Methodology for Line Share Pricing in Ireland

A REPORT PREPARED FOR THE COMMISSION FOR COMMUNICATION REGULATION

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CONTENTS

0 Executive summary 5
1 Introduction 7
2 Review and analysis of the methodologies selected by NRAs in the EU and the OECD for the setting of LS prices 12
2.1 Methodological approaches and key findings 12
2.2 Focus on the two polar approaches for the setting of LS prices: Belgium ("incremental" methodology) and Denmark ("50:50" methodology). 16
2.2.1 Implementation of the "incremental" methodology in Belgium..... 16
2.2.2 Implementation of the "50:50" methodology in Denmark..... 17
3 Assessing the risks of cost over- or under-recovery in the context of setting LS prices 19
3.1 The issue of access deficit and its consequences for the setting of LS prices 19
3.2 Tariffs are now rebalanced in EU15 countries and especially in Ireland..... 22
3.3 Consequences for the existing LS prices in Ireland, which are based on the "50:50" methodology 25
4 Assessment of the likely impact of the LS pricing methodology on infrastructure-based competition 28
4.1 Assessment from a theoretical perspective 28
4.2 Assessment from an empirical perspective..... 31
4.3 Possible impact of LS pricing methodology on other regulated products..... 32
4.3.1 Full LLU 32
4.3.2 Bitstream 35
4.3.3 SB-WLR and PSTN retail service 36
5 Which allocation methodology of common (local loop) costs for the purpose of setting LS prices in Ireland? 37
5.1 The Ramsey-Boiteux methodology 39
5.1.1 Definition 39
5.1.2 Example 40
5.1.3 Assessment..... 41
5.2 The ECPR methodology..... 42
5.2.1 Definition 42
5.2.2 Example 42
5.2.3 Assessment..... 43

5.3 The cooperative bargaining methodology 44
5.3.1 Definition 44
5.3.2 Example 45
5.3.3 Assessment 45
5.4 The Shapley-Shubik methodology 46
5.4.1 Definition 46
5.4.2 Example 47
5.4.3 Assessment 47
5.5 The Stand-Alone costs methodology 48
5.5.1 Definition 48
5.5.2 Example 48
5.5.3 Assessment 49
5.6 The Equal Proportionate Mark-Up methodology 50
5.6.1 Definition 50
5.6.2 Example 50
5.6.3 Assessment 51
5.7 The Incremental cost methodology 51
5.7.1 Definition 51
5.7.2 Example 52
5.7.3 Assessment 52
5.8 The “network incentive fee” methodology 54
5.8.1 Definition 54
5.8.2 Example 54
5.8.3 Assessment 54
5.9 The Joint production methodology 55
5.9.1 Definition and example 55
5.9.2 Assessment 55
5.10 The FCC “ad hoc” methodology 56
5.10.1 Definition 56
5.10.2 Assessment 57
5.11 Conclusions on the recommended allocation methodology of common (local loop) costs for the purpose of setting LS prices in Ireland 57
6 Recommendations for the setting of the level of LS prices in Ireland of the basis of the “incremental” methodology 61
6.1 Pair-gain removal 62
6.2 Clearing the additional faults reported on shared lines 63
6.3 Product development and management 64
6.4 Billing and administration 65
6.5 Total LS cost per month and per line 65
7 Annexes 66
7.1 National case studies 66

7.1.1 France 66
7.1.2 United Kingdom 67
7.1.3 Germany 69
7.1.4 Greece 70
7.1.5 Portugal 71
7.1.6 Austria 73
7.1.7 Spain 74
7.1.8 Denmark 75
7.1.9 Sweden 76
7.1.10 Luxembourg 78
7.1.11 Netherlands 79
7.1.12 Finland 80
7.1.13 Italy 80
7.1.14 Belgium 81
7.1.15 Australia 82
7.1.16 United States 86
7.1.17 Japan 87
7.2 Assessment of the allocation of local loop costs to LS with the Ramsey-Boiteux rule 88
7.2.1 NRAs' views on broadband and PSTN elasticities 88
7.2.2 Economists' views on broadband elasticity 89
7.2.3 Assessment of PSTN price elasticity in Ireland 90
7.2.4 Assessment of broadband price elasticity in Ireland 91
Bibliography 93
Glossary 94

0 Executive summary

Line Share ("LS") is the **provision of access to the local loop, authorising the use of the non-voice band frequency spectrum** of the twisted metallic pair. As a consequence, the provision of LS implies that the local loop will support services both of the fixed line incumbent, through the provision of the public switched network ("PSTN")-based services, and of an alternative operator ("OAO") for the provision of digital subscriber line ("DSL")-based services. LS allows OAOs to compete with the incumbent, not only on the range of services offered (broadband, voice over Internet protocol, video on demand, Internet protocol television) but also on their price, quality and other differentiating characteristics.

Pursuant to the cost-orientation principle, LS prices have been set since 2001 in Ireland so as to support 50% of the local loop costs. **Following an extensive analysis of Eircom's costs, ComReg acknowledged in 2007 that there is no longer an access deficit in Ireland, and tariffs were accepted as being fully rebalanced. Consequently applying such a "50:50" allocation rule of local loop common costs between broadband and voice services without any discount on the PSTN rental charge has led to a cost over-recovery by Eircom.**

TERA Consultants ("TERA") have been therefore asked to assess the possible methodologies for the allocation of local loop common costs in the context of rebalanced tariffs.

This report assesses LS pricing methodologies adopted in comparable OECD **countries**[1] and considers available **economic allocation methodologies for the setting of LS prices. TERA's assessments are made in line with what we believe are consistent with ComReg's objectives**.

The final **recommendations** are:

- to **implement the "incremental" methodology** leading to zero allocation of local loop common costs to the LS monthly rental price. The incremental methodology is adopted by most of the National Regulatory Authorities ("NRAs") in the countries reviewed. Tera believes the

[1] OECD being the Organisation for Economic Co-operation and Development

incremental methodology represents the highest degree of consistency with ComReg's objectives in a context of rebalanced tariffs;

- based on a preliminary assessment of the relevant incremental costs related to LS in Ireland, TERA advise setting **the monthly cost-oriented price for LS at a maximum price of €0.75 per line per month**.

1 Introduction

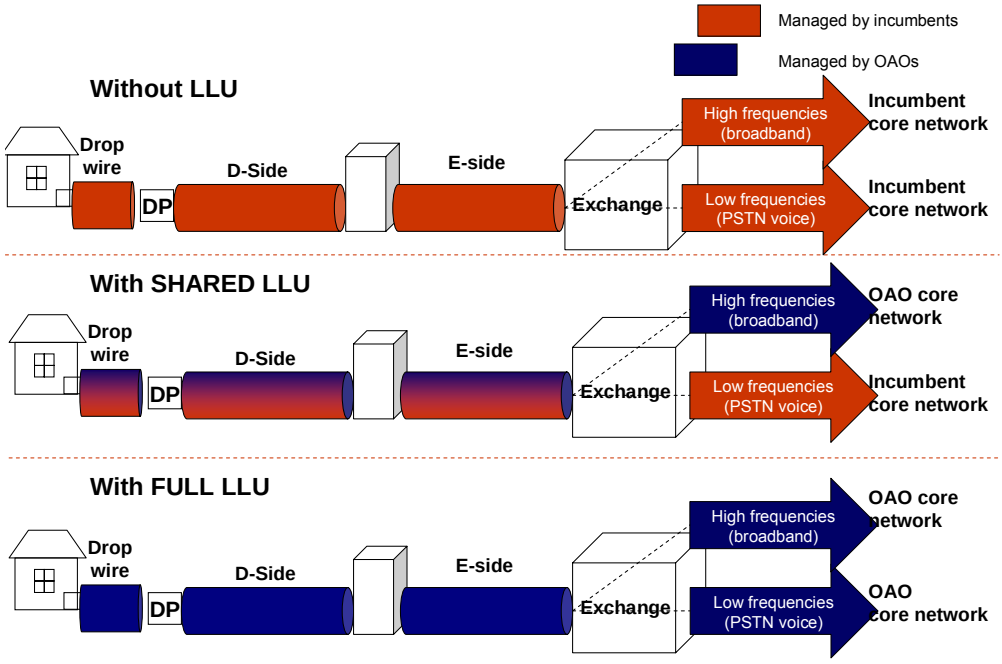
According to Regulation No. 2887/2000[2], referring to unbundled access to the local loop, **Line Share ("LS")** is defined as:

> *"The provision to a beneficiary of access to the local loop or local sub loop of the notified operator, authorising the use of the non-voice band frequency spectrum of the twisted metallic pair; the local loop continues to be used by the notified operator to provide the telephone service to the public."*

Based on the European experience, LS appears to be a pro-active scheme both to increase the choice of end-users, in terms of price and quality, and to encourage new investments in infrastructure.

This provision of LS implies that the local loop will support services both of the incumbent, through the provision of PSTN-based services, and of an OAO for the provision of DSL-based services.

Figure 1 – Comparison of LS and Full LLU in terms of usage of the local loop



Source : TERA Consultant

[2] Regulation (EC) No. 2887/2000 of the European Parliament and of the Council, on unbundled access to the local loop, 18 December 2000

LS allows OAOs to compete with the fixed line incumbent to provide a wide range of services at a reasonable price for end-users. These services currently include:

- broadband;
- voice over Internet protocol ("VoIP");
- video on demand ("VOD");
- Internet protocol television ("IPTV").

LS allows OAOs to compete with the fixed line incumbent, not only on the range of services offered but also on their price, quality and other differentiating characteristics.

Pursuant to the cost-orientation principle, LS prices have to be oriented towards the underlying costs that are either *specific* to LS or *common* with other services provided by the incumbent.

The definition of LS implies that local loop costs are common to the provision of PSTN and LS:

- LS uses a part of the local loop (non-voice frequency band),
- while the incumbent uses the other part (voice frequency band) for the provision of PSTN services.

Hence, **a key question related to the setting of LS prices is to determine an efficient methodology to allocate these local loop common costs**.

A consultation related specifically to the setting of LS prices was held in 2001. In the decision notice D8/01,[3] the Office of the Director of Telecommunications Regulation ("ODTR")[4] reviewed 5 methodologies for the allocation of local loop common costs to LS:

- Ramsey Pricing;
- Efficient Component Pricing;
- Cooperative Bargaining Theory;
- Shapley allocation;
- Share of stand-alone costs.

---

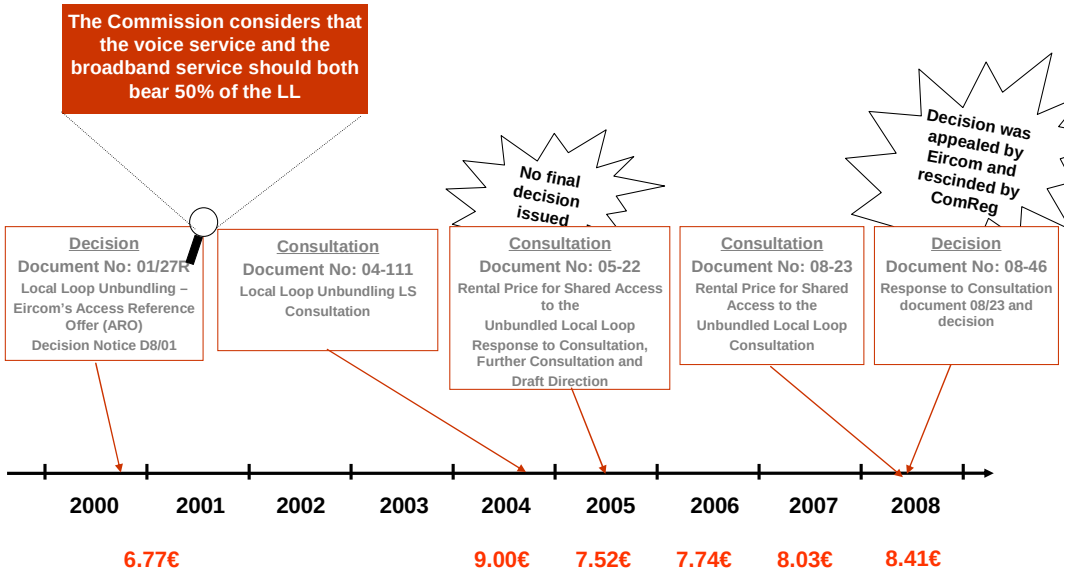
[3] "Local Loop Unbundling – Eircom's Access Reference Offer (ARO)" (Decision Notice D8/01; Document No. ODTR01/27R), dated September 2001.

[4] The ODTR is the predecessor of the Commission for Communications Regulation ("ComReg").

The ODTR concluded that Ramsey Pricing was not to be used owing to practical difficulties in terms of implementation. Efficient Component Pricing was also rejected by the ODTR mainly because of its complexity in implementation and a lack of consistency with static economic efficiency.

The ODTR explained that the 3 latter methodologies led to a "50:50" allocation rule between broadband and voice services and concluded that **LS should support 50% of the local loop costs**.

Figure 2 - Decision and consultations published by ComReg/ODTR related to LS pricing



Source: TERA Consultants

Following an extensive analysis of Eircom's costs, **ComReg acknowledged in 2007 that there is no longer an access deficit in Ireland**[5] **and tariffs were accepted as being fully rebalanced.** Consequently, applying a "50:50" allocation rule between broadband and voice services without any discount on the PSTN rental charge could lead to a cost over-recovery by Eircom. This in turn could be deemed not compliant with the cost-orientation principle for the setting of LS prices.

[5] "Retail price cap as a potential remedy on fixed narrowband access markets", Submission to consultation 07/48, 15 August 2007.

The objective of this report is therefore to review the assessment of possible methodologies for the allocation of local loop common costs determined in decision notice D8/01 in order to determine whether the "50:50" allocation rule between broadband and voice services is still appropriate in the context of rebalanced tariffs and, if not, to determine according to which methodology LS prices should be set pursuant to the cost-orientation principle for the years to come. TERA is mindful that Eircom is currently designated with significant market power (SMP) in the market for wholesale unbundled access to the local loop, based on ComReg Decision D8/04.

