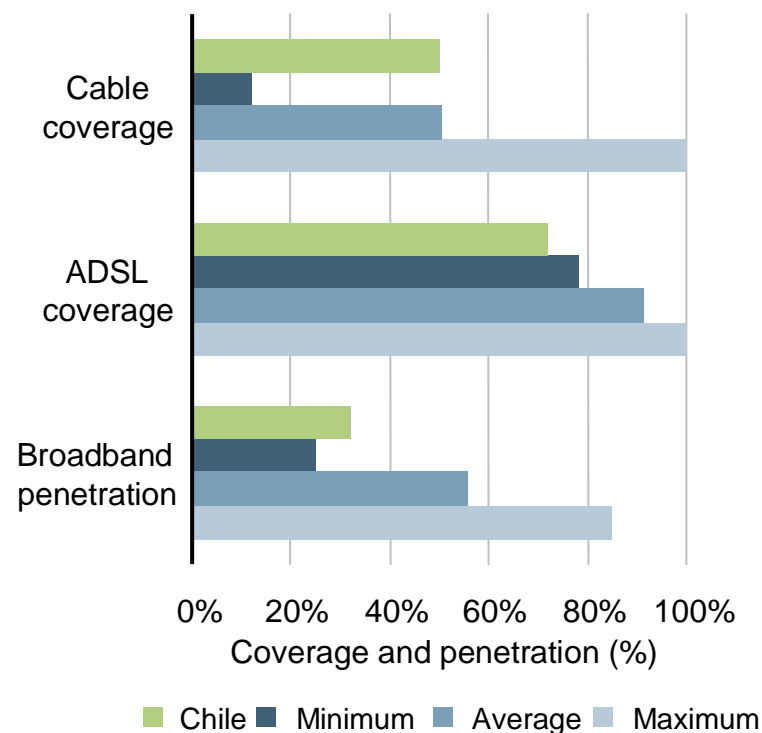
Penetration of broadband services (2002–2008)



Broadband penetration in Chile is below the average of the benchmarked countries

- Chile, while having a higher broadband penetration than Mexico, fails to attain the levels of success of other benchmarked countries:
 - Chile's broadband coverage is the lowest, closely followed by the USA and Australia – both countries with similar characteristics – and far from the coverage attained in Europe or South Korea
 - Chile's broadband penetration is the second lowest after Mexico, and half that of France and almost a third that of Korea, the two best-covered countries
- Chile's DSL coverage is the lowest among the benchmarked group, while the percentage of homes passed by cable is among the highest, but still at 50% of the total number of households

Broadband penetration versus cable and DSL coverage (2008)



- Chile's DSL coverage is the lowest among the benchmarked group's percentage of homes passed (followed by the USA), whereas its cable coverage is in line with the average of the benchmarked group at a similar level as the UK
- Chile's overall broadband penetration is only higher than Mexico

A structured comparison of retail broadband offers has to capture and simplify significant complexity

Bandwidth variations

- Several bandwidth tiers are available in each country (in Europe, typically an entry-level 2Mbit/s option, plus 6–8Mbit/s and sometimes higher ADSL2+ or cable-based bandwidths, and FTTx-based products are becoming increasingly more common)
- When it comes to bandwidth, making a like-for-like comparison tends to be significantly more complex than headline figures suggest, due to:
 - different combinations of downstream/upstream bandwidths
 - different contention ratios
 - difference between headline and actual experienced bandwidths

Different pricing structures

- Broadband offers come with a variety of pricing structures:
 - flat rate
 - flat rate with excess usage charges above a pre-specified cap
 - fully usage-based charges
 - time-based charges
- Increasingly, broadband is being offered within multi-play bundles, including fixed telephone line, mobile telephone, and/or TV:
 - these bundles are sometimes marketed in ways that imply that the broadband component is provided 'free'
- Promotional discounts and different minimum contract durations can also add to the difficulty of undertaking like-for-like comparisons

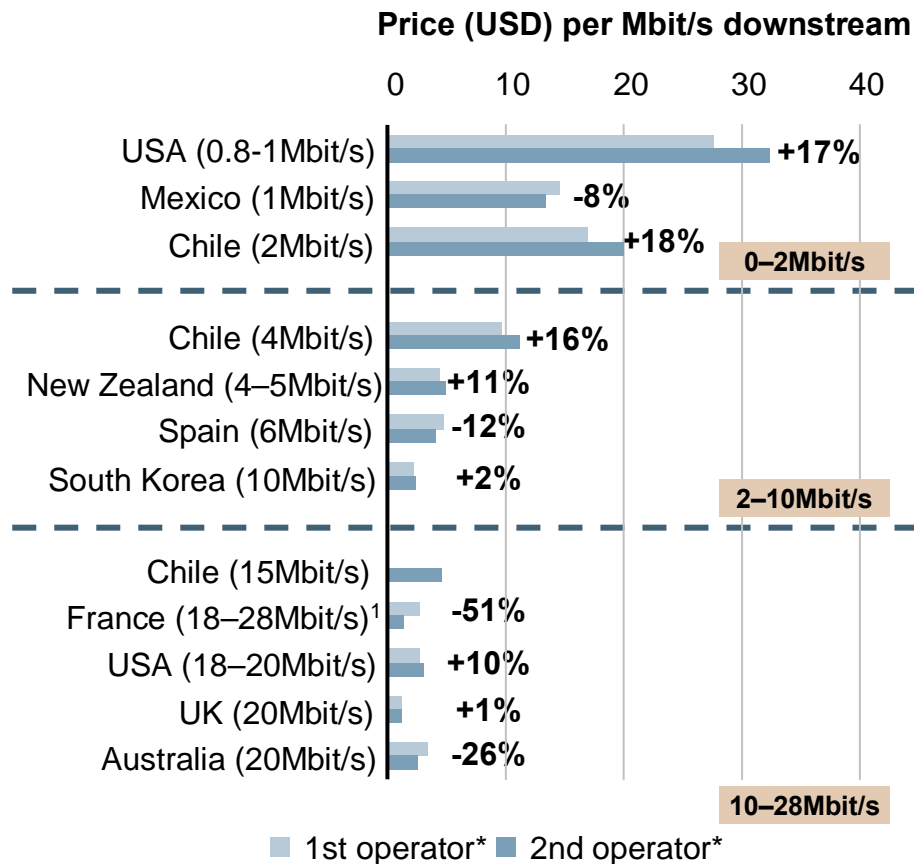
- This complexity cannot be fully avoided without over-simplifying the analysis, but we have taken care of ensuring that differences in offers and pricing structures are recognised and understood
- The objective of this comparison is to review the current status of Chilean broadband retail prices compared to those available in the selected countries to assess Chile's current situation in an international context
- A specific pricing review may be required beyond this project for a more detailed analysis to fully take into account all variables involved

We have selected a sample of reference retail prices per Mbit/s (headline downstream) for comparison purposes

- We have characterised broadband offerings by downstream speed – this is likely to be one of the most common factors used by subscribers in deciding whether to purchase a particular offering. We then compared the selected tariffs according to the following criteria:
 - we considered headline speeds rather than actual throughput – a recent study by the UK regulator, Ofcom, suggests that the average actual throughput is only about 60% of the advertised maximum bandwidth
 - we grouped offers with similar but not necessarily equal downstream bandwidths (e.g. 8–12Mbit/s)
 - for a given downstream bandwidth, we selected the products with the most similar (but not always equal) upstream bandwidths to one another, for best comparability
 - as far as possible, we only looked at offers which are not bundled with other services such as fixed telephone line, mobile telephone or TV
- In the USA in particular, one needs to bear in mind that competition and offers vary substantially by state as there are different incumbent operators in several states, mostly relating to new build of fibre and offer of DOCSIS 3.0
- Various price components are included/excluded from our benchmark, as follows:
 - includes amortisation of connection charges over three years and add to the monthly charges
 - excludes the cost of customer premises equipment (CPE)
 - excludes sales/value-added tax where charged
 - excludes promotional discounts unless the promotion was applicable over a sufficiently long period of time, e.g. 12 months

- We have reviewed retail broadband prices for three ranges of speeds (up to 2Mbit/s, 2–10Mbit/s and over 10Mbit/s)
- We have selected the offers of two key operators per country and examined the differences

Retail broadband prices seem comparable between countries, and are most influenced by the speeds offered

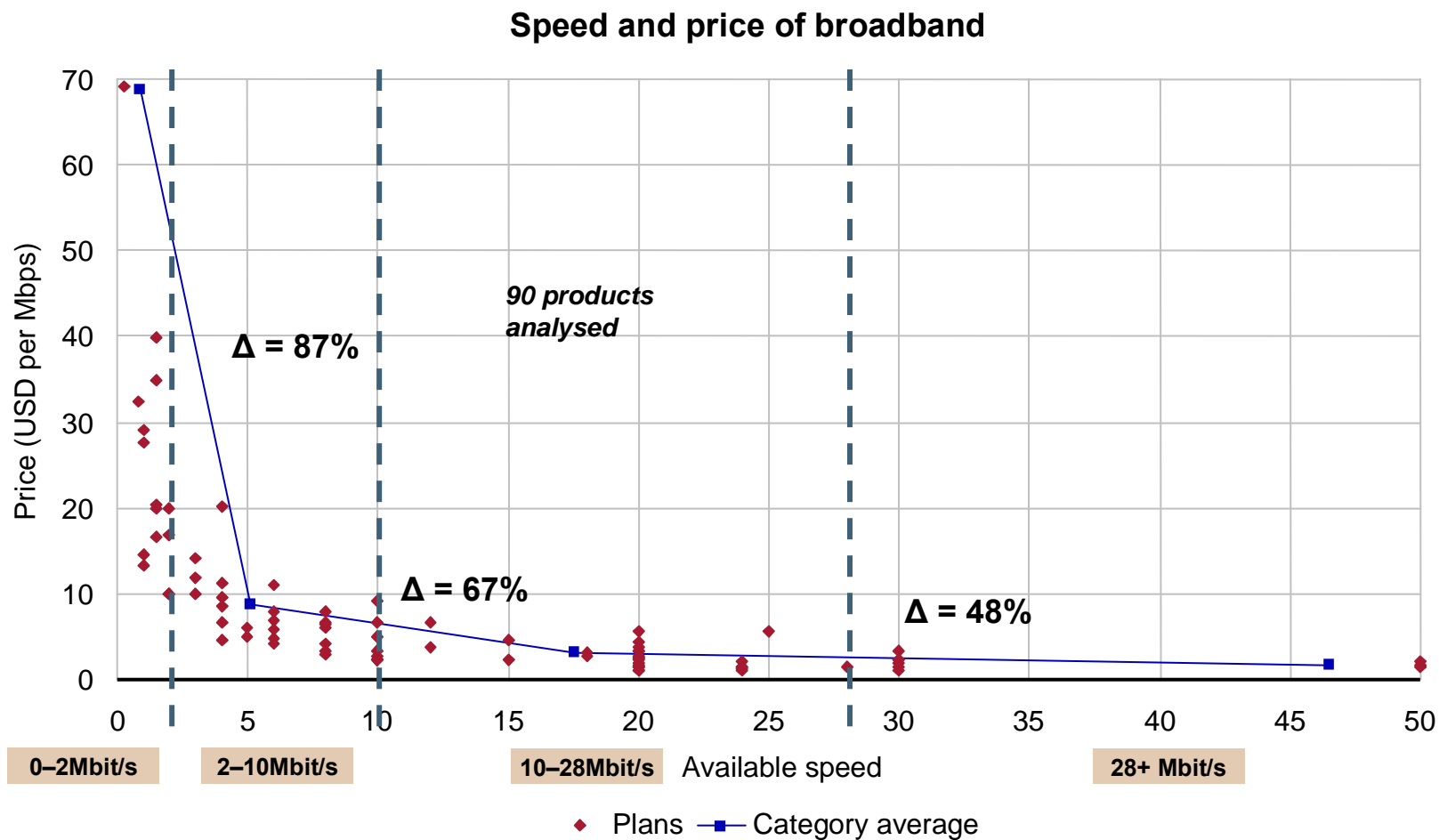


- Overall, the broadband retail price (per Mbps) of broadband in Chile seems comparable to the price of products with similar speeds in benchmarked countries for the lower speed range
- Chile’s prices in the 2–10Mbit/s and 10–28Mbit/s categories are among the highest
- The disparity in pricing between first and second operators in Chile aligns with that of the USA
- Chile’s disparity of +18% between 2Mbit/s plans and +16% between 4Mbit/s plans is similar to +17% disparity between USA’s 0.8–1Mbit/s plans
- Chile’s second operator VTR’s plans are offered at a higher price than Telefónica Chile

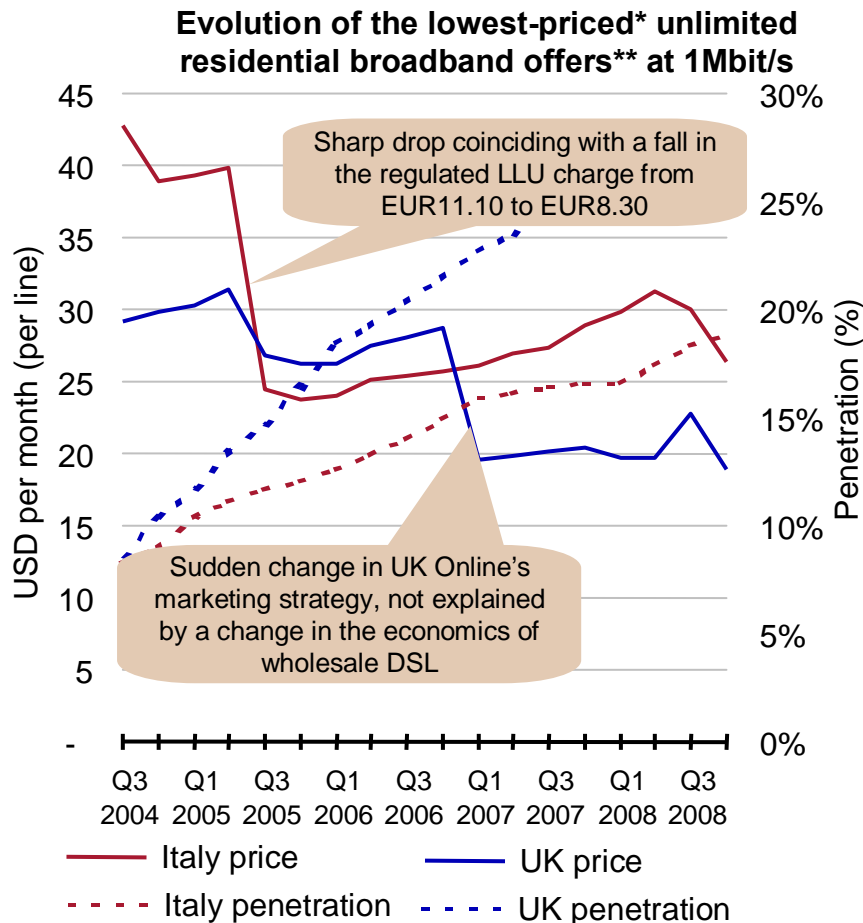
• Overall, the broadband retail price (per Mbps) of broadband in Chile seems comparable to those in the benchmark for the lower-speed range

• Chile’s prices in the 2–10Mbit/s and 10–28Mbit/s categories are significantly higher

The price per Mbps appears to follow an exponential decline, with speed increases across the benchmarked countries



In any case, the evolution of entry-level broadband prices suggests pricing has not been the main driver of take-up



- From late 2005 through 2006, the price of the cheapest 1Mbit/s offer levelled out at around USD23 to USD28
- However, penetration continued to grow substantially during this period
- This would suggest that the price of the entry-level broadband offer was not the main factor driving penetration growth during that period
- More recently, the lowest speed offered by operators has been going up, which may encourage take-up:
 - in France, all the packages offered by the various operators provide headline speeds of up to 18–20Mbit/s
 - data has been collected in local currencies and some of the growth shown on the chart is attributable to changes in the exchange rate

*The lowest-price offers shown have been selected from the four main DSL players in the country, as well as the leading cable operators

**Prices include VAT, one-off fees (activation, modem) amortised over 24 months, as well as promotions (discount monthly fees, cable rental)

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Country indicators

Success indicators

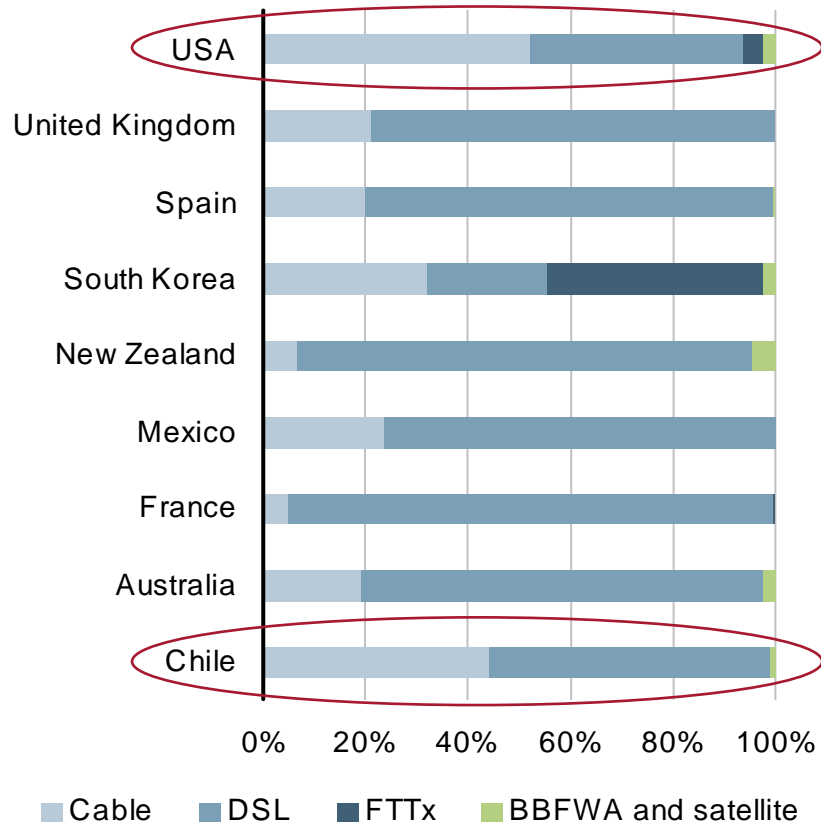
Competition indicators

Regulatory framework/public intervention

GAP and selected correlation analysis

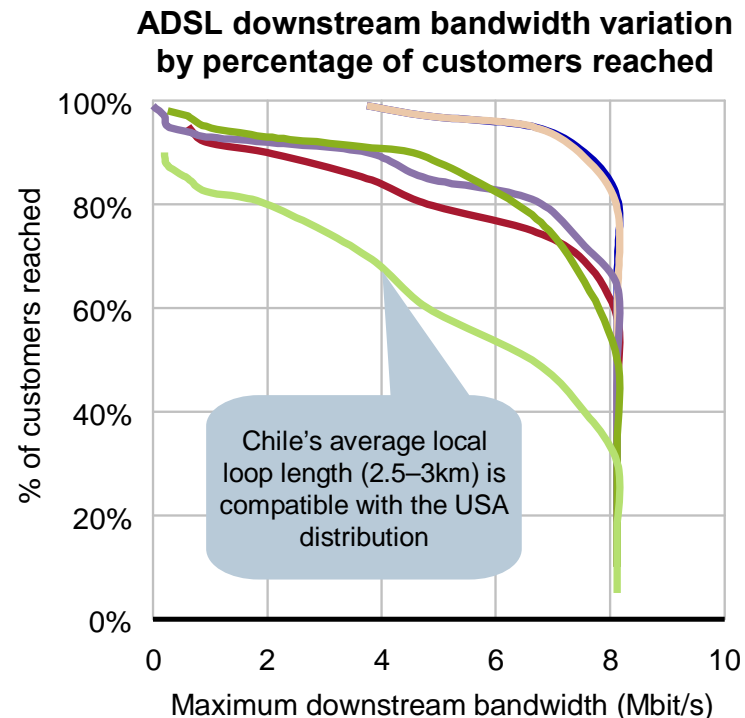
In terms of broadband technologies, DSL is prevalent in most countries. Chile's technology split is most similar to the USA

Split of broadband connections: access technologies (Q1 2009)



- DSL is the most prevalent form of broadband access technology in most countries
- Cable broadband access can provide intense competition in its coverage areas, as evidenced by countries such as the USA and Chile:
 - however, cable broadband competition is limited in France and New Zealand, making DSL- or fibre-based competition that much more important
 - the extent of cable broadband competition is often partially attributable to the extent to which cable was historically a primary option for TV access (such as the USA and Chile)
- FTTx has made the most inroads in Asian countries such as South Korea, where it predominated over DSL
- Broadband fixed wireless access (FWA) and satellite play a limited role in providing connectivity despite broadband FWA such as in Spain and the USA:
 - in many cases, the role of fixed wireless technologies has been limited to providing Internet access in rural or underserved areas

