



Final Report for
Maatschappelijke
Integratie – Intégration
Sociale

Lot 2: An Analytic Study
of the Results of Lot 1
Showing the Factors
which Explain Broadband
Retail Price Differences
between Countries

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0 Executive summary

Analysys Consulting Limited (“Analysys”) has been asked to conduct an analysis of the structural determinants of the price of broadband Internet access and triple-play offers in Belgium. This report is the second part of the framework that has been defined with the SPF MIIS, which divides this study into two ‘lots’ of work:

- **Lot 1:** a comparative study of retail prices for broadband Internet connections and triple-play offers in the residential market.
- **Lot 2:** an analytic study of the results of the first ‘lot’ aiming to show the factors which explain differences in retail prices between countries.

Lot 1 concluded that the price of broadband Internet access and triple-play offers in Belgium when compared to the benchmarked countries is a mixed picture and has changed over time: from being in the vanguard for high speeds, Belgium now finds itself with prices which are above those offered in the Netherlands and France, and indeed above the average of the benchmarked countries for three out of the four speed categories we have considered.

In the present document, we will examine and qualitatively weight the factors explaining the differences in the cost of access to broadband Internet connections and triple-play services in the identified benchmarked countries.

We considered a wide variety of possible factors. Broadly speaking, we believe that the level of competition in the retail market, influencing the extent to which costs are reflected in prices, is, in our view, the most significant factor in explaining the price differences between Belgium and other countries. The market is not significantly more concentrated in Belgium (in terms of Herfindahl-Hirschman Index (HHI)) but, crucially, operators using

local loop unbundling (LLU) are not yet making significant inroads into the market share of Belgacom and the cable operators. This is because:

- the ability for competitors to gain market share has so far been limited (even in a situation where their retail prices are lower than Belgacom's)
- the competitors are choosing to use bitstream access as a wholesale input for a variety of reasons, although this puts limits on the service innovation they can deliver (e.g. speed, ability to offer television services).

The attractiveness of the market to new entrants could force the existing players to set prices on a cost-oriented basis. Contestability is, in our view, a potentially material factor in the level of prices. However, there are some factors unique to Belgium that might account for a lower contestability via lower attractiveness to new entrants:

- the early offers at high speeds from Telenet, which leaves less room for a dramatic marketing offer of very high speeds
- the existence of Belgacom's VDSL network
- worries about whether a future margin squeeze would be successful in harming the entrant (which is, in effect, a worry about the strength of ex-ante regulation and ex-post competition authority enforcement).

Whilst noting that underlying production costs are not in our view the most important factor in determining retail broadband prices in Belgium, we have found that there are a number of costs which may account for some material cost differences between LLU operators in Belgium and elsewhere, specifically:

- the price of fully unbundled loops
- (possibly) from differences in churn rates (although we know that this factor can be significant, we do not have good data on churn rates from all operators)
- (possibly) from differences in lines per main distribution frame (MDF)
- from differences in backhaul network prices (to the extent that unbundlers use Belgacom's product)
- from VAT levels in Belgium.

These factors may lead unit costs for an alternative operator using LLU in Belgium to be of the order of 15% higher than a similar operator in a typical country amongst the benchmark set, and, potentially, of the order of 20% higher than in France.

We considered demand levels as one of the possible factors; we do not believe that current demand levels lead to material differences in unit costs between Belgium and the benchmarked countries.

These cost factors might explain some of the observed differences between Belgium prices and the average prices in the lowest speed category, but do not explain the material differences at higher speeds.

Possible policy approaches

In the body of the report, we set forward a number of possible policy approaches which might be adopted if seeking to influence the factors we have identified. The scope of this report does not however extend to selecting or recommending policy approaches.

1 Introduction

1.1 Objectives

Analysys Consulting Limited (“Analysys”) has been asked to conduct an analysis of the structural determinants of the price of broadband Internet access and triple-play offers in Belgium. This report is the second part of the framework that has been defined with the SPF MIIS, which divides this study into two ‘lots’ of work:

- **Lot 1:** a comparative study of retail prices for broadband Internet connections and triple-play offers in the residential market.
- **Lot 2:** an analytic study of the results of the first ‘lot’ aiming to show the factors which explain retail price differences between countries.

In the present document, we will examine and qualitatively weight the factors explaining the differences in the cost of access to broadband Internet connections and triple-play services in the identified benchmarked countries.

1.2 Scope

In this report, we analyse factors that may affect standalone broadband and triple-play prices in Belgium compared with Austria, France, Germany, the Netherlands, Sweden and the UK.

1.3 Structure of document

We have divided the potential causes of the (broadly speaking) higher prices observed in Belgium into three categories:

- factors influencing the costs of supply
 - including level of demand
- the extent to which retail prices are related to costs, and the factors which affect this
 - market competitiveness
 - ease of entry by new operators
- factors affecting retail prices in general, such as VAT.

In the following sections of this report, we examine each factor in turn and discuss whether such factor might explain to some extent the higher prices in Belgium and the qualitative level of weight that we apply to that factor.

2 Factors influencing the costs of supply

2.1 Demand

2.1.1 Expected levels of demand over time

Demand affects costs

Increased demand allows increased economies of scale. Different network designs may have different levels of economy of scale.

For example, an LLU-based broadband provider faces costs of broadly three types:

- per-customer: no economy of scale (LLU per-loop charges, modem)
- per-exchange: strong economy of scale driven by customers per exchange (DSLAM, co-location charges, tie cables, backhaul link)
- per-network: some economies of scale driven by total customers (core network, servers, sales, administration, billing).

As is implied above, only some of the costs scale with demand (for example, the price of the local loops does not, as the price for two loops is twice the price for one). The extent of these economies of scale depends on the network technology used and the wholesale services used, but might (for example) translate into a unit-cost reduction for an LLU-based new entrant of approximately 15% if the long-run demand was 50% higher.

Current level of demand

The most important point to emphasise is that Belgian broadband penetration is comparable to that in other similar countries, though it is currently growing less rapidly. This is shown in Exhibit 2.1 below:

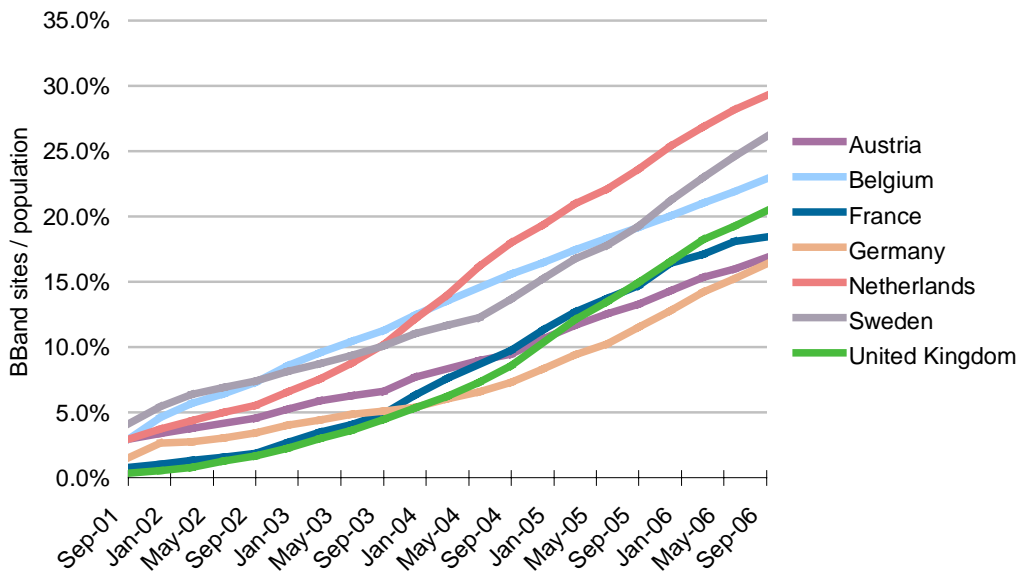


Exhibit 2.1: *Broadband penetration/population in the countries under study [Source: Analysys Research, 2006]*

This shows that price has not prevented Belgian broadband penetration from reaching levels comparable to those in similar countries with, broadly speaking, slightly lower prices today.

The level of demand is influenced by price, but also by other factors including disposable income, level of education, PC penetration of households, Internet penetration of PC households (e.g. as a result of the relevance of Internet content), and the ratio of broadband households to total Internet households. These factors may also be correlated, making separating their effects difficult.

Because there are economies of scale in broadband networks, especially for operators with their own network infrastructure such as cable modem, LLU-based DSL and incumbent

DSL, higher demand will translate into moderately lower unit costs in those countries with high demand. We estimate that a 10% higher demand for an individual operator can lead to unit costs up to 3% lower.¹ If competition is strong, these lower costs will be passed on to consumers – see Section 3 below). Accordingly, we might expect a correlation between high-demand levels and low prices in the long run; however, as shown in Exhibit 2.2 and Exhibit 2.3 below, this is not borne out by current prices and broadband penetration levels.

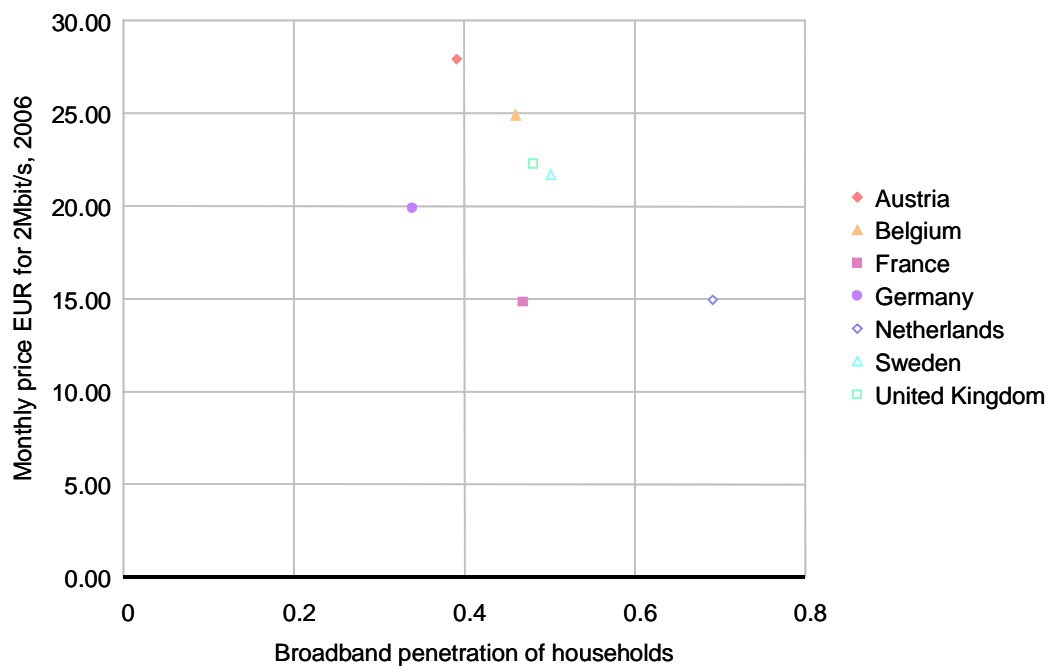


Exhibit 2.2: Monthly price for 2Mbit/s in 2006 as a function of 2006 broadband household penetration [Source: Analysys, ECTA]

¹ Naturally, a market that has more competition from alternative operators will lead to lower demand per individual operator.

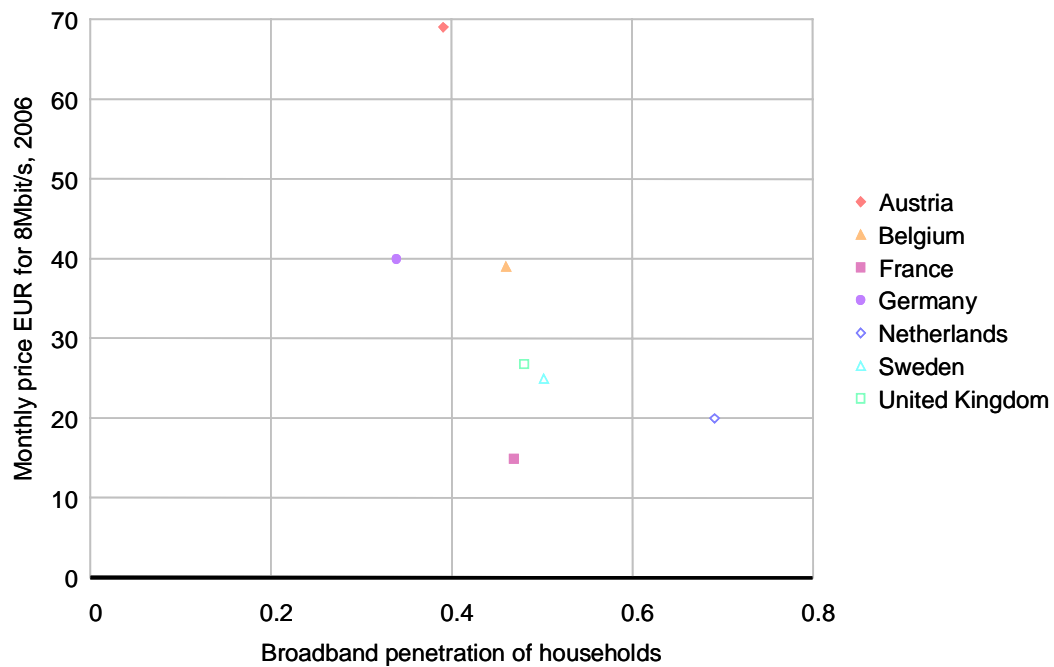


Exhibit 2.3: Monthly price for 8Mbit/s in 2006 as a function of 2005 broadband household penetration [Source: Analysys, ECTA]

Accordingly, it seems that factors other than demand levels are causing current price differences.