The need for this review of possible methodologies is mainly driven by the fact that the decision notice D8/01 did not consider all possible allocation methodologies from an economic point of view. Furthermore, other NRAs in the EU have reviewed their decisions related to the pricing of LS since, showing that the regulatory approach to the pricing of LS has evolved in the intervening period. This latest status has to be taken into account in the analysis of the most appropriate approach for setting LS prices in Ireland in the context of rebalanced tariffs.

TERA is mindful of the "Consultation on proposals for local loop unbundling ("Full LLU") pricing methodologies" (ComReg 08/56), which aims to determine the most appropriate methodology for the setting of cost-oriented LLU prices in the specific context of Ireland. **As LS and Full LLU cannot be offered simultaneously on the same copper line, there is no relation between cost-oriented LS pricing and cost-oriented Full LLU pricing**.

However, should the "50:50" allocation rule between broadband and voice services be the preferred option for setting the LS prices in the years to come, consistency should be ensured between the improved and more detailed model to be developed for the calculation of the Full LLU costs in Ireland and the cost model necessary to compute the share of the local loop common costs to be allocated to LS.

This report is divided into 5 main sections, as follows:

- review and analysis of the methodologies selected by NRAs in the EU and the OECD for the setting of LS prices (Section 2);
- evaluation of the risks of cost over- or under-recovery in the context of setting LS prices (Section 3);

- assessment of the likely impact of the LS pricing methodology on infrastructure-based competition (Section 4);
- Assessment of which allocation methodology of common (local loop) costs for the purpose of setting LS prices is most appropriate for Ireland (Section 5);
- recommendations for the setting of the level of LS prices in Ireland using the "incremental" methodology (Section 6).

Based on the European experience, LS appears to be a pro-active scheme both to increase the choice of end-users, in terms of price and quality, and to encourage new investment in infrastructure. This provision of LS implies that the local loop will support services both of the incumbent, through the provision of PSTN-based services, and of an OAO for the provision of DSL-based services. Hence, a key question related to the setting of LS prices is to determine an efficient methodology to allocate these local loop common costs. The objective of this report is therefore to assess the possible methodologies for the allocation of local loop common costs and to recommend the most appropriate methodology regarding ComReg's objectives.

2 Review and analysis of the methodologies selected by NRAs in the EU and the OECD for the setting of LS prices

2.1 Methodological approaches and key findings

Several methodologies could be envisaged for the setting of LS prices, as exemplified by ComReg Decision Notice D8/01. In order to get an overview of the methods effectively implemented, and before performing an assessment from an economical point of view, the current status in 18 selected OECD countries are reviewed and analysed, the selected countries being the EU15 countries, Japan, Australia and the United States.

This selection has been made to benchmark OECD markets that are comparable with Ireland regarding their economy, technologies and penetration of broadband and for which the availability of information and data is appropriate for the purpose of reviewing the methodologies used by NRAs for setting LS prices.[6]

[6] Mexico, Hungary, Poland, Slovakia, Turkey, Czech Republic have not been included as the PPP-GDP/capita is below $30,000, far from the Irish level. Iceland has not been included owing to the very small size of the country. South Korea and Canada have not been analysed in the absence of information (even if the situation in Canada appears to be very similar to that in the USA). Switzerland and New Zealand do not propose LS. Finally, in Norway, the same methodology as in Denmark is used.

Figure 3 – Overview of methodologies used by NRAs for setting LS prices

Country	Which current methodology?	Changes in methodology in the past?
Austria	50%	NO
Belgium	Incremental	Yes, in 2007
Denmark	50%	NO
Finland	50%	NO
France	Incremental	Yes, in 2002
Germany	Incremental	NO
Greece	Incremental	Yes, in 2006
Ireland	50%	NO
Italy	Incremental	NO
Luxembourg	Percentage determined by the incumbent	NO
Netherlands	Incremental	NO
Portugal	Incremental	Yes, in 2002
Spain	Incremental	NO
Sweden	50%	NO
United Kingdom	Incremental	NO
USA	Some allocation	NO
Australia	Incremental	NO
Japan	Incremental	NO

Source: TERA Consultants

From the figure above, it can be concluded that there are two main methodologies used in the 18 selected OECD countries for the setting of LS price:[7]

- the **"incremental" methodology**, which does not allocate any common costs of the local loop to LS, and therefore the **LS price covers only the additional costs of providing LS**;
- the **"50:50" methodology,** through which 50% of common costs of the local loop are generally allocated to LS.

From a "static" point of view, we observed that in 2008:

- 10 countries out of the selected 18 have chosen not to allocate any local loop costs to LS;
- 7 countries have chosen to do so (including the United States, where local loop unbundling is not regulated);[8]
- among these 7 countries, 5 allocate 50% of the local loop costs to LS;

[7] One country, Greece, uses a benchmark methodology to set the incumbent's LS prices.

[8] See annexes for details on each of the 18 countries.

- these 5 countries are EU15 countries: Austria, Denmark, Finland, Ireland and Sweden.[9]

More details of the 50:50 methodology applied by each of these countries are given below:

- Denmark – A discount is offered to the PSTN monthly rental charge for LS end-users to prevent any cost over-recovery.
- Austria – LS in Austria represents 0% of total OAO DSL lines, but Full LLU represents 63% of OAO DSL lines.[10] The NRA has in place margin squeeze tests; however, with the relative success of Full LLU, no change to the 50:50 methodology has been considered.
- Finland – A 50:50 methodology is applied as a solution in Finland to avoid complexity owing to the fact that there are numerous OAOs designated with SMP in the wholesale unbundled access ("WUA") market.
- Sweden – LS as a % of total OAO DSL lines is the highest win the EU, but LS represents only 15% of broadband connections;[11] thus the Swedish case appears to be moderately focused on LS.

From a "dynamic" point of view, we observed that:

- four countries changed their methodologies for setting LS prices in recent years: France and Portugal in 2002, Greece in 2006 and Belgium in 2007.
- France, Portugal and Belgium decided to allocate no local loop costs to LS.[12]

The reasons stated by NRAs for these changes are that this methodology avoids cost over-recovery, prevents discrimination, is compliant with the cost causality principle, is easier to implement in comparison with other

[9] It is to be noted that in Austria no decision was issued by the regulator on LS and that in Denmark a discount is offered to PSTN and LS end-users to prevent any costs over-recovering.

[10] EC 13th Implementation Report, October 2007.

[11] Progress report on the Single European Electronic Communications Market.

[12] The methodology used in Greece is based on benchmark.

methodologies and is consistent with the Ramsey-Boiteux methodology (see Section 5.1).

From both a static and a dynamic point of view, not allocating any common costs of the local loop to LS is the preferred methodology (the "incremental" methodology as opposed to the "50:50" methodology).

2.2 Focus on the two polar approaches for the setting of LS prices: Belgium ("incremental" methodology) and Denmark ("50:50" methodology)

Among the 18 countries selected above,[13] this report focuses on the Danish and the Belgian cases, as these two countries illustrate the two main methodologies described above:

- in Belgium the decision to use the "incremental" methodology is recent (2007),[14] and therefore the arguments associated with that change are of significant interest;
- in Denmark the decision to use the "50:50" methodology has been complemented by a specific mechanism to avoid cost over-recovery by the incumbent.

2.2.1 Implementation of the "incremental" methodology in Belgium

Before 2007, the LS price in Belgium was covering some costs of the local loop. A network incentive fee was calculated and incorporated into the LS price in the form of a mark-up, with the aim of giving incentives to the incumbent to maintain and renew its access network.

However, the allocation of some local loop costs to the LS product required a mechanism preventing cost over-recovery by the incumbent (as the latter already recovered its local loop costs through the PSTN monthly rental charge). It was decided by the Belgian NRA, the Belgian Institute for Postal Services and Telecommunication ("IBPT"), to reduce the Full LLU price, and the discount was calculated in year *N* on the basis of an estimation of network incentive fees that would be received by the incumbent in year *N*+1. A cross-subsidy between Full LLU and LS was thus implemented in Belgium.

This methodology was modified in 2007 (through the IBPT decision of 13/06/2007). The "incremental" methodology was preferred in the light of

[13] See Annex 7.1 for the other national case studies.

[14] "Décision du conseil de l'IBPTdu 13 juin 2007 concernant la "bruo rental fee"."

methodologies used in France and the Netherlands. According to the IBPT, this methodology is the most appropriate in the current regulatory framework and avoids any over-recovery of costs by the incumbent. Finally, IBPT stated that, from a historical point of view, the PSTN monthly rental charge covers local loop costs.

2.2.2 Implementation of the "50:50" methodology in Denmark

In Denmark, 50% of the local loop costs have been allocated to the LS product since 2003 according to the "50:50" methodology. Considering that the incumbent already recovers 100% of the local loop costs through the PSTN monthly rental charge, the Danish NRA, the National IT and Telecom Agency ("NITA"), decided to implement a discount so as to avoid a situation of 150% over-recovery of the local loop costs.

Two types of discounts were considered by NITA:

- individual discount in the PSTN monthly rental charge for "LS users";
- collective discount in the PSTN monthly rental charge.

Contrary to the choice of the IBPT in Belgium before 2007, an individual discount was chosen by the NITA so as to avoid cross-subsidies between users. However, it is to be noted that this option was difficult to implement operationally, as indicated in NITA's 2006–2007 annual report.[15]

[15] The main difficulty raised by NITA in the implementation of the mechanism set in Denmark for LS prices came from the pieces of information that have to be exchanged between TDC wholesale division and TDC retail division for offering discounts to end-users. See Annual Report 2006–2007, Annexes, NITA, pages 24, 25, 26 and 27.

The appropriate approach to introduce the "50:50" methodology without inducing over-recovery of costs by the incumbent is to implement a discount either on wholesale products (namely Full Unbundling) or on retail products. The Belgian case highlights that the "incremental" methodology has been considered superior to the "50:50" methodology when discounts are applied to wholesale products.

3 Assessing the risks of cost over- or under-recovery in the context of setting LS prices

3.1 The issue of access deficit and its consequences for the setting of LS prices

With LS, the incumbent rents the high portion of the copper access network's frequency to the OAOs, the low portion being used by its PSTN service. When setting cost-oriented tariffs, such as LS, the requirement for an NRA is to avoid, for the incumbent, any over-recovery (excessive margin) or under-recovery (loss) of its costs. It is therefore necessary to determine which revenues of the incumbent are relevant to cover the copper access network costs.

In theory, three sources of revenues can be considered relevant:

- the retail PSTN monthly rental charge,
- the LS price,
- and the revenues stemming from fixed line calls.

Historically, there used to be cross-subsidies between access (the retail PSTN monthly rental charge) and revenues stemming from fixed line calls. The aim was to lower the retail PSTN monthly rental charge below the costs to make sure that the vast majority of the population could get access the PSTN service. To counterbalance the loss, fixed line call prices were increased to cover this "access deficit" and, as a consequence, fixed line call revenues were cross-subsidising access revenues and were covering access costs.

In the case of cross-subsidies between fixed line call revenues and access, the setting of the LS price must integrate a share of the access deficit. Through LS, OAOs can offer voice over broadband that may prevent the incumbent from getting revenues from fixed line calls. In such a situation, the incumbent could incur losses if the LS price does not cover the access deficit (as the retail monthly rental charge does not cover the full access costs).

It should be noted that such a concern was expressed by the European Economic and Social Committee[16] in 2000 (as, in France, in the former Code of Posts and Telecommunications[17]):

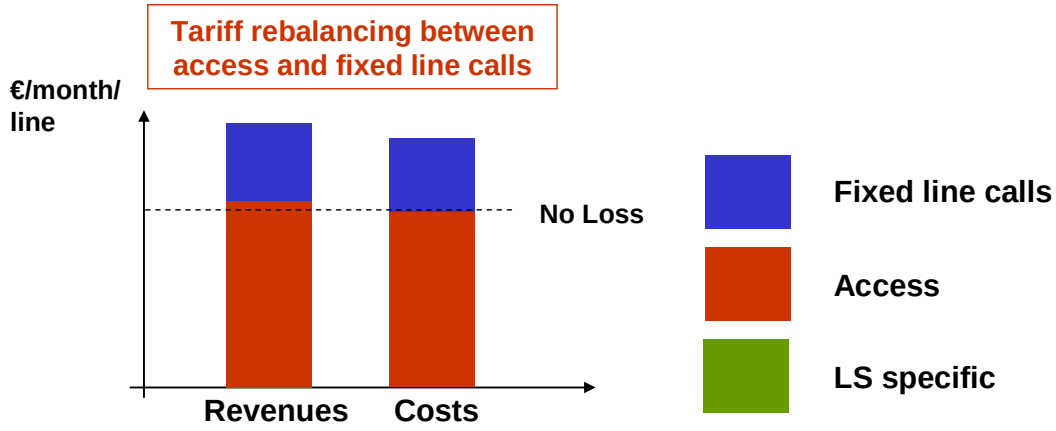
> *"The Committee feels that the shared access price should be assessed on at least the same basis as the price for full unbundled access, minus the fixed subscription payable for the voice telephony service".*

The difference between the Full LLU price and the retail PSTN monthly rental charge can indeed represent the access deficit.