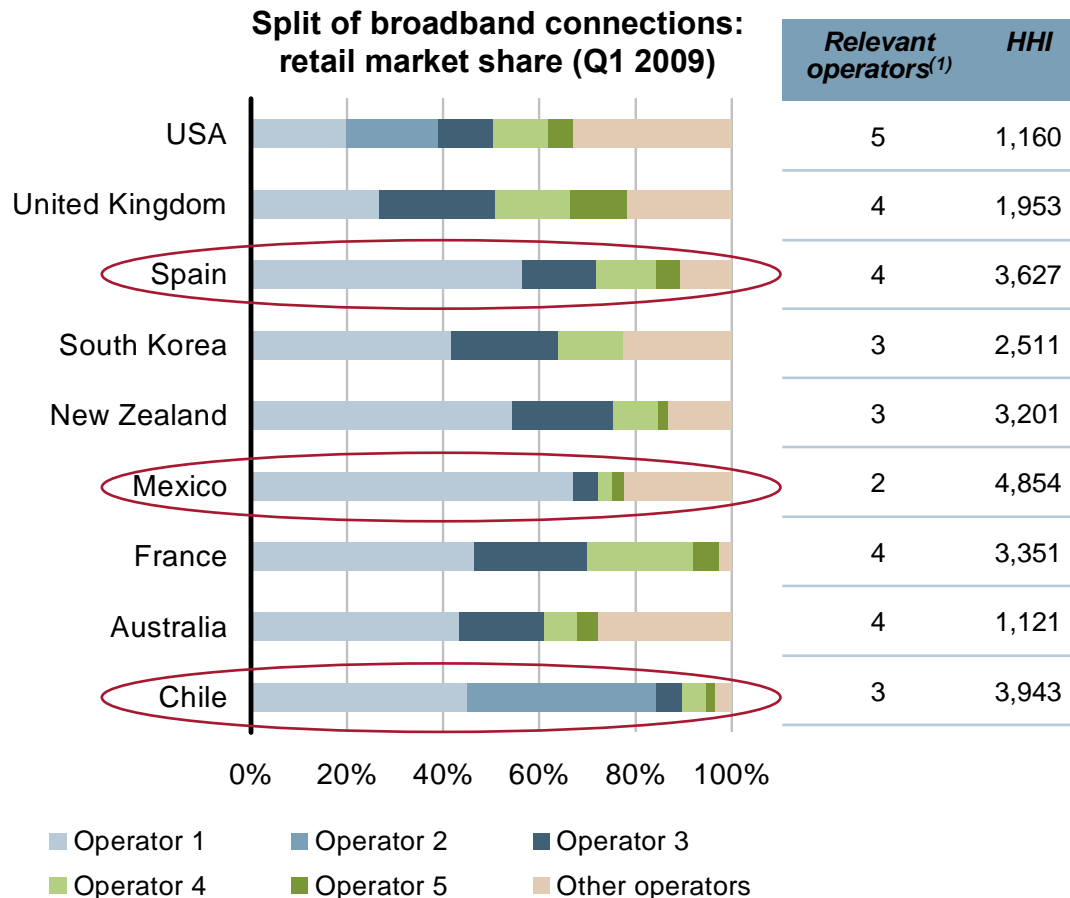
However, DSL may provide effective competition to a limited number of households, based on line quality



- The chart shows the percentage of customers reached according to the maximum theoretical downstream bandwidth
- In Europe, typically over 50% of customers can, in theory, (before line-quality issues, noise, etc. are taken into account) receive the full 8Mbit/s downstream from ADSL, and over 90% can receive at least 2Mbit/s
- In the USA, because of the longer line lengths, only 30–35% of subscribers can obtain the 8Mbit/s downstream, and only 80% or less can get at least 2Mbit/s
- This shows why line shortening (or rollout of new access networks without this distance sensitivity, such as FTTx or WiMAX) is so important in the USA – simply upgrading to ADSL2+ is not going to bring the gains that it has in Europe

- Whilst in EU countries DSL could provide effective competition at speeds of 8Mbit/s to over 50% of households, this may fall to about only 30% of households in the USA, given the poorer line quality
- It needs to be discussed whether or not the quality of lines in Chile would allow this platform to continue to be an effective competitor for a majority of households as offered speeds increase

The number of broadband competitors in Chile is similar to that of other countries, but their market dominance is higher



• Retail competition appears reasonably effective in the majority of the benchmarked countries – both where facilities-based competition dominates and where service-based competition is prevalent:

- incumbent market shares have continued to fall but remain over 50% in the case of Chile (86%), Mexico (67%), New Zealand (54%) and Spain (56%)
- the combined market share of the top two broadband providers is less than 75%, with the exception of Chile where the top two operators amount to a market share of 86%
- however, the data available at a national level obscures the following facts:
 - countries such as the USA have regional incumbents with much larger market shares in their regions, which might make certain states have a more concentrated market
 - countries such as Chile have one DSL incumbent and one cable modem incumbent
 - national market shares are not necessarily reflective of service choices available to customers in different geographical areas

⁽¹⁾Relevant operators are operators with more than 3% market share of subscribers; see slide 96 for further details

*OLO (other licensed operator) refers to any broadband provider other than an incumbent telecoms company

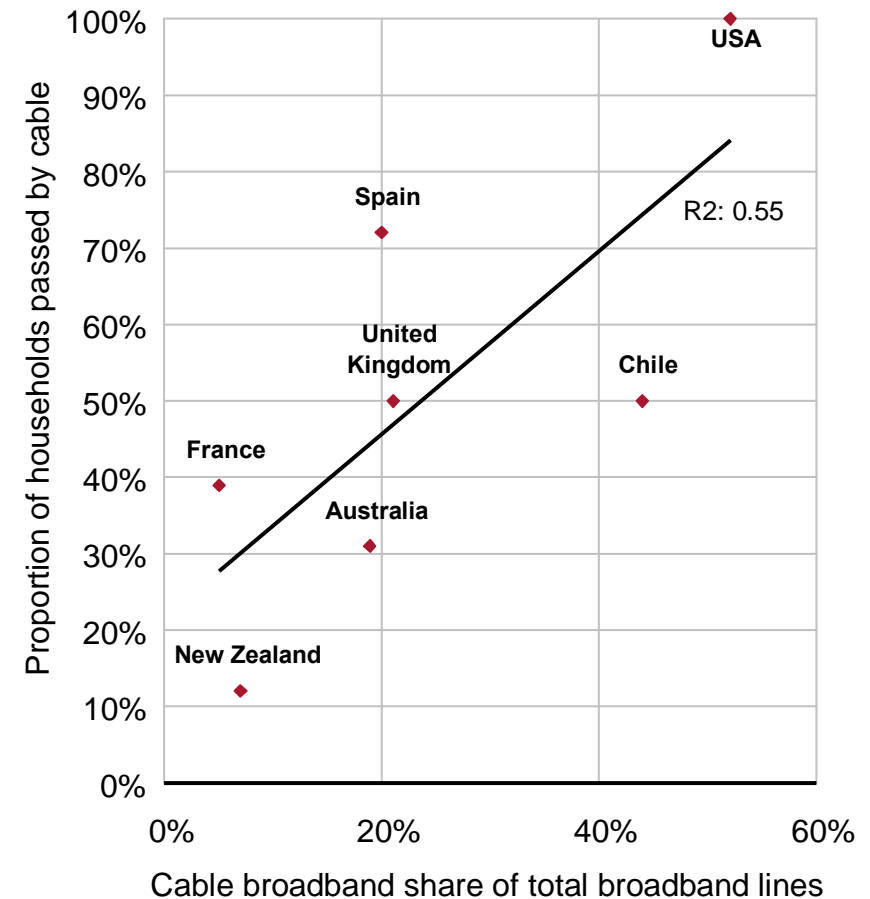
Sources: Analysys Mason research division, GlobalComms, operator websites, Analysys Mason estimates

Where cable networks have been rolled out, they can provide significant competition between networks

- The chart to the right suggests that in countries with greater cable coverage, cable broadband players tend to secure a larger market share, thus providing greater competition between networks to the incumbent
- However, significant investment is required to upgrade old analogue cable TV networks to digital networks capable of delivering broadband:
 - cable networks have not been 100% digitised in all countries, but digitization is extensive in most of the (developed) countries in our sample – although unfortunately data on the full extent of digitization is not widely or readily available in the public domain
- However, in some countries, e.g. Austria, cable coverage had not led to significant competition until mobile broadband made the market more dynamic

- In Chile, cable has a higher share of broadband with respect to this technology's coverage in the country
- Competition between networks can significantly contribute to broadband penetration

Cable homes passed versus cable broadband share of total broadband lines (1Q 2009)

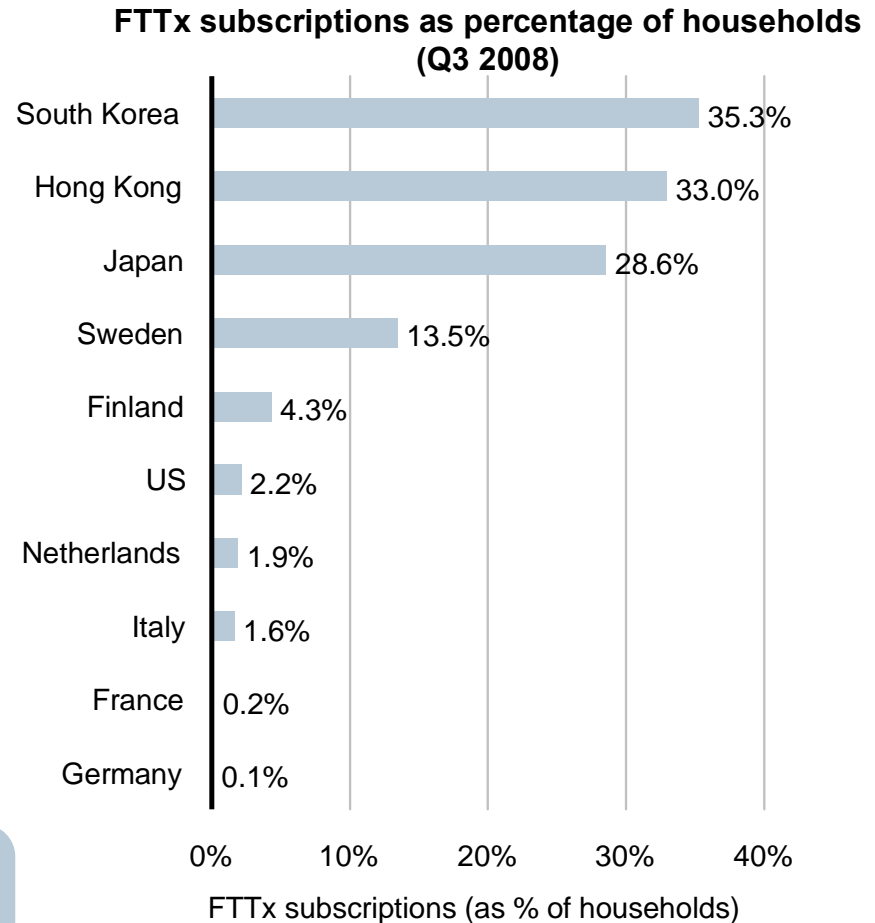


Note: The trend line does not pass through the origin as might be expected because it is only a best-fit regression to the available data, not a statement about fundamental dynamics of broadband markets

Fibre rollout has mainly been limited to high-density areas, which are more economically viable

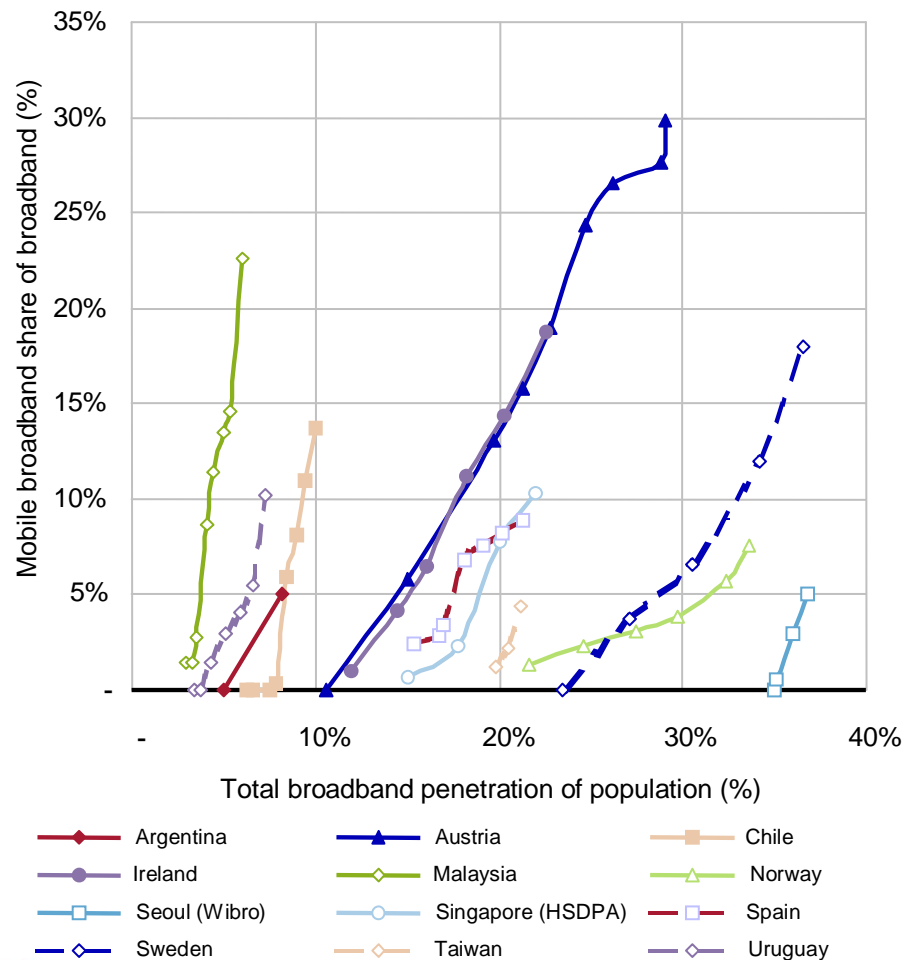
- FTTx becomes more viable in areas with a high proportion of multi-tenant buildings (such as large apartment blocks). This helps explain why Hong Kong, Japan and some cities in Italy (where apartment living is prevalent) have led FTTx rollout
- FTTx has also been extensively rolled out in Sweden under a municipal fibre model
- Most European incumbents and some OLOs, as well as several US operators, have announced plans or have started to deploy fibre-based networks:
 - BT announced it plans to roll out superfast broadband to 40% of UK households by 2012, at a cost of GBP1.5 million
 - Telefonica planned to invest up to 2010 more than EUR1 billion for the construction of an FTTH network covering the main Spanish cities; the plan was scaled back in 1Q 2009 due to the recession
 - France Telecom invested some EUR270 million for the connection through FTTH of some estimated one million homes
 - Iliad (Free) has a programme of FTTH construction between 2007 and 2012 with an estimated cost of EUR1 billion

- While FTTH increases data rates, it will do little to improve broadband penetration and coverage given its reduced footprint
- This may change in the future with large private or public plans as those announced in Australia and New Zealand



Mobile broadband is growing rapidly and has become both an alternative and a complement to fixed broadband

Mobile broadband share of total broadband (4Q 2008)



- In many emerging countries, with limited fixed network infrastructure, mobile broadband is effectively driving overall broadband take-up: e.g. in Malaysia 55% of net additional broadband subscribers are HSDPA
- In general, in developed countries with moderate broadband penetration, mobile broadband services were initially seen as a means of gaining broadband connectivity everywhere ...
- ... but in many countries, e.g. Austria or Ireland, they subsequently began to be used also as a substitute to fixed broadband access partly due to the lack of fixed broadband coverage or lack of efficient competition
- In many countries, the success of mobile broadband has brought about a competitive price compared to fixed broadband ...
- ... however, mobile operators might rethink their product and pricing strategy as they face scalability issues, especially on the backhaul as mobile networks need to cope with rapidly growing data traffic
- Mobile and wireless technologies can make the broadband market more dynamic by taking broadband to unserved/underserved areas or putting pressure on fixed broadband operators' prices

- Mobile broadband can help increase broadband coverage as mobile operators typically have higher coverage (around 80% in Western Europe) and penetration
- Mobile broadband products can deliver an average throughput per subscriber of less than 2Mbit/s

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Regulatory framework/public intervention – summary [1/4]

| Country | Favoured regulation | Remedies on SMP players | | | | | Comments |
|-------------|---|-------------------------|---|-----------------------|-----------------------|-------------|---|
| | | Price control | Wholesale access | Accounting separation | Functional separation | Equivalence | |
| Chile | Competition between networks | ✓ | | | | | VTR was obliged to provide wholesale broadband access as a condition for allowing its merger with Metrópolis Intercom in 2005 |
| Australia | Competition within networks | ✓ | ✓ | ✓ | | | |
| France | Competition within networks | ✓ | ✓ | ✓ | | | France Telecom currently offers wholesale access to its fibre network without being mandated by the regulator |
| Mexico | Competition between networks | | | | | | |
| New Zealand | Competition within networks | ✓ | ✓ | ✓ | ✓ | ✓ | Telecom New Zealand provides open access to dark fibre |
| South Korea | Competition within and between networks | | | | | | |
| Spain | Competition within networks | ✓ | ✓ | ✓ | | | Fibre unbundling is not mandated – Telefónica provides access to ducts and dark fibre |
| UK | Competition within networks | ✓ | ✓ | ✓ | ✓ | ✓ | Openreach provides wholesale broadband access |
| USA | Competition between networks | | Included in Telecoms Act, but not developed | | | | |

Regulatory framework/public intervention – summary [2/4]

| Country | Favoured regulation | Wholesale access products | | | | |
|-------------|---|---|----|-----------|-----------|---|
| | | LLU | LS | Bitstream | Naked DSL | Other |
| Chile | Competition between networks | Implemented but not actively encouraged | ✓ | ✓ | | |
| Australia | Competition within networks | ✓ | ✓ | ✓ | ✓ | Set of ancillary services: colocation, backhaul, etc. |
| France | Competition within networks | ✓ | ✓ | ✓ | ✓ | Set of ancillary services: colocation, backhaul, etc. |
| Mexico | Competition between networks | Proposed but not implemented | | | | |
| New Zealand | Competition within networks | ✓ | ✓ | ✓ | ✓ | Set of ancillary services: colocation, backhaul, etc. |
| South Korea | Competition within and between networks | LLU effect limited due to ownership of lines | | ✓ | | |
| Spain | Competition within networks | ✓ | ✓ | ✓ | ✓ | Set of ancillary services: colocation, backhaul, etc. |
| UK | Competition within networks | ✓ | ✓ | ✓ | | Set of ancillary services: colocation, backhaul, etc. |
| USA | Competition between networks | Mandated but effectively overridden by a combination of Court and FCC actions | | | | |

Regulatory framework/public intervention – summary [3/4]

| Country | Other public interventions | |
|-------------|--|--|
| | Broadband as part of the USO | Digital dividend and broadband spectrum policy |
| Chile | No formal USO | Digital dividend outcome not decided yet. 2.6GHz band reserved for 4G services |
| Australia | Not implemented | Digital dividend outcome not decided yet. Bands in 800MHz, 900MHz, 1800MHz and 2.1GHz available for 3G/mobile broadband, 2G→3G refarming has started |
| France | Policy goal is to have 512kbit/s in the 'Digital France 2012' plan but no subsidies will be provided | Some frequencies (790–862MHz) allocated for mobile operators and broadband. The 2.6GHz band is reserved for 4G services. The 900MHz, 1800MHz and 2.1GHz available for 3G/mobile broadband, but GSM→UMTS refarming has not yet taken place |
| Mexico | Not implemented | Digital dividend outcome not decided yet. The 900MHz, 1800MHz and 2100MHz bands can be used for 3G mobile broadband. New spectrum in the 1700MHz and 1900MHz bands to be auctioned for broadband use. Spectrum in the 3.4GHz and 3.7GHz bands reserved for WiMAX |
| New Zealand | Proposal stage | Digital dividend outcome not decided yet. Spectrum in the 2.3GHz and 2.5GHz bands auctioned in 2007 for mobile broadband. Spectrum in the 800MHz, 900MHz, 1800MHz and 2.1GHz bands available for 3G/mobile broadband |
| South Korea | Implemented | Some frequencies (698–790MHz) allocated for mobile broadband services. LTE to be deployed in the 2.6GHz band. The 2.3GHz band used to offer wireless broadband. 3G mobile services can also be offered in the 900MHz, 1800MHz and 2100MHz bands |
| Spain | Adopted as a policy goal with national and specific regional funding available | Some frequencies (790–862MHz) allocated for mobile broadband services. The 2.6GHz band is reserved for 4G services, whereas the 900MHz, 1800MHz and 2.1GHz bands are available for 3G/mobile broadband, but GSM→UMTS refarming has not happened yet |
| UK | Adopted as a policy goal of 2Mbit/s by 2012 including technology-neutral funding of GBP200 million | Some frequencies (790–862MHz) to be auctioned potentially for mobile broadband services. The 2.6GHz band is reserved for 4G services. The 900MHz, 1800MHz and 2.1GHz bands available for 3G/mobile broadband, but GSM→UMTS refarming has not happened yet |
| USA | Stimulus plan includes a USD7.2 billion for broadband deployment in unserved/underserved areas | Some frequencies (698–790MHz) allocated for mobile broadband services. The 800MHz, 1900MHz and 2100MHz bands can be used for 3G services. The 2.6GHz band is reserved for 4G services |

Regulatory framework/public intervention – summary [4/4]

| Country | Public and combined investments | |
|-------------|--|---|
| | Extension into rural and remote areas | Alternative networks – satellite, WiMAX |
| Chile | FDT promotes the provision of telecoms services in rural and economically disadvantaged areas with USD100 million of funding | USD6.7 million from FDT's resources are committed to the rural Internet project in rural regions such as Los Ríos; the aim of the project is to increase broadband penetration from 35% to 80% of the population using WiMAX |
| Australia | NBN plans to deliver FTTH to 90% of the population over the next eight years | OPEL Networks was awarded a contract to boost broadband coverage using a combination of DSL and WiMAX technologies (AUD958 million – later aborted) |
| France | Local authorities are building fibre networks (combined investment of EUR900 million) | The fourth 3G licence is currently being auctioned. The winner will be given spectrum in the 900MHz band |
| Mexico | - | - |
| New Zealand | The Broadband Investment Fund was announced in 2008 and comprises USD217 operating funds and USD10 million capital funds over five years NBN plan to bring FTTH to 80% of population | - |
| South Korea | High levels of government investment in fixed networks; no specific rural/remote area network extension programme | - |
| Spain | Plan Avanza extended broadband coverage from 2005–2008 (EUR39 million) | Several regions have funded the deployment of small WiMAX networks to provide broadband services to rural areas |
| UK | RDAs supported and funded the rollout of ADSL; there are plans for a GBP0.50 per-line tax on broadband to fund NGA | Government-funded satellite-based broadband schemes have been implemented in rural areas of Scotland and Northern Ireland |
| USA | In 2009, the US government approved a stimulus bill of USD787 billion to boost the nation's economy, of which USD7.2 billion were committed to expanding broadband coverage in rural and underserved areas | The Rural Utilities Service and the Community Connect Scheme provide grants to improve broadband coverage in rural areas – in 2007, the Rural Utilities Service provided grants of USD10.3 million; a proportion of this money was used to fund wireless networks |

USA's broadband policy has focussed on competition between networks despite some LLU initiatives ...