PC penetration

One factor that might become important over time is the level of PC penetration. It is reasonable to suppose that the long-run demand for broadband will be higher in countries with higher PC penetration, simply because a residential or SOHO PC user is a potential broadband customer. This higher demand will translate into moderately lower unit costs in those countries.

Euromonitor data we have processed indicates PC penetration levels comparable to those estimated by the Belgian ISPA (57%, see below) and very similar to those seen in Germany and the UK. This is shown in Exhibit 2.4.

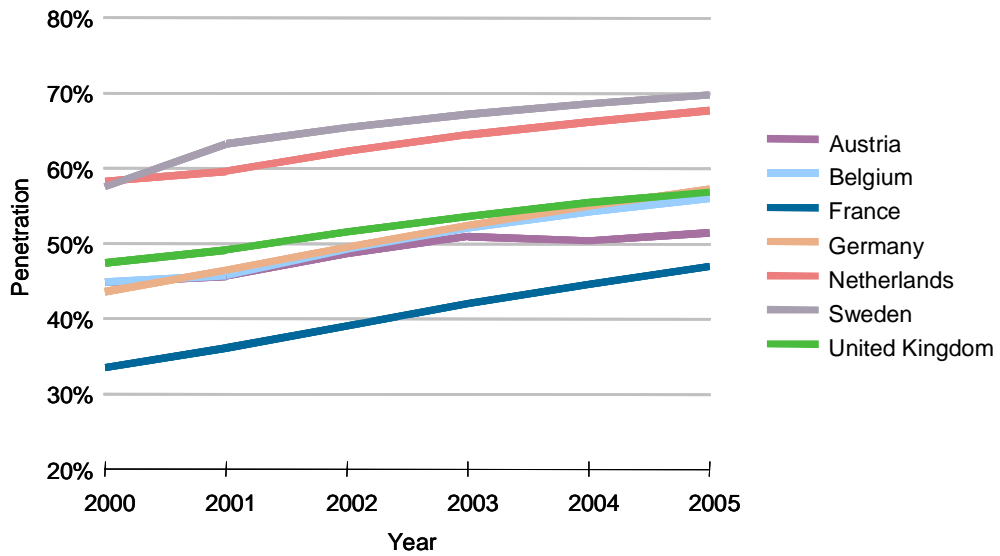


Exhibit 2.4: Household PC penetration [Source: Analysys, derived from Euromonitor]

Accordingly, we might expect a correlation between higher PC penetration and lower prices in the long run, if competition is strong and these lower costs are being passed on to consumers. However, as shown in Exhibit 2.5, this is not borne out by current prices and PC penetration levels. This is consistent with our previous observation that countries with higher broadband demand did not have lower prices.

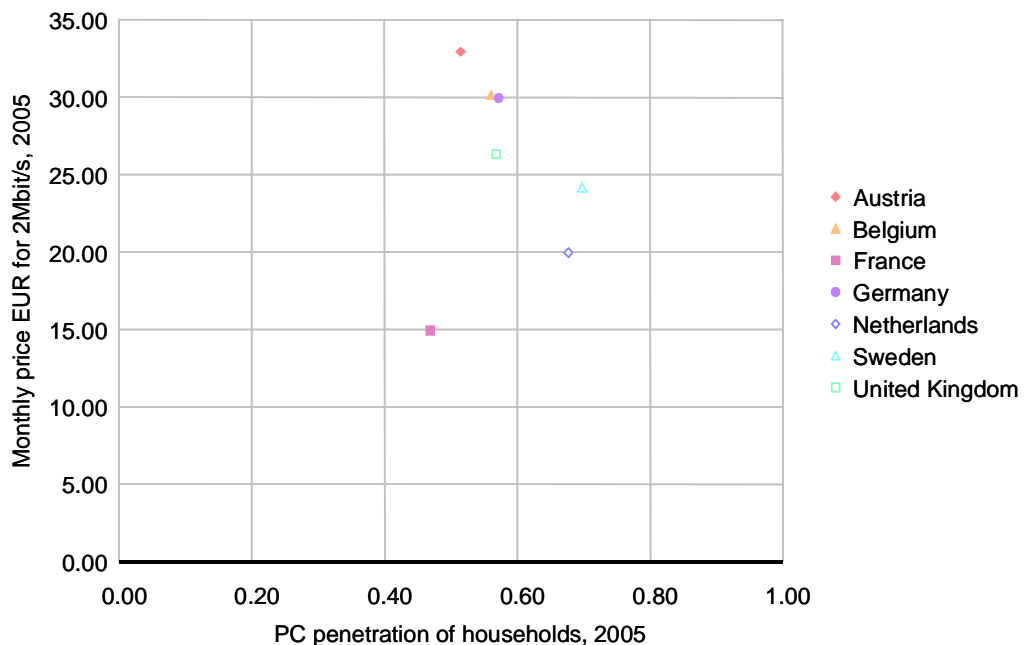


Exhibit 2.5: Monthly price for 2Mbit/s in 2005 as a function of 2005 PC household penetration [Source: Analysys, Euromonitor]

It is difficult to be conclusive from this graph, but the position of France and the Netherlands suggests that PC penetration can have a wide range while prices are low, and that other countries may have higher prices with intermediate levels of PC penetration. Alternatively, perhaps there is some relationship but anomalous behaviour in France. In any case, we do not expect a 10% variation in PC penetration to cause a 50% impact on the costs; any apparent correlation might be more subtle (e.g. countries with urbanised, computer-literate populations might be correlated with more vibrant competition between ISPs and hence lower prices).

This study is not primarily about the level of demand. However, if PC penetration levels and their rates of growth in Belgium are indeed comparable to those in the UK and Germany, and higher than those in France, then we believe that PC penetration is currently, and will continue for the near future to be, a minor factor in broadband prices in Belgium.

We note that different sources have different views on PC penetration of households in Belgium, ranging from 46% (ITU) to 56% (Euromonitor, processed by Analysys) to 57% (INRA). It may therefore be worthwhile to commission work to improve the understanding of this factor (e.g. in the next Belgian census).

Regional effects

Belgian ISPA statistics indicate a significant regional disparity between Wallonia and Flanders. Broadly speaking, Flanders appears to have broadband penetration rates similar to the rates currently seen in the Netherlands, and Wallonia to have levels similar to those currently seen in France. This indicates that there may be significant regional factors at work, as illustrated in the following two exhibits which show data for 2005 and 2006.

	2006	2006	2006	2006
	Belgium	<i>Brussels</i>	<i>Flanders</i>	<i>Wallonia</i>
Internet access at home	54%	51%	60%	45%
Broadband at home	48%	44%	53%	40%
(A)DSL at home	35%	37%	33%	37%
Other broadband access at home	13%	7%	21%	3%
Dial-up access at home	6%	7%	6%	5%
PC penetration (households)	57%	57%	64%	46%

Exhibit 2.6: 2006 residential PC penetration, broadband penetration [Source: ISPA]

	2005	2005	2005	2005
	Belgium	<i>Brussels</i>	<i>Flanders</i>	<i>Wallonia</i>
Internet access at home	50%	48%	56%	41%
Broadband at home	41%	38%	46%	32%
(A)DSL at home	29%	30%	28%	30%
Other broadband access at home	12%	8%	18%	2%
Dial-up access at home	10%	9%	10%	9%
PC penetration (households)	no data	no data	no data	no data

Exhibit 2.7: 2005 residential PC penetration, broadband penetration [Source: ISPA]

These figures for PC penetration of Belgian households are similar to those we have produced using Euromonitor inputs, which adds credence to both.

These large regional differences could be due to one or more of a number of effects:

- they could be a reflection of a more rural average density in Wallonia
- they might be influenced by cultural differences relating to the attractiveness of broadband Internet such as English language skills or PC penetration
- they might result from better broadband services being offered earlier in one region (specifically, Telenet in Flanders).

These regional effects are important to understand for the Belgian Federal and other governments, however, from the perspective of a service provider, they merely reduce average demand levels for Belgium as a whole and discourage deployment of networks (e.g. using LLU) in the lower-demand areas.

Demand levels are increased by low prices

It is fairly well established in academic circles² that low prices increase demand for broadband Internet services. These studies generally sought to estimate the own price elasticity and cross-price elasticity of broadband Internet of various types (DSL, cable modem) and narrowband Internet services, using large-scale surveys in the USA.

²

See, for example, Rappaport, P., Kridel, D.J., and Taylor, L.D., (2002) "Residential Demand for Access to the Internet," Working Paper. http://www.colorado.edu/engineering/alleman/print_files/Forecasting_the_Demand_for_Internet_Services.PDF.

Broadband penetration is now higher, and the local situation in Belgium may be different to that in the USA (for example, narrowband penetration is currently quite low). Nevertheless, we believe that the basic premise (lower prices would increase demand) is still true, even if it would not be possible to forecast the impact of lower prices obtained from these previous studies on broadband take-up in Belgium.

As lower prices increase demand, they can create a ‘virtuous circle’ where lowering prices increases demand, which in turn reduces the costs of supply. Indeed, certain customer segments might only adopt broadband at a low price. Conversely, high prices can be self-defeating if they are so high as to preclude service adoption.

Demand levels might be affected by disposable incomes

We might expect that demand for broadband would be suppressed if disposable income were smaller. However, while this effect is no doubt material in developing economies, Exhibit 2.8 below shows that this does not appear to be a measurable effect in the chosen benchmarked countries, which have a range of average disposable income per household.

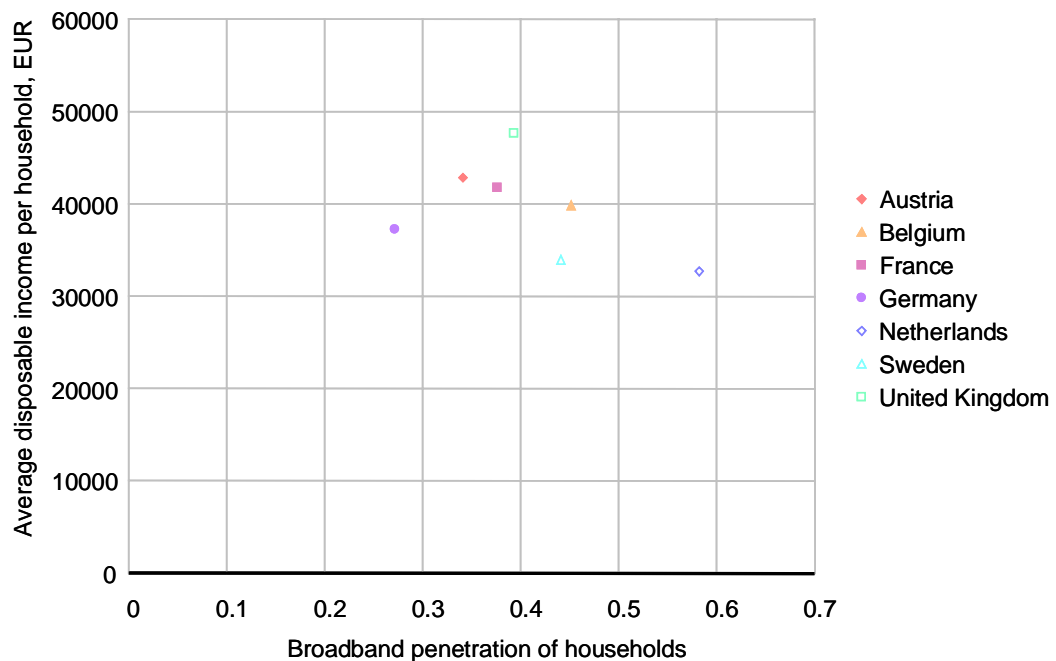


Exhibit 2.8: Plot of disposable income versus broadband penetration of Belgian households
 [Source: Analysys, Euromonitor, ECTA]

We do not have data in exactly this form for the regions of Belgium, however, Flanders (income 106% of national average) has a slightly higher level of average income than Wallonia (92%), and Wallonia higher than Brussels (85%). This is not proportional to broadband penetration, with Brussels being ahead of Wallonia. We note that it is the income of marginal subscribers that is of the most interest, and hence the level of income inequality might be an important factor.