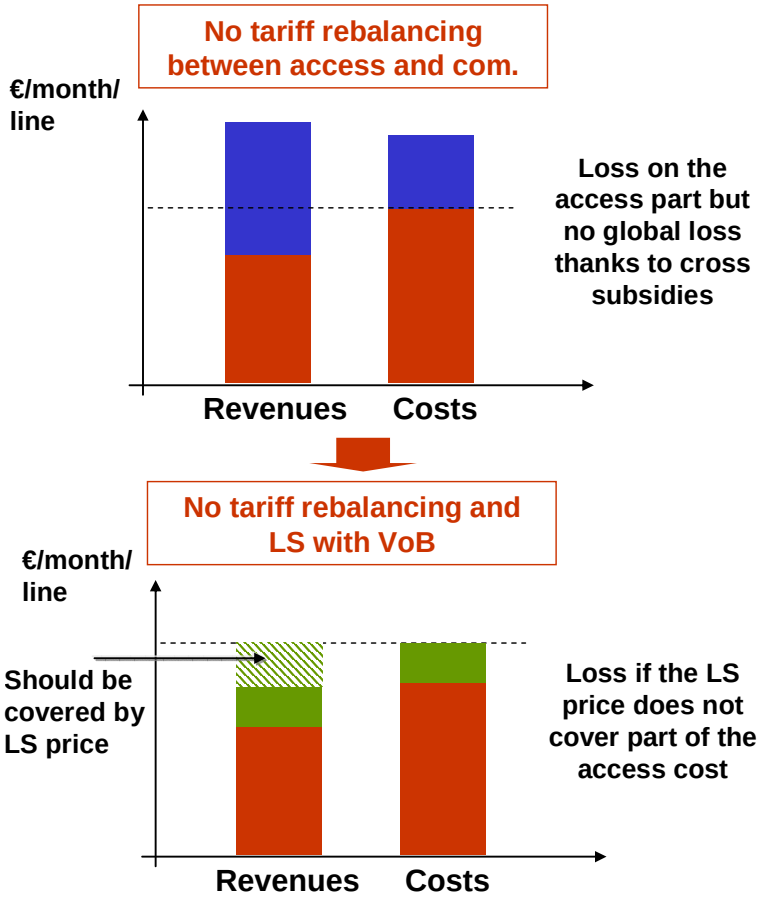
[16] Economic and Social Committee opinion on the Proposal for a Regulation of the European Parliament and of the Council on unbundled access to the LL (COM(2000) 394 final – 2000/0185 COD), Brussels, 19 October 2000.

[17] Article D99-24 of the former "Code des postes et télécommunications".

Figure 4 – Impact of tariff rebalancing on LS prices



Source: TERA Consultants



Source: TERA Consultants

Where tariffs are not rebalanced between access and fixed line calls, the LS price may cover a part of the access deficit.

Where tariffs are rebalanced between access and fixed line calls, the retail PSTN monthly rental charge covers access costs and the LS must not cover any access cost in order to avoid cost over-recovery by the incumbent.

For NRAs, when retail tariffs are rebalanced, there are two options for the setting of LS prices that avoid cost over-recovery, as shown by the benchmark of the 18 selected OECD countries:

1. No access network costs are allocated to LS ("incremental" methodology). In this case there is no cost over-recovery.
2. Some access network costs are allocated to LS ("50:50" methodology). In this case the retail PSTN monthly rental charge should be reduced for access lines that support LS (as exemplified by the situation in Denmark).

When tariffs are rebalanced between access and fixed line calls, if some access network costs are allocated to LS according to the "50:50" methodology, these costs should be deducted from the retail PSTN monthly rental charge.

3.2 Tariffs are now rebalanced in EU15 countries and in Ireland

By now cross-subsidies between fixed line calls and access are no longer necessary and the retail PSTN monthly rental charge covers the access network costs. Tariffs are said to be "rebalanced" as a clear consequence of the liberalisation of the fixed telephony market in the EU15 countries since 1998:

> *"Under the legal monopoly, operators used to cross-subsidise low retail subscription fees with high call charges. However, according to the Full Competition Directive and the Voice Telephony Directive,*

> *tariffs for voice telephony services offered by dominant operators have to be cost-oriented".*[18]
>
> *"Our action may lead to an increased retail subscription fee for all telephone users. However, this does not necessarily mean that consumers will have to pay more. We believe that rebalancing should be a "zero sum operation", because increases of subscription fees should be compensated by decreases of call charges. Furthermore, we have promoted the application of social tariffs and low user schemes, avoiding that the weakest consumers would be hit by increases of telephone tariffs."*[19]

In practice, with the exception of Finland,[20] all EU15 countries have by now a positive difference between the retail PSTN monthly rental charge and the Full LLU price (that is assumed to be cost-oriented according to the EU regulatory framework). Ireland has the second-highest difference within the EU15 between the residential retail PSTN monthly rental charge and the Full LLU price. **ComReg acknowledged in 2007 that there is no longer an access deficit in Ireland**:

> *"A price cap has been the method of price control since the Telecommunications Act in 1996, and has been effective in controlling prices, while allowing a rebalancing of tariffs to cost-orientation. Eircom's tariffs are now fully rebalanced".*[21]

It should be noted that this has been recently confirmed by Eircom:

> *"In line with the rest of Europe, voice revenues of the Incumbent have been in decline. However, Eircom management has instituted successful measures to mitigate the effect:*
>
> […] *Heavily rebalanced tariff structure weighted towards fixed access charges with low per minute charges".*[22]

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[18] http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/00/480&format=HTML&aged=0&language=EN&guiLanguage=en.

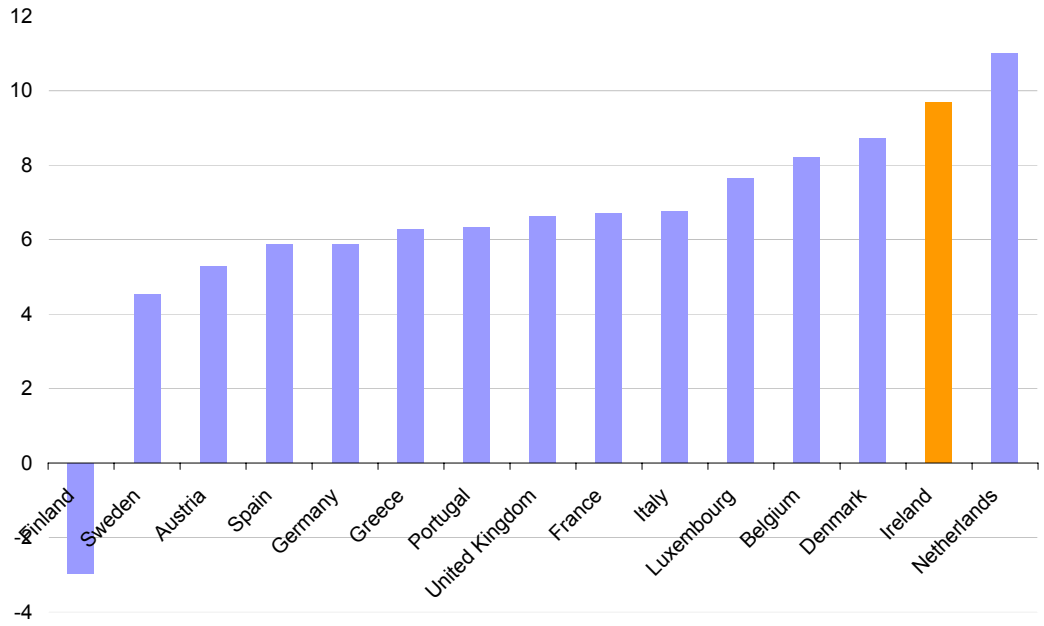
[19] Jean-François Pons, Deputy Director General, DG Competition, European Commission/European Competition Policy in the New Economy (26 June 2001).

[20] But the situation is singular as many operators compete directly with full local loops.

[21] "Retail price cap as a potential remedy on fixed narrowband access markets", Submission to consultation 07/48, 15 August 2007.

[22] ASX Release, 17 April 2008, Eircom presentation, Babcock & Brown Capital Ltd - http://www.babcockbrowncapital.com/media/347312/587748.pdf.

Figure 5 – Difference between the retail residential monthly rental charge (VAT included) and the Full LLU price

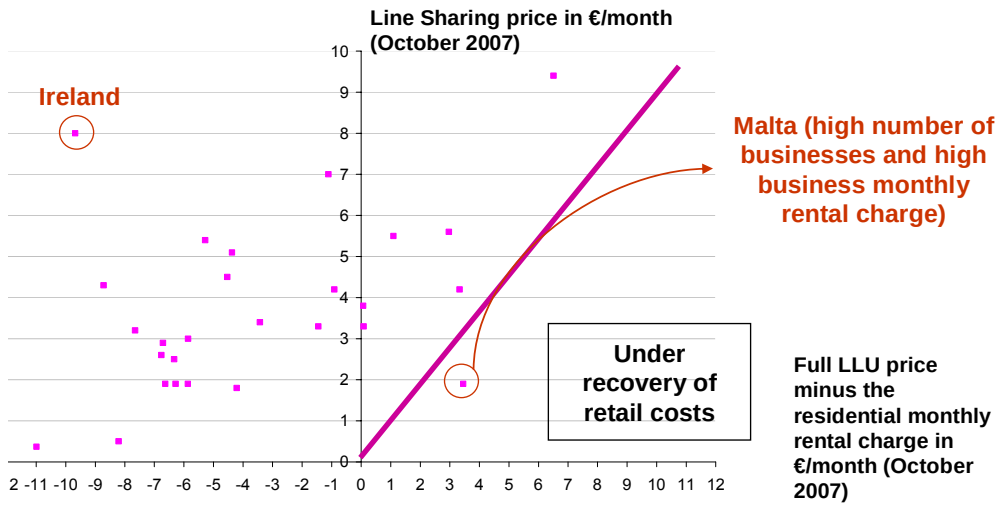


Source: EC, PROGRESS REPORT ON THE SINGLE EUROPEAN ELECTRONIC COMMUNICATIONS MARKET 2007 (13th REPORT)

In the 12 new EU Member States, tariff rebalancing has been implemented more recently, and some countries still experience an access deficit. Consequently, all 12 new EU Members apply a rule consistent with that stated by the Economic and Social Committee in 2000 (see Section 3.1).

When the difference between the retail monthly rental charge and the Full LLU price is negative, the LS price covers the difference. This is the case in Malta, for example.

Figure 6 – Comparison between the LS price and the residential monthly rental charge in €/month in October 2007 in the EU27



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

Tariff rebalancing in EU countries, Ireland included, is not a central issue anymore, as cross-subsidies between fixed line calls and access have progressively disappeared.

3.3 Consequences for the existing LS prices in Ireland, which are based on the "50:50" methodology

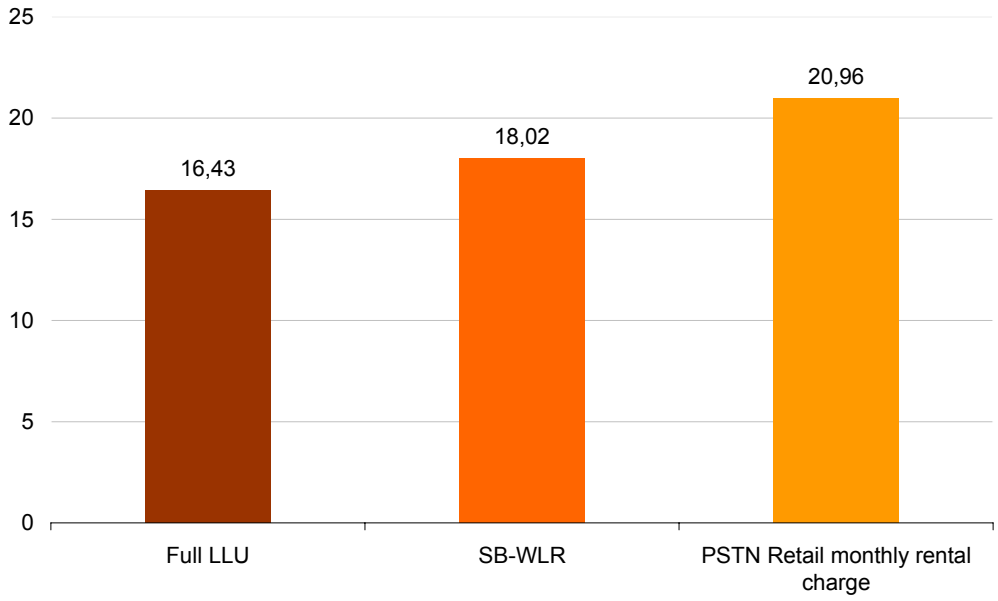
Eircom's tariffs are now rebalanced. In this respect, it can also be observed that the Full LLU price in Ireland is equal to €16.43[23] while the retail PSTN monthly rental charge is equal to €20.96[24] and Single Billing – Wholesale Line Rental ("SB-WLR") (representing an approximation of the retail monthly rental charge less distribution, marketing and advertising costs) is equal to €18.02.[25]

[23] Source: Eircom Access Reference Offer.

[24] Source: Telecommunication Scheme 2008 – Retail Service Offerings.

[25] Source: Eircom Reference Interconnect Offer (RIO) pricelist 2008.

Figure 7 – Level of PSTN monthly rental charge, Full LLU monthly rental charge and SB-WLR monthly rental charge in Ireland

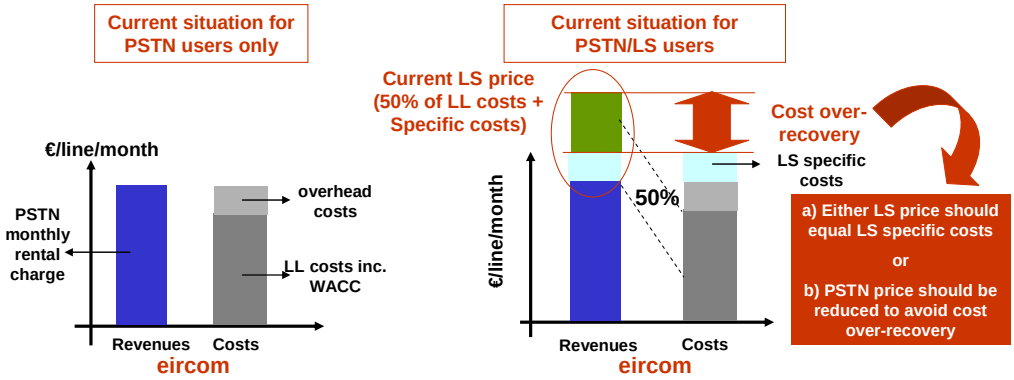


Source: TERA Consultants from Eircom's website

As a consequence, the retail PSTN monthly rental charge covers access costs, and the LS must not cover any access cost in order to avoid cost over-recovery by the incumbent.