- In the USA, cable operators historically have had the leading position in broadband:
 - cable operators began to upgrade their networks in response to pay-TV competition from satellite providers, which enabled them to easily upgrade with DOCSIS for the triple play
 - aside from merger conditions imposed on Time Warner (following the AOL merger), cable operators have not had to provide any wholesale access to their networks
- Broadband service-based competition never reached critical mass in the USA:
 - following a combination of FCC and Court decisions in 2003–2004, there are effectively no wholesale access conditions for copper-based networks including unbundling or line sharing
 - in order to stimulate deployment of next-generation fibre networks, the Federal Communications Commission (FCC) did not impose any unbundling regulations on these networks in 2003, leading AT&T and Verizon to begin to deploy FTTC and FTTP networks respectively
 - in 2005, the Supreme Court upheld the FCC's decision not to require cable companies to have to provide wholesale access (the 'Brand X' decision)
 - it seems that the recipients of funds from the Stimulus plan will not have the obligation to open their network to competitors

- Historical and line-quality issues seem to be the reasons explaining the USA focus on competition between networks
- In particular, strong broadband cable offers and poor line quality have led the main incumbent local exchange carriers (ILECs) to begin to upgrade their networks with fibre in order to compete

... while European broadband policy tends to focus on competition within networks and 'sustainable' altnets

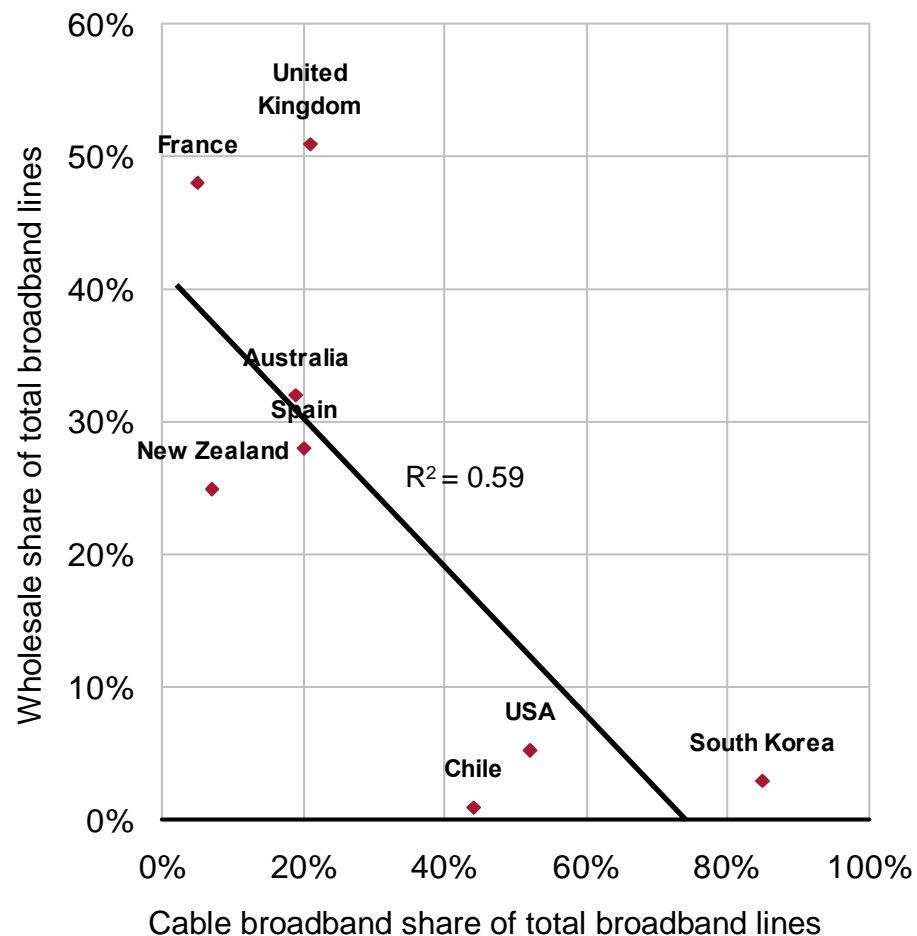
- Europe exhibits the following characteristics that favour competition within networks:
 - relatively limited cable deployment, which lessens the opportunity for competition between networks in a number of countries, thus making service-based competition more important
 - copper loops in Europe are generally more suitable for DSL service-based competition through LLU than those in the USA, due to shorter loop lengths and post-war construction
- In its recent decision on NGA, the European Commission (EC) expressed its preference to drive infrastructure-based competition where possible and efficient. However, Europe's policy choice in support of competition within networks is now well entrenched:
 - the EC opened formal proceedings against the German government, which granted a regulatory holiday to the incumbent for its FTTx deployment
- Some European regulators have been more aggressive than others in setting prices and conditions to incumbents, which has resulted in a variety of competing obligations between and within networks
- However, the greater emphasis on competition within networks may have more to do with political and timing differences compared to the USA, than economic or structural factors:
 - unbundling was mandated in the Telecommunications Act of 1996, but this requirement has recently been overturned by the FCC (in particular with regards to FTTx deployments by incumbent operators)
 - European incumbent operators did not succeed with the EC, which imposed regulation of wholesale broadband (in support of competition within networks) across Member States
- Australia and New Zealand, although they have their own regulatory framework, have followed the European steps in mandating wholesale access to the incumbents' networks

- Limited broadband cable offers have been a historical factor making EC and National Regulatory Authorities to focus on competition within networks
- Moreover, relatively good line quality have made regulatory intervention favouring competition within networks (e.g. LLU) more attractive in Europe

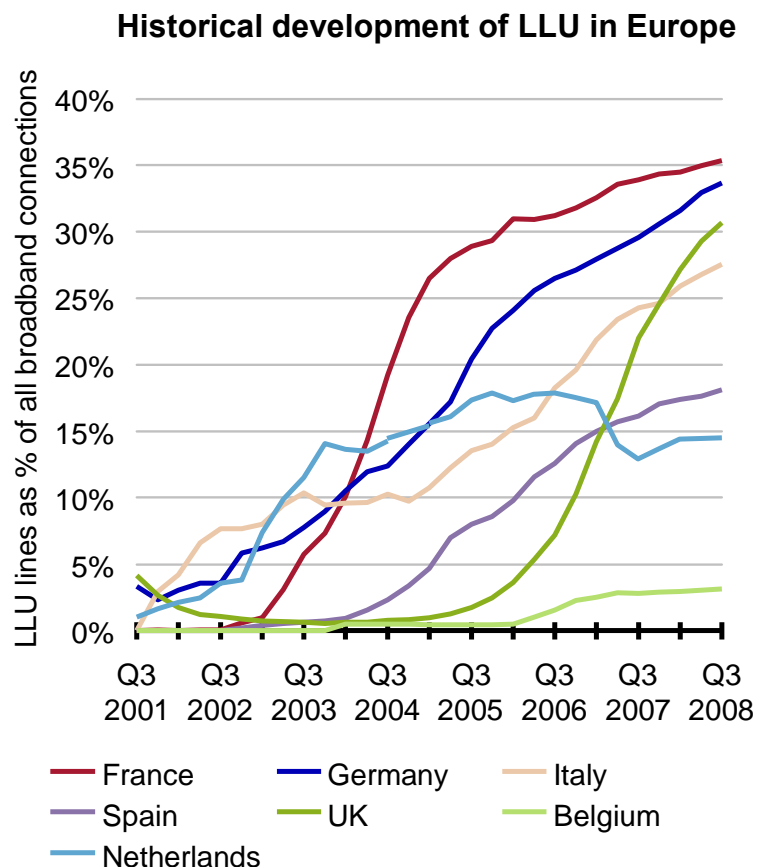
Broadband regulatory policy appears to be largely shaped by facilities deployment

- In general, countries with a high level of cable modem deployment (as a proportion of broadband access lines) tend to focus more on competition between networks:
 - in North America there is a high level of cable deployment and not much competition within networks
 - Europe has less cable deployment and focuses more on competition within networks
 - South Korea focuses on competition both between and within networks

Cable broadband share of total lines versus wholesale share of total broadband lines (Q1 2009)



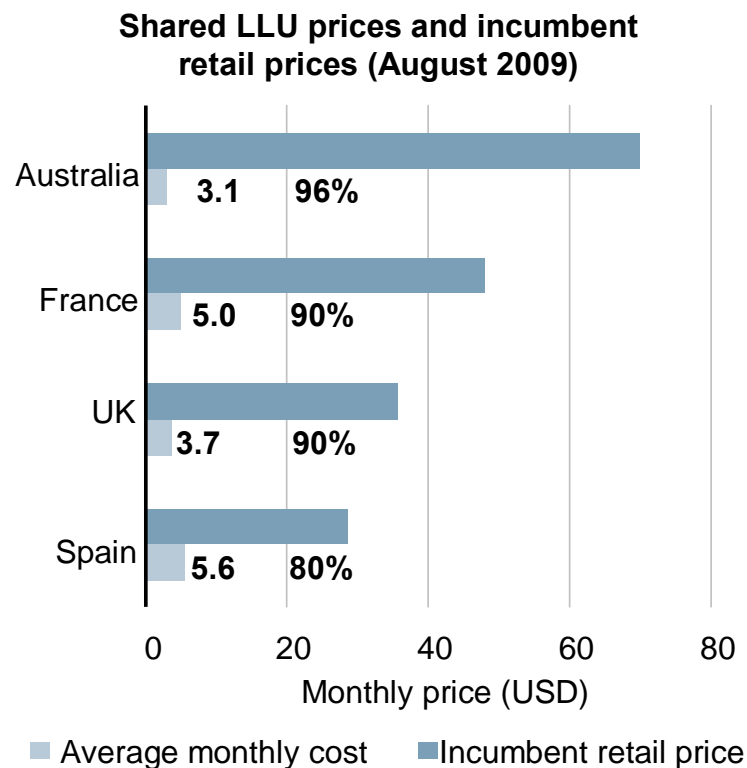
LLU has enjoyed strong growth in most Western European markets, driven by tight regulation



- Since European legislation mandating LLU was introduced in January 2001, national regulators have progressively tightened their regulation of the prices and service level agreements of LLU
- Historically, high LLU prices and operational problems with the implementation of offers have held back investment:
 - in France, specific obligations on price and equipment space were placed on the incumbent in 2003, stimulating LLU
 - in the UK, operational problems with unbundling were a catalyst for structural separation of the incumbent, accelerating LLU substantially
- In Germany, Italy and the Netherlands, early aggressive regulatory focus on LLU allowed LLU to gain a foothold much earlier in the process
- More recently, LLU has continued to expand, for two main reasons:
 - the deregulation of bitstream offers, as regulators like Ofcom take the view that in most places deeper infrastructure competition is taking hold
 - a focus on triple-play offers which require unbundled loops and generally cannot be offered via bitstream

- It can be said that LLU has had a neutral effect on coverage as unbundlers have focused on the most commercially viable areas, but it has helped create competition in those areas by helping prices reach a more attractive level to consumers while increasing penetration

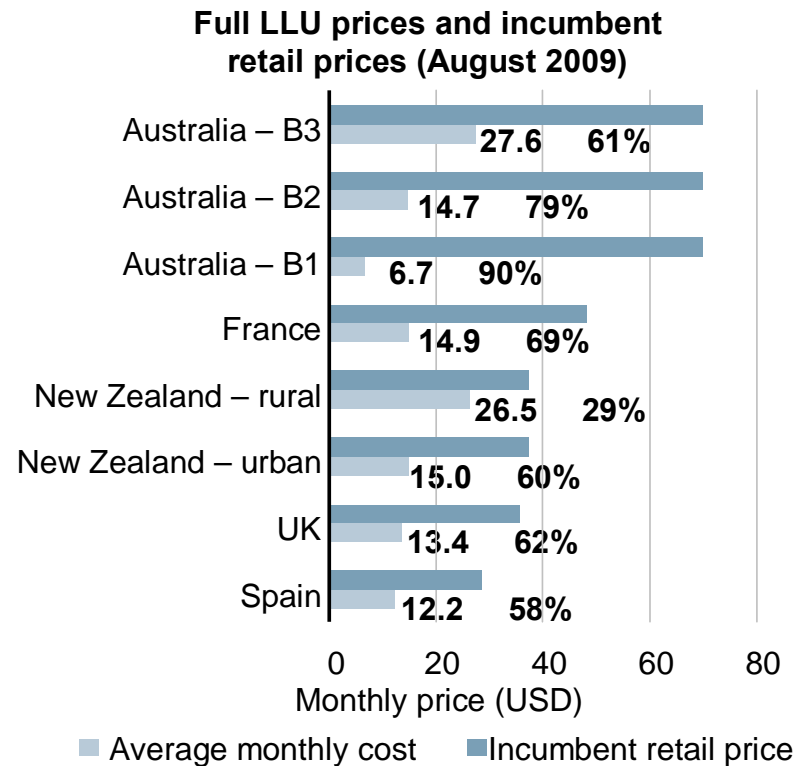
The cost of line sharing on the copper loop remains a small proportion of the retail broadband prices



- Gross margins between the incumbent's highest-bandwidth retail offer and line sharing range from 80% in Spain to 96% in Australia:
 - we look at the fastest retail bandwidth offer from the incumbent because LLU operators often differentiate themselves on speed
- Within this margin, an LLU operator must cover its other costs of provisioning broadband (e.g. DSLAM, backhaul, IP transit, marketing, overheads)
- Extensive and growing deployment of LLU by several large players in Europe would suggest that they have the margins sufficient to compete, although it is not clear if rates fully compensate the incumbent

- Regulators have set up line-sharing prices in such a way that competition to the incumbent is viable by allowing sufficient margins

... and the prices for full LLU also provide an opportunity for offering multi-play services (inclusive of broadband)



- Full LLU gives operators use of the full spectrum of frequencies available on the copper loop:
 - it has most commonly been used for business DSL offerings (e.g. symmetric DSL) and by triple-play ISPs offering voice, video and data, such as FastWeb and Free
- The gross margins between the incumbent's highest-speed DSL offer and the full LLU price are less than for shared LLU (in the range of 29% to 90%), but the revenue potential from triple play is also greater

- Regulators have set up LLU prices in such a way that competition to the incumbent is viable by allowing sufficient margins
- Australia and New Zealand have regionally deaveraged LLU prices possibly related to the different costs of providing wholesale access in remote regions. These measures might be interesting for Chile due to its similar population distribution

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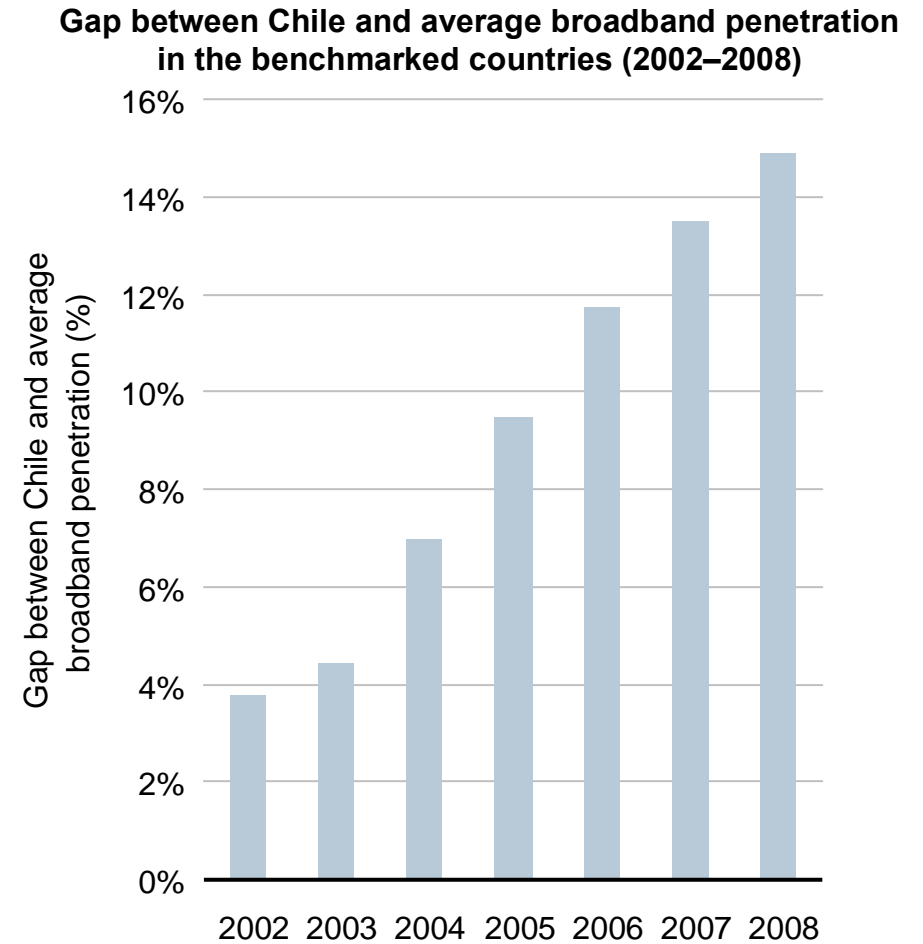
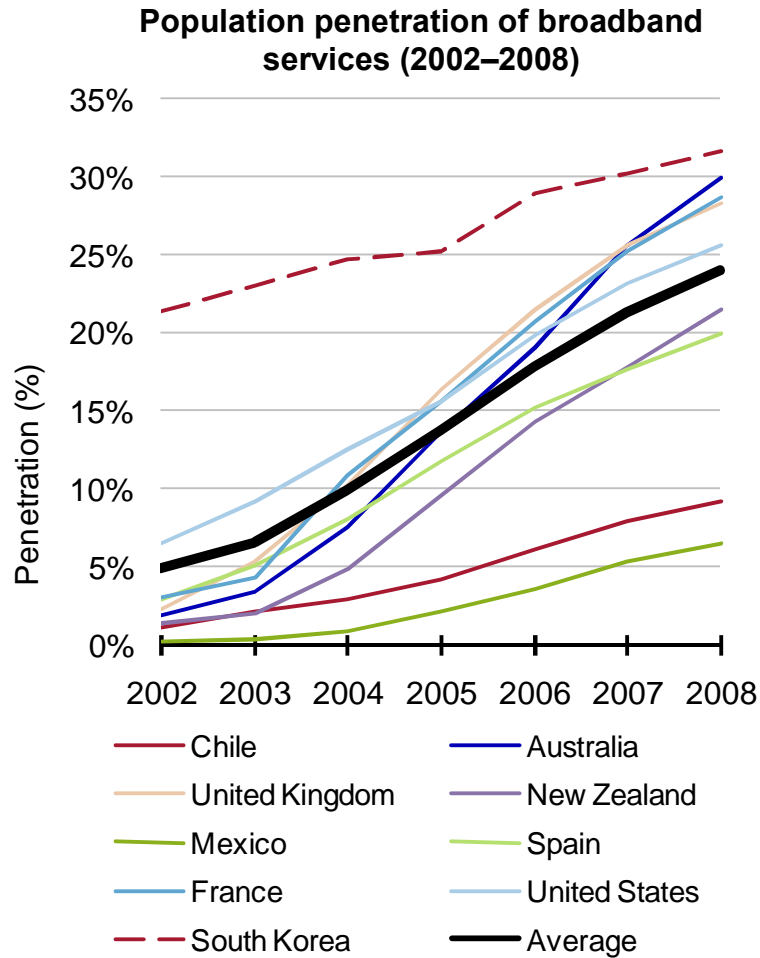
Success indicators

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GAP and selected correlation analysis

Chile's broadband penetration remains low compared to other developed countries, and the GAP is widening



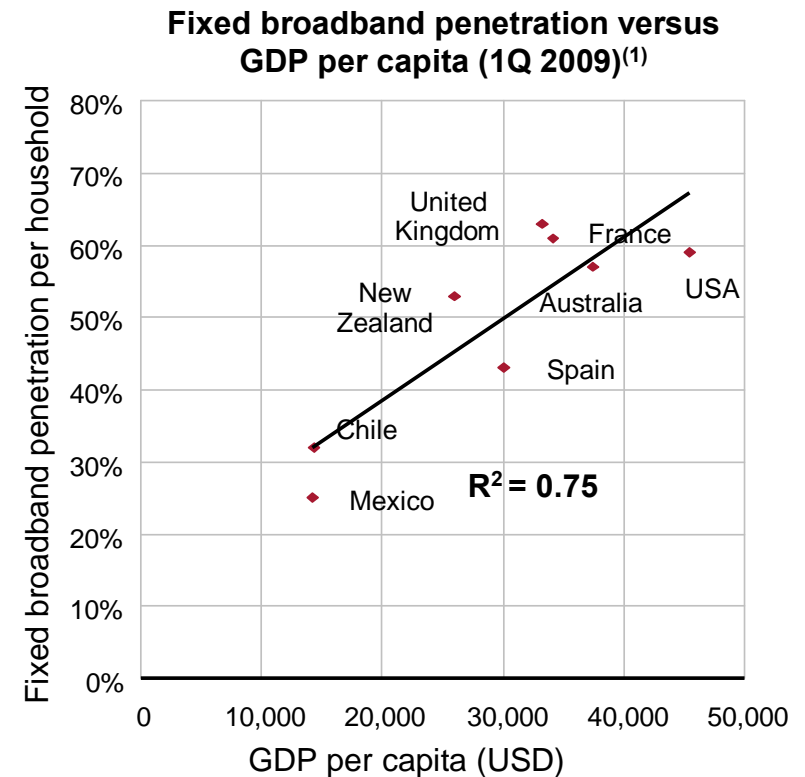
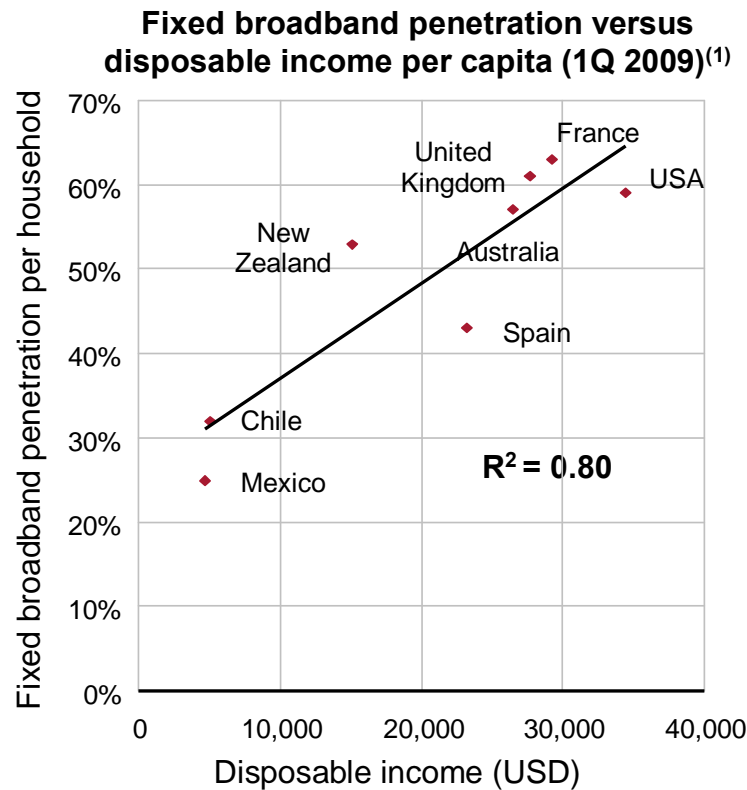
We have run some correlations to evaluate the situation of broadband penetration in Chile, potential enablers and barriers

- We have run a number of correlations with selected indicators:
 - it must be noted that these correlations use only a few data points; nonetheless, they provide a good basis for a qualitative discussion on the current status and potential barriers to broadband development
 - additionally, for the sake of argumentation, we have removed outliers in some cases where the uniqueness of the outlier did not make it useful in the comparison
- Our analysis shows a strong or medium correlation between broadband penetration and the following factors that may pose a barrier to its development:

| Correlations | |
|---|-------------------------|
| Disposable income per capita | (R ² = 0.80) |
| GDP per capita | (R ² = 0.75) |
| PC penetration | (R ² = 0.74) |
| Level of competition or consolidation in terms of HHI index | (R ² = 0.66) |
| Inequality of wealth as per Gini coefficient | (R ² = 0.58) |
| Retail prices | (R ² = 0.51) |
| Coverage | (R ² = 0.46) |

- There appears to be a low correlation between broadband penetration and the following indicators:
 - share of wholesale of total broadband (R² = 0.13)
 - urban population (R² = 0.10)
 - cumulative investments (R² = 0.08)
- Each of these correlations and the relative position of Chile with regard to the benchmarked countries is discussed in the following slides

Broadband penetration appears to be strongly correlated with a country's income per capita and GDP per capita ...