2.1.2 Level of competition

Retail competition as a stimulator of demand

Exhibit 2.9 below measures demand in terms of broadband penetration by population and retail competition in terms of the HHI. The HHI is calculated by the sum of the squares of the market shares for all retail broadband ISPs in the country. Therefore, a low HHI implies a more competitive market.

From this exhibit, it appears that in our benchmarked countries high demand is correlated with more vigorous competition in the retail market for broadband Internet and triple-play services. While this may partly be because larger markets can sustain more competitors (demand creates competition), it is also entirely possible that the existence of many players all advertising and making sales promotions grows the market as a whole (competition creates demand).

In calculating the HHI we have aggregated and treated as a single provider the cable networks, because they do not compete with each other as they do not overlap.³ At best, these different cable networks form a weak indirect constraint on each other's pricing, because consumers may see advertising for alternative providers, or in the event that Belgacom may change its prices nationally in response to the cable operator in a particular area with high demand (e.g. Telenet). Accordingly, for the purposes of calculating the HHI in different countries, we treat 'cable' as a single competitor.

³

Strictly speaking, they do not overlap with their own access networks; they may, in some countries, have off-net offers which use DSL bitstream services, a complication which we are ignoring here.

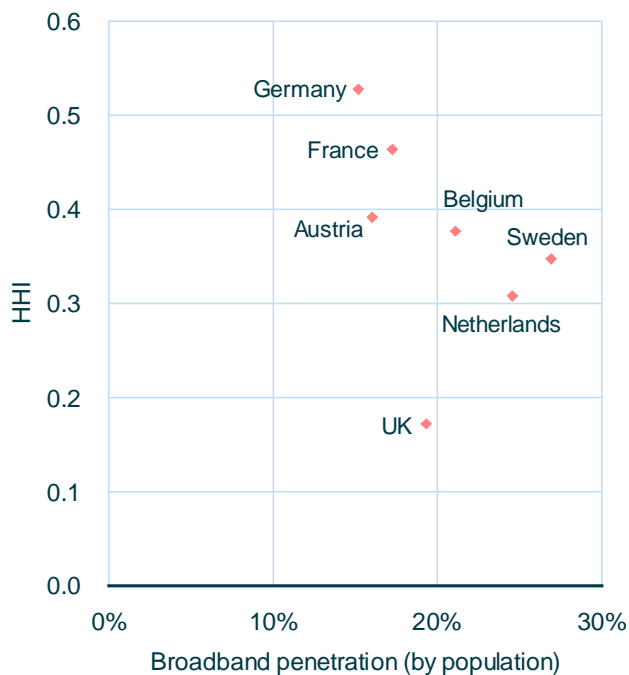


Exhibit 2.9:
*HHI versus
 broadband
 penetration by
 population [Source:
 Analysys, 2006]*

Exhibit 2.9 demonstrates some correlation between a more competitive market and a higher broadband penetration, with the exception of the UK, which is anomalous. In fact, Belgium’s broadband penetration is most similar to that of the UK, but its HHI indicates it to be significantly less competitive. While this may be partly explained by the fact that the larger UK market can sustain more competitors, it suggests that there are other factors at work in the UK.

In comparison with countries with similar (fairly high) broadband penetration, Belgium has a broadly similar level of market concentration. Concentration alone is therefore not a reason for differences in prices.

2.1.3 Conclusions about demand levels

Demand levels affect costs of supply. While Belgian levels of demand are not as high as some other countries in the benchmark group, they are comparable to others and higher than those in France (where prices are significantly lower). The impact of demand level on unit costs is significant: a 10% increase in demand density (comparable to the difference between Belgium and France) results in less than a 3% decrease in unit costs.

Given that current levels of demand are similar to other countries, some of which currently have lower prices, it is hard to argue that the price levels have strongly reduced demand (at least in the past). Those who would wish to make such arguments would have to argue that with lower prices Belgian demand would be even higher (e.g. as a result of having had good and reasonably priced broadband services earlier than other countries). It is certainly possible, however, that the higher prices currently seen are reducing growth in demand, as in growing markets such as broadband new subscribers will tend to be those whose willingness to pay is lower.

Demand for broadband in Belgium is strong, and can perhaps be understood as falling somewhere in between demand in France and the Netherlands. Perhaps the low prices currently prevailing in France will mean that, in the future, French broadband demand grows and overtakes Belgium, but this is yet to be seen.

2.2 Churn

Over a particular period of time, the subscriber base of an operator will alter as subscribers connect and disconnect. This process is called 'churn'. Customer churn creates additional costs for operators (costs of sale, installation, modem, provisioning or migration fees, etc.). The rate of churn is defined as a ratio of the total disconnections in a period (usually monthly, quarterly, or annual) to the size of the subscriber base (which can be taken to be several different quantities, but is usually taken to be the average number of subscribers across the period).

Exhibit 2.10 below displays values of broadband churn rate for a variety of operators in several countries, collated from sources in the public domain. Data is shown for a single year for all cases (primarily 2005) where possible. In the absence of broadband churn figures for operators, overall annual churn is specified if available.

<i>Country</i>	<i>Operator</i>	<i>Year</i>	<i>Annual churn rate (%) (broadband, unless noted)</i>
Austria	Telekom Austria	2004	14%
Belgium	Telenet	2005	8%
Denmark	TDC	2005	11%
France	Telecom Italia France	2005	Approx 30% ⁴
Germany	Hansenet	2005	29.0%
Sweden	B2 Bredband	2005	17% (overall)
Sweden	Com Hem AB	2005	18% (overall)
UK	Telewest	2005	18.0%
UK	NTL	2005	15.4%
UK	BT	2006	30%

Exhibit 2.10: *Values of annual broadband churn for a selection of operators [Source: operator financial reports, broker reports, press releases]*

As can be seen above, the values of churn vary widely; clustered around the 20% mark. Churn is low for Telenet in Belgium.

The reasons for churn are many and varied, but in the case of broadband are typically either changing supplier or moving house. Low churn could be indicative of high customer satisfaction or of the existence of barriers to switching such as the difficulty of switching supplier (e.g. making installation appointments with engineers, loss of service for several days, change of email address, etc).

An increase in the churn rate from 15% to 25% increases the total monthly costs per subscriber by approximately 10%.

This would appear to indicate that churn-related costs might be a material cause of cost differences between countries. To the extent that they are important, they appear to reduce the costs of Telenet compared to peers in other countries: churn data for other Belgian operators is not in the public domain. Low churn reduces the costs of existing market players. However, low churn is often not good for the business case for new entrants in markets that are not growing quickly, because churners are good potential customers for the new entrant.

⁴ The annual broadband churn for Telecom Italia France is higher than the others, but is hard to calculate due to the acquisition of the ISP LibertySurf during 2005.

2.3 Costs of or terms of access to regulated products

These costs might be higher in some countries due to differences in regulation (e.g. retail-minus or cost-plus) or due to real differences in the cost of production such as geography or planning regulations (buried infrastructure costs more than overhead).

LLU price per loop

One potential factor is the price of LLU line rental. Exhibit 2.11 clearly shows the very low take-up of LLU in Belgium compared to the other countries in the study (other than the UK).

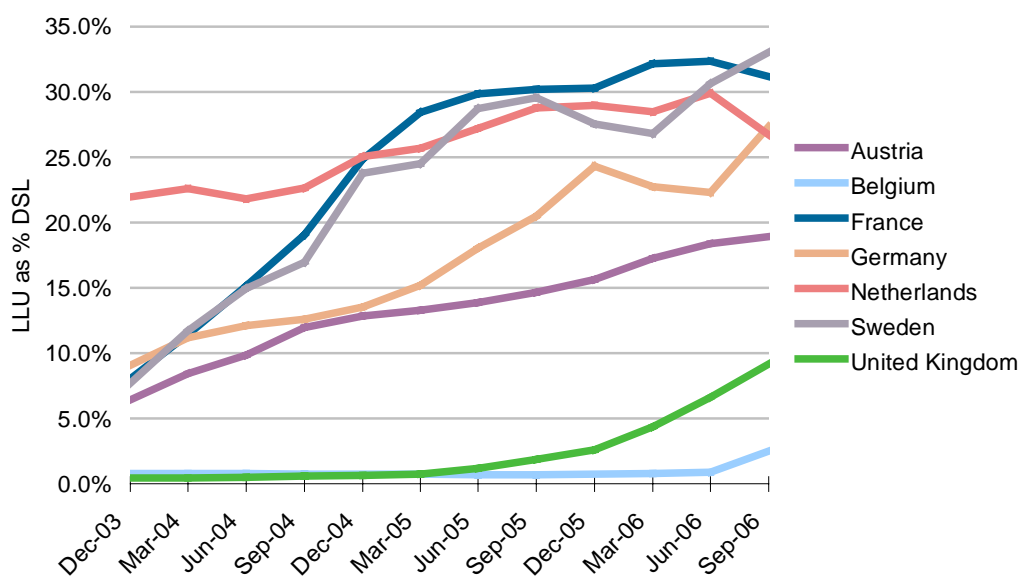


Exhibit 2.11: LLU penetration of xDSL broadband [Source: Analysys Research, 2006]

Exhibit 2.12 and Exhibit 2.13 below show that Belgium has the lowest shared access LLU prices and the highest full access LLU prices.

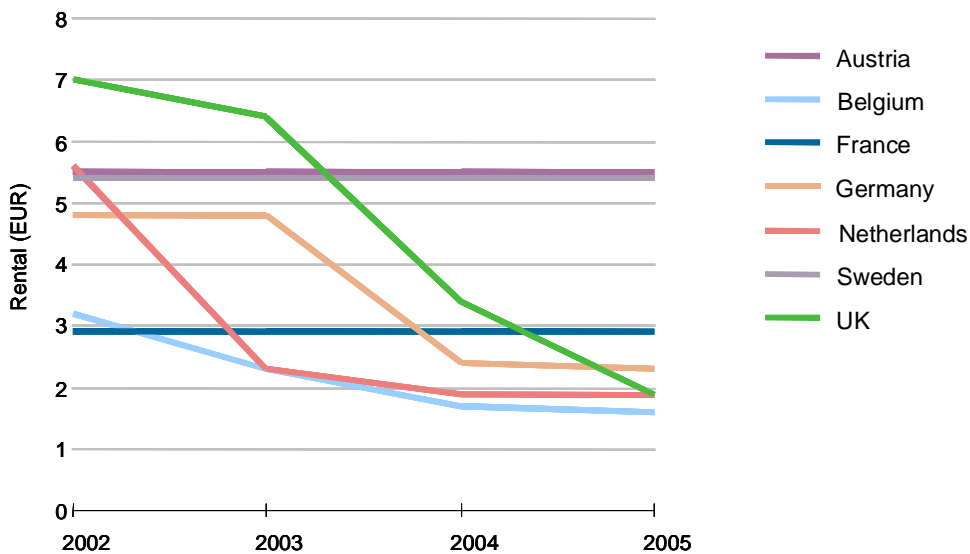


Exhibit 2.12: Monthly rental for LLU shared access [Source: European Commission, 2006]

The price of shared LLU is important in enabling infrastructure-based competitors to offer cheap broadband services, at least until they wish to offer double- and triple-play services. They affect costs directly. A EUR1 per-month per-loop fall in the price for shared loops will translate directly into a unit cost reduction of EUR1 per month per subscriber

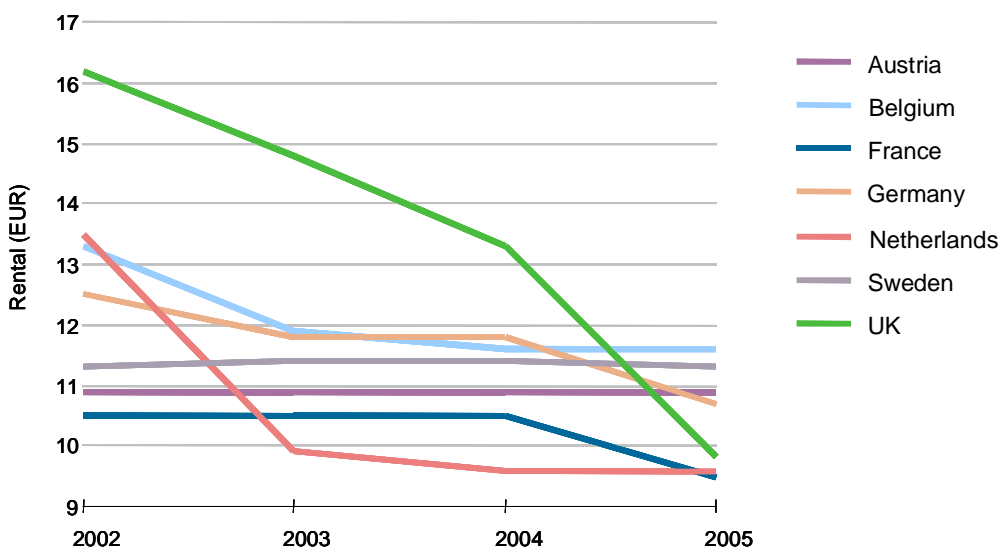


Exhibit 2.13: Monthly rental for LLU full access [Source: European Commission, 2006]

Full loops enable the unbundler to replace the end user’s telephone line contract with the incumbent; the end user no longer has to pay the incumbent for a ‘line rental’. It is therefore important for triple-play services in particular (and also for mobile operators seeking to replace fixed telephony with mobile and broadband). A large fraction of the unbundled loops in Belgium are fully unbundled loops.