This implies that, with existing LS prices in Ireland, Eircom over-recovers its costs, as the price of LS incorporates 50% of the access costs while the retail PSTN monthly rental charge for access that supports LS is not reduced.

Figure 8 – Access network cost recovery with and without Line Sharing



Source: TERA Consultants

As tariffs in Ireland are rebalanced between access and fixed line calls, with existing LS pricing in Ireland, Eircom over-recovers its costs, as this price incorporates 50% of the access costs while the retail PSTN monthly rental charge for access that supports LS is not reduced.

4 Assessment of the likely impact of the LS pricing methodology on infrastructure-based competition

This section addresses the central issue of the impact on infrastructure-based competition of the selected methodology used to determine LS monthly rental price. A key objective of NRAs under the current EU regulatory framework is to guarantee that investments in alternative infrastructure are not deterred by LS prices.

For example, Full LLU prices are, in some EU countries, cost-oriented on the basis of the Bottom-Up Long Run Average Incremental Cost ("BU-LRAIC") methodology. This methodology enables NRAs to replicate the cost of an OAO building a new network with capabilities and features similar to the incumbent's network. Therefore, the "make or buy" decision of the OAO is not biased by this methodology.

This issue is addressed from a theoretical perspective in Section 4.1 and an empirical perspective in Section 4.2. Section 4.3 focuses on the possible impact of the LS pricing methodology on other regulated products.

4.1 Assessment from a theoretical perspective

A key objective of NRAs under the current EU regulatory framework is to guarantee that investments in alternative infrastructure are not deterred by inefficient pricing. In so doing, NRAs must ensure that the efficient investment decisions by OAOs are not biased when setting prices of regulated services.

Where no access network costs are allocated to the LS service according to the "incremental" methodology", LS prices are oriented towards the costs specific to LS (administration, billing etc.). These specific costs generally amount to between €0.37/line/month and €3/line/month[26] (depending on whether some costs related to LS are covered by the LS monthly rental charge[27]). It might be argued that setting LS prices using the "incremental" methodology would deter

[26] TERA Consultants, from Progress Report on the Single European Electronic communications market 2007" (13th Report) of the European Commission and from the list of NRAs having chosen the "incremental" methodology.

[27] For example, in France, costs related to fault repairs are included in the LS price, while they are not in Ireland.

investment in alternative access infrastructures or investment in full unbundling: LS would indeed enable OAOs to offer customers broadband, TV, voice etc. for less than €3 per line and per month, whereas the access cost of OAOs (offering same type of services) based on Full LLU could amount to more than €9 per month in many countries.[28] However, such reasoning we consider to be simplistic, as a PSTN line rental charge is applied in addition to the LS price, when providing a LS service.

Let us consider an OAO that has to decide between building a new access infrastructure and renting the high-frequency band of the incumbent's copper access network using the LS product.

Let us denote:

- ***CaIt:*** the cost of the alternative access infrastructure (access/month);
- ***C:*** the cost of the incumbent's copper access network (access/month);
- ***CIs:*** the costs specific to LS.

1. If the **alternative infrastructure provides both broadband and voice** for ***CaIt***, then:

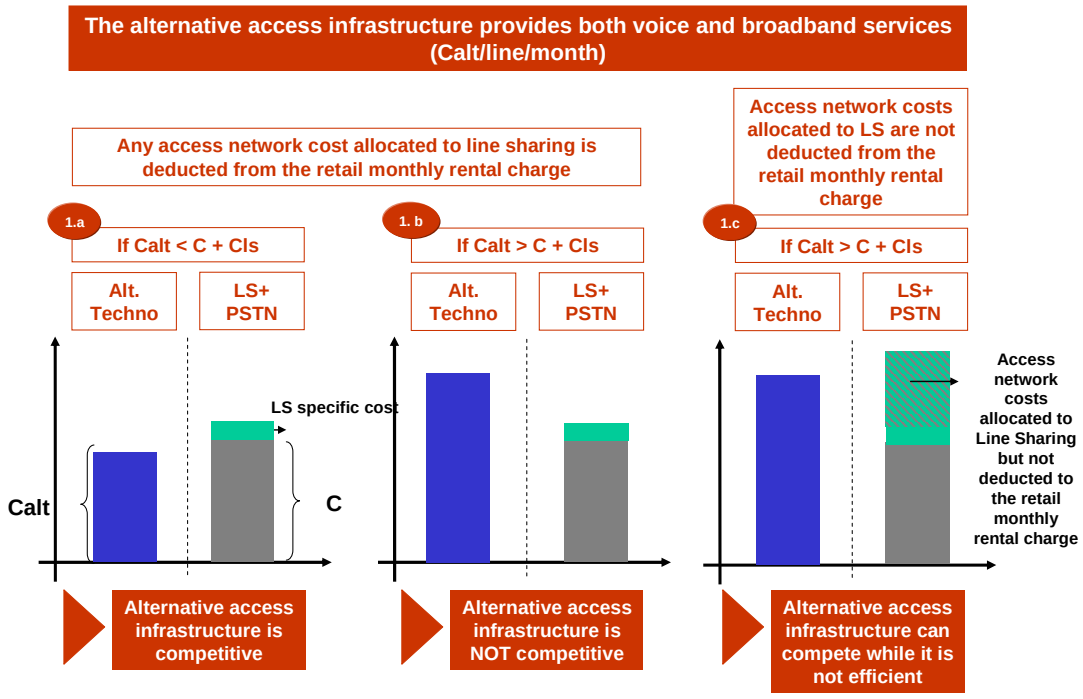
   the OAO will clearly be competitive, compared to LS, as long as ***CaIt*** **is below** ***C + CIs*** and network costs deducted from the monthly rental charge (1.a in the next figure).

   If ***CaIt*** **exceeds** ***C + CIs*****,** there may not be sufficient margin to challenge LS with a new infrastructure (1.b in the next figure),

   except if the LS price covers costs that are not deducted from the retail monthly rental charge (1.c in the next figure). But such a situation is not desirable, as it preserves inefficient investments.

[28] "Progress report on the Single European Electronic Communications Market".

Figure 9 – Choice of OAO between "make or buy"



Source: TERA Consultants

2. **If the alternative access infrastructure simply allows voice services**, then this alternative infrastructure is not desirable for the market unless ***Calt*** is below ***Cls***. The copper infrastructure enables both voice and broadband offerings.

To the extent that the incumbent's access network costs are neither under-recovered (retail tariffs rebalanced) nor over-recovered (any access network cost allocated to LS deducted from the retail PSTN monthly rental charge), there is no risk of distorting competition in infrastructure or of altering the "make or buy" decisions of the OAOs.

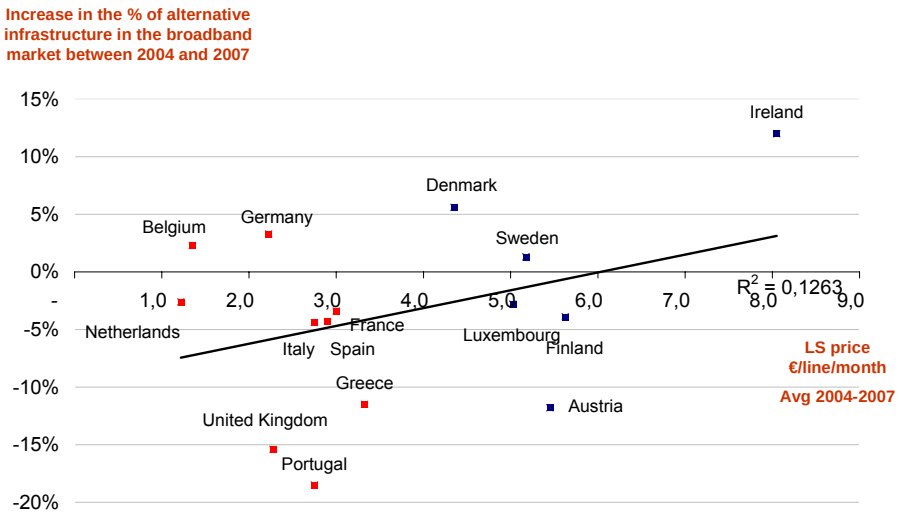
4.2 Assessment from an empirical perspective

On the basis of data published by the European Commission in its 2007 report on competition in electronic communication markets,[29] we understand that:

- **there is no correlation** between the level of LS prices[30] and the increase in alternative infrastructures for the provision of broadband between 2004 and 2007 in the EU15 countries;
- **there is no correlation** between the LS pricing methodology chosen by NRAs and the increase in alternative infrastructures for the provision of broadband between 2004 and 2007 in the EU15 countries.

As can be seen from the figure below, some countries with the "incremental" methodology have experienced an increase in the share of alternative infrastructure (e.g. Belgium, Germany) while some countries with the "50:50" methodology approach have seen their share decrease (e.g. Austria, Finland).

Figure 10 – Impact of LS prices on the increase of alternative access infrastructure in the broadband market between 2004 and 2007 for the EU15 countries (in red, countries with the incremental cost approach)



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

[29] "Progress report on the Single European Electronic Communications Market".

[30] Average price published by the European Commission between 2004, 2005, 2006 and 2007 for each EU15 country.

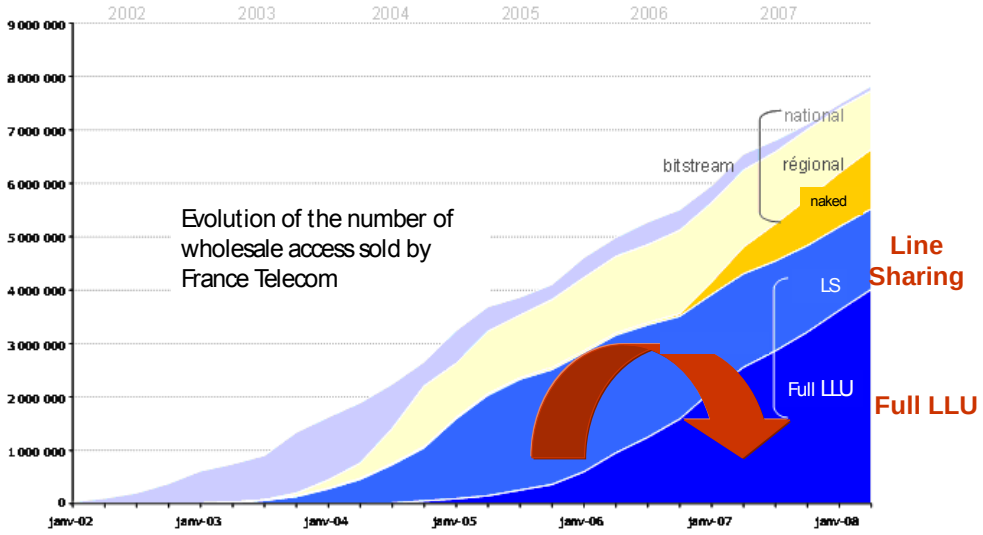
On the basis of data published by the European Commission in its 2007 report on competition in electronic communication markets, no correlation can be identified between the level of LS prices or the type of methodology used and the increase in alternative infrastructures for the provision of broadband between 2004 and 2007 in the EU15 countries.

4.3 Possible impact of LS pricing methodology on other regulated products

4.3.1 Full LLU

The impact of the LS pricing methodology on the full local loop unbundling ("LLU") development is marginal, as LS generally constitutes an intermediate step towards Full LLU ("investment ladder" approach). This has been observed in France, where OAOs first chose bitstream, then LS and are now switching to Full LLU.

Figure 11– Evolution of LS and Full LLU in France



Source: ARCEP

Source: ARCEP

In terms of investment, LS and Full LLU require the same level of investment as OAOs need in both cases to deploy a network that reaches the targeted exchanges. In terms of services, both LS and full LLU enable the OAO to provide the same type of services, TV over IP, high-speed access to the Internet, voice over broadband etc, but LS does not allow the provision of PSTN services. The main difference is that, with LS, the end-user will continue to pay the retail or wholesale PSTN monthly rental charge: on the one hand, LS offers less flexibility to OAOs compared to Full LLU but, on the other hand, LS leads to a progressive transition from "legacy telephony" services to "broadband" services as it does not interrupt the relationship between the end-user and the incumbent.

An important point to note is the fact that LS does not prevent the use by OAOs of full unbundling and there is no relationship between LLU pricing methodology and LS pricing methodology. Reviewing the EU15 countries shows that in the majority of jurisdictions there is no correlation between the LLU pricing methodologies and the LS pricing methodologies employed.