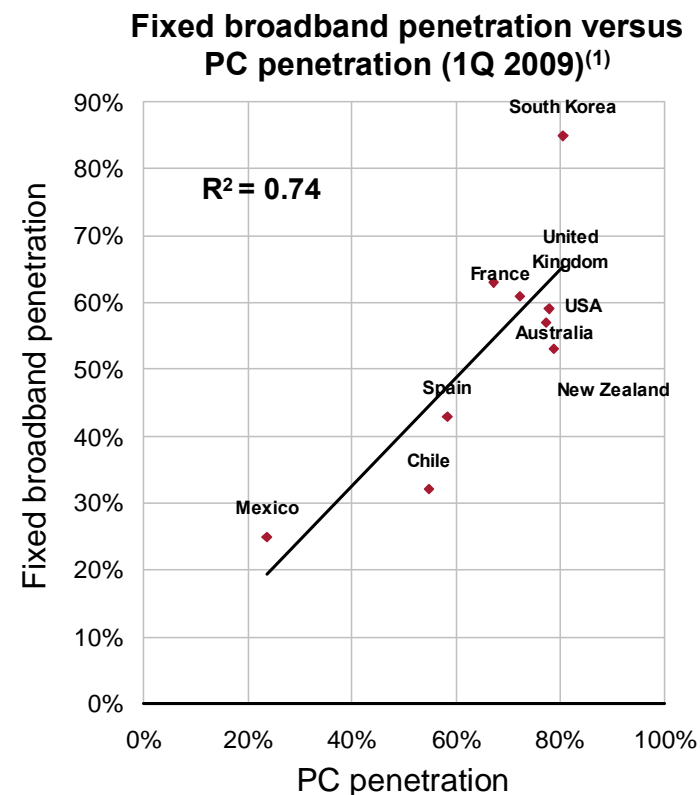
- The lower Chilean indicators (compared to OECD countries) may point to the existence of a barrier to broadband penetration in Chile. However, it seems reasonable given the country's income and GDP per capita indicators
- The UK, France and New Zealand seem also good performers relative to these indicators

Source for economic data: EIU

⁽¹⁾South Korea is an outlier and has been removed from this analysis; R^2 value including South Korea is 0.19 for penetration versus disposable income, and 0.33 for penetration versus GDP per capita

... and with PC penetration

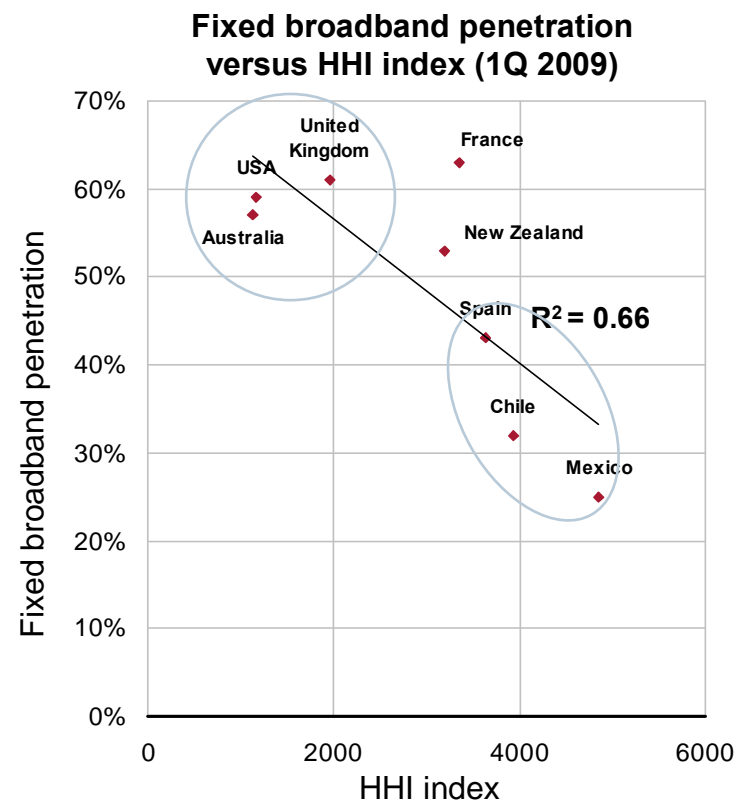
- Of all the variables examined, the number of PCs per 100 households is one of the variables that shows the highest correlation with the level of broadband penetration
- This would seem intuitive in that a PC has historically been needed for almost all activities carried out over the Internet (although mobile devices are increasingly in use for Internet access), so PC penetration will put a ceiling on the size of the addressable broadband market
- However, we must beware that correlation does not necessarily imply causation:
 - PC penetration may itself be a symptom of the same demand-side factors that explain broadband penetration – including income distribution, IT literacy and cultural factors



- The low penetration of PCs in Chile (compared to OECD countries, although much higher than Mexico) may appear to be a barrier to broadband penetration – broadband penetration in Chile seems relatively low in this case
- The UK and France exhibit a good performance against this indicator

Broadband penetration appears to be correlated with the concentration of competition (HHI index) ...

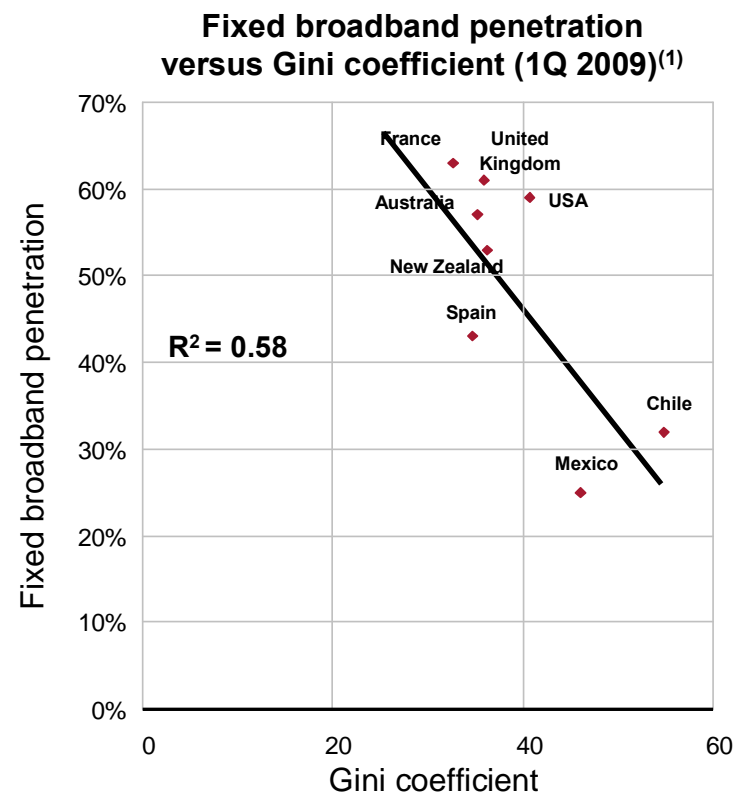
- The Herfindahl-Hirschman Index (HHI) is a measure of the size of companies in a given market and is often used to estimate the level of concentration in a market
- The higher the HHI index, the higher level of concentration there is in a given market
- It seems that there is some correlation between market concentration and broadband penetration, in three differentiated groups, which could potentially reflect cultural- and country-specific characteristics:
 - those countries with low concentration and high broadband penetration (USA, Australia and the UK)
 - those countries with medium concentration and high broadband penetration (France and New Zealand)
 - those countries with medium-to-high market concentration and medium-to-low penetration (Spain, Chile and Mexico)
- Chile appears to be at the lower end of the benchmark countries when considering their HHI index



- Broadband penetration seems to be correlated with the level of concentration in a given market (HHI index)
- Chile appears to be at the lower end of the benchmarked countries when considering their HHI index

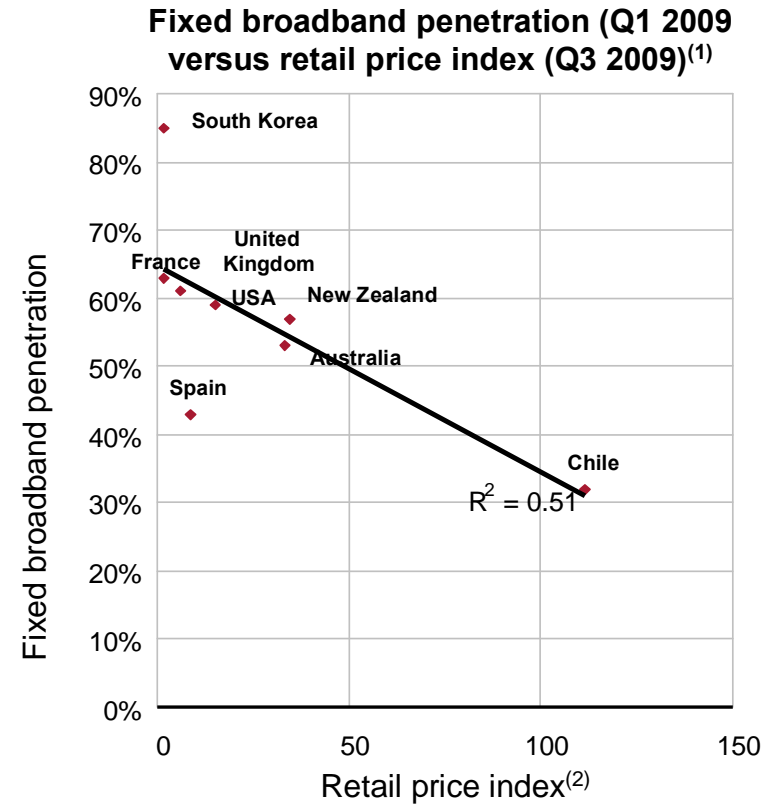
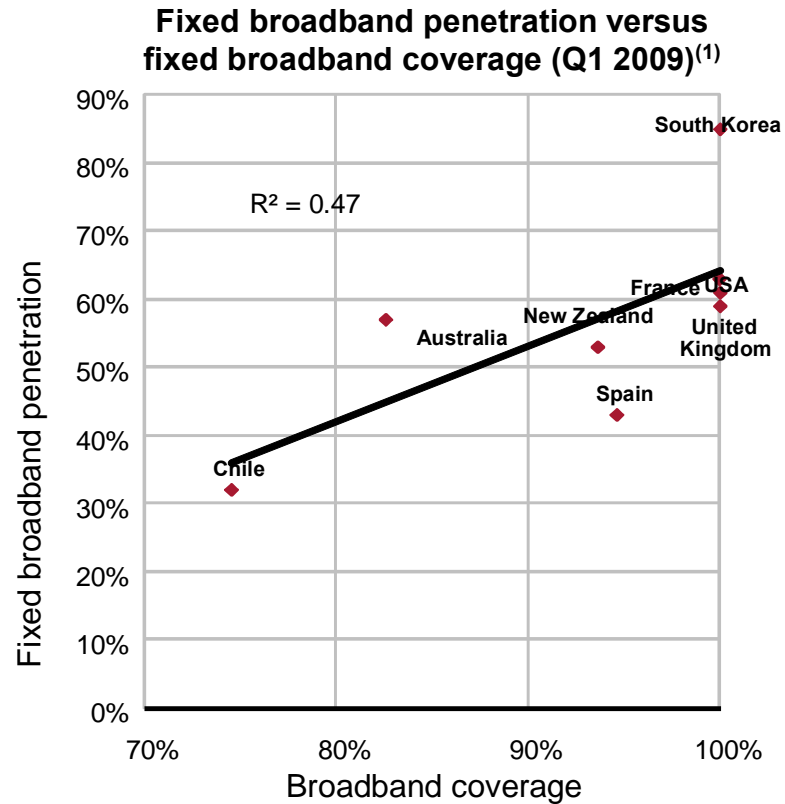
... but indirectly correlated with the unequal distribution of income (Gini index)

- The Gini index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution
- Our analysis shows a correlation between the level of income inequality in the benchmarked countries and their level of broadband penetration, i.e. broadband penetration tends to be higher among those countries with a lower Gini index
- It would seem intuitive to think that the existence of a large middle class would often be associated with higher levels of income equality, which in turn would drive broadband penetration as people earn more money, are more literate, etc.
- Chile and Mexico have the highest Gini coefficients of the countries in our benchmark, i.e. they have the highest levels of income inequality among the benchmark countries. However, Chile has achieved a higher broadband penetration given its Gini coefficient



- In Chile, its high Gini index – greater income inequality (compared to OECD countries) – may pose a barrier to broadband penetration. However, Chile's broadband penetration seems reasonable, or even a good performer, given its Gini index
- South Korea, the USA, the UK, France and New Zealand seem also good performers relative to these indicators

There also appears to be a correlation between broadband penetration/coverage and retail prices ...

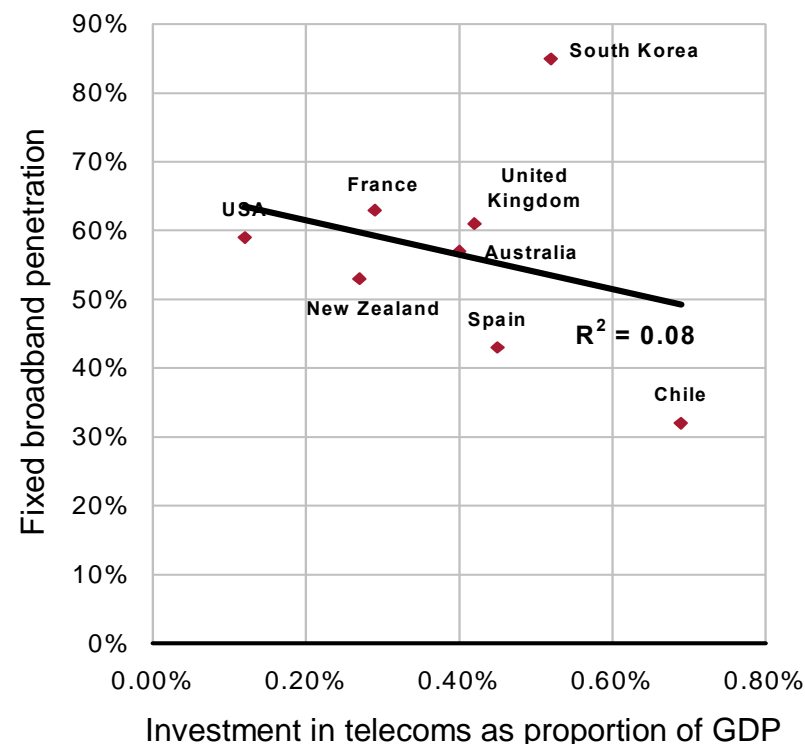


- There appears to be a correlation between fixed broadband penetration and broadband coverage, and between broadband penetration and the retail price index
- There may be a direct link between broadband coverage, the retail price index and broadband penetration

... although there appears not to be a strong correlation with cumulative capital investment in telecoms ...

- Cumulative capital investment in telecoms seems to be loosely correlated with broadband penetration
- Chile ranks very high in terms of capital investment in telecoms
- However, we must bear in mind that correlation does not necessarily imply causation:
 - capital investment in telecoms may simply be a supply-side response to the same demand-side factors that explain broadband penetration – including income distribution, IT literacy, and cultural factors

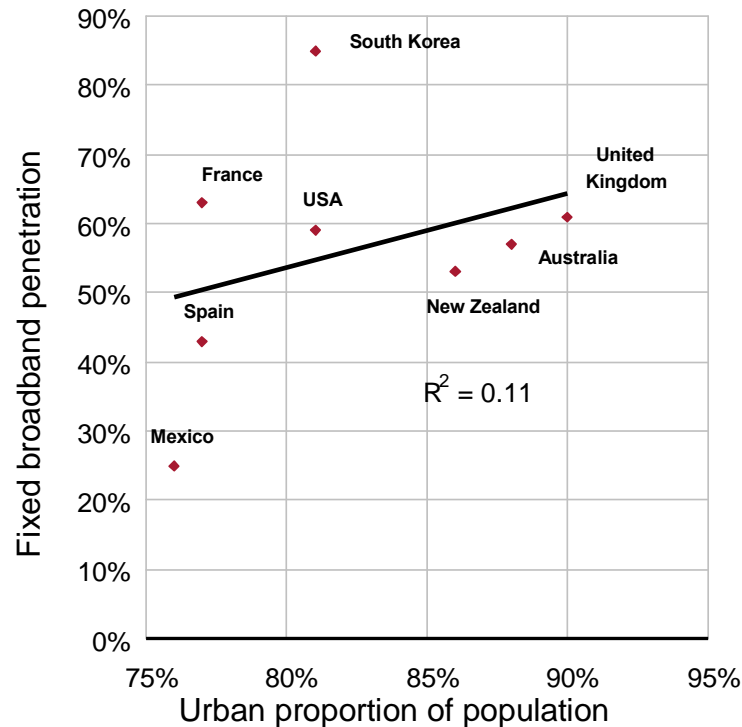
Fixed broadband penetration (Q1 2009) versus investment in telecoms as a proportion of GDP (2003–2008)⁽¹⁾



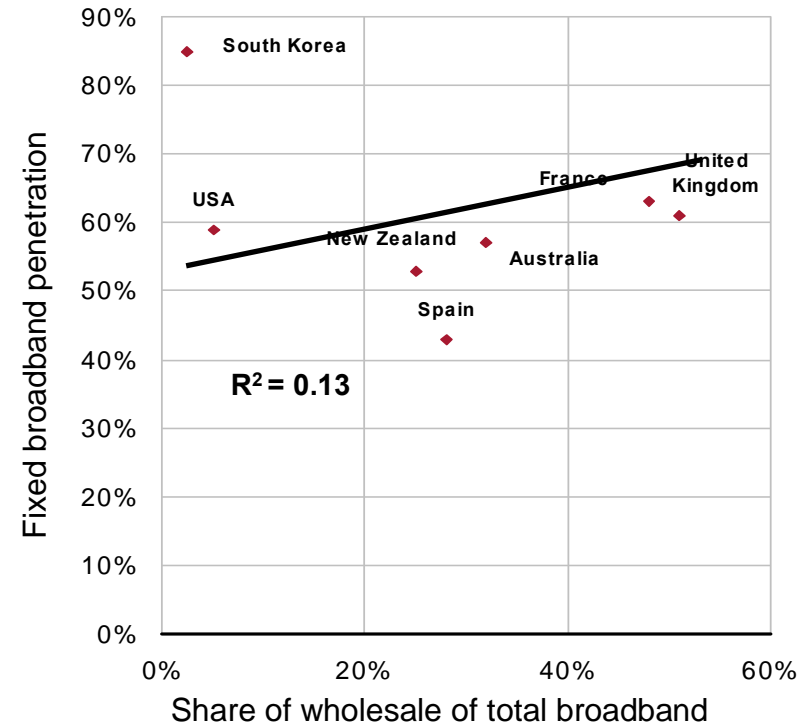
- Capital investment in telecoms and broadband penetration seem to be correlated, however, we must bear in mind that correlation does not necessarily imply causation, as low investment could be a result of low penetration, or its cause
- Chile is at the higher end of the benchmarked countries in terms of capital investment in telecoms