More expensive full loops lead to higher costs for triple play for DSL-based players (they do not affect the cost base of the cable operators). A EUR2 per month difference in the cost of full access loops would translate directly into a EUR2 per month increase in cost per subscriber (we are talking about unit costs: whether prices would be similarly affected is the subject of Section 3 below). It is an important factor in the costs. Nevertheless, this cost difference is still much smaller than the observed triple-play retail price difference between France and Belgium.

In the draft market analysis of Markets 11 and 12 published by IBPT, it is indicated that LLU take-up started to improve in Belgium during 2005. This trend continued into early 2006, as demonstrated below using the most recently available data from ECTA.

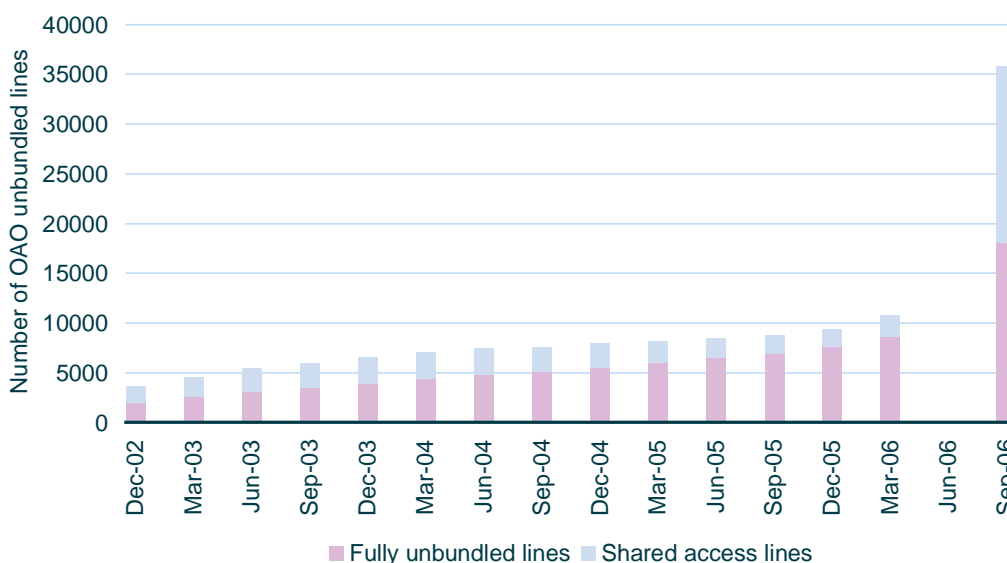


Exhibit 2.14: Evolution of unbundled lines in Belgium [Source: ECTA]

However, despite this growth, Belgium still has a low proportion of unbundled lines as a percentage of total national broadband lines (1.7%). As we will see later in this report, countries with a high proportion of LLU lines have lower prices.

Co-location and co-mingling

There are differences between the charges for co-location in Belgium and other EU countries. These prices are hard to compare due to different charging structures (e.g. fixed, variable) and are sometimes bespoke (i.e. priced on demand) and not published. We elaborate on, and compare a number of the charges in this area (including tie cabling), in Annex A. For those charges that can be successfully compared between countries, these differences amount to relatively small annualised costs per subscriber (a few EUR per annum in cost differences).

Accordingly, co-location cost differences, such as can be compared between countries, are, in our view, a minor contributor to overall cost differences between countries (less than EUR1 per month per subscriber).

Backhaul costs

Backhaul is a name given to transmission services required by local loop unbundling operators (LLUO). A link is established between the co-location space in which they install their DSLAMs and a PoP in their core network. The price for such services is regulated in Belgium. Exhibit 2.15 shows the backhaul prices for a 20km link of speed 34Mbit/s (or 100Mbit/s in the case of the UK) in the benchmarked countries. The absence of publicly available pricing in the Netherlands, since the service is not regulated and has commercially negotiated rates, has meant that it has been omitted.

<i>Country (Bandwidth (Mbit/s))</i>	<i>Annual price (EUR)</i>	Exhibit 2.15: Annual price (with installation costs annualised over three years) of a 20km long 34Mbit/s backhaul link [Source: incumbent offers, Tarifica]
France (34)	22 000	
UK (100)	27 000	
Germany (34)	37 000	
Sweden (34)	40 000	
Austria (34)	43 000	
Belgium (34)	47 000	

As can be seen in Exhibit 2.15 above, the price of such a service is relatively high in Belgium. Backhaul costs make up a substantial part of the costs of an LLUO. We estimate that a 30% increase in the price of backhaul would result in approximately a 10% increase

in costs per subscriber. Accordingly, the markedly higher prices in Belgium will have a significant effect in increasing unit costs compared to France (we estimate up to a 20% increase in unit cost, although in practice Belgian operators may use higher contention ratios to save money, or use other network suppliers). These are the incumbent's prices: where competitive networks exist, or where operators have their own networks, they can make significant savings. Anecdotal evidence from Belgian operators indicates that they use Belgacom's backhaul products in approximately 50% of their unbundled exchanges.

If an operator wishes to offer higher peak speeds to users (e.g. up to 20Mbit/s via ADSL2+), then it is a separate decision whether they wish to increase the capacity of the backhaul. They could increase the contention ratio as an alternative: 200 customers with 20Mbit/s peak speed at a contention ratio of 100:1 requires 40Mbit/s of backhaul; 200 customers with 8Mbit/s at a contention ratio of 40:1 requires the same 40Mbit/s of backhaul. There is little public data on this key parameter, but there is some anecdotal evidence that early deployments of high peak speeds did increase the contention ratio in this way to limit the additional backhaul costs of these peak speeds (e.g. Yahoo!BB in Japan). Over time, bandwidth demand will increase, and contention ratios will fall, increasing the importance of the backhaul costs.

Bitstream (wholesale broadband access) costs

Bitstream services (also called wholesale broadband access services) are wholesale DSL services which are sold by the incumbent to alternative operators and ISPs. Bitstream costs are extremely difficult to benchmark between countries in a fair and representative way, due to the different and complex pricing structures adopted in each country, and the different geographies and networks in which they are deployed. Analysys has previously analysed these in a number of countries, although this analysis did not include Belgium and is therefore not useful in this context. We are aware that the European Regulators Group is currently studying this matter, under the leadership of the French regulatory authority ARCEP.

As is discussed at length elsewhere in this document, countries with substantial LLU deployment have lower retail prices than countries that do not. As a corollary, it can be argued that it is the use of bitstream that leads to high prices.

Bitstream is important even within the context of LLU-based deployments, because it enables service providers to offer a rural service that complements LLU-based deployments in urban areas as well as building market share ahead of using LLU.

Similarly, as discussed elsewhere, television services are not economic over bitstream links today. Therefore, even if bitstream were to be made cheaper in Belgium, we do not believe this would have a transformative impact on the pricing of triple-play services.

We note that IBPT has recently modified the price of Belgacom's wholesale broadband offer, leading to a general reduction in prices. The two key features in the pricing structure that have changed are:

- incremental monthly rental for providing ADSL access (in addition to either a shared pair or a full pair), which has been reduced from EUR6.54 to EUR4.95 per end-user line
- pricing of ATM transport, which has been simplified so that only two formulae are used. One is for the cost of transport at a local level and the other is for non-local level. Prior to 2007, there were several formulae for each of these two cases, depending on the aggregated capacity. The general effect of this simplification is a cost reduction, particularly at the local level.

A decrease in the bitstream price makes LLU less preferable compared with bitstream. This means that this recent IBPT decision may reinforce the observed tendency in Belgium to favour bitstream at the expense of LLU, hence making triple-play unattractive.

For other factors discussed in this document (e.g. demand, geodemographics, cost of capital), we have considered their impact on unit costs of an LLU-based player. Bitstream prices, on the other hand, directly affect the costs of a bitstream-based operator but are not directly relevant to this unit-cost comparison.

However, the factors identified do also affect the costs for Belgacom to offer a bitstream service, allowing for the greater scale of Belgacom in making its bitstream offer. Therefore, to this extent, the costs identified for Belgium do not need to take bitstream prices into account in addition to these factors. However, if Belgacom's price for bitstream is not cost-oriented, any additional margin for Belgacom would then represent an additional cost for those using bitstream rather than LLU.

2.3.1 Impact of the regulator

Regulated costs make up a significant fraction of the total cost base of a broadband provider. We estimate this fraction to be approximately 30–40% for a DSL LLU operator using shared loops. For a full LLU operator, this fraction would represent a higher fraction, perhaps 55–65%. Accordingly, even if the regulated prices were to be substantially changed, this would not necessarily lead to equally dramatic falls in the cost base as a whole.

While regulated costs are only a fraction of the total cost base, at least some of these costs can be changed (in that they are affected by choices made by the regulator). Other costs are not subject to any kind of policy level intervention in this way, as they are the result of free market operation (e.g. equipment prices), geography, etc.

Accordingly, the regulators (in Belgium, IBPT and the regional media regulators) and their actions can have a material effect on the market. The most obvious differences between the approach of IBPT and regulators in other countries are:

- the divided responsibility between IBPT and the regional media regulators as regards the markets for LLU and bitstream (Markets 11 and 12 according to EU terminology) – the markets of concern in this study
- the delay in performing market analyses and in implementing decisions under the new EU regulatory framework, in particular for Markets 11 and 12,⁵ which may be related to the division of responsibility noted above, as well as the small size of IBPT's staff working on telecoms competition issues, relative to other regulators (e.g. according to the ECTA 2006 survey, 20 in Belgium (10.5 million population) compared to 54 in Austria (8.5 million population) and 85 in the Netherlands (16 million population))
- some regulators in other countries (e.g. ARCEP in France) are seen to have taken a more vigorous or proactive policy stance than others in encouraging alternative providers of broadband and triple play.

5 IBPT's analysis for Markets 11 and 12 has been prepared (the draft decision has been published on IBPT's Web site, www.ibpt.be). The sector consultation has taken place, and the Competition Council has rendered its advice. The decision cannot, however, be notified to the European Commission until a political agreement between the federal state and the communities is ratified and implemented in relation to organising co-operation on shared competencies.

2.4 Other costs for unregulated products

While there are many other inputs required by broadband and triple-play providers, there are few factors that would strongly increase costs for these products in Belgium as opposed to other countries in the Euro zone.

Items that we have explicitly identified include:

- cost of international bandwidth to the Internet ('IP Transit')
- costs to offer service in two languages.

IP transit

Telegeography data indicates that the average price of IP Transit in Belgium is very similar to that in other major EU cities (at around USD40/Mbit/s per month for STM-1). Therefore, the cost of international bandwidth does not create significant cost differences.

Costs to offer service in multiple languages

Potentially, there are slightly higher costs involved in servicing a country in which multiple languages are spoken: multiple sets of marketing, sales and support infrastructure.

In our estimate, a substantial increase in customer support costs (e.g. of the order of 30%) would have an impact of less than EUR1/month per subscriber on the underlying costs of the service provider.

2.5 Geo-demographics

Geo-demographics might make it hard to serve rural customers, or change costs to serve the entire population (e.g. France is, on average, more rural than the Netherlands).

The impact of rurality is that it decreases the number of customers per served exchange (or fibre node in a cable network), and increases the length of the 'backhaul' network linking the core network to the connected exchanges (with a lower number of customers sharing

each of these links). The resulting increased unit costs in rural areas can be sufficient to make rural areas uneconomic.