Figure 12 – Full LLU and LS pricing methodologies in the EU15 in 2008

Country	LLU methodology
	BU LRIC
	BU LRIC
	BU LRIC
	BU LRIC
	CCA
	BU LRIC
	TD LRIC
	BU LRIC
	HCA
Lux	
	TD LRIC
	HCA
	CCA
	HCA
	CCA

Country	Line sharing methodology
	50%
	Incremental
	50%
	50%
	Incremental
	Incremental
	Incremental
	50%
	Incremental
Lux	% determined by the incumbent
	Incremental
	Incremental
	Incremental
	50%
	Incremental

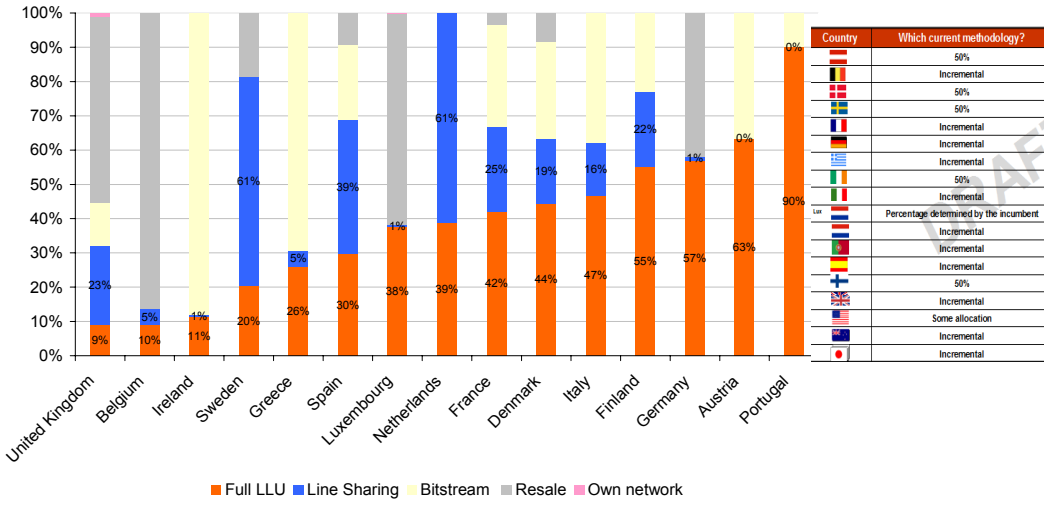
In many EU15 countries that choose to allocate 50% of local loop costs to LS, the BU-LRAIC methodology is used for the setting of full unbundling prices. However, some countries use BU-LRAIC for LLU pricing and incremental costs for LS pricing (Germany, Belgium) whereas others use Historical Cost Accounting ("HCA") for LLU pricing and 50:50 for LS.

As shown in the figure 12 below, the majority of countries applying the "incremental" methodology, the use of LS by OAOs is low compared to the use of Full LLU (e.g. France, Italy, Belgium, Greece, Germany and Portugal).

It can also be noted that in 4 countries the use of LS by OAOs is higher than the use of Full LLU. However, for these 4 countries, the choice of not allocating access network costs to LS prices is not the reason for having a high level of LS compared to Full LLU:

- In Sweden, 50% of local loop costs are allocated to LS with no discount on the retail monthly rental charge, but LS represents only 15% of broadband lines.
- In the Netherlands, the current trend indicates that OAOs increasingly prefer Full LLU compared to LS: since January 2006, the number of shared lines is stable while the number of Full LLU lines has increased 3-fold.
- In the United Kingdom, the levels of Full LLU and LS are very low compared to resale and bitstream, but also compared to cable.
- In Spain, the difference between the number of Full LLU lines and LS lines is not significant.

Figure 12 - New entrants' DSL lines by type of access (July 2007)



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

4.3.2 Bitstream

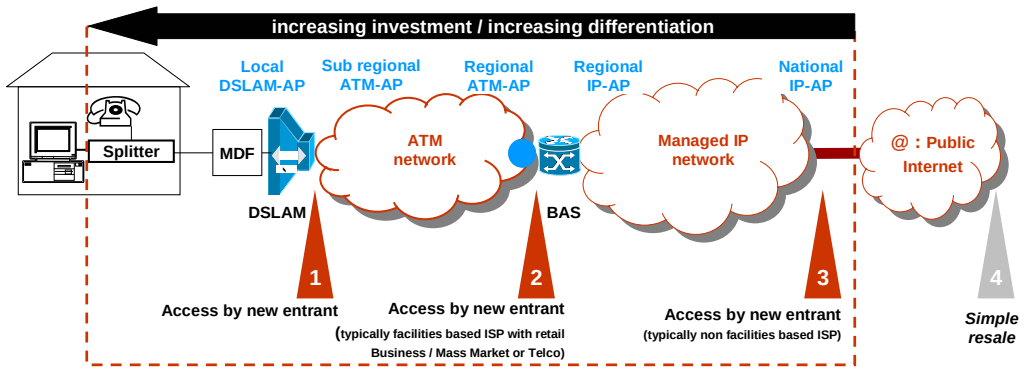
In its Common Position document,[31] the European Regulators Group defines the bitstream product as:

> *"the provision of transmission capacity* […] *between an end-user connected to a telephone connection and the point of interconnection available to the new entrant."*[32]

In practice, the bitstream product is a wholesale product that enables OAOs to provide DSL services to end-users within the whole territory through an interconnection to the incumbent's Internet Protocol ("IP") or Asynchronous Transfer Mode ("ATM") network. In comparison with LS or Full LLU, the bitstream product requires less investment to cover a whole territory as there is no need to deploy equipment in all of the exchanges of the incumbent.

However, bitstream offers less differentiation in terms of prices and of products offered (e.g. OAOs cannot currently offer triple play services).

Figure 11 - Definition of bitstream



[31] "ERG common position on bitstream access – adopted on 2nd April 2004 and amended on 25th May 2005".

[32] "High speed bitstream access (provision of DSL services by the incumbent operator) refers to the situation where the incumbent installs a high speed access link to the customer premises (e.g. by installing its preferred ADSL equipment and configuration in its local access network) and then makes this access link available to third parties, to enable them to provide high speed services to customers.

The incumbent may also provide transmission services to its competitors, to carry traffic to a 'higher' level in the network hierarchy where new entrants may already have a point of presence (e.g., transit switch location).

The bitstream service may be defined as the provision of transmission capacity (upward/downward channels may be asymmetric) between an end-user connected to a telephone connection and the point of interconnection available to the new entrant."

Source: TERA Consultants

LS is a sub-product of the bitstream product. As a consequence, bitstream product costs should incorporate LS costs. When setting bitstream prices, the NRA should ensure that there is no margin squeeze with LS prices. The level of bitstream prices should be set so that investments in LS are not discouraged.

NRAs should promote LS, like Full LLU, as it offers higher differentiation and requires more investment from OAOs and permits an efficient use of the existing copper local loop. This is one of the reasons for having bitstream prices set on the basis of the retail-minus methodology, or cost-based with a margin squeeze test as in France, while Full LLU and LS prices are cost-oriented in many countries.

As LS is a sub-product of bitstream, LS prices must not be set on the basis of bitstream prices. Currently, in Ireland, the price of Eircom's 1mb/s Wholesale Broadband product is €9.48[33] per month as compared to €8.41 for LLU Line Share, which means that the bitstream price does not appear to currently incorporate the LS price and represents a situation where margin squeeze may arise.

4.3.3 SB-WLR and PSTN retail service

Other regulated products like SB-WLR or the PSTN retail monthly rental charge are not related to LS as they are based on the retail-minus methodology and as retail tariffs are rebalanced in Ireland.

To the extent that the incumbent's access network costs are neither under-recovered (retail tariffs are rebalanced) nor over-recovered (any access network cost allocated to LS is deducted from the retail monthly rental charge), LS pricing does not deter investment in LLU. Bitstream prices should be set by building on LS prices and not the opposite.

[33] Eircom Wholesale Bitstream Price List 3.9

http://www.Eircomwholesale.ie/dynamic/pdf/bitpricelistv3.9_v2.pdf

5 Review of allocation methodologies.

As stated in the Section 3 of this report, the main issue is to determine whether some local loop costs should be allocated to LS prices.

Based on the benchmark of the 18 selected OECD countries, a review of papers and consultations published by NRAs and a survey of relevant economic literature, 10 methodologies for the allocation of common costs of the local loop have been identified:

1. Ramsey-Boiteux Pricing;
2. Efficient Component Pricing ("Baumol-Willig rule");
3. Cooperative Bargaining Theory;
4. Shapley-Shubik Pricing;
5. Stand-alone cost;
6. Equi Proportionate Mark-Up (EPMU);
7. Incremental costs (mainly used by NRAs);
8. Network incentives fees (formerly used by IBPT);
9. Joint production theory (proposed by Telstra in Australia);
10. FCC "ad hoc" method.[34]

For each of these 10 methodologies, an assessment has been made of their appropriateness to the aims pursued by ComReg. As with all NRAs, ComReg's aims are defined in the framework directive:[35]

- *"The national regulatory authorities shall contribute to the development of the Internal Market".*
- *"The national regulatory authorities shall promote the interests of the citizens of the European Union".*
- *"The national regulatory authorities shall promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services".*[36]

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[34] The five first methodologies were analysed in 2001 by ComReg.

[35] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services.

[36] These objectives will not change if the new electronic communication directives are adopted (see e.g. Proposal for a Directive of the European Parliament and of the Council of 2007 amending Directives 2002/21/EC on a common regulatory framework for electronic

Although the first two objectives are not directly related to LS,[37] **LS can be a tool for the achievement of the third aim,** which, according to the framework directive, can be completed by the following four objectives:

- *"(a) ensuring that users, including disabled users, derive maximum benefit in terms of choice, price, and quality;*
- *(b) ensuring that there is no distortion or restriction of competition in the electronic communications sector;*
- *(c) encouraging efficient investment in infrastructure, and promoting innovation; and*
- *(d) encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.*"

Considering all of these elements, it is intended here to verify, for each allocation methodology, its compliance with the four following objectives:

- maximising consumers' welfare;
- ensuring that Eircom recovers its costs with an appropriate degree of efficiency;
- avoiding any cost over-recovery by Eircom;
- encouraging efficient investment in infrastructure and not creating a risk of deterring investment in alternative infrastructure.

Alongside this "test" of adequacy, the assessment also includes a practical criterion so as to guarantee that ComReg can effectively implement it, meaning the practicality of the methodology (this constitutes the fifth objective).

communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and services, and 2002/20/EC on the authorisation of electronic communications networks and services.

[37] In particular, the second objective can be achieved, according to the framework directive, by providing universal service, ensuring personal data protection, addressing the needs of disabled users, ensuring electronic communications integrity, ensuring tariff transparency, as well as by protecting consumers.

In the remainder of this section, 10 methodologies, relevant for LS pricing are assessed so as to verify their consistency with the objectives of ComReg.

The 10 methodologies are:

1. ***Ramsey-Boiteux Pricing;***
2. ***Efficient Component Pricing (Baumol-Willig rule);***
3. ***Cooperative Bargaining Theory;***
4. ***Shapley-Shubik Pricing;***
5. ***Stand-alone cost;***
6. ***Equal Proportionate Mark-Up (EPMU);***
7. ***Incremental costs (mainly used by NRAs);***
8. ***Network incentives fees (formerly used by IBPT);***
9. ***Joint production theory (proposed by Telstra in Australia);***
10. ***FCC "ad hoc" method.***

The 5 objectives of ComReg are:

- ***maximising consumers' welfare;***
- ***ensuring that Eircom recovers its costs with an appropriate degree of efficiency;***
- ***avoiding any cost over-recovery by Eircom;***
- ***encouraging efficient investment in infrastructure and not creating a risk of deterring investment in alternative infrastructure;***
- ***simplicity of the methodology.***

5.1 The Ramsey-Boiteux methodology

5.1.1 Definition

The main idea behind the Ramsey-Boiteux pricing rule is quite simple: when several services use a unique asset, a smaller part of their common costs should be allocated to the service that is more price-sensitive. Thus, the total demand for services supported by the common asset will be maximised.

Lafont and Tirole (2000) highlight the Ramsey-Boiteux Pricing rule as follows:

- *"It would be absurd (on efficiency grounds) to charge high mark-ups on those services for which consumers are not willing to pay much above the marginal cost. Cost recovery should place a higher burden on those services with relatively inelastic demands."*
- *"The structure of mark-ups must thus reflect the structure of demand elasticities. Furthermore, the cross-elasticities must also be accounted for."*

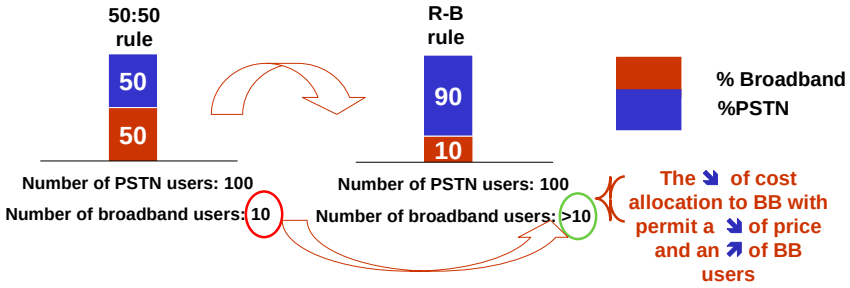
5.1.2 Example

Let us consider that:

- local loop costs are equal to 100 per access and are equally shared between broadband and PSTN services;
- the PSTN service is perfectly inelastic (e=0);
- the broadband service is elastic (e=–1);
- there are initially 100 PSTN users and 10 broadband users.

If it is decided to apply the "Ramsey-Boiteux rule" instead of the "50:50" allocation rule, a high proportion of local loop costs will be allocated to LS (e.g. if 90% is allocated to PSTN (due to inelasticity) and 10% to broadband). As a consequence, the number of PSTN users will remain stable (100) owing to the inelasticity of PSTN while the number of broadband users will increase because of the higher elasticity of broadband.

Figure 12 – Example of the impact of the use of the Ramsey-Boiteux methodology



Source: TERA Consultants

5.1.3 Assessment

The central result of the Ramsey-Boiteux rule is that it *"maximises welfare subject to a break-even constraint on the regulated firm(s)".*[38] The main difficulty of implementing Ramsey-Boiteux pricing is that it requires detailed information, technical limitations that are clearly identified in the literature:

- *"Academic economists and policymakers both often argue that regulators do not have the information to set Ramsey prices".*[39]
- *"While regulators could try and approximately implement such global Ramsey pricing formulas, there have been no known attempts to do so".*[40]
- *"This requires a substantial amount of information, particularly as the impact of one service's price on the demand for other services has to be taken into account. It is also very important that market rather than company elasticities of demand are used to set prices, because otherwise all the shared and common fixed costs end up being recovered from services where there is little or no competition."* Office of the Director of Telecommunications Regulation ("ODTR")[41] Decision D8/01.