... or with the proportion of wholesale broadband connections, or urban population

Fixed broadband penetration versus urban proportion of population (1Q 2009)⁽¹⁾



Fixed broadband penetration versus share of wholesale of total broadband (1Q 2009)



- Broadband penetration and the proportion of wholesale broadband connections seem to be loosely correlated
- This may suggest that there is a limited direct relationship between wholesale solutions and the increase in broadband penetration

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| | |
|--------------------------------------|---|
| <p>Country indicators</p> | <ul style="list-style-type: none"> • No single country appears to be a ‘best fit’ for Chile, but most of the benchmarked countries show some similarities to draw lessons from • However, South Korea seems completely different and more difficult to draw lessons from despite it being very successful in increasing broadband penetration (partially through the launch of several government-led programmes) |
| <p>Success indicators</p> | <ul style="list-style-type: none"> • Chile’s broadband indicators are, in most cases, behind those of other OECD countries and higher than other Latin American countries. Chile’s prices in the medium to high data-rate segments are the highest with the exception of Mexico • Most successful countries include South Korea, France, the UK, the USA and Australia, which have reached high levels of broadband penetration. In France, the UK and South Korea most products on the market now offer high data rates |
| <p>Competition indicators</p> | <ul style="list-style-type: none"> • Competition indicators seem reasonable in Chile, although its broadband penetration seems low given its level of market concentration • There seems to be limited correlation between broadband penetration and the proportion of wholesale broadband connections |
| <p>Regulation frameworks</p> | <ul style="list-style-type: none"> • Historical and line-quality conditions in Chile seem to be behind those in the USA and the EU, favouring both competition between and within networks: <ul style="list-style-type: none"> • Australia and New Zealand have adopted a geographical approach to LLU regulation and tariffs to take into account their difficult geographical conditions • In the EU, Australia and New Zealand price controls have been put in place to enable OLOs to obtain sufficient margins • Although broadband is not commonly part of the USO, public policies directed at fostering broadband in underserved/unserved areas are becoming popular • Most countries have reserved spectrum for mobile broadband services and are in favour of assigning spectrum from the digital dividend to mobile services • Public investments have, in most cases, been geared towards extending broadband coverage in rural areas. However, large national plans (Australia and New Zealand) have recently been approved to deploy nationwide fibre networks |

Relevance of countries to Chile based on country indicators

| Country | Relevance | Similarities vs. Chilean context |
|-------------|---|--|
| Australia |  | <ul style="list-style-type: none"> • Closest population • Closest urban proportion of population |
| France |  | <ul style="list-style-type: none"> • Closest land area |
| Mexico |  | <ul style="list-style-type: none"> • Closest number of people per household • Closest GDP per capita • Closest disposable income per capita • Closest Gini index • Closest revenue from telecoms as a proportion of GDP • Closest broadband penetration • Closest distribution of broadband packages by data rate |
| New Zealand |  | <ul style="list-style-type: none"> • Closest population density • Closest total GDP • Closest telecoms market size |
| South Korea |  | |
| Spain |  | <ul style="list-style-type: none"> • Closest PC penetration of households • Closest Internet penetration of households • Closest market concentration index |
| UK |  | <ul style="list-style-type: none"> • Closest cable coverage |
| USA |  | <ul style="list-style-type: none"> • Closest DSL coverage • Closest market share of download speeds • Closest split of connections by technology • Closest investment in telecoms as a % of GDP • Closest approach to regulating broadband |

- No single country appears to be a 'best fit' for Chile, but most of the benchmarked countries show some similarities to draw lessons from: Mexico is the most similar followed by Spain, New Zealand and the USA, for different reasons
- South Korea seems completely different and more difficult to draw lessons from

Success indicators – summary of findings

- Chile's broadband indicators are, in most cases, behind those of other OECD countries and higher than other Latin American countries. However, the gap with OECD countries has widened in recent years
- From the supply side, Chile's broadband penetration seems reasonable given:
 - its current DSL and cable coverage levels
 - its level of current prices for the most popular packages, which do not look unreasonable compared to similar plans in other countries
- However:
 - low DSL coverage may reduce Chile's potential broadband development, which may be partially compensated by good cable coverage
 - despite a similar product offering distribution as in more penetrated markets, in Chile the share of the broadband market per product shows a concentration on the lowest speeds
 - current prices for medium to high data rate products are the highest among the benchmarked countries. On the other hand, price analysis shows that broadband penetration often continues to grow even when entry-level prices stagnate, or does not accelerate its growth when prices are drastically reduced, which suggests that pricing may not be the main driver of subscriber growth
- Although Chile's demand-side related indicators are low with respect to the most advanced benchmarked countries, Chile's broadband penetration level seems broadly consistent with them:
 - the higher Chilean Gini index – greater inequality – (compared to OECD countries) could be a barrier to Chile's broadband penetration growth despite the fact that it currently seems reasonable given its Gini index
 - Chile's penetration seems relatively low given its low PC penetration (compared to OECD countries although much higher than Mexico); this may appear to be a barrier to broadband penetration in Chile
 - Chile's broadband penetration seems reasonable given its disposable income and GDP per capita indicators, which stand at lower levels than in all benchmarked countries except for Mexico
- Chile's level of capital investment in telecoms, both in absolute terms and as a proportion of GDP, is well above all other benchmarked countries, although it is not clear whether there is a causal relation given that capital investment in telecoms may simply be a supply-side response to the same demand-side factors that explain broadband penetration

- Chile's broadband indicators are in most cases behind those of other OECD countries and higher than in other Latin American countries. However, these indicators seem reasonable given the specificities of the Chilean broadband market
- Most successful countries include South Korea, France, the UK, the USA and Australia, which have reached high levels of broadband penetration. In France, the UK and Korea most products on the market now offer high data rates

Competition indicators – summary of findings

- DSL is prevalent in most of the benchmarked countries (except the USA). However, whilst in EU countries DSL could provide effective competition at speeds of 8Mbit/s to over 50% of households, this may fall significantly in Chile given the poorer quality of its lines
- Where cable networks have been rolled out, they can provide significant competition between networks, which can significantly contribute to broadband penetration
- There seems to be a correlation between broadband penetration and the telecoms market concentration as measured by the HHI index. Chile appears to be below the trend line in terms of penetration given its HHI index, at a similar level of underperformance as Mexico
- We have found that broadband penetration seems to have limited correlation with the proportion of wholesale broadband connections
- It appears that markets with a higher level of competition from cable (competition between networks) may tend to invest in next-generation broadband technologies and infrastructure earlier, which may be partly due to incumbents facing greater pressure from cable operators
- In many emerging countries, with limited fixed network infrastructure, mobile broadband is effectively driving overall broadband take-up. However, in some countries like Austria or Ireland, they subsequently began to be used also as a substitute to fixed broadband access partly due to the lack of fixed broadband coverage or lack of efficient competition:
 - it was competition from mobile broadband that forced fixed broadband operators to compete more aggressively, which helped increase broadband penetration

- The level of broadband penetration in Chile seems low given its level of market concentration, which is the second highest of the benchmarked countries
- Broadband penetration seems to have limited correlation with the proportion of wholesale broadband connections

Regulation indicators – summary of findings

- Historical market developments and line-quality conditions in Chile seem to be behind those in the USA and the EU, favouring regulatory approaches for competition between and within networks, respectively:
 - in general, countries with a high level of cable deployment (as a proportion of broadband access lines) tend to focus more on competition within networks
- Australia and New Zealand have adopted a geographically deaveraged approach to LLU to take into account their difficult geographical conditions
- Countries where NRAs have favoured competition within networks have imposed a series of remedies on the SMP players, including wholesale access to the incumbent's network, price control, accounting separation, functional separation and equivalence:
 - a variety of methods has been used to set the (cost-oriented) prices of the incumbent's broadband-related wholesale products
 - in some cases like Spain, the incumbent needs to get approval of retail prices, including bundles, price structures and some services. Margin-squeeze tests and abusive bundling tests are used to grant approval
 - NRAs have forced SMP operators to offer a wide variety of access and ancillary products such as LLU, LS, bitstream, naked DSL, co-location, backhaul transport, etc.
 - it can be said that LLU has enjoyed strong growth in most Western European markets, driven by tight regulation. It has had a neutral effect on coverage as unbundlers have focused on the most commercially viable areas, but it has helped create competition in those areas by helping prices reach a more attractive level to consumers while increasing penetration
- LLU and LLU-related product prices have been set by NRAs in such a way that they should allow OLOs compete and make sufficient margins, e.g. in the benchmarked countries LLU leaves between 29% and 90% margin, whereas LS leaves between 80% and 90%
- Although broadband access is not considered as part of the USO in any of the benchmarked countries, it has been adopted as a policy goal in many of them and funds have been assigned to its extension into unserved/underserved areas
- The general trend in spectrum policy is to allocate more spectrum to mobile services, which also entails they can be used for mobile broadband. Besides the frequency bands allocated to 3G, many countries have also decided to allow the refarming of 2G spectrum for 3G usage and to assign part of the digital dividend to mobile broadband, which is especially interesting to cover rural areas
- So far, most of the public funding so far has been dedicated to extending the reach of broadband networks into unserved/underserved areas, except in South Korea where the government has a history of 4 all encompassing national broadband plans. This has changed recently with public initiatives, notably in Australia and New Zealand, to deploy nation-wide FTTx networks

• Historical and line-quality conditions in Chile seem to be behind those in the USA and the EU, favouring competition between and within networks, respectively, while Australia and New Zealand have adopted a geographical approach to LLU to take into account their difficult geographical conditions

Key conclusions of workstream 1 [1/2]

- Status of the broadband sector in Chile and GAP with the benchmarked countries:
 - the broadband penetration (of population) GAP has widened from 3% to 15% compared to the average of benchmarked countries
 - Chile seems to have the lowest broadband coverage of all compared countries (25% GAP in DSL coverage with respect to the average)
 - despite a similar product offering distribution as in more penetrated markets, Chile's broadband market share per product shows a concentration on the lowest speeds
 - although the current level of prices for the most popular packages does not look unreasonable compared to similar plans in other countries, prices for medium to high data rate products are the highest among the benchmarked countries
 - the level of competition seems low: Chile's level of broadband penetration seems low given its level of market concentration, which is the second highest of the benchmarked countries
- Potential enablers and barriers to broadband development:
 - relatively low broadband penetration in Chile seems to be influenced by demand-side factors such as disposable income, GDP per capita, income inequality, general IT literacy and PC penetration. This may also influence the level of sustainable long-term competition (market size)
 - from the supply side, the relatively low level of competition in Chile may affect the widespread availability of high-speed products at affordable prices

Key conclusions of workstream 1 [2/2]

- Potentially interesting experience to explore initiatives for broadband development:
 - broadband coverage has been influenced by the historical deployment of fixed networks
 - in some cases incumbents have upgraded all their exchanges with DSL as a matter of image and brand building
 - in some countries, the existence of wholesale products priced at the right level has allowed OLOs to become credible competitors in more areas
 - some countries, such as the USA, have relied on the early advantage of cable operators in broadband, to roll back access requirements to the existing and next-generation networks and rely on facilities-based competition
 - extension of coverage to rural areas has frequently been funded with public money; this has sometimes been brought about by wireless/mobile technologies
 - in countries or areas where the quality of the network allows it, high-speed offers at affordable prices have become widely available as a result of competitive pressure on the incumbents (DSL)
 - in this sense, LLU has allowed competitors to differentiate themselves by offering high-speed data rates
 - mobile broadband has been the catalyst that has made stagnant broadband markets more dynamic, forcing fixed operators to differentiate themselves more aggressively with high-speed products
 - the quality of US loops, and competition from cable, has led the main incumbents to roll out FTTx networks, which in turn is leading cable operators to begin to upgrade to DOCSIS 3.0
 - in European countries where wholesale products have been priced so that OLOs can make sufficient margins, prices have fallen rapidly as customers have been migrated to higher data rate products
 - in some markets mobile broadband has also forced fixed operators to lower the prices to compete

Workstream 2: Competition assessment

Introduction

Summary of key findings

Affordability analysis

Wholesale regulated prices analysis

Competition assessment is the second of three workstreams

1

BROADBAND GAP ANALYSIS

- Identify the differences between broadband and connectivity indicators in Chile and in the main OECD and Latin American countries, as well as the main differentiating factors relating to competition and regulation
- The key indicators that must be taken into account for this analysis are provision of connectivity and other elements that may characterise the countries analysed

2

COMPETITION ASSESSMENT

- Assessment of the telecoms market in Chile
- Assessment of the state of competition in the broadband market in Chile. Specifically, the objective is to understand the current state of the broadband market and its possible evolution in terms of competition, coverage and quality of service



3

REGULATORY COMPETITION OPTIONS

- Analysis of the service-based (within networks) and facilities-based (between networks) competition models
- The international lessons on competition models must be analysed in the context of the Chilean market, taking into account findings from the previous workstreams in order to promote increased competition and coverage of broadband

Key objectives

- Interview different stakeholders in Chile about the status and evolution of the Chilean broadband market
- Analyse current findings to assess the situation to help focus the research and assessment of regulatory competition options during workstream 3

Introduction

Summary of key findings

Affordability analysis

Wholesale regulated prices analysis

We have carried out 12 face-to-face interviews in Chile with key stakeholders

Workstream 2 – Chile (1 to 4 September)

1. INECON
2. Telefónica Chile
3. VTR
4. Telsur
5. ENTEL
6. Movistar
7. Fullcom
8. Telmex
9. Ministerio de Economía
10. Subtel
11. ENTEL – PCS
12. Innovation Board

Interview focus

- Current status of the broadband market in Chile and evolution to date
- Enablers and barriers to the future development of the broadband market
- Public broadband policy initiatives and regulatory framework

**Key notes of our interviews are included in this document.
These individual contributions are confidential and are not included in this report**

Summary of key findings [1/2]

- **Coverage and penetration** – 20% of households do not have fixed broadband coverage, affecting both urban and rural areas. When taking this into account, the average Internet penetration in Chile in those areas where there is fixed coverage looks more favourable:
 - perhaps 50% of households may not be able to have higher data rates unless new investments are made in upgrading the current networks
 - mobile broadband coverage currently reaches around 50% of the population, but it is expected to reach 88% of the population within two years
 - improving coverage seems to be an important part of the public-policy objectives – coverage of remote (at least 5–20% of the population) and low-income (approximately 40% of the population) areas seems to be holding back Internet penetration
- **Competition** – there appears to be strong competition in the Chilean broadband market, but it seems to be mainly concentrated on particular geographical areas and income segments:
 - however, there are indications that this level of competition may not be sufficient for the country as a whole despite the ‘single- tariff’ policy across the country adopted by broadband operators. Mobile broadband may cover this in part but may not be a perfect substitute
 - although dual- and triple-play packages drove up penetration initially, ‘naked DSL’ seems to be driving market growth today
- **Quality** – the quality of fixed broadband connections has significantly increased over the last 12–18 months:
 - the average fixed broadband connection currently stands at between 1.5Mbit/s and 2.5Mbit/s. This increase in quality has been mainly driven by the increased competition from mobile broadband operators
 - most mobile broadband connections offer, on average, 200–700kbit/s at peak data rates of up to 3.2Mbit/s

Summary of key findings [2/2]

- **Prices** – the price of entry-level broadband has significantly reduced over the last two years:
 - given the ‘single-tariff’ policy adopted by broadband operators nationwide, those areas where there is less competition have benefited from competition in the most competitive areas. In those areas where only Telefónica Chile is present broadband prices are higher given that this operator has some of the highest tariffs
 - however, lower prices alone may be unlikely to yield similar increases in Internet penetration, as shown by the experience of some operators offering the lowest tariffs – there seems to be an affordability issue for some segments that needs to be assessed
- **Barriers and enablers** – there appears to be a general agreement on the key barriers to broadband penetration in Chile (out of coverage, PC penetration, content, price). Some ideas were put forward regarding potential remedies, including incentives and subsidies to foster demand (e.g. vouchers for low-income households) and supply (FDT plans)
- **Public policy and regulatory framework** – there tends to be a general positive view towards the current regulatory framework (focused on competition *between* networks rather than competition *within* networks), with the exception of the Innovation Board. It is generally believed that there are a number of other initiatives to consider rather than changing the current regulatory framework

Summary of key findings – Coverage and penetration [1/2]

- Chile's average Internet **penetration**, which currently stands at 35%, may be a misrepresentation of the market:
 - coverage: given the 80% 'fixed' addressable market, the average Internet penetration could be equivalent to a 44% average penetration; this would narrow the gap with other comparable countries by 9%
 - income: moreover, the average penetration hides a very high deviation by demographic segment (over 75% in the top ABC1 segment, whilst only 12% and 10% of households in the D and E segments)
- **Fixed coverage** – about 20% of the population do not seem to be covered by a fixed broadband network. It is likely that future investments will focus on areas where there are overlapping networks, which will slightly increase 'competitive coverage' (This is areas with more than 1 operator):
 - 80% of the population seem to have coverage from at least one operator (Telefónica Chile), although this would be reduced to 50% if speeds of up to 8Mbit/s were offered (this does not take into account potential investments to improve the quality of cooper)
 - there is strong coverage in urban and high-income segments, including several over-build networks in the top 10% of the market
 - according to interviews, 20–30% of households may have a choice of at least two operators; this may increase by 5–10% per annum
 - in terms of affordability, some of the major operators interviewed suggest that only 60% of the market is 'addressable'. This percentage seems to exclude the 40% of households in the D and E segments which currently have 10% broadband penetration
 - the interviewees expressed doubts regarding the potential increase of overall fixed broadband coverage

Summary of key findings – Coverage and penetration [2/2]

- **Mobile coverage** seems reasonable, including 3.5G networks. It is rapidly evolving:
 - mobile 2G coverage seems high at about 88% – one of the operator interviewed claims to have 97% coverage
 - 3G and 3.5G coverage is rapidly increasing – operators claim to cover between 50% and 75% of population (top 200 towns) and that it could reach 88–97% of population in two years
 - there is a relatively small proportion of the population (5–10%, or about one million people) that appears to be very difficult to be reached even by mobile operators, and may require alternative networks like satellite or WiMAX
 - additional capacity and coverage could be built and deployed during the next two to three years as new frequencies are awarded in the 2.5GHz and 700MHz – some operators suggest the Subtel may award them in 2009 and 2010
- **Wi-Fi connections** – there seems to be limited information about whether or not some households may be sharing their broadband subscriptions. This could 'hide' some broadband penetration
- Improving coverage seems to be an important part of the public-policy objectives – coverage of remote (at least 5–20% of the population) and low-income (approximately 40% of the population) areas seems to be holding back Internet penetration

Summary of key findings – Competition [1/2]

- Some indicators suggest that there is significant competition in the Chilean broadband market, although it seems to be focused on specific geographical areas and income segments:
 - there is an increasing number of fixed operators in more affluent urban areas – e.g. Telmex is regarded as a strong new entrant capable of having a significant impact on the broadband market
 - mobile operators have entered the market with competitive broadband services (although at lower speeds)
 - alternative fixed operators have been expanding their broadband coverage over the past few years, at a rate of approximately 15% per annum
 - mobile broadband coverage (3G and 3.5G) currently reaches 50–60% of the population, but it is expected to reach 80–90% of the population within two years
 - as a result, there is a decreasing proportion of the population with a choice of a single fixed operator
 - within the next two years mobile broadband coverage will be higher than fixed coverage; this a second option to Telefónica Chile in those areas where it is the only fixed operator
 - broadband price reductions of 42% over the last two years
 - the average fixed broadband speed has grown significantly (an eight-time increase) in the last two years
- Service bundling appears to have been a key competition factor, while naked DSL seems to be key for future growth:
 - triple-play and dual-play to ‘protect’ high-income subscribers
 - naked DSL to support the entrance of new operators and expand the market

Summary of key findings – Competition [2/2]

- There are different views about the role of mobile as a complement or substitute to fixed broadband:
 - mobile operators are very optimistic in this regard and have set up ambitious targets that could completely change the shape of the market in the next two years by adding one or two additional million mobile broadband subscriptions
 - some of the fixed operators interviewed and the Innovation Board consider mobile to be complementary rather than a substitute to fixed broadband
 - the current pricing policies suggest that mobile operators are targeting customers both with premium prices for top services (complement) and by offering very low-entry packages (substitute)
- Competition may not be sufficient to significantly increase fixed broadband coverage given the limited attractiveness of some geographical areas (less urban) and of some income groups (e.g. C3DEs)
- Competition may be sufficient to keep putting pressure on prices and speeds, the question is to what extent this can be extended to all the country given the coverage of different fixed and mobile operators – this should probably be assessed in more detail

Summary of key findings – Quality of services

- The average fixed broadband speeds have significantly improved over the last 12–18 months (2007 to mid 2009), with speeds doubling three times (representing an eight-time increase) – average speeds stand at about 1Mbit/s, and offers of 2Mbit/s and 4Mbit/s are common:
 - operators claim not to offer speeds lower than 1Mbit/s or 1.2Mbit/s, with average speeds ranging from 1.6Mbit/s and 2.5Mbit/s
 - operators seem to offer up to 4Mbit/s and some of them up to 10–15Mbit/s services
- Mobile operators tend to offer significantly lower broadband speeds with an average bit rate between 200kbit/s and 700kbit/s (up to 1.5Mbit/s under good conditions) using 3.5G, although peak data rates can go up to 3.2Mbit/s. Newer versions of HSPA (3.5G) and 4G networks will allow operators to achieve higher peak data rates
- According to the operators interviewed, fixed broadband speed increases have mainly responded to competitive threats from mobile operators, which were perceived to be real competitors offering data rates below 1Mbit/s:
- In terms of service bundling, there are different views on the impact of bundling for the future evolution of Internet penetration:
 - some of the operators interviewed focus on triple-play and dual play
 - according to some operators, naked DSL is the most important and the fastest-growing service