Belgium has the lowest rural population of the countries in the study (2.7% of the total population, although there are strong regional differences between Flanders and Wallonia), with the UK being the next lowest at 10.7%. If Belgium is less rural, then it ought to have lower costs than countries that are more rural. However, the effect will depend on the area served. Although the incumbent telecoms operator – and possibly the cable companies – will cover a large proportion of the country, a new entrant might choose only to serve areas of greatest density (e.g. the densest areas, when ordered, that contain 60% of the population).

If the economics of DSL are studied more closely, then the most critical point is the average number of lines per main distribution frame ('exchange' in everyday language, although increasingly DSLAMs are deployed from locations closer to the end user). If the MDFs serve few lines, then they will be uneconomic to serve with LLU. Taking the average lines across all MDFs as a proxy is insufficient, since new entrants will 'cherry-pick' the best exchanges, with higher-than-average lines per exchange, so costs will be under-estimated (since the most significant costs come from going to an additional exchange).

Exhibit 2.16 below estimates the national lines per unbundled MDF in each country. This has been calculated using public data where available. Otherwise, estimates have been made using the population coverage of LLUOs, calculated by Analysys Research, as a proxy for line coverage.

<i>Country</i>	<i>MDFs</i>	<i>Unbundled MDFs (June 2006)</i>	<i>Estimated lines reached by unbundled MDFs</i>	<i>Estimated lines reached per unbundled MDF</i>
Sweden	7000	2047	2 726 000	1300
Belgium	950	188	695 800	3700
Germany	7900	2700	11 628 000	4300
Netherlands	1367	530	2 950 000	5600
Austria	1486	231	1 440 000	6200
UK	5600	510	8 280 000	16 200
France	12 496	1155	19 276 000	16 700

Exhibit 2.16: *Total lines per unbundled MDF, as of March 2006 [Sources: Analysys, ECTA, incumbent Web sites]*

As can be seen above in Exhibit 2.16, we estimate that Belgium has a low ratio of lines per unbundled MDF. Only Sweden has a smaller ratio, but this is to be expected given the large number of exchanges necessary in Sweden to reach the thinly spread population. Belgium's low ratio implies that an LLUO has a smaller number of potential customers for each exchange that it unbundles.

In order to make an order of magnitude estimate of the importance of the number of lines per MDF in Belgium, we have considered the impact of increasing the served broadband lines per exchange by 100% and 200%, reducing the number of exchanges served at a constant base of subscribers. This reduces the annualised cost per subscriber by approximately 7% and 15%; the Netherlands and Austria are therefore likely to have lower unit costs by less than 5% and France, and the UK lower unit costs than Belgium by around 15%.

If our estimates are correct, which is particularly uncertain as public data on this parameter is not available, this factor may have significant weight in increasing average unit costs in Belgium compared to the UK and France.

2.6 Cost of capital

Telecoms networks require capital investments to provide broadband services; countries in which the cost of capital is higher will face higher costs. Regulators set this cost of capital for incumbent operators; new entrants probably face higher costs than incumbents due to their higher risk profile (less history, less revenue).

Country	Incumbent carrier	Regulated WACC for LLU (%)
Austria	Telekom Austria	9.34
Belgium	Belgacom	12.88
France	France Telecom	10.40
Germany	Deutsche Telekom	8.00
Netherlands	KPN	10.70
Sweden	Telia Sonera	15.00
UK	BT	10.00*

*Access network

Exhibit 2.17: *Regulated cost of capital used for LLU calculations [Source: Europe Economics 2004, Ofcom 2005]*

The WACC of incumbents also affects the price of regulated inputs for alternative operators such as fully unbundled loops.

We estimate cost of capital to account for approximately 15% of the costs to serve a DSL customer when using shared loop unbundling. This will result in Belgian costs being approximately 3% higher than those in France and the Netherlands⁶ and, accordingly, this factor has low weight in explaining cost differences for shared loop unbundling.

Given that cost of capital represents an estimated 50% of the cost of a local loop, cost of capital represents a higher percentage of the costs (perhaps 35% of the costs) when using full loop unbundling, but we have already ascribed a weight in explaining cost differences for the price of fully unbundled loops in our previous discussion in Section 2.3 above.

2.7 Lack of access or high price of access to important content

To be a player in the TV distribution market means developing an offer that is at least equivalent to the existing offering from the main source of TV, specifically cable in Belgium.

If we compare France and Belgium we find significant differences:

- In France, operators were able to strike deals to get access to the free-to-air terrestrial content (and indeed to the premium content from the satellite providers). In Belgium, we believe that only Belgacom has paid the terrestrial broadcasters to have access. We have already noted that bitstream is currently not an economic way to offer TV over DSL, and that the total number of unbundled lines in Belgium is as yet low. Accordingly, the LLU subscriber base will need to be grown rapidly before any access to content which costs any significant amount of money to obtain would be economic.
- In France, where there are still many analogue terrestrial broadcast customers, triple-play LLU operators such as Free and Neuf were in a position to offer services that were better (e.g. offering more channels) than those over terrestrial means.

The impact on costs of this factor is unknown because the cost is not in the public domain.

⁶

Note that shared LLU prices are not directly related to cost of capital as the local loop cost is allocated between shared access and the PSTN line (which bears the vast majority of the costs of the loop in many countries).

2.8 Alternative technologies to DSL

A significant amount of the discussion in this document refers to the costs to use DSL, the main technology used by competing broadband Internet service providers in Europe.

There are alternative 'last mile' technologies including broadband fixed wireless access (FWA) (such as WiMAX or pre-WiMAX). In Western Europe as a whole, FWA is a small fraction of the broadband market (approximately 100 000 connections out of 71 million, according to Analysys Research).

The economics of deploying FWA are similar to those of a mobile telephony network: a large number of base stations is required, each of which is costly to deploy (costing approximately the same as deploying a DSLAM in an MDF site), and there is customer premises equipment (CPE; a capable and expensive radio). In practice, the CPE is a significant cost (several hundred Euro) and this is a significant disadvantage when FWA is competing directly with low-cost DSL and cable modem offers (DSL and cable modem CPE are much cheaper, only tens of Euros, as a result of their very significant installed base). Amortising this extra CPE cost over the customer lifetime could result in increased costs of approximately EUR5 per month. Set against this, FWA does not have to rent the local loop, although it does have to pay for the radio spectrum it uses.

The capacity of each 'cell' in a FWA network is limited by the amount of spectrum and the efficiency with which this spectrum is used. This capacity is such that high peak speeds can be offered (e.g. 4Mbit/s upstream and downstream), but the total throughput is finite and therefore the contention required is necessarily high. We do not believe that a triple-play offer including streaming video (television) can therefore be delivered to the mass market over an FWA network at this point in time. This is in contrast to a DSL network where the contention offered is currently high but which could relatively easily be upgraded to offer television (i.e. to have a low contention ratio) simply by increasing the speed of the backhaul link. Cable operators also have the ability to increase their capacity at low marginal cost, and do not need to offer television through the cable modem system (they already have a television offer directly).

FWA is therefore, in our view, capable of competing today in countries where the DSL prices are high and where triple play is not essential (Belgium, Ireland), but will find it

much more difficult in countries with much lower prices or where triple play is needed (e.g. France). Investors looking at investing in such a network would be deterred by the knowledge that they will have difficulty in matching the cost base or the service offering of an aggressive DSL or cable modem player. Because of these factors, an FWA player will not, in our view, use highly aggressive pricing (i.e. they will not start a ‘price war’).

Cable modem

Cable operators offer services on their own networks using cable modem; they do not offer the equivalent of a bitstream product to competitors.

In our view, the ongoing consolidation in the cable networks in Belgium will greatly affect neither the cost of providing broadband services on those networks (because either the economies of scale are not strong, or the total contribution to unit costs are not large, in the parts of the network that can now be combined) nor the level of competition in the market.

2.9 Factors which directly affect prices – VAT

In contrast to factors that affect costs, VAT directly influences retail prices. The differences in the VAT rates in the benchmarked countries are not very large.

The following table gives the VAT rates in each of the benchmarked countries as at December 2006.

<i>Country</i>	<i>VAT rate</i>
Austria	20%
Belgium	21%
France	19.6%
Germany	16%
Netherlands	17.5%
Sweden	25%
UK	17.5%

Exhibit 2.18: VAT rates in the benchmarked countries [Analysys Consulting, 2006]

Belgium’s VAT rate is 5% above Germany’s and 4% below Sweden’s. Therefore, this is potentially a factor that might influence prices by approximately 5%.

In this study, Austria has the highest prices and a VAT rate of 20%. France, Sweden and the Netherlands (VAT rates 19.6%, 25% and 17.5% respectively) have consistently the lowest prices. Belgium has a VAT rate of 21%. Germany, with the lowest VAT rate of 16%, is middle ranking in price.

The lack of correlation between VAT rate and price implies that factors other than this are determining most of the price difference.

We conclude that this factor (VAT rates) is of moderate weight in prices in Belgium, affecting prices by approximately plus or minus 4%.

2.10 Summary

The different costs to offer broadband Internet and triple-play services in different countries are, in our view, only a minor factor in explaining the price differences between Belgium and other countries.

<i>Factor</i>	<i>Estimated impact on Belgian unit costs</i>	
	<i>Relative to typical EU country</i>	<i>Relative to France</i>
Demand	-2%	-<3%
Churn	<-10% (very uncertain)	<-10% (very uncertain)
Full loop prices	+5%	+10%
Co-location costs	0<+5%	0<+5%
Backhaul price	+0-5%	<+10% (depends on contention ratio)
Higher customer support costs	0<+3%	0<+3%
Geo-demographics / lines per MDF	+5% (very uncertain)	+15% (very uncertain)
WACC	+3%	+3%
Access to content	Unknown	Unknown
VAT	+ - 4%	+2%
Total	Could be +15%	Could be +20%

Exhibit 2.19: *Summary of impact of factors on unit costs relative to the benchmarked countries*
[Source: Analysys]

The uncertainties in many of these quantities make creating a total or ‘aggregate value’ fraught with difficulty. Nevertheless, it is fair to say that, on balance, we find that costs in Belgium are likely to be somewhat higher than in the benchmarked countries, and that the low price of fully unbundled loops, superior density (in selected areas) and low backhaul costs in France may result in a material difference in unit costs compared to the urban areas served by players using LLU in France in particular.

The greatest objective cost differences between Belgium and other countries arise, in our view:

- from the price of fully unbundled loops (as opposed to shared unbundled loops where the Belgian price is low). We note that IBPT is currently finalising a model to set prices for loops, so this may change in the near future. It is not known whether the prices will be higher or lower, however, we note that prices in Belgium are already higher than other benchmarked countries
- (possibly) from differences in churn rates (although we know this factor can be significant, we do not have good data on churn rates from all operators)
- (possibly) from differences in lines per exchange (similarly, this is uncertain)
- (possibly) from differences in backhaul network prices (this depends on contention ratios and the extent to which operators can use alternative network providers).

Of these cost differences, the ones most susceptible to regulatory intervention are the wholesale price of fully unbundled loops and the wholesale price of backhaul.

3 Whether retail prices are related to costs

3.1 Telecoms service pricing

3.1.1 General factors

Telecoms service pricing takes account of many effects:

- Certain forms of price discrimination are widespread, for example businesses are charged different tariffs than households, and different services on the same network are charged at different prices.
- Early service prices are commonly set high for various reasons:
 - to test levels of demand: it is efficient to obtain a premium from the early adopters (in effect, a form of price discrimination)
 - to limit or manage levels of demand (e.g. to allow the operator to build, test and maintain efficient processes of installation for the later adopters in the mass market)
 - unit costs are higher in the early years.
- The costs may be higher than the price charged, but this ‘forward pricing’ can be efficient if customers tend to stay for a long period (in effect, the price is set at levels to generate demand in the future at a level at which a profit can be made).

Several of these factors can be seen in broadband and triple-play pricing.

3.1.2 Costs to provide broadband access services

The economics of being an infrastructure-based DSL operator (such as one using LLU) are such that the costs are in effect substantially independent of peak Internet downstream and upstream speed, up to a certain speed which is the limiting speed of the modem technology. The current limiting speed of ADSL2+ is approximately 28Mbit/s.⁷ Thus, a new entrant using LLU can afford to offer peak speeds of 20Mbit/s with a price similar to that of a 512kbit/s offer. This is because up to this limiting speed, peak upstream or downstream speed has no effect on the costs of the local loop, the DSLAM, modems, the co-location space, customer service, sales and administrative costs (i.e. a large fraction of the total costs).

Peak speed *does* have a weak impact on the costs that arise from the total traffic generated, for which the operator has to provision capacity (in the backhaul, core network and Internet). However, operators typically under-provision (or ‘overbook’) capacity by a factor of up to 50:1 (the ‘contention ratio’), and can use even higher contention ratios for customers with high peak speeds, as their perceived level of service will not suffer as much as that of customers with lower peak speeds. In addition, if the traffic is on a network owned by the operator (e.g. a fibre link), the incremental costs of additional traffic can be low. Both these effects mean that the impact on costs of offering higher peak speeds can be very low.