- The Ramsey-Boiteux approach fulfils all of the objectives of ComReg listed above except for simplicity:
- **maximising consumers' welfare**: this is the optimal methodology in terms of service development;
- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are allocated either to PSTN or to broadband;
- **avoiding any cost over-recovery by the incumbent:** to avoid any cost over-recovery, if more than 0% of the costs are allocated to LS, then 100-x% should be allocated to PSTN and the PSTN monthly rental charge should be reduced;
- **encouraging efficient investment in infrastructure:** since the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices

[38] Vogelsang I. (2006).

[39] Lafont J-J., Tirole J. (2000).

[40] Vogelsang I. (2006).

[41] ODTR is the predecessor of the Commission for Communication Regulation ("ComReg").

take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;

- **simplicity:** No. There are a number of difficulties associated with the practical implementation of Ramsey pricing which include the requirement for long-term demand and price information, where it is important to use market information on prices and demand rather than company information. For PSTN, it is difficult to determine whether full PSTN prices (fixed line calls + access) or just access should be considered. ADSL broadband is not available in Ireland without PSTN, which make cross-elasticities difficult to assess.

5.2 The ECPR methodology

5.2.1 Definition

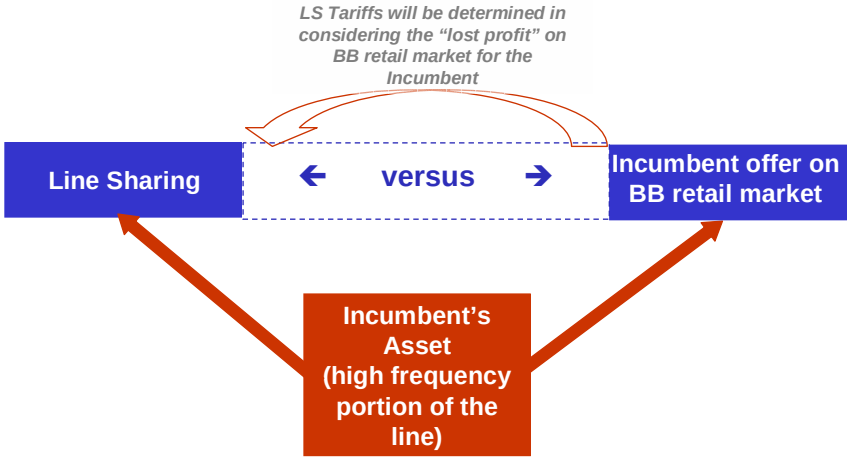
The Efficient Component Pricing Rule ("ECPR") represents the incremental cost plus the opportunity cost that the incumbent incurs when the OAO provides the service. This opportunity cost is computed as revenues less all incremental costs.

As a consequence, prices derived on the basis of the ECPR represent both profit and contribution to common costs of the incumbent, given the existing retail prices for the service considered. ECPR ensures that new operators enter if they provide the downstream service more efficiently than the incumbent.

5.2.2 Example

If LS prices are determined on the basis of the ECPR methodology, then it shall equal the opportunity cost, for the incumbent, of "not selling directly BB services in the retail market" with the high-frequency portion of the line (which is not dedicated to LS).

Figure 13 – LS pricing under ECPR



Source: TERA Consultants

5.2.3 Assessment

The expected social benefits of charging ECPR are that:

- it sends a clear signal to potential entrants and avoids "adverse selection" (meaning that the most efficient OAOs enter the market);
- as it is neutral for its profits, the incumbent is less reluctant to reduce the quality of access.

Nevertheless, ECPR has been criticised repeatedly because:[42]

- the incumbent's retail tariff guides the access price set and, thus, entrants must adjust their retail prices when the incumbent does;
- ECPR may force the entrants to contribute to the incumbent's cost inefficiency and may reduce the incentive to improve this degree of efficiency;
- the opportunity cost may be difficult to identify as OAOs' offers may attract new customers with zero opportunity cost for the incumbent;
- which would mean that the implementation may present a "false simplicity" (the relevant information is quite simple to collect but leads to a biased interpretation);

[42] See Lafont, Tirole (2000).

One central issue is related to the uncertainty regarding the existence of an opportunity cost for the incumbent: the market dynamics may be induced by competition (especially if the OAOs present differentiated offers), meaning that no opportunity cost really impacts the incumbent. Moreover, for products with network effects, the incumbent may benefit from those market dynamics as this is impossible to create in a monopolistic context. The competition will tend to increase the consumers base in the market and, then, may sometimes lead to higher average revenues per user even for the incumbent due to the existence of network effects.

Contrary to the Ramsey-Boiteux rule, the ECPR methodology has a reduced number of qualities to make it suitable for LS pricing:

- **maximising consumers' welfare**: there is no guarantee that this methodology maximises consumers' welfare as it may preserve the inefficiency of the incumbent or lead to compensation for a "non-existing" opportunity cost;
- **ensuring that the incumbent recovers its costs**: Yes, by construction of the methodology;
- **avoiding any cost over-recovery by the incumbent**: as prices based on this methodology are related not to local loop common costs but to retail prices, there is a risk of costs being over-recovered. The eventual excessive profits on the local loop segment will not be excluded;
- **encouraging efficient investment in infrastructure**: only service-based competition or low infrastructure-based competition is encouraged;
- **simplicity:** this methodology requires information about retail costs.

5.3 The cooperative bargaining methodology

5.3.1 Definition

This methodology seeks to determine what would happen in the presence of 2 operators wishing to build a local loop "from scratch". To avoid an inefficient duplication of the infrastructure, the operators would negotiate so as to share the local loop costs.

Logically, such a process would lead to splitting the local loop costs between the two operators on a 50:50 basis:

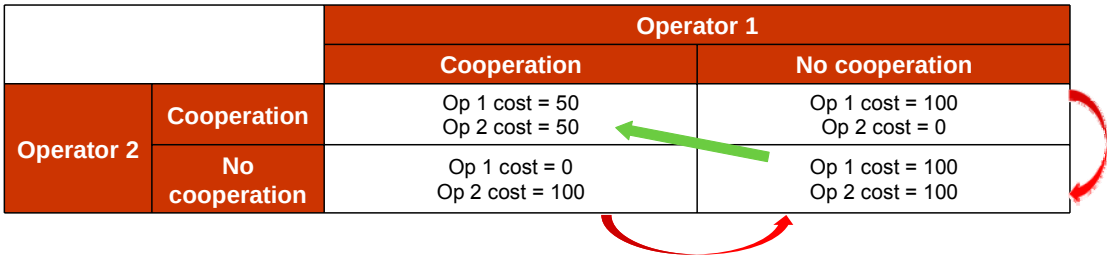
- if one party was asked by the other to pay more than half of the local loop costs, it may decide to build its own local loop and ask the other party to pay 50% of the costs.

5.3.2 Example

Let us consider two operators intending to build a local loop to provide broadband and PSTN services with the cost of the local loop equal to 100. The question, under the cooperative bargaining methodology, is: which allocation rule may avoid the decision to duplicate the local loop?

If one of the operators refuses to share equally the costs, the other one will prefer to build itself the local loop, which would be the worse situation. As a consequence, the operators have to choose between the 2 equilibriums that permit for both of them to offer the service(s). The “double cooperation” is the most consistent equilibrium for the 2 players as it avoids duplication of the infrastructure.

Figure 14 – Possible behaviours of the 2 operators wanting to provide PSTN and broadband services



Source: TERA Consultants

5.3.3 Assessment

The reasoning is a rather simple (even simplistic) method leading to a 50:50 allocation of the common costs (but other methods lead to the same allocation, as explained later). Nevertheless, the situation of bargaining that it describes is hypothetical as it is based on the assumption that 2 comparable operators enter into such a process at the same moment. Even if it would be logical to split the costs 50:50 for 2 firms entering simultaneously, this allocation is not appropriate in the present situation, as the entry is sequential with LS (by definition).

Considering the adequacy of this methodology to ComReg's objectives, the main disadvantages are that it does not maximise consumers' welfare and it requires the setting up of a discount mechanism on the PSTN monthly rental charge for "LS users":

- **maximising consumers' welfare:** this issue is not addressed by this methodology as the allocation does not consider the willingness of consumers to pay;
- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are recovered;
- **avoiding any cost over-recovery by the incumbent:** the PSTN monthly rental charge should be reduced by 50% of the local loop costs;
- **encouraging efficient investment in infrastructure:** as the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;
- **simplicity:** the calculation is quite simple, but the implementation is complicated by the necessity to implement a discount in the PSTN monthly rental charge for LS users.

5.4 The Shapley-Shubik methodology

5.4.1 Definition

Like the cooperative bargaining methodology, the Shapley-Shubik methodology is derived from game theory.[43] Under this methodology, costs allocated to a given service are equal to the expected incremental cost considering the order of arrival, assuming that the rank of arrival of the services is random and equiprobable. This method guarantees that the cost allocation for a service is lower than its stand-alone cost, even with the existence of technologies providing a service independently of the others.

The final equilibrium, in the present case, is the same as for cooperative bargaining but with a more consistent and sophisticated reasoning: with 2 members in the coalition, the expected equilibrium is therefore 50:50.

[43] Game theory is a branch of applied mathematics that is used in economics to capture behaviour in strategic situations, in which an individual's success in making choices depends on the choices of others.

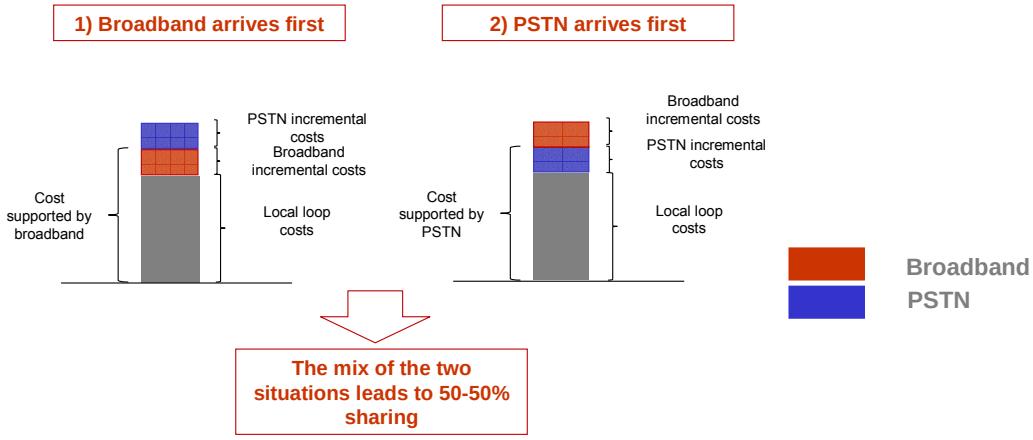
5.4.2 Example

Let us consider two scenarios regarding the order of arrival of the services:

- If PSTN arrives first, the operator has to pay for the local loop costs plus incremental costs related to the PSTN service. When broadband arrives, the operator needs to pay only for the broadband incremental costs.
- If broadband arrives first, the operator has to pay for the local loop costs plus incremental costs related to the broadband service. When PSTN arrives, the operator has to pay only for the PSTN incremental costs.

The two scenarios imply that broadband should support half of the local loop costs plus the incremental costs related to broadband and that PSTN should support half of the local loop costs plus the incremental costs related to PSTN.

Figure 15 – Costs generated by broadband and PSTN depending on their order of arrival in the market



Source: TERA Consultants

5.4.3 Assessment

Shapley-Shubik is an appropriate method in the presence of a complex combination of services (meaning more than 2). For LS, this method suffers the same limitations as cooperative bargaining, even though the rationale is more solid (and, thus, is probably easier to share with the “stakeholders”).

- **maximising consumers’ welfare:** this issue is not addressed by this methodology as the allocation does not consider the willingness of consumers to pay;

- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are recovered;
- **avoiding any cost over-recovery by the incumbent:** to avoid any cost over-recovery, the PSTN monthly rental charge should be reduced by 50% of local loop common costs;
- **encouraging efficient investment in infrastructure:** as the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;
- **simplicity:** the calculation is quite simple, but the implementation is complicated by the necessity to implement a discount in the PSTN monthly rental charge for LS users.

5.5 The Stand-Alone costs methodology

5.5.1 Definition

The allocation to one service is proportionate to its share of the sum of the stand-alone costs for all services considered. The method detailed by Moriarity (1975)[44] consists, more precisely, of allocating costs in proportion to the minimum between the stand-alone costs and the sum of directly attributable and joint costs.

In the case of LS, this methodology would lead to a 50:50 allocation: the stand-alone costs of deploying from scratch the local loop for voice and, from scratch also, the local loop for broadband services are (roughly) the same (the cost of a full local loop). As 2 services are present, the stand-alone cost of one is half of the sum of their combined stand-alone costs, giving a 50:50 allocation.

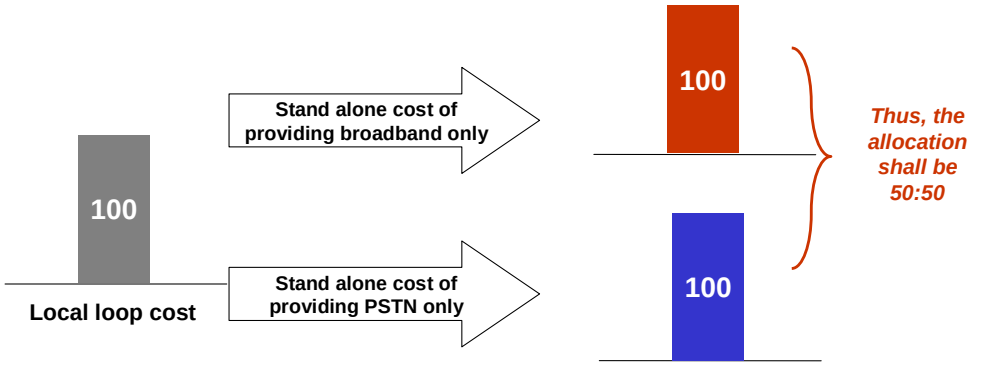
5.5.2 Example

Let us consider that the local loop costs 100. Then the stand-alone cost of providing broadband is 100 while the stand-alone cost of providing PSTN

[44] Moriarty S. (1975).

services is 100 (incremental costs of broadband and PSTN are neglected in this example). The stand-alone costs are the same for the two services.