Summary of key findings – Prices

- The ‘single tariff’ policy adopted by broadband operators across Chile means that the price and speed competition in top segments and areas has implications for the whole market
- In absolute terms, the price of broadband at 1Mbit/s can be as low as CLP12 500 in selected areas, and probably between CLP18 500 and CLP20 000 in most areas:
 - the price of entry-level fixed broadband offers has been reduced to between CLP12 500 and CLP15 000, although with limited coverage (this excludes the ‘free tariff’ for local Chilean content only offered by Telefónica Chile)
 - the price of entry-level mobile broadband offers has been reduced to CLP9900, although standard prices may be closer to CLP20 000 for comparable products to the fixed 1Mbit/s
- The price of fixed broadband has decreased by 42% in the last two to three years (from CLP35 000 to CLP20 000, approximately):
 - some of the fixed operators interviewed claim that fixed broadband prices have declined between 12–15% per annum, and that they have even tried 50% reductions with certain limitations
 - if this price reduction were to continue, the average price of fixed broadband could go down to CLP15 500 in two years, whereas the basic broadband service could be priced as low as CLP9900 – increased competition from new operators and mobile could accelerate this trend
 - however, some of the operators suggested that these price efforts have had a lower impact than expected (e.g. less than 1% increase), which may lead them to reconsider whether or not they should continue with such price reductions – this practical experience may be contrary to the expected high elasticity of demand
- Regarding mobile broadband prices, these have declined by 33% in the last two years (from CLP30 000 to CLP20 000, approximately). However, lower prices alone may be unlikely to yield similar increases in Internet penetration, as shown by the experience of some operators offering the lowest tariffs – there seems to be an affordability issue for some segments that needs to be assessed in more detail

Summary of key findings – Barriers to the future development of broadband [1/2]

- 20–25% of population has no fixed or mobile broadband coverage today. A tiny minority access the Internet via expensive and worse-performing wireless or satellite networks:
 - new buildings, even in urban areas, are not cabled
 - over one million people live in remote or rural areas which are not covered by broadband networks; the high maintenance costs and opex that operators would have to incur in covering these areas could deter them from doing so
 - in some cases, there is not even a reliable power source
 - the cost of having a maintenance team in remote areas is also high
 - backhaul costs are an issue for some remote locations, although it seems less of a problem now
 - the QoS requirements for deployment under the FDT are too high:
 - mobile operators were excluded from previous tenders, although this is not the case nowadays – Movistar and Entel PCS have participated in recent tenders
 - QoS indicators, e.g. bandwidth, latency, etc. may not have been realistic

Summary of key findings – Barriers to the future development of broadband [2/2]

- In areas where there is broadband coverage, i.e. at least one provider, the following **barriers** have been identified:
 - low PC penetration (Subtel's survey – 55% do not have a PC)
 - low-value attached to broadband (Subtel's survey – 48% do not value it)
 - affordability (Subtel's survey – 41% cannot afford it)
 - current prices seem high for the C3DE segments
 - some recent initiatives suggest this may have a lower impact than anticipated (lower response to 50% discounts or free national broadband), however, certain restrictions in product features may limit the attractiveness of such offers
 - international bandwidth costs have a significant impact on the cost base and retail tariffs
 - the lack of customer lock-in mechanisms does not incentivise operators to offer more attractive financing/subsidies: in their view, the lack of lock-in mechanisms causes high levels of churn and subscriber acquisition costs (SAC), thus reducing the operators' ability to adopt a more aggressive approach in certain areas such as handset subsidisation and other financing alternatives
 - exclusivity of access to buildings by the operator that cables them reduces competition
 - increasing costs of civil works for new infrastructure
 - the limit of 60MHz per operator, which mobile operators claim will hinder their ability to increase mobile broadband capacity in the near future
 - the Innovation Board considers that the regulated prices of bitstream and LLU are too high at CLP7170 (plus a per-Mbps charge) and CLP8147, respectively, making them unattractive

Summary of key findings – Enablers to the future development of broadband

- There appears to be a general agreement on the key barriers to broadband penetration in Chile (out of coverage, PC penetration, content, price). Some ideas were put forward regarding potential remedies, including incentives and subsidies to foster demand (e.g. vouchers for low-income households) and supply (FDT plans):
 - **demand side** for areas where there is broadband coverage
 - education – value of a connection and a PC, more attractive content (government, local)
 - e-commerce, e-government initiatives, which have been actively promoted by the Administration
 - key content
 - PC – acquisition and price
 - vouchers for the acquisition of a PC or notebook may help for low-income segments
 - broadband price
 - **supply side** for areas without broadband coverage
 - alternative technologies based on 3.5G seem to be much better than WiMAX, potentially including subsidies
 - FDT seems a good initiative, but service conditions should be adjusted (relaxed) to the specific conditions so that it makes them feasible/attractive
 - mobile coverage complement
 - digital dividend at 700MHz
 - 2.6GHz frequencies

Summary of key findings – Public policy and regulatory framework [1/2]

- There tends to be a positive view towards the current regulatory framework:
 - most criticism comes from the Innovation Board, not the operators themselves
 - one of the operators interviewed stated that there is potentially too much *ex ante* regulation
 - unbundling was considered to be a positive remedy by one operator
 - one operator considered that naked DSL offers a clear benefit to the market and that all operators should be obliged to provide it
 - public policy is focused on subsidising coverage deployments in remote areas (FDT)
 - significant interest in digital dividend and 2.6GHz spectrum in order to foster competition in the mobile broadband market
 - the Innovation Board advocates for LLU and bitstream and it has strong views on other public-policy and regulatory initiatives such as:
 - LLU/bitstream coupled with subsidies is the only way to penetrate the C3D segment significantly
 - functional separation should be applied
 - co-location: the Subtel should adopt a more aggressive position towards mobile co-location
 - expert panel: setting up an expert panel (at the superintendent level) to solve problems in the industry very much in line with the electricity industry
 - USO: include broadband as a USO
 - international costs: set-up a CDN co-ordinated by the government to cache popular content in order to decrease international bandwidth costs
 - FDT to subsidise a 'last-mile ring' in lower-income areas

Summary of key findings – Public policy and regulatory framework [2/2]

- There is also a positive view towards LLU and bitstream:
 - no operator has complained about the current prices for LLU and bitstream
 - LLU/bitstream will not provide greater coverage, which is the main issue in Chile
 - LLU/bitstream may be against ‘technological neutrality’ as it is not clear whether this is possible for cable
 - LLU /bitstream may deter some investments – but are they “efficient” investments?
 - the Innovation Board believes it is essential for future development – prices and process
- Conclusions from international benchmarks should be carefully extrapolated to Chilean case:
 - ‘take into account specific costs’ versus ‘there is no reason why costs should be different in Chile’
 - pricing comparisons should be like-for-like, which is difficult
 - international comparisons should be with ‘peer’ countries rather than OECD countries, although the indicators of the latter group are seen as the ‘target’ for Chile
 - there are some international trends not to mandate unbundling for new networks (e.g. NGN, fibre)
- Other policies and regulatory considerations:
 - potential extension of subsidies to include broadband infrastructure in homes and buildings
 - make explicit that mobile and broadband are not basic services and therefore debtors can be ‘black-listed’
 - consider lock-in contracts to favour operators to take more risk on low-income segments

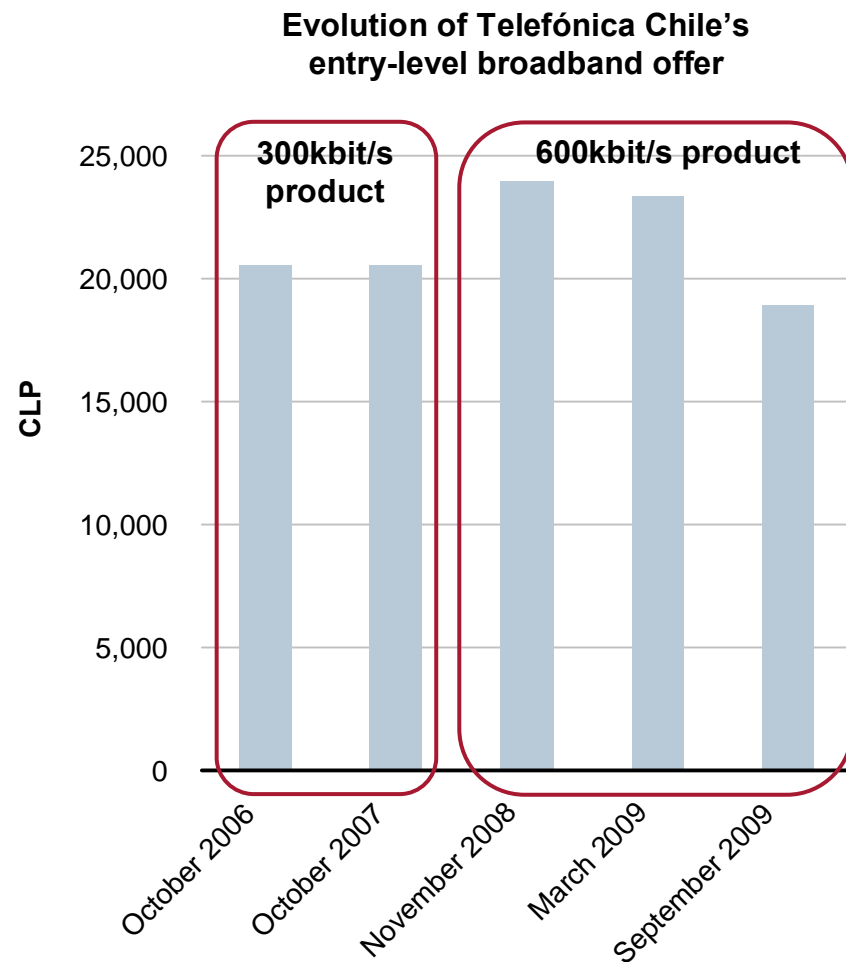
Introduction

Summary of key findings

Affordability analysis

Wholesale regulated prices analysis

While the price per Mbps has decreased significantly over time, Telefónica Chile's entry-level prices started to decline recently



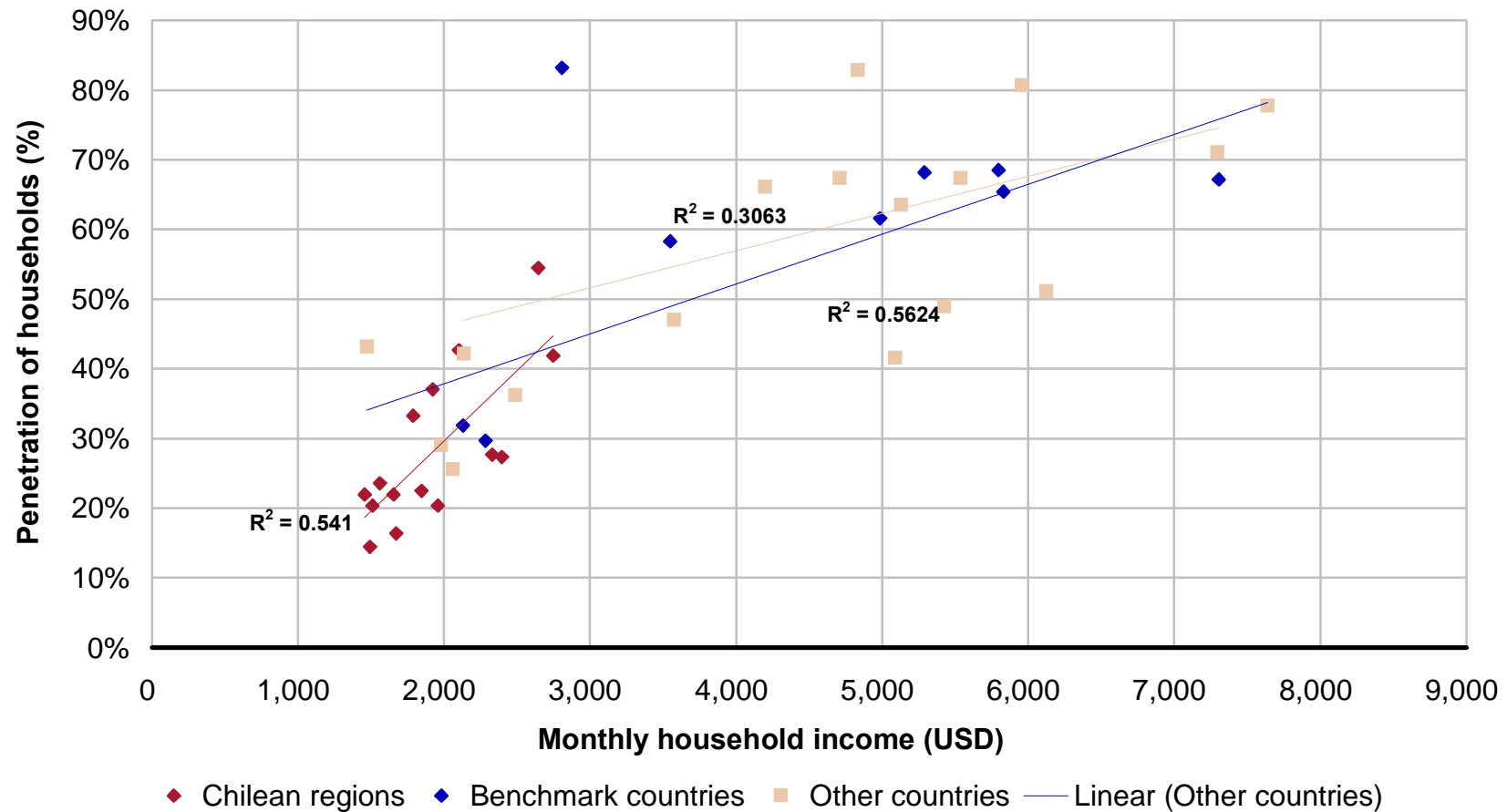
- According to various sources, despite claims to the contrary from Telefónica Chile and other fixed broadband operators, the absolute price of entry-level broadband products has not started to fall until recently. However, this does not seem to have affected Telefónica Chile significantly:
 - in fact, when Telefónica Chile discontinued its 300kbit/s product (headline rate 512kbit/s) in 2008, its entry-level product of 600kbit/s (headline rate 1Mbit/s) was priced higher
 - although there is increasing pressure from competitors offering entry-level prices as low as CLP12,500 for 1Mbit/s in certain areas, this seems yet to have a material impact on Telefónica Chile's national prices
- However, it is true that the price per Mbps has followed a downward trend based on three duplication of speeds (eight-times increase):
 - these speed increases alone translate into more than an 80% decrease in price per Mbps over the last 12–18 months

Chile's relatively high-price entry-level broadband offer may pose a barrier to penetration growth

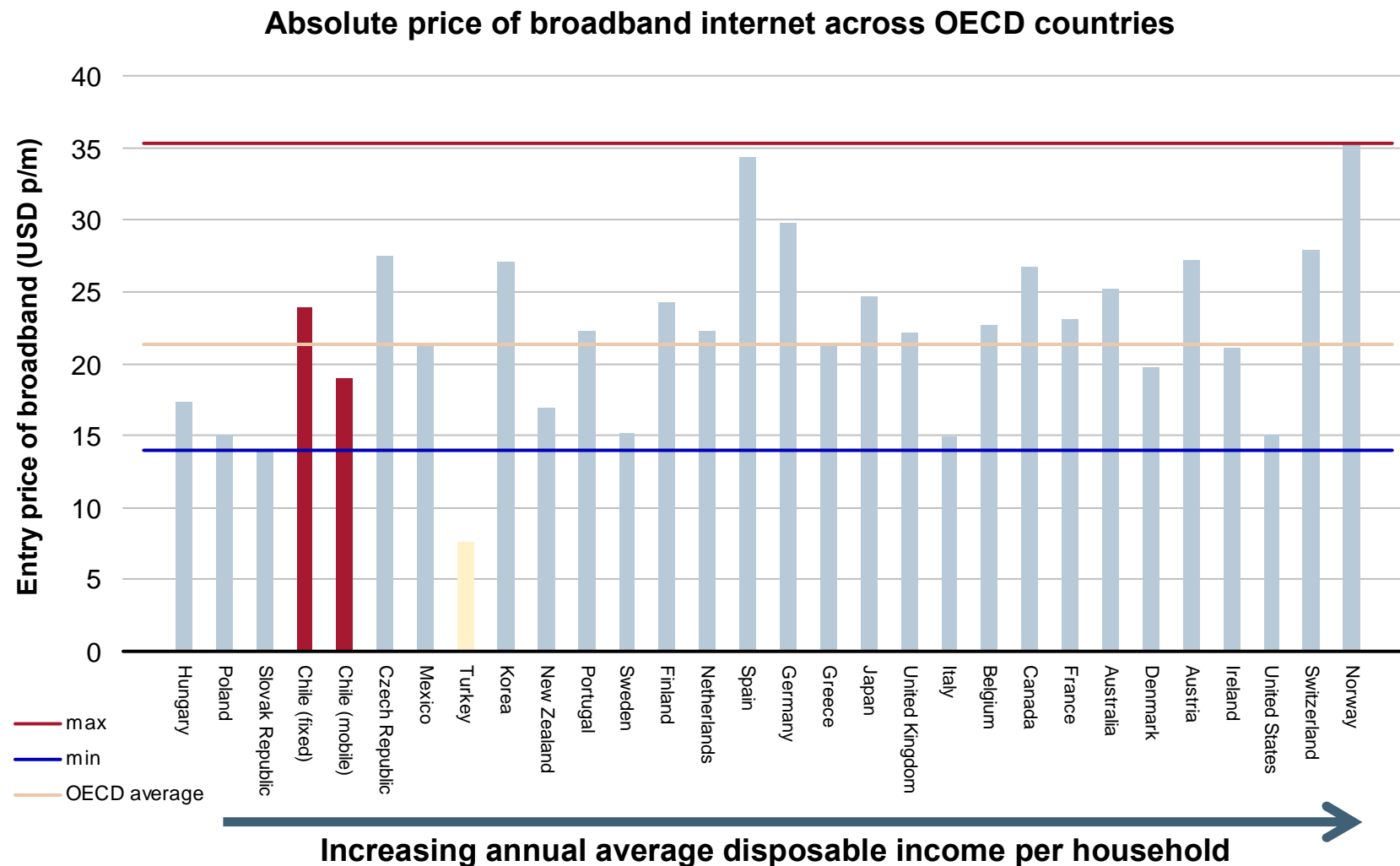
- Chile's relatively high-price entry-level broadband offer (representing 1.12% of the average annual disposable income per household) may represent a barrier to penetration growth:
 - there appears to be a strong correlation between annual average disposable income per household and fixed broadband penetration – Chile versus benchmarks and among Chile's regions
 - in Chile, the price of the entry-level broadband offer is high relative to the country's income, leading to a low broadband penetration
- Moreover, Internet affordability seems to be an issue:
 - based on international comparisons, the current entry-level price of fixed broadband is CLP12 500 per month, which represents an affordability index of over 0.7% for 80% of Chilean households
 - broadband affordability varies across Chile's regions, but the affordability index is below the nation's average in four regions, namely Antofagasta, Atacama, Magallanes and Región Metropolitana
 - when mobile broadband at CLP9500 per month is included in the analysis, the affordability index improves significantly, with only two regions falling below the 0.7% mark
 - the nation's average stands at 0.9%
 - even if the entry-level broadband price were to be at the lowest of the OECD benchmarked countries, the affordability index would decline to reach the 0.7% mark for the whole country

There appears to be a strong correlation between low-income levels and household penetration

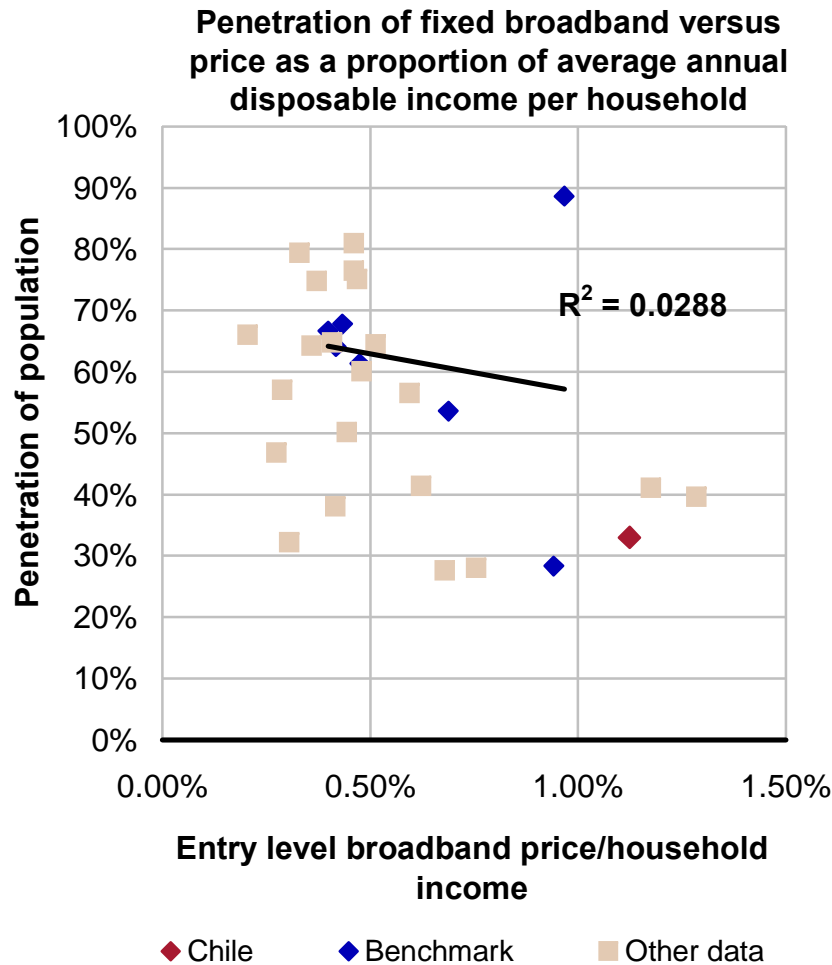
Penetration versus annual average disposable income per household of 15 Chilean regions and benchmark countries



The entry-level broadband price in Chile is similar to comparable countries and within the range of OECD benchmarks

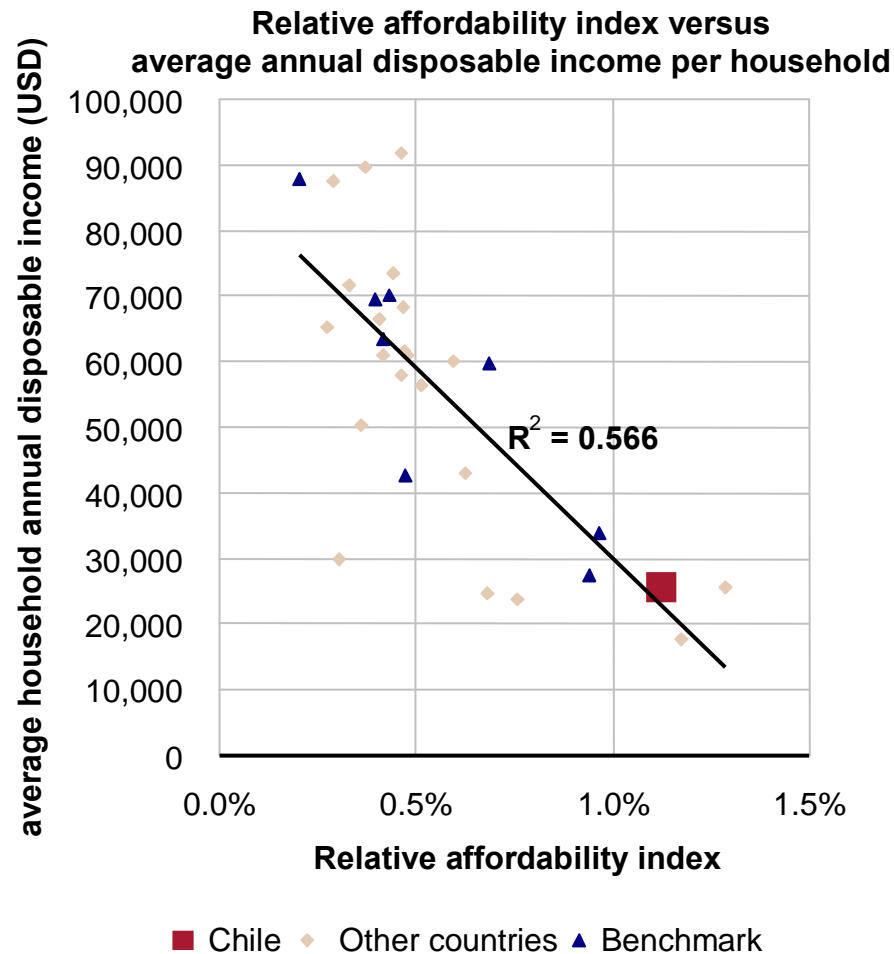


In Chile, the price of entry-level broadband offers is high relative to its income, resulting in low penetration ...