Cable-modem systems, though using a very different technology, have similar economics: peak speeds can be high without greatly increasing the costs.

Prices for higher speeds are set higher than for lower speeds (and by more than the cost differential) for a number of reasons:

- As a profit-maximising strategy based on price discrimination, seeking to get higher revenues from certain customers who need specific features. (This is comparable to the charging structures of airlines, which attempt to charge business people more for in effect the same service; or railways, which charge more at certain times of day). This strategy is

⁷

To offer higher speeds, there are options available such as VDSL, using sub-loop unbundling. However, this requires the operator to install electronics in the street cabinets, of which there are many more (over 26 000 in Belgium) than MDFs (950 in Belgium), and each of which serves many fewer potential customers.

only sustainable in the long run if the competing operators have a similar price structure, or if there are additional features to the offer (e.g. bundled items, brand, convenience).

- In order to defend profits made in other service markets (e.g. leased lines and ATM). This is not a concern for new entrants, which do not have these revenues to defend.

3.2 Extent to which low costs will be reflected in low prices

3.2.1 General

Much of the discussion in this study has related to the level of costs that will be faced by an operator offering broadband services in Belgium and the other benchmarked countries. It is the effects of competition in the marketplace that will determine whether market prices are set at, or close to, these cost levels; imperfect competition will not generate cost-oriented retail prices.

Given that our analysis above has shown that costs in Belgium are broadly comparable to those in the benchmarked countries, a substantial part of the price differences that do exist must be due to how closely prices are tracking costs. The Economic Analysis Team (EAT) unit of OPTA recently published a paper on a highly related topic.⁸ It investigates whether there can be sufficient competition in an oligopoly. EAT concludes that, other than a single player having significant market power, there are two ways in which effective competition can be threatened:

- supra-normal profits by *explicit or tacit collusion*
- *non-competitive outcomes* – these non-competitive outcomes are not the result of implicit or explicit co-operation, but are the result of a situation in which firms have a high degree of market power.

Explicit collusion is illegal under competition law. The incentives for a firm to engage in *tacit* collusion depend on a trade-off between, on the one hand, the current and future profits of sticking to a collusive agreement (tacit or otherwise) and, on the other hand, cheating on the agreement. The likelihood of tacit collusion depends on a number of market characteristics. Essential characteristics are: few firms, high entry barriers and frequent interaction. Important characteristics are: market stability and transparency,

⁸ "Is two enough?", OPTA, Economic Policy Note, no. 6, September 2006.

symmetry and no quality differences, homogeneous products, countervailing buyer power, excess capacity, and a number of other factors.⁹

Non-competitive outcomes. In the absence of tacit collusion, EAT concludes that an oligopoly can give effectively competitive outcomes if firms compete according to the pure Bertrand model, or if markets are contestable and disciplined by potential entry. Therefore, the level of competition in a tight oligopoly depends on a number of factors: whether firms compete on prices or on quantity, the level of product differentiation, switching costs, barriers to entry and contestability of the market and countervailing buyer power.

Tacit collusion

If we examine the essential factors for tacit collusion in the broadband or triple-play markets, we see that there is a mixed picture. We could argue that broadband competitors using bitstream inputs, or those substantially relying on such inputs, are potentially many and are not subject to high entry barriers. This alone might make tacit collusion unlikely, if the bitstream product is fit for purpose.

In the triple-play market, however, there are high barriers to entry as the bitstream products are not suitable to offer triple play today. If switching costs are high (which might be indicated by low churn) and products are somewhat differentiated, then the pure Bertrand model may not apply; and the high barriers to entry and low countervailing buyer power of end users all indicate that there could be some cause for concern regarding this market.

Non-competitive outcomes

The first defence in this case is to have many firms in the market. If there are few firms, then the level of competition depends on a number of factors:

- whether firms compete on prices or on quantity
- the level of product differentiation
- switching costs
- barriers to entry and the contestability of the market
- countervailing buyer power.

⁹ The EC has recently issued a 'serious doubts' letter regarding Market 12 in Malta which contains additional relevant material on this point http://forum.europa.eu.int/Public/irc/infso/ecctf/library?!=/commissionsdecisions/2007_serious_amended/_EN_1.0_&a=d.

Mass-market retail telecoms markets such as broadband and triple play do not display countervailing buyer power; also, whilst the players are partially competing on price, a pure Bertrand model may not apply due to the switching costs and level of product differentiation. Customers do not instantly change provider when another offer appears that is cheaper. Accordingly, in a situation with few active firms, low barriers to entry and contestability are critical to obtaining competitive outcomes. In the *broadband* market, the quality and price level of the bitstream offer will be crucially important to ensuring that contestability drives pricing levels towards costs. In the *triple-play* market it is unlikely that providers can enter the market and experience a low barrier to entry unless there is a video-capable bitstream offer – but no such practical offer exists in Europe today.

Given that we have already concluded that, in comparison with countries with similar (fairly high) broadband penetration, Belgium has a broadly similar level of market concentration, it is not easy to argue that these effects are unique to Belgium. Nevertheless, the as yet rather underdeveloped state of LLU might be a significant factor in the state of competition in the Belgian broadband market.

3.2.2 Barriers to exit

As noted in the introduction, it is possible that some operators might be pricing below long-run costs if there was too much competition but they had spare capacity and faced barriers to exit. This is not, in our view, a factor currently affecting Belgian prices, but it might conceivably be affecting operators in other benchmarked countries (and this effect might in turn make Belgian prices seem expensive). However, we do not believe that this is the case in the broadband market, given that operators with low prices such as Free (in France) in effect entered the market at that price level. (It does, though, remain a valid question whether they can make money at this price level.) Accordingly, we do not believe that this is a factor at all in the price differences between Belgium and other countries.

3.3 Competitiveness of existing players

3.3.1 Ability to gain market share

If the incumbent telecoms operator or cable TV operator has a strong brand and customer loyalty, then better execution by (new) competitors will be hard to achieve. Similarly,

customers who are inertial and resist changing supplier will make it difficult for a new entrant to gain market share. In Belgium, the high cable coverage, and the long-standing customer relationships of the cable companies with households for analogue television, mean that broadband and triple-play new entrants would be facing, in effect, *two* incumbents, both of which are benefiting substantially from customer loyalty. This might be one reason why the alternative operators in Belgium are finding it so difficult to grow their market share (see Exhibit 3.1), even when they are offering a significant price discount relative to Belgacom. The situation in the Netherlands appears to be similar, as shown in the exhibit below. The low churn experienced by Telenet, as noted in Section 2, whilst not conclusive, is also potentially indicative of the difficulty in gaining market share.

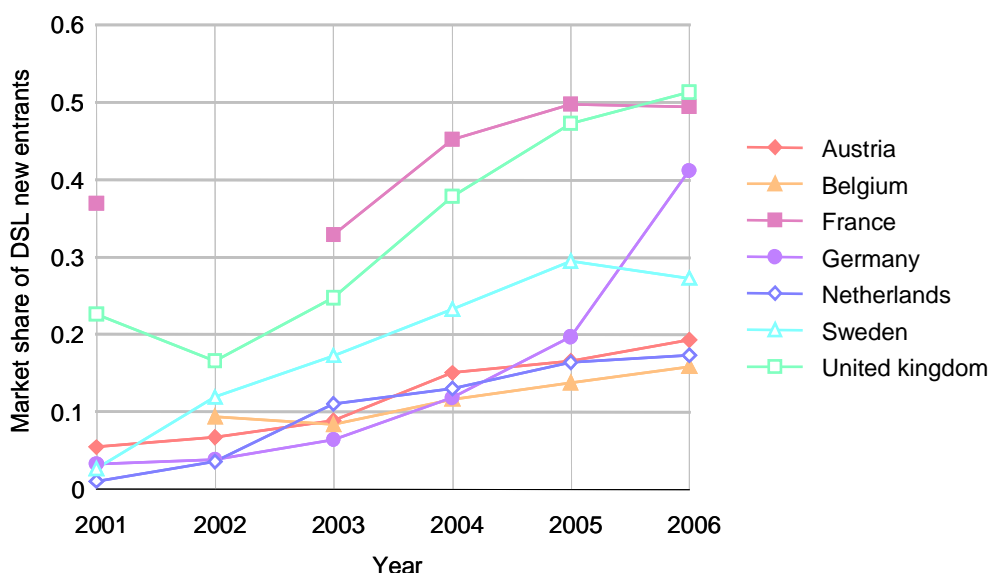


Exhibit 3.1: Non-incumbent DSL broadband market share [Source: ECTA]

Given that subscriber acquisition is expensive, and forward pricing is also expensive, an operator that was less confident in its ability to win market share rapidly would be forced to price more conservatively and manage its subscriber growth carefully so as to control expenditure in the early years and not precipitate a cashflow problem.

3.3.2 Wholesale products might limit the level of innovation

We have already noted that in countries where LLU has been successful, retail prices are low, especially for higher-speed broadband products. Bitstream has been successful in building the retail market in many countries, but has not had dramatic effects on the price or speed compared to LLU (or indeed cable competition, which had a significant effect on the speed offered in Belgium).

LLU

As well as the cost issues discussed in Section 2, it is unfortunately common for LLU operators to complain about non-cost items such as service quality, delays in provisioning, and other issues where the service they obtain is allegedly inferior to the incumbent's own customers. These issues can be addressed by the regulator. A variety of approaches has been used, ranging from an independent adjudicator or 'Tsar' (representing a rapidly responding and highly focussed regulatory involvement in day-to-day detail) to quite intrusive functional separation remedies such as the BT Openreach settlement.

Bitstream

Aside from peak speed and price, which we believe to be the most important features of a broadband offer, there are also additional parameters that service providers may wish to control. Actual provisioned *capacity* (i.e. the extent of overbooking or contention) is one of these. Whilst this factor may sound overly technical, it fundamentally affects the ability of the operator to offer different types of service such as:

- triple play incorporating streaming video (television)
- high-quality voice over IP at the same time as broadband Internet services
- corporate VPNs with control of quality of service
- leased-line substitutes.

The first two of these are critical for residential triple-play offerings. The bitstream offer of Belgacom is an ATM-based offer, and those operators using this offer can configure it so as to offer VoIP, VPNs and leased-line substitutes, but it is not currently economical to use this offer to create retail streaming video (television). There are, as far as we know, no

triple-play service offerings based solely on TV over IP delivered over a bitstream service in any European country, let alone the benchmarked countries. In many countries the bitstream service is not capable of supporting triple play (either technically, or economically from the point of view of the bitstream-taker). In others there are (in theory) bitstream offerings that might be able to support triple play, though none of these has yet been used by an alternative network operator to launch commercial services.

If service providers want to offer triple play, then they need their own infrastructure, LLU, or a highly configurable bitstream service that offers similar economics to LLU (e.g. low charges even for high peak speeds). There is potentially a regulatory argument to be made that if Belgacom is selling a retail service (TV over DSL) that is not replicable by other parties (due to the high barrier to entry, unless they have an access network), its network arm is making undue discrimination (in effect selling a particular wholesale product only to themselves).

In addition to these qualitative differences (whether triple play can or cannot be offered), the correlation between countries with strong LLU and low prices for high speeds is striking, as shown in Exhibit 3.2.