Figure 16 – Stand-alone costs of broadband and PSTN services



Source: TERA Consultants

5.5.3 Assessment

Such a method is, once again, a way to rationalise the 50:50 equilibrium for LS pricing. For that reason, the limits are the same as those for the Cooperative Bargaining and Shapley-Shubik methodologies, as this methodology is not demand-side-orientated.

- **maximising consumers' welfare:** this issue is not addressed by this methodology as the allocation does not consider the willingness of consumers to pay;
- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are recovered;
- **avoiding any cost over-recovery by the incumbent:** to avoid any cost over-recovery, the PSTN monthly rental charge should be reduced by 50% of local loop common costs;
- **encouraging efficient investment in infrastructure:** as the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;
- **simplicity:** the calculation is quite simple, but the implementation is complicated by the necessity to implement a discount in the PSTN monthly rental charge for LS users.

5.6 The Equi Proportionate Mark-Up methodology

5.6.1 Definition

The Equi Proportionate Mark-Up ("EPMU") methodology leads to the recovery of common costs through the addition of a mark-up on top of incremental costs. These mark-ups are defined so that each service bears a share of the common costs that is proportionate to the incremental costs of the service.

5.6.2 Example

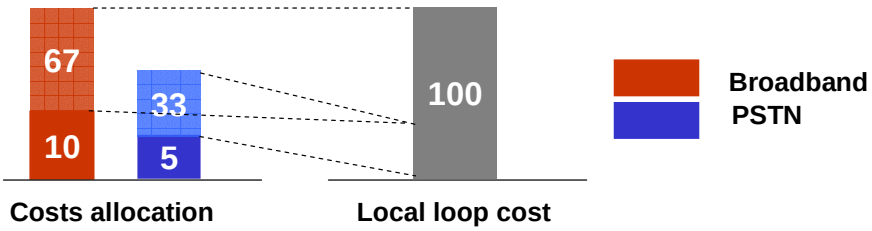
Let us consider that:

- the local loop costs are 100;
- the incremental cost of PSTN is 10 per line;
- the incremental cost of broadband is 5 per line.

As the incremental cost of PSTN is double the incremental cost of broadband, PSTN will support twice the local loop costs (100) that broadband will:

- PSTN will support 67 + 10 = 77;
- broadband will support 33 + 5 = 38.

Figure 17 – Example of cost allocation with the EPMU methodology



Source: TERA Consultants

5.6.3 Assessment

Even if the EPMU method seems to lead to a more sophisticated solution than the stand-alone cost method (the allocation ≠ 50:50), this rule is also limited as there is no reason to correlate the proportion of incremental costs to differences in "willingness to pay" for each service (which tends to maximise the global welfare): "*The difference with Ramsey prices is that the willingness to pay does not count, only the costs. Henceforth, this method neglects demand-side factors and scores worse than Ramsey pricing on allocative efficiency. In cases where common costs are small relative to incremental costs, this distortion is modest".*[45]

- **maximising consumers' welfare:** this issue is not addressed by this methodology as the allocation does not consider the willingness of consumers to pay;
- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are recovered;
- **avoiding any cost over-recovery by the incumbent:** to avoid any cost over-recovery, the PSTN monthly rental charge should be reduced by 50% of local loop common costs;
- **encouraging efficient investment in infrastructure:** as the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;
- **simplicity:** the calculation is quite simple, but the implementation is complicated by the necessity to implement a discount in the PSTN monthly rental charge for LS users.

5.7 The Incremental cost methodology

5.7.1 Definition

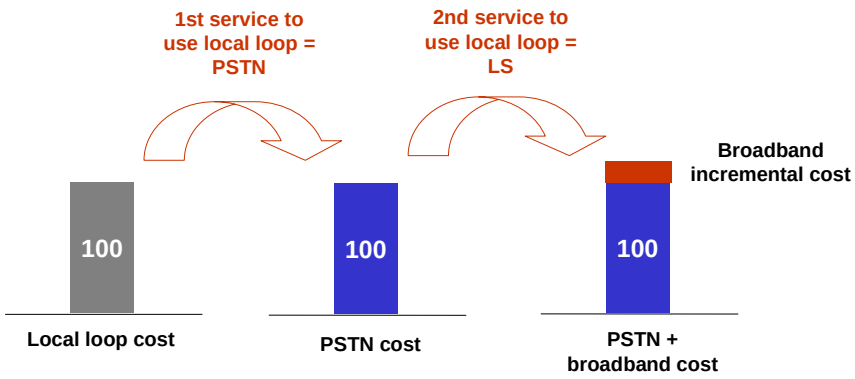
This methodology considers that the first service to use a common cost should bear the costs and that the other services should bear only incremental costs.

[45] Canoy M., De Bijl P., Kemp R. (2002).

5.7.2 Example

Let us consider that the local loop costs 100. As the local loop was initially built for the PSTN service, the broadband service bears only the incremental costs.

Figure 18 – Example of application of the incremental cost methodology



Source: TERA Consultants

5.7.3 Assessment

The incremental cost methodology conforms to the principle of non-discrimination as incumbents are in general paying only the incremental cost when providing broadband in addition to PSTN (no reduction in the PSTN monthly rental charge is proposed, except in Denmark and Norway).

This methodology is simple because any allocation of the local loop costs to the LS service would require a reduction of the incumbent's PSTN monthly rental charge:

> *"If some of these shared costs related to the copper line were to be recovered from the shared access service, TeliaSonera would need to ensure that corresponding reductions were made to the current PSTN subscription charges to avoid over recovery of costs. However, if such a scheme were implemented, consumers not subscribing to broadband services would be paying a higher*

> *price for PSTN rental charge than broadband users, which would make such a scheme difficult to implement."*[46]

Owing to the apparent low price elasticity of PSTN and the apparent higher price elasticity of broadband (see Annex 7.2), this approach should lead to an allocation consistent with the Ramsey-Boiteux pricing rule, which provides allocative efficiency

Finally, the benchmark of the 18 selected OECD countries has revealed that the majority of the NRAs have selected this method and that some have decided to switch from a "50:50" allocation to an "incremental" methodology. This methodology has been further explained by the Independent Regulators Group ("IRG"):[47]

> *"The costs of the line [...] could be most easily attributed fully to the voice band. Alternatively these line costs can be split between the voice band and the non-voice band in a way that up to 50% of the line costs are attributed to the non-voice band. In this case there is a need to re-investigate monthly line rentals charged to the end user."*

This method is both relevant to the demand side and simple to implement:

- **maximising consumers' welfare:** this is not as optimal in terms of service development as with the Ramsey-Boiteux methodology, but broadband is provided to the end-users at "low cost" while PSTN penetration is saturated;
- **ensuring that the incumbent recovers its costs:** tariff rebalancing ensures that the incumbent recovers its costs through the PSTN monthly rental charge;
- **avoiding any cost over-recovery by the incumbent:** this is guaranteed by this methodology;
- **encouraging efficient investment in infrastructure**: the use of the copper infrastructure is made very efficient. According to Section 4 of this report, there is no distortion of investment incentives to the extent that the incumbent's access network costs are neither under-recovered (retail tariffs are rebalanced) nor over-recovered (any access network cost allocated to LS is deducted from the retail monthly rental charge);

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[46] "Pricing shared access in Sweden, 12 October 2004, Final draft for public consultation".

47 Principles of implementation and best practice regarding LLU as decided by the Independent Regulators Group, 18 October 2001, and amended in May 2002.

- **simplicity**: this methodology is very simple as only incremental costs have to be calculated and no discount on the PSTN monthly rental charge is required.

5.8 The "network incentive fee" methodology

5.8.1 Definition

This "method" was implemented in Belgium up to 2007 (being replaced then by the incremental method): a network fee was calculated to give incentives to the incumbent to maintain and renew its network. In order to avoid any cost over-recovery by the incumbent, the Full LLU price was reduced: this reduction was calculated in year *N* on the basis of the estimation of network incentive fees that will be received by the incumbent in year *N*+1.

5.8.2 Example

See Section 2.2.1.

5.8.3 Assessment

This methodology is not demand-side-oriented and implies cross-subsidies between LS and Full LLU. The mechanism sets out to avoid cost over-recovery based on forecasts, but because of the subjective nature of forecasting there is no guarantee that costs will not be over-recovered. The only point of interest in this method is that it is centred on the quality of the infrastructure:

- **maximising consumers' welfare:** the allocation rule is arbitrary. It also distorts competition as the reduction is offered not to LS customers (through a reduction in the monthly rental fee, for example) but to Full LLU customers;
- **ensuring that the incumbent recovers its costs:** in theory this methodology ensures that the incumbent recovers its costs, but in practice this might not be the case, as the reduction in the Full LLU price is calculated in year *N* on the basis of the estimation of network incentive fees that will be received by the incumbent in year *N*+1. If estimates are wrong, costs might be under-recovered;
- **avoiding any cost over-recovery by the incumbent**: see the previous point;

- **encouraging efficient investment in infrastructure**: no, as the reduction in the Full LLU price increases the attractiveness of LLU and can deter investments in alternative technologies;
- **simplicity**: the system of Full LLU price reduction can be complicated.

5.9 The Joint production methodology[48]

5.9.1 Definition and example

The "joint production theory"[49] deals with a situation where a joint input is used to produce different services. In the present case, this methodology considers that, as far as the demand for voice services is stronger than the demand for broadband services, all joint production costs (the full cost of the local loop) should be apportioned to the voice services as the local loop was initially dimensioned to provide such services. It is close to the reasoning behind incremental costs but has a stronger theoretical basis.

An allocation of joint costs to broadband services would be consistent only if offering these services had an impact on the construction of the infrastructure that determines the joint costs. In the opposite case, broadband services should support zero joint costs.

5.9.2 Assessment

This methodology fits ComReg's objectives similarly to the incremental methodology:

- **maximising consumers' welfare:** this is not as optimal in terms of service development as with the Ramsey-Boiteux methodology, but broadband is provided to the end-users at "low cost" while PSTN penetration is saturated;

[48] Even if this method has not been widely disseminated, it appears in Australia in the debate between the ACCC and the operators.

[49] Kahn, A. (1988).

- **ensuring that the incumbent recovers its costs:** tariff rebalancing ensures that the incumbent recovers its costs through the PSTN monthly rental charge;
- **avoiding any cost over-recovery by the incumbent:** this is guaranteed by this methodology;
- **encouraging efficient investment in infrastructure**: the use of the copper infrastructure is made very efficient. According to Section 4 of this report, there is no distortion of investment incentives to the extent that the incumbent's access network costs are neither under-recovered (retail tariffs are rebalanced) nor over-recovered (any access network cost allocated to LS is deducted from the retail monthly rental charge);
- **simplicity**: this methodology is very simple as only incremental costs have to be calculated and no discount in the PSTN monthly rental charge is required.

5.10 The FCC "ad hoc" methodology

5.10.1 Definition

In 1999 the Federal Communication Commission ("FCC") proposed that only the *"amount of loop costs the incumbent Local Exchange Carrier ("LEC") allocated to ADSL services when it established its interstate retail rates for those services"* be covered by LS prices.[50] This approach was practical for establishing rates consistent with the general pro-competitive purpose underlying the TELRIC principles: *"If an incumbent* [LEC] *allocates zero loop costs to the xDSL service when it offers such services over a voice line, then it cannot charge the competitive LECs any loop cost for access to a line for the purpose of offering those same xDSL services".*

The FCC considered that it would not prevent incumbents recovering their costs as incumbent LECs were recovering the full embedded cost of their loops through revenues received from intrastate business and residential voice services, interstate access charges and intrastate access charges.

[50] FCC99355 http://www.fcc.gov/Bureaus/Common_Carrier/Orders/1999/fcc99355.doc.

5.10.2 Assessment

This methodology is particular to the United States and would be difficult to implement in Europe:

- **maximising consumers' welfare:** this issue is not addressed, and the allocation does not consider the willingness of consumers to pay;
- **ensuring that the incumbent recovers its costs:** 100% of local loop costs are recovered;
- **avoiding any cost over-recovery by the incumbent:** to avoid any cost over-recovery, the PSTN monthly rental charge should be reduced for LS users;
- **encouraging efficient investment in infrastructure:** as the SB-WLR price is superior to the BU-LRAIC Full LLU price, the end-user prices take into account a BU-LRAIC local loop cost, which encourages efficient investment in infrastructure;
- **simplicity:** allocation is done on the basis of the existing allocation rule. However, this is not completely relevant in the EU context (there are no interstate retail rates for ADSL services in Europe).

5.11 Conclusions on the recommended allocation methodology of common (local loop) costs for the purpose of setting LS prices in Ireland

From a theoretical point of view, the best allocation of local loop common costs to LS methodology is the Ramsey-Boiteux pricing rule.

This is acknowledged by many economists and NRAs, as exemplified by the following quotes:

- *"When common costs are large, Ramsey prices, or more generally demand-side factors, should not be discarded that easily. Difficult data requirements can sometimes be resolved. Imperfect demand estimations can be better than no demand-side estimations*."[51]

[51] Canoy M., De Bijl P., Kemp R. (2002).