- International benchmarks appear to suggest that the price of broadband ceases to be a barrier to high penetration at 0.5%
- With the exception of South Korea, no country has penetration above 50% with price as a proportion of average household annual disposable income greater than 0.7%
- Chile's broadband price as a proportion of income (at 1.12%) may be sufficiently high so as to prevent penetration increasing beyond current levels

... although the relative affordability index is clearly related to the average household's disposable income



- International benchmarks appear to suggest that there is a strong correlation between broadband affordability and the average household annual disposable income
- With the exception of Turkey, no country has an affordability index below 0.6% with an average annual disposable income per household lower than USD30 000
- Chile's broadband price as a proportion of income (at 1.12%) may seem high, but it is actually in line with the benchmarked countries' trend

The price of fixed broadband in Chile represents a higher share of a household's disposable income than in other OECD countries

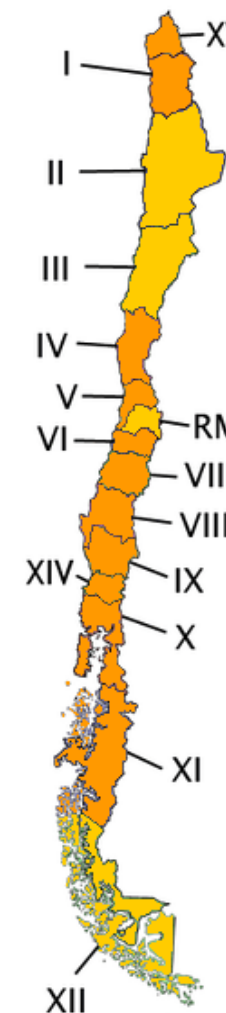
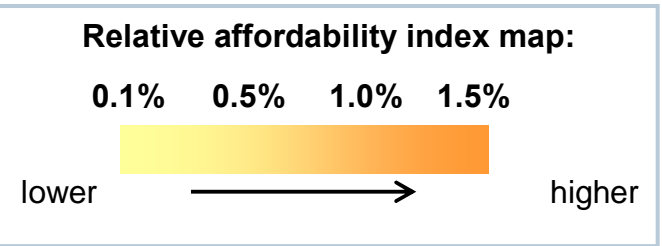
| | Annual average disposable income per household (USD) | Quintile 1 | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 | Total |
|-----------------|--|------------|------------|------------|------------|------------|-------|
| Hungary | 17,670 | 2.6% | 1.7% | 1.4% | 1.1% | 0.6% | 1.2% |
| Poland | 23,794 | 2.0% | 1.3% | 1.0% | 0.7% | 0.3% | 0.8% |
| Slovak Republic | 24,754 | 1.4% | 1.0% | 0.8% | 0.6% | 0.4% | 0.7% |
| Chile | 25,559 | 3.4% | 2.0% | 1.4% | 1.0% | 0.5% | 1.1% |
| Czech Republic | 25,651 | 2.7% | 1.8% | 1.5% | 1.2% | 0.7% | 1.3% |
| Mexico | 27,401 | 4.2% | 2.1% | 1.4% | 0.9% | 0.4% | 0.9% |
| Turkey | 29,887 | 1.0% | 0.5% | 0.4% | 0.3% | 0.1% | 0.3% |
| Korea | 33,693 | 3.2% | 1.6% | 1.1% | 0.8% | 0.5% | 1.0% |
| New Zealand | 42,578 | 2.6% | 1.1% | 0.6% | 0.4% | 0.2% | 0.5% |
| Portugal | 42,909 | 1.9% | 1.1% | 0.8% | 0.6% | 0.3% | 0.6% |
| Sweden | 50,368 | 0.8% | 0.5% | 0.4% | 0.3% | 0.2% | 0.4% |
| Finland | 56,534 | 1.2% | 0.8% | 0.6% | 0.5% | 0.3% | 0.5% |
| Netherlands | 58,007 | 1.1% | 0.7% | 0.5% | 0.4% | 0.2% | 0.5% |
| Spain | 59,830 | 1.8% | 1.1% | 0.8% | 0.6% | 0.4% | 0.7% |
| Germany | 60,081 | 1.8% | 1.0% | 0.7% | 0.5% | 0.3% | 0.6% |
| Average OECD | 61,021 | 1.7% | 0.9% | 0.6% | 0.4% | 0.2% | 0.5% |
| Greece | 61,093 | 1.4% | 0.7% | 0.5% | 0.4% | 0.2% | 0.4% |
| Japan | 61,586 | 1.5% | 0.8% | 0.6% | 0.4% | 0.2% | 0.5% |
| United Kingdom | 63,480 | 1.8% | 0.8% | 0.5% | 0.3% | 0.2% | 0.4% |
| Italy | 65,115 | 0.8% | 0.5% | 0.4% | 0.3% | 0.1% | 0.3% |
| Belgium | 66,455 | 1.1% | 0.6% | 0.5% | 0.3% | 0.2% | 0.4% |
| Canada | 68,442 | 1.7% | 0.9% | 0.6% | 0.4% | 0.2% | 0.5% |
| France | 69,563 | 1.0% | 0.6% | 0.4% | 0.3% | 0.2% | 0.4% |
| Australia | 69,979 | 1.9% | 0.9% | 0.5% | 0.4% | 0.2% | 0.4% |
| Denmark | 71,507 | 1.2% | 0.6% | 0.4% | 0.3% | 0.2% | 0.3% |
| Austria | 73,496 | 1.0% | 0.6% | 0.5% | 0.4% | 0.2% | 0.4% |
| Ireland | 87,540 | 1.1% | 0.5% | 0.4% | 0.2% | 0.1% | 0.3% |
| United States | 87,654 | 1.2% | 0.5% | 0.3% | 0.2% | 0.1% | 0.2% |
| Switzerland | 89,755 | 1.1% | 0.6% | 0.4% | 0.3% | 0.2% | 0.4% |
| Norway | 91,673 | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

Broadband affordability varies across Chile, but the average affordability index is close to, or higher than, 1%

Broadband affordability index by income quintile – Price = CLP12 500 per month

| Región | I | II | III | IV | V | Total |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| XV | 3.5% | 2.1% | 1.4% | 1.2% | 0.6% | 1.2% |
| I | 2.4% | 1.7% | 1.1% | 0.9% | 0.7% | 1.1% |
| II | 1.9% | 1.3% | 1.0% | 0.8% | 0.5% | 0.9% |
| III | 2.7% | 1.5% | 1.1% | 0.8% | 0.6% | 1.0% |
| IV | 3.7% | 2.1% | 1.7% | 1.4% | 0.7% | 1.4% |
| V | 3.1% | 2.0% | 1.6% | 1.2% | 0.7% | 1.3% |
| VI | 3.3% | 2.1% | 1.7% | 1.3% | 0.7% | 1.4% |
| VII | 4.4% | 2.7% | 1.9% | 1.5% | 0.8% | 1.6% |
| VIII | 4.9% | 2.6% | 1.9% | 1.4% | 0.7% | 1.5% |
| IX | 6.0% | 2.9% | 2.0% | 1.5% | 0.7% | 1.6% |
| XIV | 4.5% | 2.8% | 2.0% | 1.5% | 0.7% | 1.6% |
| X | 3.8% | 2.1% | 1.5% | 1.1% | 0.6% | 1.3% |
| XI | 3.4% | 1.7% | 1.4% | 0.9% | 0.7% | 1.2% |
| XII | 2.5% | 1.6% | 1.2% | 0.8% | 0.5% | 1.0% |
| RM/XIII | 2.6% | 1.6% | 1.1% | 0.8% | 0.4% | 0.9% |
| Total país | 3.4% | 2.0% | 1.4% | 1.0% | 0.5% | 1.1% |
| OECD average | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

- Broadband is most affordable in Región Metropolitana and Antofagasta (relative affordability index 0.9%)
- Comparatively low income levels in Maule, La Araucanía and Los Rios make the relative affordability of broadband high (relative affordability index 1.6%)

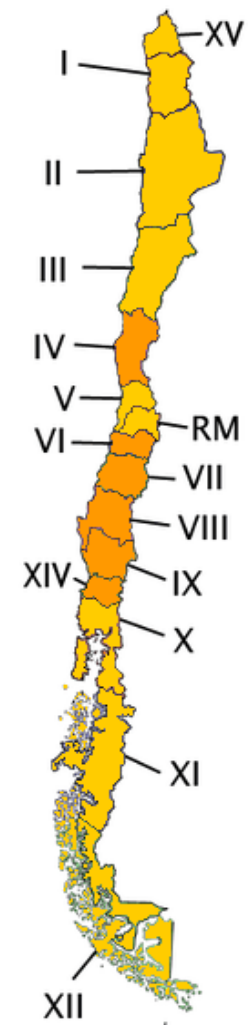
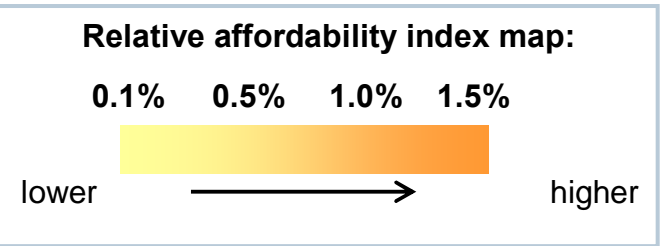


When mobile broadband is included in the analysis, affordability increases

Broadband affordability index by income quintile – Price = CLP9500 per month

| Región | I | II | III | IV | V | Total |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| XV | 2.8% | 1.7% | 1.1% | 0.9% | 0.5% | 1.0% |
| I | 1.9% | 1.3% | 0.9% | 0.7% | 0.6% | 0.9% |
| II | 1.5% | 1.1% | 0.8% | 0.6% | 0.4% | 0.7% |
| III | 2.1% | 1.2% | 0.9% | 0.7% | 0.4% | 0.8% |
| IV | 2.9% | 1.7% | 1.4% | 1.1% | 0.6% | 1.1% |
| V | 2.5% | 1.6% | 1.3% | 1.0% | 0.5% | 1.1% |
| VI | 2.6% | 1.7% | 1.3% | 1.0% | 0.6% | 1.1% |
| VII | 3.5% | 2.1% | 1.5% | 1.2% | 0.6% | 1.3% |
| VIII | 3.9% | 2.1% | 1.5% | 1.1% | 0.6% | 1.2% |
| IX | 4.8% | 2.3% | 1.6% | 1.2% | 0.6% | 1.3% |
| XIV | 3.5% | 2.2% | 1.6% | 1.2% | 0.6% | 1.3% |
| X | 3.0% | 1.7% | 1.2% | 0.9% | 0.5% | 1.0% |
| XI | 2.7% | 1.4% | 1.1% | 0.7% | 0.6% | 1.0% |
| XII | 2.0% | 1.3% | 1.0% | 0.7% | 0.4% | 0.8% |
| RM/XIII | 2.0% | 1.3% | 0.9% | 0.7% | 0.3% | 0.7% |
| Total país | 2.7% | 1.6% | 1.1% | 0.8% | 0.4% | 0.9% |
| OECD average | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

- Mobile broadband is affordable for 20% of households with the highest income in all regions except for Maule
- Relative affordability remains poor compared to OECD average figures

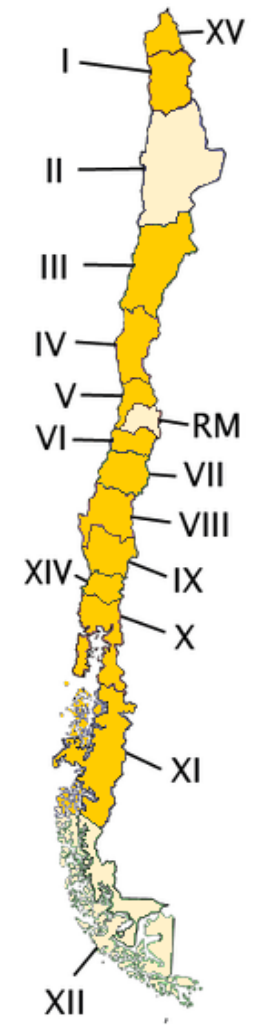
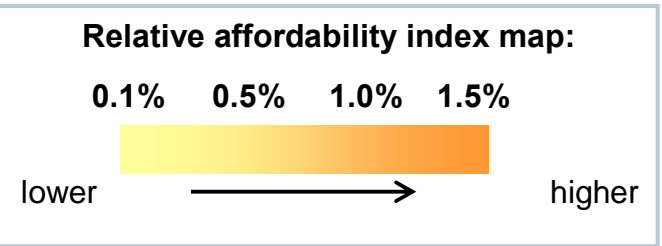


If fixed broadband were priced at CLP7315 per month, the relative affordability index would still be high for the C3DE segments

Broadband affordability index by income quintile – Price = CLP7315 per month

| Región | I | II | III | IV | V | Total |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| XV | 2.0% | 1.2% | 0.8% | 0.7% | 0.3% | 0.7% |
| I | 1.4% | 1.0% | 0.6% | 0.5% | 0.4% | 0.7% |
| II | 1.1% | 0.8% | 0.6% | 0.4% | 0.3% | 0.5% |
| III | 1.6% | 0.9% | 0.7% | 0.5% | 0.3% | 0.6% |
| IV | 2.1% | 1.3% | 1.0% | 0.8% | 0.4% | 0.8% |
| V | 1.8% | 1.2% | 0.9% | 0.7% | 0.4% | 0.8% |
| VI | 1.9% | 1.3% | 1.0% | 0.8% | 0.4% | 0.8% |
| VII | 2.6% | 1.6% | 1.1% | 0.9% | 0.4% | 0.9% |
| VIII | 2.9% | 1.5% | 1.1% | 0.8% | 0.4% | 0.9% |
| IX | 3.5% | 1.7% | 1.2% | 0.9% | 0.4% | 1.0% |
| XIV | 2.6% | 1.7% | 1.2% | 0.9% | 0.4% | 0.9% |
| X | 2.2% | 1.2% | 0.9% | 0.7% | 0.4% | 0.8% |
| XI | 2.0% | 1.0% | 0.8% | 0.5% | 0.4% | 0.7% |
| XII | 1.4% | 1.0% | 0.7% | 0.5% | 0.3% | 0.6% |
| RM/XIII | 1.5% | 0.9% | 0.7% | 0.5% | 0.2% | 0.5% |
| Total país | 2.0% | 1.2% | 0.8% | 0.6% | 0.3% | 0.7% |
| OECD average | 1.1% | 0.7% | 0.6% | 0.4% | 0.2% | 0.5% |

- If entry-level broadband prices came in line with the lowest OECD (excl. Turkey) prices (USD14 per month), the relative affordability index would still be high for the C3DE segments



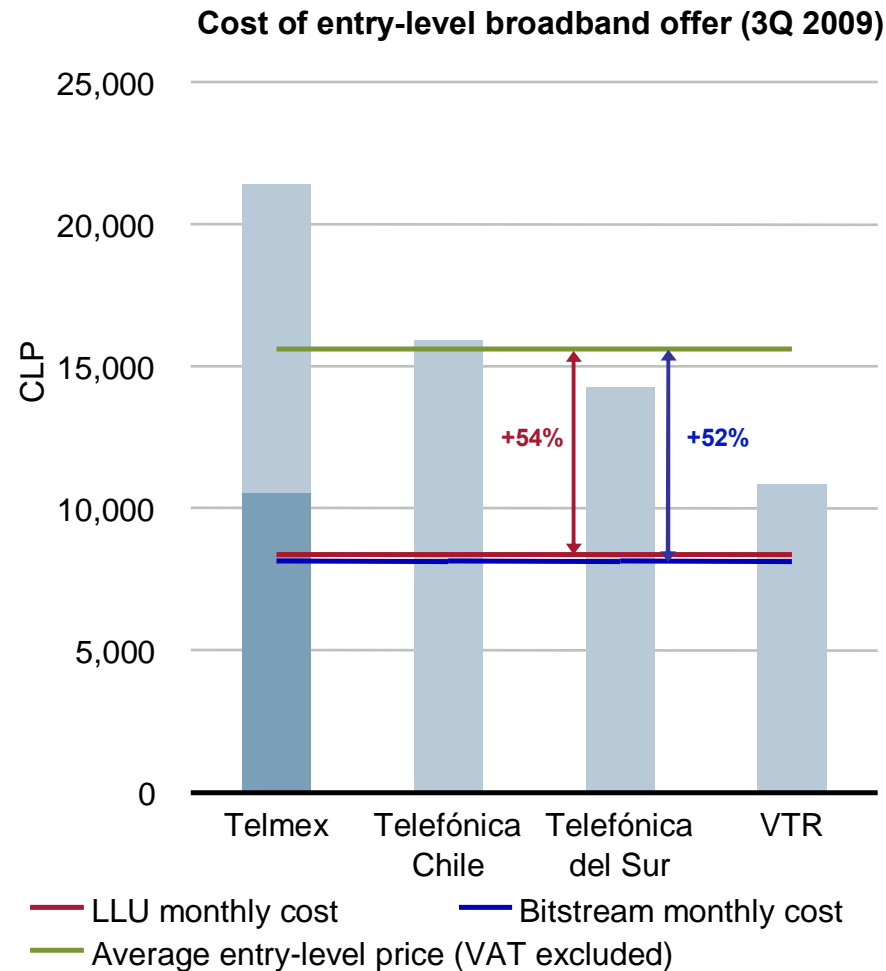
Introduction

Summary of key findings

Affordability analysis

Wholesale regulated prices analysis

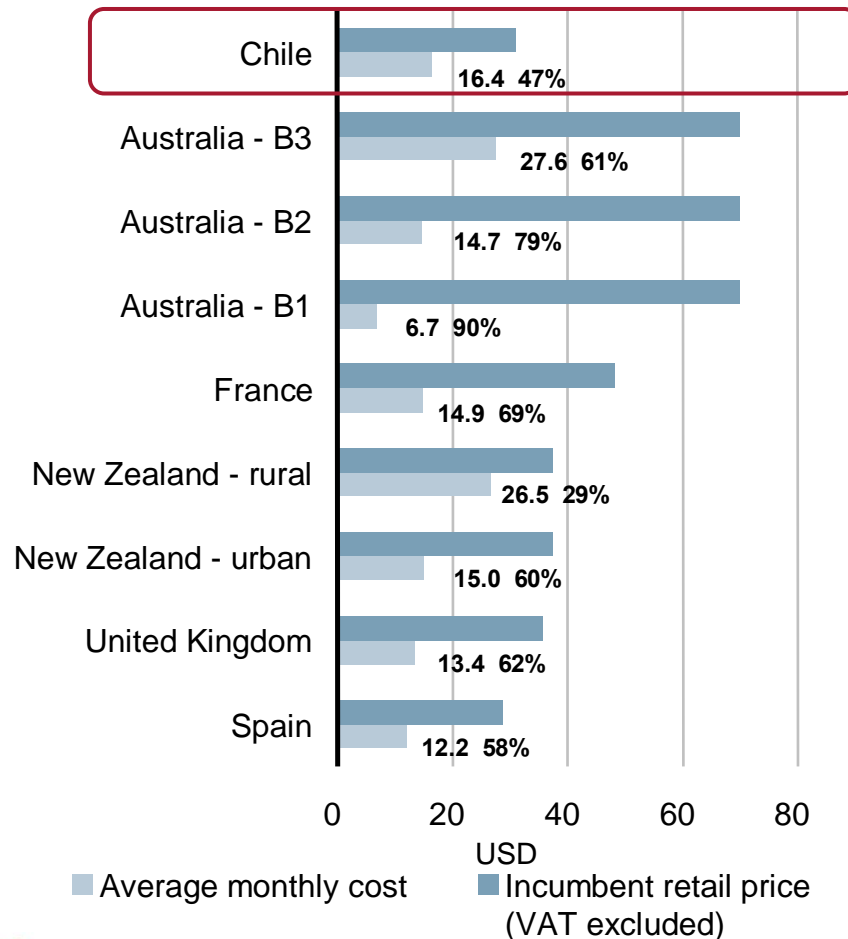
Wholesale regulated prices in Chile seem to be low enough to allow for reasonable margins