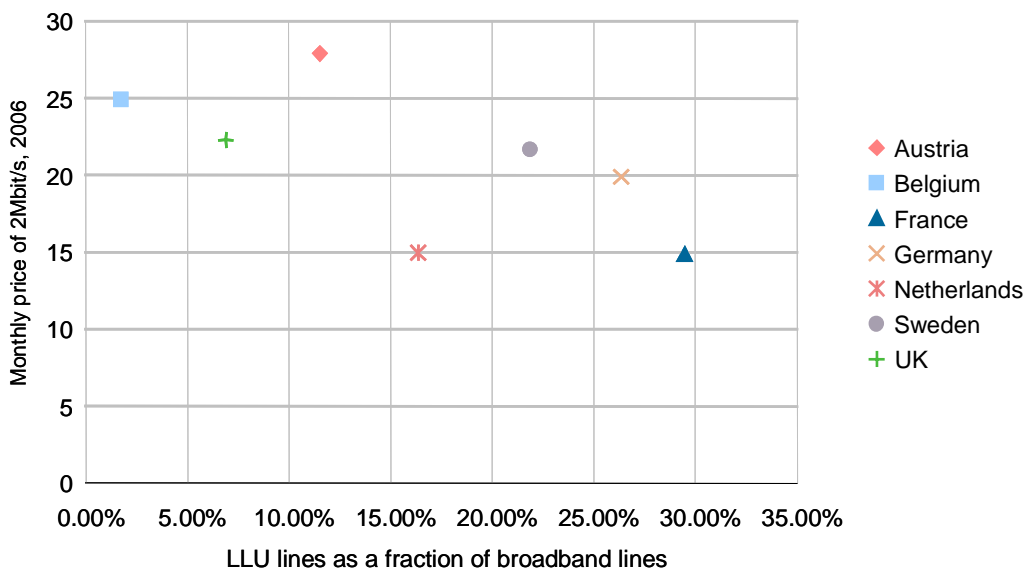


Exhibit 3.2: *Lowest price for 2Mbit/s versus LLU as a fraction of broadband connections*
 [Source: Analysys, ECTA]

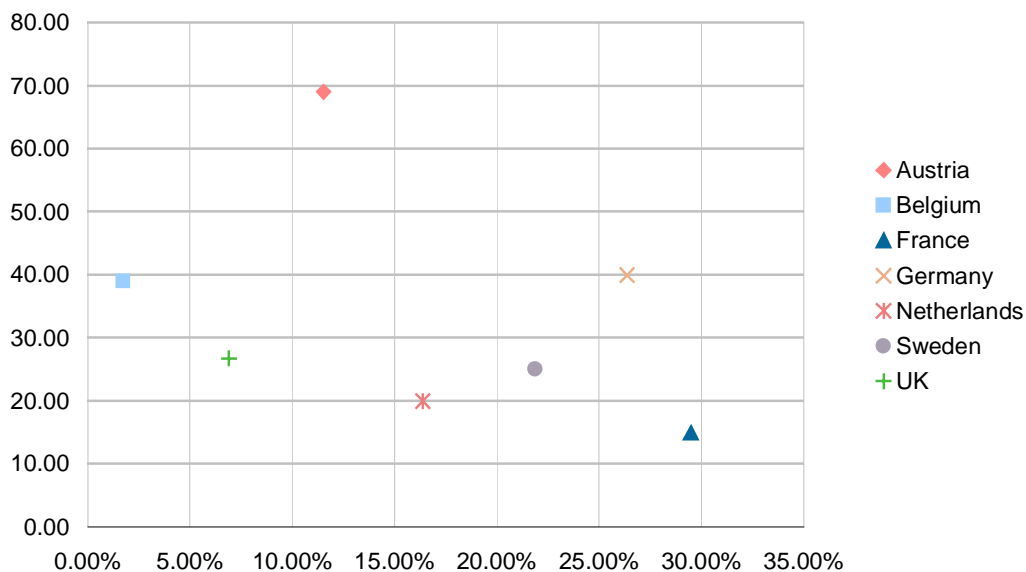


Exhibit 3.3: *Lowest price for 8Mbit/s versus LLU as a fraction of broadband connections*
 [Source: Analysys, ECTA]

3.3.3 Summary and weighting

The competitiveness of existing players is a factor in the extent to which costs are reflected in prices, which is in turn the most significant factor in explaining the price differences between Belgium and other countries.

Within this, both of the factors identified may be material:

- ability to gain market share
- limits to innovation when using the wholesale bitstream products.

We note that Belgian operators are moving slowly towards LLU and also that the price of bitstream has recently changed, reducing the regulated price differentials between bitstream and LLU (which may tend to discourage LLU, until the new entrants have substantial market share). In addition, we have heard anecdotal evidence that alternative network operators are now finding that double-play offers are attractive to Belgian consumers, representing a significant fraction of new customers and implying that it is possible to win

customers away from Belgacom and Telenet. Accordingly, it might be that the level of competitiveness and innovation will increase in the near future.

3.4 Attractiveness of market to new entrants

We have already noted that contestability is an extremely important factor in gaining cost-oriented prices in a competitive retail market that has insufficient competitors. A contestable market is one which could be rapidly entered by a new player: if the existing players do not believe that a new player will enter, then they can price higher than would otherwise be the case. This may be for several reasons, elaborated below.

3.4.1 Lack of 'low-hanging fruit'

The high speeds offered by Telenet in the early years of broadband service in Belgium, and the historically relatively low prices, both meant that a new entrant could not rely on finding a significant and attractive user base which had hitherto been unserved by the major providers (at least in the areas served by Telenet). This is in contrast to other countries, including France, where DSL-based new entrants such as Free could offer far higher speed services at service launch than the incumbent at a comparable price to the basic service.

3.4.2 Technology risk

One unusual factor about Belgium is that the incumbent has already deployed VDSL and is providing VDSL-based services. This is in contrast to the incumbents in nearly all the other benchmarked countries (only Deutsche Telekom has launched VDSL-based services, in September 2006). Whilst it can be economic for a new entrant to use LLU to provide broadband access based on DSL at the MDF, it is a lot more difficult to make the economic case for using sub-loop-unbundling (SLU) at the street cabinet to support VDSL. In essence, this is because the new entrant would need to invest in infrastructure or lease backhaul to reach those cabinets, each of which serves only a limited number of potential customers. We have recently seen the publication of a report¹⁰ written for OPTA by Analysys, which elaborates on this in considerably more detail in the case of the Netherlands.

¹⁰ <http://www.opta.nl/asp/nieuwsenpublicaties/onderzoeken/document.asp?id=2120>.

Accordingly, a new entrant intending to use LLU may be faced with a particular dilemma: investment in ADSL2+ and similar MDF-based technologies may be considered to be riskier in Belgium than in other countries because Belgacom has already deployed a superior technology and is in a position to very rapidly offer faster services (for example, it could match the price offered by the new entrant, but offer a higher speed).

Even if Belgacom chose not to compete on speed, it might in the future reengineer its network along the lines currently proposed by KPN in the Netherlands ('All-IP'), removing the MDFs and thereby making LLU unavailable. The new entrant would then be forced to write off its MDF-based network investments and use a wholesale service offered by Belgacom, if such a service is indeed made available. Whether the regulator could delay this occurrence, or ensure that the wholesale offer was sufficiently attractive, is a further unknown risk. This risk exists in many of the benchmarked countries (e.g. the Netherlands), but is highlighted in Belgium by the advanced state of Belgacom's VDSL deployment and uncertainties about whether VDSL-based bitstream services will become available.

Cable operators are in a similar position to Belgacom, being able to offer speeds comparable to VDSL (e.g. by using DOCSIS 3 cable modems). Accordingly, there are in effect already two next-generation-access-capable networks in Belgium (those of Belgacom and the cable operators). Therefore, this technology risk is a possible reason that may deter additional LLU-based entrants in Belgium.

3.4.3 Threatened competition

The implied threat of vigorous competition from incumbents might be enough to deter entry if they were considered likely to fight hard.

Although sharp cuts in retail prices in order to deter market entry or prevent market share loss have occurred in some Member States, it does not appear that Belgacom or the cable companies have done this in the broadband or triple-play markets in Belgium. There is, however, one recent case that may be relevant. In 2005, Tele2 alleged that Belgacom's Happy Time tariffs amounted to an abuse of its dominant position. According to Tele2, Belgacom was using its price-setting power to prevent Tele2 from making any profit, or even recovering its costs, on the downstream market. This allegation was not specifically

about retail prices, but was a complaint about margin squeeze (the margin between the retail price and the essential inputs used by Tele2).

The auditors for the Competition Council considered that Belgacom's conduct did constitute an abuse of its dominant position and suggested that the Competition Council should order Belgacom to suspend its Happy Time offer, or amend its wholesale interconnection tariffs. However, Tele2's application for interim relief was rejected by the Competition Council, as it was determined that the Happy Time offer could be explained as a normal commercial reaction to price cuts introduced by competitors.

We believe that the case is still subject to appeal (though this serves to illustrate the slow speed of ex-post enforcement).

An operator that intended to rely on Belgacom's inputs in the future (e.g. bitstream) would be worried that Belgacom could, if it wished, cut its retail prices and make the same arguments, claiming that its retail prices were being reduced in response to competition from cable. This worry will apply, to some extent, even to LLU-based operators, since they will use bitstream in rural areas.

3.4.4 Summary and weighting

The attractiveness of the market to new entrants is a material factor in the extent to which costs are reflected in prices, as it forces the existing players to price in a cost-oriented way. There are some factors unique to Belgium that might account for a lower attractiveness to new entrants:

- VDSL deployment by Belgacom
- the early offers at high speeds from Telenet
- worries about whether a margin squeeze would be successful in harming the entrant.

3.5 Conclusion

The nature of competition in the retail market, influencing the extent to which costs are reflected in prices, is, in our view, the most significant factor in explaining the price differences between Belgium and other countries.

The market is not significantly more concentrated in Belgium (in terms of HHI) but, crucially, operators using LLU are not yet making significant inroads into the market share of Belgacom and the cable operators. This is because:

- the ability for competitors to gain market share has so far been limited (even in a situation where their price is lower than Belgacom)
- the competitors are choosing to use the bitstream product for a variety of reasons, but this puts limits on the service innovation they can deliver (e.g. speed, ability to offer television services).

The attractiveness of the market to new entrants could force the existing players to set prices on a cost-oriented way. Contestability is, in our view, a significant factor in the level of prices. However, there are some factors unique to Belgium that might account for a lower attractiveness to new entrants:

- the early offers at high speeds from Telenet, which leaves less room for a dramatic marketing offer of very high speeds
- the existence of Belgacom's VDSL network
- worries about whether a future margin squeeze would be successful in harming the entrant (which is, in effect, a worry about the strength of ex-ante regulation and ex-post competition authority enforcement).

4 Conclusions

In the Lot 1 report, we showed that prices for broadband services were slightly higher in Belgium than the average of the benchmarked countries in three of the four speed categories considered. Exhibit 4.1 below summarises these differences.

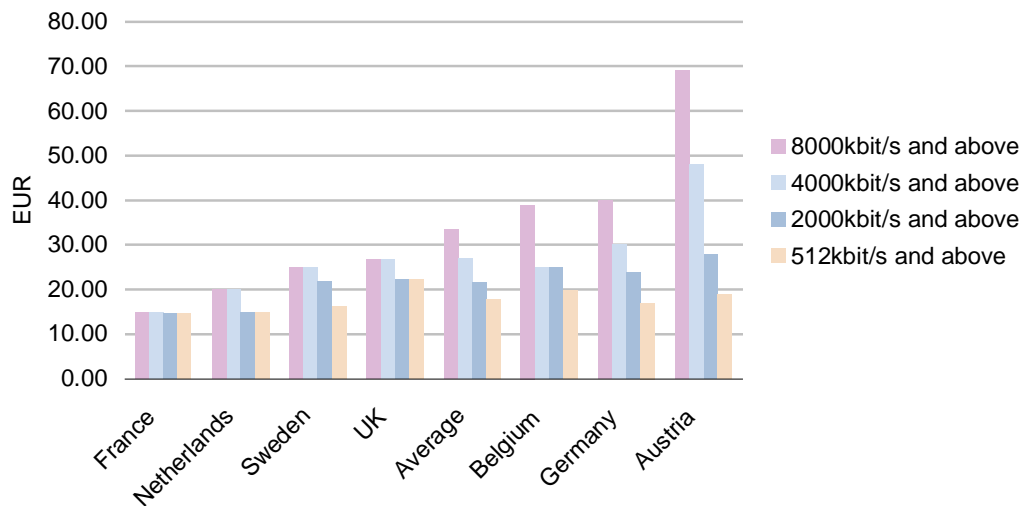


Exhibit 4.1: Summary of prices and speed categories in each country (November 2006)
[Source: Analysys]

The price of the entry-level service in Belgium is not greatly higher than in the Netherlands, but the price of higher speeds is considerably higher. As the incremental costs in offering higher speeds are small, this price structure cannot be understood in terms of factors affecting costs; it is, however, understandable given the state of development of LLU in Belgium, and the reliance of operators on Belgacom's bitstream product. It is not

yet too late for the market to change: as take-up of LLU increases, higher speeds (up to the limits of ADSL2+, possibly up to around 20Mbit/s) may become cheaper.

Moving to yet higher speeds (such as those offered by VDSL) requires different network topologies and is unlikely to be provided for the mass-market using SLU. Competitive offers in this speed range by players that do not own the last mile (i.e. players other than cable operators and Belgacom) will be highly dependent on a wholesale bitstream offer of the incumbent.

Reasons for higher prices

Broadly speaking, we believe that the level of competition in the retail market, influencing the extent to which costs are reflected in prices, is, in our view, the most significant factor in explaining the price differences between Belgium and other countries. The market is not significantly more concentrated in Belgium (in terms of HHI) but, crucially, operators using LLU are not yet making significant inroads into the market share of Belgacom and the cable operators. This is because:

- the ability for competitors to gain market share has so far been limited (even in a situation where their price is lower than Belgacom)
- the competitors are choosing to use the bitstream product for a variety of reasons, but this puts limits on the service innovation they can deliver (e.g. speed, contention, ability to offer television services).