- We have selected only speeds above 256kbit/s over any kind of terrestrial technology – e.g. ADSL, cable
- The entry-level broadband offer is far from heterogeneous for each of the main operators – prices range from CLP10 840 with a monthly cap of 1Gb, to CLP21 429 per month (VAT excluded), with an average of CLP15 607 per month
- The latest revision to the LLU and bitstream offer dates from May 2009:
 - bitstream was introduced at CLP7170 per month with an extra CLP704 per Mbps and an activation fee of CLP9642
 - the price of LLU increased from a territorial average of CLP5344 to a national average of CLP8148, with and activation fee of CLP8167
- LLU is priced very similar to bitstream

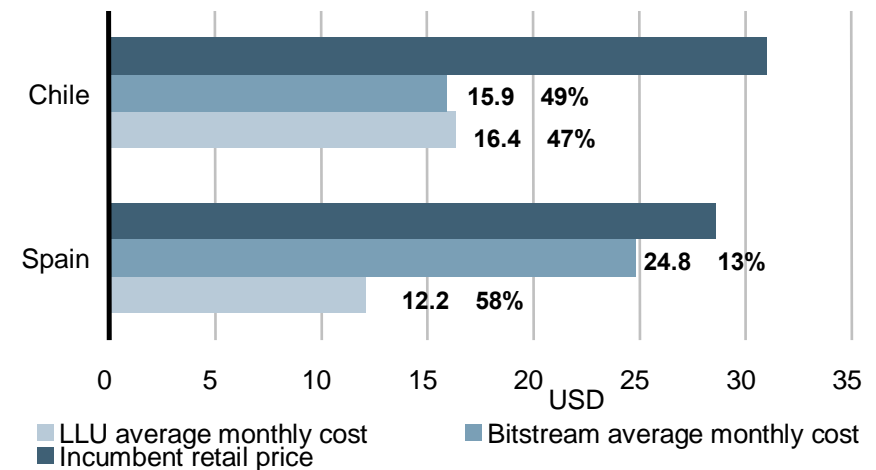
Chile is among the countries with a lower margin between LLU prices and the incumbent's retail prices

Full LLU prices and incumbent retail prices (August 2009)



- Regulators have set up LLU prices in such a way that competition to the incumbent is viable, allowing them to make sufficient margin to be able to compete:
 - compared to the benchmarked countries, in Chile the incumbent's margin is lower at 47%, compared to an average of 62% for the benchmark group
 - this makes it more difficult for alternative operators in Chile to obtain a profitable margin through LLU-based offers

Full LLU, bitstream prices and incumbent retail prices (August 2009)



Note: LLU average monthly cost = LLU monthly fee + LLU activation cost / 36 months
 Bitstream average monthly cost = bitstream monthly fee + 1Mbit/s bitstream fee + bitstream activation cost / 36 months

Workstream 3: Regulator competition options

Regulatory competition option assessment is the third of three workstreams

1

BROADBAND GAP ANALYSIS

- Identify the differences between broadband and connectivity indicators in Chile and in the main OECD and Latin American countries, as well as the main differentiating factors relating to competition and regulation
- The key indicators that must be taken into account for this analysis are provision of connectivity and other elements that may characterise the countries analysed

2

COMPETITION ASSESSMENT

- Assessment of the telecoms market in Chile
- Assessment of the state of competition in the broadband market in Chile. Specifically, the objective is to understand the current state of the broadband market and its possible evolution in terms of competition, coverage and quality of service

3

REGULATORY COMPETITION OPTIONS

- Analysis of the service-based (within networks) and facilities-based (between networks) competition models
- The international lessons on competition models must be analysed in the context of the Chilean market, taking into account findings from the previous workstreams in order to promote increased competition and coverage of broadband



Key objectives

- Interview relevant governments and national regulatory agencies about key specific aspects that are of interest to Chile
- Assess the relevance of particular international experiences and provide final recommendations and conclusions

We carried out interviews with five key regulators and public bodies across the benchmarked countries

| Country | Questions/issues |
|-----------------------|--|
| France | <ul style="list-style-type: none"> • LLU – strong push? – rationale and results • Local fibre networks: financing by local authorities • Access to in-building fibre in NGA • Debate around broadband as part of USO |
| New Zealand | <ul style="list-style-type: none"> • Geographically deaveraged LLU fees – rationale and results • NBN aspects, wholesale access including unbundling, in-building wiring, etc. • Broadband as part of USO • Broadband coverage in rural areas (e.g. NBN) • Deployment of international cable to decrease international bandwidth prices |
| Spain | <ul style="list-style-type: none"> • Digitisation of schools initiative ('Plan Escuela 2.0') including PC subsidies • Access to in-building fibre • ICT law (telecoms infrastructure in buildings) • Rural broadband plans: reverse subsidy auctions? Level of requirements? |
| United Kingdom | <ul style="list-style-type: none"> • Bitstream prices per geographical area • Functioning of the OTA • Digital Britain initiative: a new GBP0.50-per-month broadband tax • Regional Development Agencies supported ADLS rollout |
| USA | <ul style="list-style-type: none"> • Stimulus plans: rural coverage • LLU – was it considered, why was it not implemented/enforced? |

France – summary of key findings [1/2]

| Initiative | Description | Rationale and results |
|--|---|---|
| Success of LLU | LLU is widely used by alternative operators and largely explains the success of broadband take-up in France | <ul style="list-style-type: none"> • The French regulator ARCEP was one of the first European NRAs to significantly reduce the price of shared LLU in 2001. This allowed alternative operators/ISPs (like Iliad Free) to undercut France Telecom's offer by 33% in 2001 • Simultaneously, ARCEP opted for a 'voluntarist' approach regarding the operational issues related to LLU. It decided to get deeply involved in a 'pro-active manner' on operational issues to avoid being called up for litigation (on an <i>ex post</i> basis): it became involved in monthly multi-lateral operational meetings – and in the validation of operational solutions • The choice of this approach was mainly based on the fact there was a significant unbalance of power between the incumbent operator and the ISPs, but the latter were really keen to develop the market (as a result, this behaviour was found to be the most efficient to promote competition) • Key decisions that helped to develop the market included: payment of filters on a monthly basis (for shared LLU); definition of real penalty systems incentivising operators to work efficiently; review and strong improvement of the 'after-sales service' between France Telecom and OLOs/ISPs • It should be noted that no formal audit of France Telecom's wholesale broadband services was undertaken. Instead, ARCEP relied on feedback from OLOs/ISPs, which were the best positioned to raise material issues • Although there is no regulatory obligation in France for operators to follow a uniform LLU pricing, there is however a (political) consensus to use a geographical unique pricing (LLU pricing evolution being reviewed in light of France Telecom's line rental price). There is also a general acknowledgement that LLU uniform pricing allowed the development of broadband on a national basis (and not only in dense areas) |
| Functional separation not necessary | The success of the non-discrimination obligation is found to be sufficient | <ul style="list-style-type: none"> • ARCEP approach suggest that they believe that the non-discrimination obligation is a very powerful remedy (both at the tariff and operational level). The regulator pushed this obligation very far and managed to obtain very good results without the need to enforcing functional separation. According to ARCEP, the imposition of functional separation would not obtain a better outcome that what it had obtained so far through the non-discrimination obligation, and it could indeed prove inefficient (as this would force France Telecom to split its departments) |

France – summary of key findings [2/2]

| Initiative | Description | Rationale and results |
|--|---|--|
| NGA and fibre deployment | Due to a political initiative, ARCEP defined some guidelines for fibre deployment in very dense areas | <ul style="list-style-type: none"> • The LME (Loi de modernisation de l'économie) was published in 2008 by the French government. Among other things, it defined the main approach regarding NGA rollout: the need to share in-building fibre; the location of a concentration point which by default should be in the public domain (point from which operators can have access to in-building fibres). The government also required ARCEP to define operational aspects related to NGA deployment. (These issues are treated on a symmetrical basis and not in the framework of an <i>ex ante</i> 'asymmetrical' approach). <i>Note: The LME also specified that new buildings are required to have passive telecoms infrastructure (fibre access)</i> • As a result, ARCEP defined a set of guidelines (still not adopted) for very dense areas (representing 5.2 million households), whereby the first operator rolling out fibre to a building has the obligation to announce it (on a municipality level) and to offer to install up to three dedicated in-building fibres (on a cost basis) on behalf of other operators. ARCEP justified this by stating that the additional cost to roll out multiple fibre would be around 5% of the total network deployment cost. ARCEP also defined the mutualisation point as being located in the basement building (Note: this is an exception to the LME law which initially specified that the concentration point was due to be in the public domain) • Even though this is a controversial subject from a political viewpoint, ARCEP did not (and does not plan in the near future) to define comparable rules for the remaining part of the country as it prefers to leave market forces to drive initiatives in this area • It should be noted that the use of France Telecom's ducts and the potential development of fibre in very dense areas could impact LLU (as the LLU infrastructure would be less used as a result, which could therefore drive up costs). This is internally being discussed and taken care of within ARCEP (with some internal projects being currently carried out) |
| Local authorities fibre deployment initiative | Local authorities have the responsibility to deploy local fibre networks and do so in co-operation with ARCEP | <ul style="list-style-type: none"> • Since 2004, the L-1425 law assigned responsibility to local authorities to deploy local fibre networks. To ensure consistency, ARCEP took the initiative to create the CRIP (Committee of Public Initiative Network) with the aim of sharing best practices and guidelines regarding public interventions |

New Zealand – summary of key findings [1/2]

| Initiative | Description | Rationale and results |
|--|---|--|
| Geographical pricing of LLU | LLU is available at different prices in urban and rural areas | <ul style="list-style-type: none"> • There is a different regulated wholesale price for LLU sold by Chorus in urban and rural areas of New Zealand. This affects not only unbundlers, but also TNZ wholesale which buys LLU from Chorus as part of the functional separation • The geographical deaveraging encourages 'cherry picking': the unbundlers only serve the urban areas. The wholesale broadband bitstream service (UBA) is priced at retail minus, again providing no incentive for LLU in rural areas. This cherry picking in turn puts pressure on the retail pricing of TNZ, which is the same price across geographies: arguably the geo-deaveraging deters further rural rollout of services by TNZ (because it would make the UBA increasingly loss-making) • Unbundling is not taking place very quickly in New Zealand for four reasons: late start, partly due to previous regulation against LLU; one of the major unbundlers has decided to concentrate more on mobile; the cabinetisation process within TNZ may "strand" some investment in LLU at the MDF; and any future FTTB/FTTH investments by the state may also render LLU obsolete |
| Functional separation | Functional separation negotiated | <ul style="list-style-type: none"> • This was modelled on the basis of the functional separation of BT/Openreach in the UK • It is seen as working by the government • Its costs have been quite high (as perceived by TNZ) |
| Cabinetisation programme | Large-scale FTTC/VDSL underway | <ul style="list-style-type: none"> • As part of the separation agreed with the previous NZ government, TNZ agreed to proceed with an extensive "cabinetisation" (FTTC/VDSL) programme to more than half the population, which will increase broadband speeds and coverage in certain long-loop areas • This is proceeding according to an agreed timetable |
| Broadband Investment Initiative | Government ambition for public/private new open access fibre access network | <ul style="list-style-type: none"> • The new government has issued a proposal to spend NZD1.5billion on an FTTH rollout called the Broadband Investment Initiative (BII), aiming to roll out FTTH to 75% of the population • It will be partly funded by private-sector partners. If built, it will be an open-access network. Vertical integration will be specifically forbidden (therefore, at present, Chorus could not submit a bid, as it is only functionally separate from TNZ). It is not known whether it will be PON or P-P fibre |

New Zealand – summary of key findings [2/2]

| Initiative | Description | Rationale and results |
|-------------------------|---|--|
| International bandwidth | International bandwidth prices are an issue for ISPs in New Zealand | <ul style="list-style-type: none"> • 90% of the content comes from overseas • ISPs have tried to minimise bandwidth needs by: getting servers from major social networks and video content providers hosted within New Zealand, and pricing some retail packages with “overage” charges for excess throughput • The government has become involved in different ways: negotiating prices with Southern Cross (prices not higher than the alternative route via Australia), and considering joining a new Australian-US cable somewhere in the Pacific – although we understand this has been halted |
| Internet peering | National peering was poor but has improved | <ul style="list-style-type: none"> • In the past, there were significant issues regarding peering inside New Zealand. Local peering was poorly developed and there was a lot of tromboning of traffic on long-distance links (e.g. interconnection occurring in the US, probably at the transit provider) even given the high price of international bandwidth. Even large ISPs did not peer due to perceived geographical disparities in their networks • This has been sorted out by determining better peering conditions; peering with the large ISPs is now available if interconnecting at 29 specified points (among which there is competitive capacity, with at least three carriers at each of these points) |

Spain – summary of key findings [1/2]

| Initiative | Description | Rationale and results |
|---|---|--|
| Division of responsibilities among different parts of the administration | Ministry of Industry and CMT (regulator) | <ul style="list-style-type: none"> • The Ministry is in charge of USO regulation, quality assessment and spectrum. Setsi also works on access infrastructure requirements to buildings and players sharing schemes • The CMT (regulator) is in charge of market analysis, and remedies regulation on SMP players for all the regulated services • The regulator is independent from the government and may not follow the main political guidelines |
| First Reference Unbundling Offer (RUO) | The Ministry of Industry negotiated the first RUO and handed over to CMT afterwards | <ul style="list-style-type: none"> • The policy behind the Spanish RUO (called OBA – Oferta de Bucle de Abonado) was to have a legal contract supervised by the regulator that sets: 1) the operating conditions of the LLU-related services and the bitstream-related services and ancillary services; 2) the technical conditions; and 3) the price of those services • The first RUO was negotiated by the Ministry of Industry with Telefónica. It was handed over to the CMT afterwards |
| Enforcement of regulatory measures | Legal aspects of regulatory measures | <ul style="list-style-type: none"> • Up until now, any of the regulatory measures being challenged could be put on hold until a court ruled for or against such measure. Provisional measures are unlikely to be established until the ruling. A regulation allowing “decisiones ejecutivas” that pre-empt Court appeal would reduce significantly the legal route used to gain time by incumbents |

Spain – summary of key findings [2/2]

| Initiative | Description | Rationale and results |
|---|---|---|
| Investment in rural areas | National Programme for Broadband Deployment in Rural and Isolated Areas expanded broadband coverage | <ul style="list-style-type: none"> • PEBA (National Program for Broadband Deployment in Rural and Isolated Areas) was a national funding programme promoted by the Ministry of Industry, Tourism and Commerce between 2005 and 2008 in order to stimulate operators' investments in broadband infrastructure in rural and isolated areas • Service requirements consisted of providing broadband access with a minimum download speed and a maximum monthly fee: 1) minimum bandwidth: 256kbit/s/128kbit/s; 2) fixed maximum prices: initial fee of EUR39 (subscription), and a monthly fee of EUR39 during the first 36 months of contract • The operating requirements of the programme were: technological neutrality; open network policy, i.e. licensees had to open up their networks to competition; infrastructure investments in well-defined unserved areas in order to avoid the duplication of investments • PEBA investments, through 29 projects and two beneficiary operators, amounted to nearly EUR85 million and extended broadband coverage from an estimated 83% to 92% of the population. 95% of the funding was awarded to Telefónica |
| The ICT (Infraestructuras Comunes de Telecomunicaciones) law | The ICT laws regulate the minimum telecoms infrastructure in a new building | <ul style="list-style-type: none"> • It specifies the minimum passive telecoms infrastructure that needs to be deployed in a new building • Copper is installed by default. Only if a cable operator is present, hybrid fibre coaxial (HFC) is deployed in the building • A cost study has shown that the additional cost of installing this infrastructure has represented an average of 0.5% of the total construction cost of the building. The infrastructure belongs to the building owners (in most cases these are multi-tenant buildings) • If a minimum number of the building owners (1/3 in a multi-tenant building) decide to install infrastructure in a pre-ICT building, then it is compulsory to install the infrastructure • Through a modification in the regulation, from 2010 onwards fibre will be installed by default • Four million households out of 18 million have adopted common infrastructure following this over a ten-year period (mainly new buildings) |

UK – summary of key findings [1/2]

| Initiative | Description | Rationale and results |
|--|--|---|
| Functional separation | BT's access network has been separated into a separate division, Openreach | <ul style="list-style-type: none"> • BT and Ofcom negotiated a set of binding undertakings creating Openreach. These are a competition law mechanism • The undertakings are not focussed (as is all other regulation) on narrow markets where there is SMP, but on creating the correct incentive properties for Openreach as a whole • The undertakings cover a wide range of issues relating to equivalent price and non-price terms, including interactions with all customers (incl. BT divisions), staff pay, information sharing, rules about IT systems • The separation is seen as successful |
| Office of the Telecommunications Adjudicator | Ofcom handed over operational dispute resolution in a few specific areas to OTA | <ul style="list-style-type: none"> • Making LLU work was a policy priority (related to the creation of Openreach) • However, a number of issues emerged around colocation and LLU which the incumbent had limited incentives to solve, and which are too detailed for regulation to address effectively without risking being too slow • An energetic and more commercial approach could be adopted by a delegated person with limited authority (rather like commercial dispute adjudication). This is perceived as having worked for LLU • Later the OTA has acquired responsibility for a number of other areas which may be slightly less successful (e.g. as regards NGN interconnection). This may be partly due to the fact that these areas are not as clear cut and the relevant policy questions may not yet have been fully answered |
| Geographical market definitions | The broadband market is divided into three zones with different competitive conditions | <ul style="list-style-type: none"> • Regulation in the UK is now very different in the zones with different competitive conditions for wholesale broadband. This is a new approach in the European framework • The areas are defined by (in essence) the number of operators using LLU in those areas • The market for wholesale broadband is deregulated in the competitive areas; some remedies are still being applied in the uncompetitive areas • It is a more complex solution, but perceived to be better than trying to find a single regulatory approach to a market with very different competitive conditions |

UK – summary of key findings [2/2]

| <i>Initiative</i> | <i>Description</i> | <i>Rationale and results</i> |
|---|---|---|
| RDA investment | RDAs are regional development bodies which have invested in broadband projects in a number of ways | <ul style="list-style-type: none"> • Investment by RDAs in subsidising commercial rollouts had some limited success. It did cause some network build, although in the end the majority of rural coverage was generated by a decision by the senior management of the incumbent • Some of the investment was lost (e.g. small providers went bankrupt) – though it may also have got the desired result (incumbent took over the customers) • Some RDA-led demand stimulation and public-sector demand aggregation was useful in encouraging rollout • Ultimately, unsubsidised commercial deployment is the aim |
| GBP0.50 levy to fund next-generation broadband | There is a proposal for an explicit tax on fixed connections to fund the “final third” – uneconomic rural NGA rollout | <ul style="list-style-type: none"> • This is still a politically contentious proposal (opposed by the likely next government) and the regulator is not closely involved in it |

USA – Summary of key findings

| Initiative | Description | Rationale and results |
|-------------------------------------|--|--|
| Regulation LLU | – Unbundling was mandated in the Telecommunications Act of 1996, but this requirement was effectively overridden by a combination of Court and FCC actions | <ul style="list-style-type: none"> • The Telecom Act of 1996 allowed for seven unbundled network elements (UNEs) to be made available at cost-based rates • In the implementation, the Federal Communications Commission (FCC) developed the total element long-run incremental cost (TELRIC) methodology, and also made available the UNE Platform (UNEP), which combined all seven UNEs into effectively a resale platform at cost-based rates • Although the incumbent local exchange carriers (LECs) had agreed to the provisions of the Telecom Act, in exchange for entering long distance markets, they opposed the creation of the UNEP, as well as the TELRIC methodology, and successfully fought this, leaving as the main UNE the loop, albeit not at cost-based rates. • The main learning from this was that the Telecom Act led to many unforeseen difficulties, such as difficulties in making OSS available as a UNE, and also that the UNEP, without any sunset provisions, was an overreach that enabled the FCC to be effectively challenged |
| Supply side – rural coverage | The US Stimulus Act contained USD7.2 billion for broadband service deployment in rural areas | <ul style="list-style-type: none"> • The US Stimulus Act contained USD7.2 billion for broadband service deployment • It is being given in grants and loans, by both the NTIA and RUS. It is all intended for un- and underserved areas. While many of these are likely to be rural, many inner city areas are also underserved • The first round of applications for the stimulus funds has been received, but the awards have not yet been made. NTIA received far more applications than expected, to the extent that its website for uploading the applications crashed before the deadline • At the same time as this money is being deployed, the FCC is creating a National Broadband Plan, which among other things will identify areas in need of broadband. This plan will be presented in February 2010, after the stimulus funds have been assigned. Congress acted on the stimulus independently of the new FCC's study |
| Demand side – subsidies | There are currently no demand-side subsidies, other than universal service money used for schools and libraries | <ul style="list-style-type: none"> • There are currently no demand-side subsidies, other than universal service money used for schools and libraries. The stimulus money could go to demand-side, including schools, libraries, and hospitals, but there is no published amount that will go for these uses |

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