The attractiveness of the market to new entrants could force the existing players to set prices oriented to costs. Contestability is, in our view, a significant factor in the level of prices. However, there are some factors unique to Belgium that might account for a lower attractiveness to new entrants:

- the existence of Belgacom's VDSL network
- the early offers at high speeds from Telenet, which leaves less room for a dramatic marketing offer of very high speeds
- worries about whether a margin squeeze would be successful in harming the entrant (which is, in effect, a worry about the strength of ex-ante regulation and ex-post competition authority enforcement).

Costs

Whilst noting that costs are not in our view the most important factor in determining broadband prices in Belgium, we have found that there are a number of costs which may account for some material cost differences between LLU operators in Belgium and elsewhere, specifically:

- the price of fully unbundled loops
- (possibly) from differences in churn rates (although we know this factor can be significant, we do not have good data on churn rates from all operators)
- (possibly) from differences in lines per MDF
- from differences in backhaul network prices
- from VAT levels in Belgium.

These factors may lead unit costs for an alternative operator using LLU in Belgium to be of the order of 15% higher than a similar operator in a typical country amongst the benchmark set, and potentially of the order of 25% higher than in France.

Possible actions

There are a variety of possible policy approaches available, which range from the short to the long term:

- Seek to use existing regulatory powers in a focussed way
 - consider giving IBPT a specific mandate to increase the level of competitiveness of the broadband market in terms of pricing and service innovation
 - revise the regulated prices of key inputs (specifically, fully unbundled loops and backhaul services) – we note that some of this may already be in-hand within IBPT
 - seek to change the capabilities of the bitstream offer so as to make a wider range of services economically feasible to offer
 - consider investigating whether Belgacom is engaged in undue discrimination as regards bitstream access
 - investigate whether non-cost factors (whether deliberate or not) are a material barrier to alternative providers. If so, consider interventions which will rapidly respond to such discrimination

- Clarify important issues
 - clarify the situation regarding whether a margin squeeze can be permitted in response to competitive pricing
 - clarify (in so far as this is feasible) the future regulatory treatment of bitstream on VDSL and sub-loop unbundling
- Strengthen and speed up regulation and related competition law enforcement
 - streamline the process by which IBPT and the regional media regulators share responsibility for Markets 11 and 12
 - increase the capability of IBPT to undertake telecoms regulatory work (e.g. increase staff and budget in relevant areas) so as to make more rapid progress
 - increase the speed of action of the ex-post competition system.

It is not within the scope of this report to select amongst, or make recommendations from, these options.

Annex A: Co-location and co-mingling

A.1 Definitions

Types of co-location

The Independent Regulators Group (IRG) defines the following three broad categories of co-location:

- *physical* co-location – where an other authorised operator (OAO) can request space (co-location space) to locate its equipment within the site of the incumbent’s local MDF, or within an equivalent distribution point
- *distant* or *adjacent* co-location – where an OAO can choose to use its own premises and connect to the incumbent’s local MDF site, or equivalent distribution point
- *managed* co-location – where the incumbent operator houses, owns and runs equipment at the MDF site, or equivalent distribution point, on behalf of the OAO.

Physical co-location is the most commonly used form in most countries. Physical co-location itself comes in several flavours. These depend on the location of the co-location space, which can be fitted and operated within a room that is (a) separate from the incumbent’s equipment at the MDF site, (b) shared by several other OAOs, or (c) shared with the incumbent’s own equipment, with no permanent barrier between them.

The last is called *co-mingling* and is the most commonly implemented form of indoor co-location. In Belgium, all co-location used to be in a separate room but co-mingling is now the predominant option. Co-mingling is popular due to the lower cost of installation. In particular, the separate room option often involves construction charges, which are not required in this case.

Set-up services

There are several set-up services that come under the scope of co-location, as shown below in Exhibit A.1.

<i>Service</i>	<i>Description</i>
Survey	Provided by the incumbent, the survey aims to determine whether and at what price co-location can be set up
Administration	Fees related to invoicing and management
Floor space	The area where an OAO can place their equipment. This area also includes the Handover Distribution Frame (HDF) and access space in some cases
HDF	The interface between incumbent and OAO, usually provided and installed by the incumbent. Tie cables come from the MDF and end at the HDF
Power	The provision of an electrical supply to the co-location space
Climate control	Air conditioning (cooling and heating). Aims to offset heat produced by equipment and to protect equipment against temperature variations
Access	Service permitting the OAO to maintain its equipment. Personnel requiring access to the co-location space may have to be escorted by incumbent personnel from the incumbent

Exhibit A.1: Co-location set-up services [Source: Analysys]

A.1 Pricing

Pricing for co-location services varies from country to country, and the pricing structure also varies, making comparisons very difficult; even where the pricing structure is comparable, there are often bespoke prices that are not published. An example of this is the pricing structure for the HDF, which is often bundled with other services, as shown below in Exhibit A.2.

<i>Country</i>	<i>Price structure</i>	<i>Initial charge (EUR)</i>	<i>Annual charge (EUR)</i>	<i>NPV over 10 years (EUR per line)</i>
Austria	Bespoke	Bespoke		Bespoke
Belgium	Bundled	Not available	Not available	Not available
France	Bundled		0.14	0.99
Germany	Bespoke	Bespoke		Bespoke
Italy	Bespoke	Bespoke	Bespoke	Bespoke
Netherlands	Separate price	1.21	Bundled	
Portugal	Included	2.18	0.11	2.98
Spain	Separate price	1.45	0.02	1.58
UK	Included	1.58		1.58

Exhibit A.2: Summary results on HDF prices for various countries [Source: Analysys]

All prices in this section, except where otherwise noted, were current in September 2005. The main exception is Belgium where, unless otherwise stated, prices are consistent with those in the 2006 version of Belgacom's Reference Unbundling Offer (RUO).

Power

Power supply set-up charges for co-location services are one aspect that can be compared between countries. Charges to install power are preset in several countries, but the pricing structure varies significantly. It can be:

- *fixed* – as in Spain, the Netherlands and the UK, where the cost is entirely fixed per MDF exchange site
- *by formula* – as in Belgium, where the initial cost of the power supply facility depends on the number of amperes requested
- *included in floor space prices* – such as in France and Portugal
- *bespoke* – such as in Austria, Germany, Italy and Luxembourg.

Exhibit A.3 below displays price levels for the initial charge for power supply provision. We show the prices for both a minimum scale of co-location set-up ('low volume' configuration – 100 lines) and for a scale consistent with an OAO providing broadband services to around 2500 lines ('high volume' configuration).

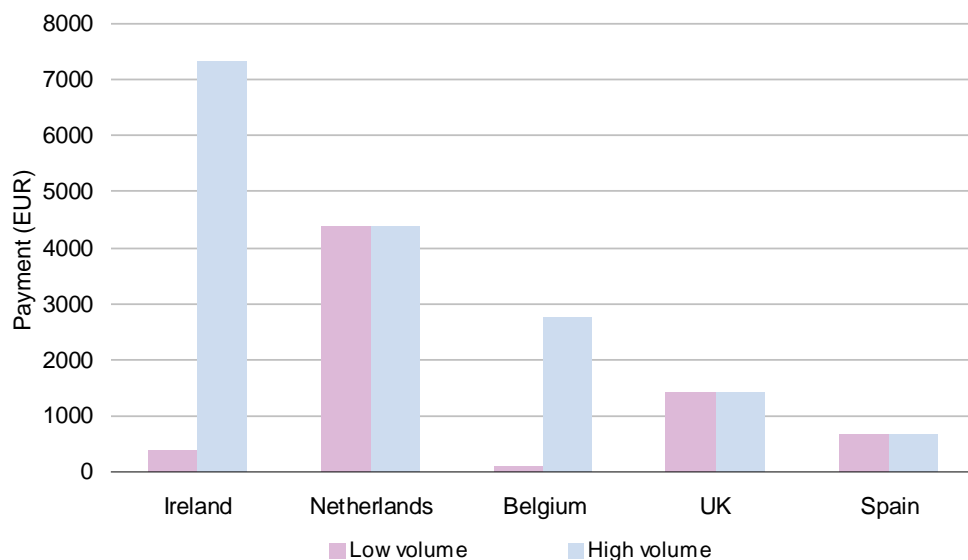


Exhibit A.3: Price levels for power supply by country [Source: Analysys]

Countries such as Belgium with a variable price have lower charges for lower volumes, but can increase substantially for high volumes, whereas countries with fixed price have lower charges at high volumes.

Tie cables

Tie cables are used to connect the incumbent's MDF to an OAO's HDF. There are different configurations for this connection, dependent on whether the co-location space is internal or external and therefore whether tie cable needs to go outside the MDF building. As shown below in Exhibit A.4, price structures for both internal and external tie cabling in the selected countries are either a preset fixed fee or based on case-by-case estimates (bespoke). This is because most regulators consider tie cabling to be a standardised product for which prices can be preset.

<i>Country</i>	<i>Internal tie cabling (and external as well)</i>
Austria	Bespoke
Belgium	Fixed
France	Fixed
Germany	Bespoke
Netherlands	Fixed
UK	Fixed

Exhibit A.4: *Price structures for tie cable services [Source: Analysys]*

Fees for tie cable tend to be the combination of an initial fee and an annual rental. The NPV of charges over a ten-year period has been calculated for countries where data was available and the pricing structure permitted it. These values are displayed below in Exhibit A.5, on a per-line basis. We have assumed that tie cables are purchased for a low-volume configuration (100 pair capacity).



Exhibit A.5: NPV of charges over ten years for tie cable services to indoor co-location facilities;
[Source: Analysys]

As can be seen above, Belgium has no annual rental contribution, so countries with substantial annual fees such as France and Portugal end up being more expensive for this service in the long term. However, the initial fees in Belgium are the highest among our benchmarks, making it expensive by comparison with the remaining countries. Nonetheless, this difference is small in terms of its influence on the overall costs.

A.2 Contribution of co-location to costs

There are differences between the charges for co-location in Belgium and other EU countries. For those charges that can be successfully compared between countries, these differences amount to relatively small annualised costs per subscriber (a few EUR per annum). Accordingly, differences in co-location costs are a minor contributor to overall cost differences (less than EUR1 per month per subscriber).

Annex B: Glossary of terms

ADSL	Asymmetric Digital Subscriber Line
ADSL2+	ADSL2+ is an extension of ADSL with enhanced bandwidth, with potential speeds of up to 24Mbit/s.
ATM	Asymmetric Transfer Mode
Backhaul	The link between the MDF co-location space where the alternative operator houses its DSLAMs and its PoP
Bitstream	A wholesale DSL service in which the end-user traffic is delivered to an ISP or network provider at a more central location or locations by the incumbent operator. An alternative to LLU
BROBA	Belgacom Reference Offer for Bitstream Access
BRUO	Belgacom Reference Unbundling Offer
Churn	The proportion of subscribers who leave a supplier during a given time period. The definition used here is gross additions – net additions)/(average subscribers during the period)
DOCSIS	Data Over Cable Service Interface Specification. Defines interface requirements for cable modems for high-speed data distribution over cable television system networks
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DTT	Digital Terrestrial Television
EAT	Economic Analysis Team (division of the Dutch regulator OPTA)
ECTA	European Competitive Telecommunications Association
EU	European Union
HDF	Handover Distribution Frame
HHI	Herfindahl-Hirschman Index
IBPT	Belgian Institute for Postal Services and Telecommunications
INRA	A Belgian Market Research organisation

IP	Internet Protocol
IRG	Independent Regulators Group
ISP	Internet Service Provider
ISPA	Internet Service Providers Association
ITU	International Telecommunication Union
LLU	Local Loop Unbundling. Renting the copper wires from the end-user to the nearby site (MDF) of the former incumbent operator
LLUO	Local Loop Unbundling operator
MDF	Main Distribution Frame. The location at which the local loop terminates in the incumbent's premises
NPV	Net Present Value
OAO	Other Authorised Operator
PC	Personal Computer
PoP	Point of Presence
PSTN	Public Switched Telephone Network
RUO	Reference Unbundling Offer
SLU	Sub-Loop Unbundling. Similar to local loop unbundling, but terminating on a frame in a street cabinet rather than the MDF
SMP	Significant Market Power
SOHO	Small Office / Home Office
STM-1	Synchronous Transmission Module. A speed of leased line (155Mbit/s)
Triple-play	Provision of three services – normally Internet, telephony and digital television - over a single broadband connection
VAT	Value-Added Tax
VDSL	Very High speed Digital Subscriber Line
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
WACC	Weighted Average Cost of Capital
xDSL	Generic name to refer to all the various forms of DSL available