- *"In cases where Ramsey pricing is unfeasible, the regulators will find themselves at crossroads since none of the alternatives can be assessed as being a priori superior to the other".*[52]
- *"There is no one theoretically correct way to allocate the shared costs of the copper line between PSTN access and shared copper access"* [53]
- *"However, the ACCC also notes that, as the allocation of line costs can happen in a number of ways, there may not be a single "correct" allocation of line costs to the LSS. Accordingly, whether any given allocation better reflects cost of provisioning may be doubtful"* (ACCC).[54]

However, as set out in Section 4.1.3, the requirements of Ramsey pricing in terms of information required are very high and the implementation for NRAs is very burdensome.

The benchmark of the 18 selected OECD countries clearly demonstrates that NRAs have decided to adopt a "second-best solution": "incremental" methodology or the "50:50" methodology.

As the Ramsey-Boiteux methodology is not practically feasible, ComReg has to consider what the next-best options are:

- the **"symmetric allocation" group**: Stand-alone costs, Cooperative Bargaining Theory or Shapley-Shubik Pricing represent different theoretical ways that lead to a 50:50 allocation of the common costs of the local loop between PSTN line rental and LS;
- the **"asymmetric allocation" group**: Incremental costs or Joint Production Theory lead to a lower allocation of the common costs of the local loop to LS and a higher allocation of common costs to PSTN line rental.

All of the other methods are either too difficult to be implemented or too fragile from a logical point of view. **Most NRAs considered the superiority of "asymmetric allocations" in initially choosing incremental or in moving from 50:50 to incremental.**

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[52] Canoy M., De Bijl P., Kemp R. (2002.

[53] http://www.pts.se/upload/Documents/SE/Pricing_methodology-shared_access_141103.pdf.

[54] Review of the Line Share Service, Declaration Final Decision, October 2007.

Figure 19 – Advantages and disadvantages of the 10 allocation methodologies in relation to the achievement of ComReg's objectives

		Maximizing welfare	Ensuring Eircom recovers its costs	Avoiding any cost over recovery	Encouraging efficient investment in infras	Compliance with full LLU	Simplicity
1rst best but too complex	Ramsey Boiteux	Yes	Yes	Yes if reduction in PSTN monthly charge	Yes	Yes	No
Asymmetric methods	Incremental	Yes but lower than Ramsey	Yes	Yes	Yes	Yes	Yes
	Joint production	Yes but lower than Ramsey	Yes	Yes	Yes	Yes	Yes
Symmetric methods	Coop. Bargaining	No	Yes	Yes if reduction in PSTN monthly charge	Yes	Yes	Yes for calc./No for implem. as PSTN monthly charge required
	Shapley	No	Yes	Yes if reduction in PSTN monthly charge	Yes	Yes	Yes for calc./No for implem. as PSTN monthly charge required
	Stand alone	No	Yes	Yes if reduction in PSTN monthly charge	Yes	Yes	Yes for calc./No for implem. as PSTN monthly charge required
Not relevant here	ECPR	No	Yes	No	No	No	Yes
	EPMU	No	Yes	Yes if reduction in PSTN monthly charge	No guarantee	Yes	Yes for calc./No for implem. as PSTN monthly charge required
	FCC ad hoc	Yes but lower than Ramsey	Yes	Yes	Yes	Yes	Not relevant in the EU case
	Incentive fee	No	No	No	No	Yes	No

Source: TERA Consultants

The "asymmetric methods" group presents the most interesting characteristics for ComReg:

- The degree of compliance with ComReg's' objectives is higher than for symmetric solutions. In particular, "symmetric" methodologies are more complex to implement as a discount on LS users' PSTN monthly rental charge is necessary.

- Moreover, it represents an approximation of the Ramsey-Boiteux rule (see Annex 7.2) and will therefore be more consistent with the consumers' welfare optimisation than symmetric methods. On the one hand, the PSTN price elasticity appears to be low in Ireland as the number of PSTN users remained stable while the PSTN monthly rental charge increased several times during the last few years. On the other hand, studies in the USA and the analysis of the relationship between broadband penetration and broadband prices indicate that broadband price elasticity is high (and obviously higher than for PSTN monthly rental charges).

- It has been adapted in diverse environments owing to the wide adoption of incremental cost by NRAs.

- Although some NRAs have decided to change from "50:50" to "incremental", there is no opposite example.

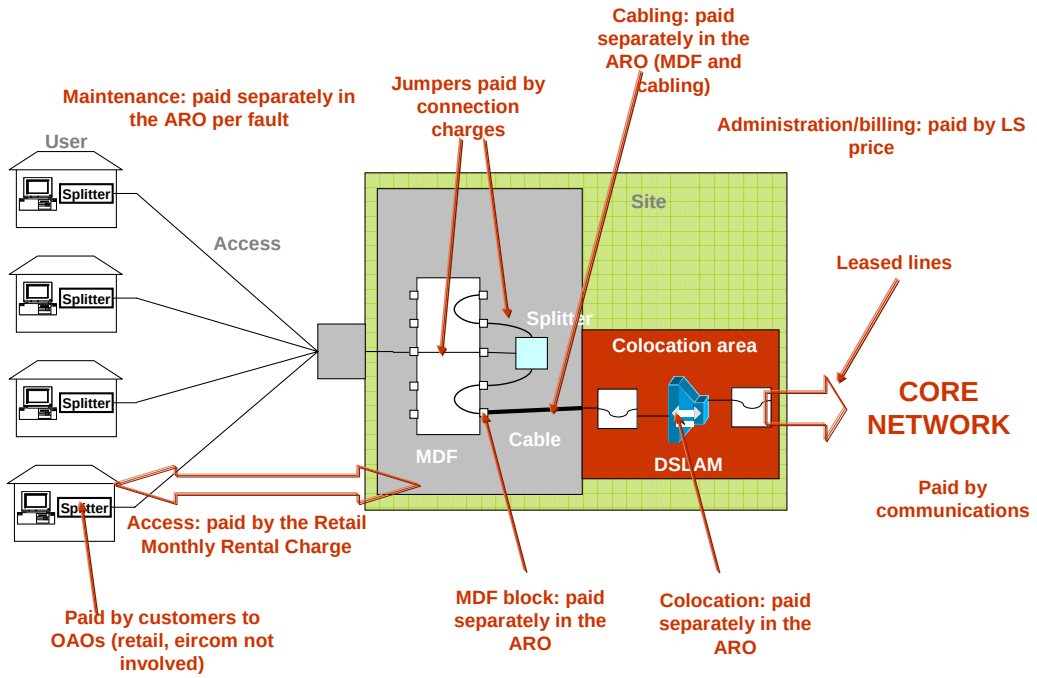
TERA Consultants therefore recommends that a methodology from the "asymmetric methods" group be chosen by ComReg and, based on the findings of a review of the 18 selected OECD countries, recommends selection of the "incremental" methodology.

6 Recommendations for LS prices in Ireland on the basis of the "incremental" methodology

The provision of LS requires Eircom to complete several tasks: installation of cables, removal of jumpers, administration, billing etc. Among these tasks, many are not covered by the LS monthly rental price of Eircom but by specific prices listed in the incumbent's access reference offer ("ARO").

However, the LS monthly rental price shall cover only costs related to the local loop (network costs), **fixed costs related to the development of LS** (which are allocated to the LS monthly rental price in general) and recurring fees related to the provision of the service (**billing and administration**).

Figure 20 – Costs related to LS in Ireland



Source: TERA Consultants

Among local loop costs, three categories can be defined:

- **capital and operational costs**: the incremental cost approach allocates 0% of these costs to the LS product;
- **maintenance costs related to the high-frequency band**: these are charged for separately in Eircom's ARO;
- **pair-gain removal costs**: these are to be covered by LS prices, if LS is allowed on lines with pair-gain systems.

It is proposed to undertake a preliminary assessment of relevant costs to LS in Ireland and consider the relevant incremental costs of the following categories:

1. pair-gain removal;
2. clearing the additional faults reported on shared lines;
3. product development and management;
4. billing and administration.

6.1 Pair-gain removal

Pair gain is a method of transmitting multiple POTS signals over the twisted pairs traditionally used for a single traditional subscriber line in telephone systems and is never compliant with the provision of DSL services.

Two options could be envisaged here by ComReg:

- considering that it is not entitled to unbundle lines with pair-gain systems;
- or considering that lines with pair-gain systems can be unbundled and, in this case, that the cost of pair-gain removal for LS must be covered by the LS price.

If the second option is preferred, the total investment related to pair gain removal should be assessed and then depreciated to be recovered through the LS monthly price. Economic depreciation methodologies such as the tilted annuity formulae or the Net Present Value could be used to derive the monthly charge related with this total investment. One of the key inputs of such depreciation methodologies is the asset lives of pair gain systems. Based on information provided by ComReg the estimated cost could be €0.79/line/month. This cost has been derived by depreciation over the broadband subscription life of 42 months.

In the United Kingdom, Ofcom has considered the pair-gain removal with depreciation over 15 years.[55] **TERA recommends using 10 years, as economic asset lives in Ireland are currently lower than in the UK.**[56] This leads to a cost for pair-gain removal equal to €0.36/line/month. This has been assessed on the basis of the depreciation methodology proposed by Eircom.[57]

Figure 21 – Pair-gain removal costs per line and per month

Depreciation period	42 months With old WACC	42 months With new WACC	120 months With new WACC	180 months With new WACC
Cost per line and per month	0,79€	0,78€	0,36€	0,29€

Source: TERA Consultants

6.2 Clearing the additional faults reported on shared lines

In Eircom's ARO, faults are paid for separately through the "fault clearance charge". As a consequence, additional faults reported on shared lines should not be paid by OAOs through the LS monthly price but through the "fault clearance charge".

If the process created by Eircom to handle faults is correctly set up, there should not be any additional costs for Eircom.

When a fault occurs on a shared line:

- If it is related to broadband only

and if the end-user calls Eircom's customer service and there is no PSTN fault (meaning that the phone line is OK), Eircom should ask the end-user to call the OAO;

and if the end-user calls the OAO, then the OAO contacts Eircom if the fault is related to Eircom's access network and pays the "fault clearance charge".

[55] http://www.ofcom.org.uk/static/archive/Oftel/publications/broadband/llu/shac1001.htm.

[56] This comparison is based on the current regulatory asset lives in Ireland.

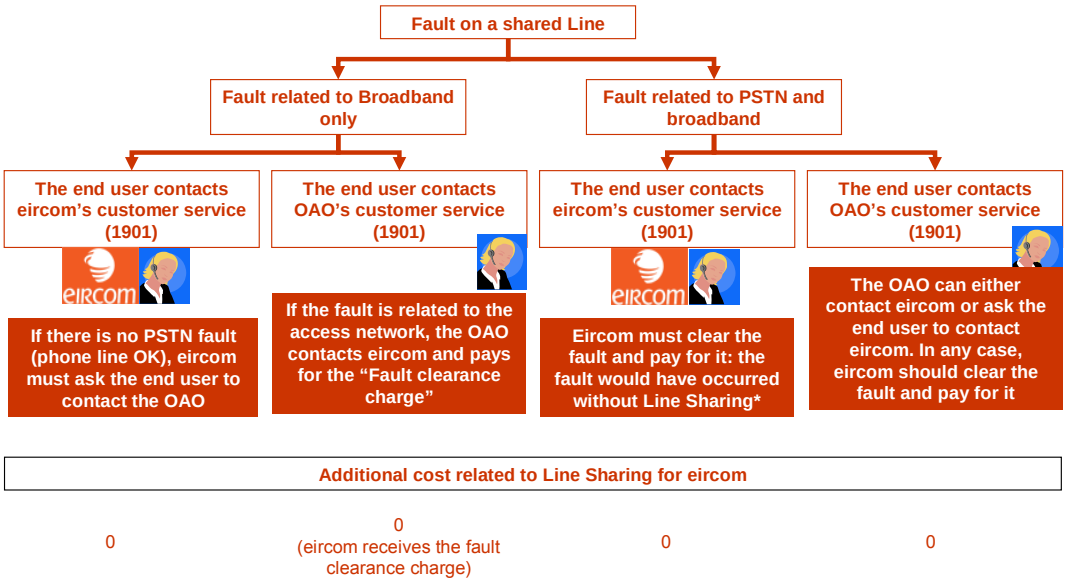
[57] Other depreciation methodologies might be selected but would lead, in the present case, to costs that are not significantly different from the ones calculated here (difference lower than 2cts€/line/month).

- If it is related to the PSTN service:

  and if the end-user calls Eircom's customer service, Eircom must clear the fault as it affects the PSTN service and must pay for it: the fault would have occurred without LS. It is possible that, with an increase in the usage of the line because of broadband, PSTN faults may be noticed by the end-user more often, but these PSTN faults occur even without LS.

  and if the end-user calls the OAO, then the OAO can either contact Eircom or ask the end-user to contact Eircom. In any case, Eircom should clear the fault and pay for it, as it affects the PSTN service.

Figure 22 – Costs related to faults on shared lines



*It is possible that, with an increase in the usage of the line because of broadband, PSTN faults may be noticed by the end user more often

Source: TERA Consultants

TERA's conclusion is that the cost of clearing the additional faults reported on shared lines is zero.

6.3 Product development and management

Product development and management costs are the cost incurred for developing the Line Sharing product. These costs should be recovered by the LS price.

These costs are primarily incurred in the first years of LS, and it is not clear whether Eircom still supports these costs today or whether it has already recovered these costs through the cost over-recovery introduced by the allocation of 50% of local loop costs to LS in previous years. **As a consequence, TERA recommends that these costs should no longer be supported by the LS price**.

6.4 Billing and administration

Billing and administration costs are the costs incurred by the incumbent for billing, receiving and managing orders related to LS from OAOs. These costs should be recovered and based on information provided by ComReg could be approximately €0.39/line/month by Eircom.

6.5 Total LS cost per month and per line

Based on the "incremental" methodology, the maximum price of LS according to TERA should only include the incremental cost: €0.39 for billing and administration + €0.36 for pair-gains removal = €0.75/line/month.

7 Annexes

7.1 National case studies

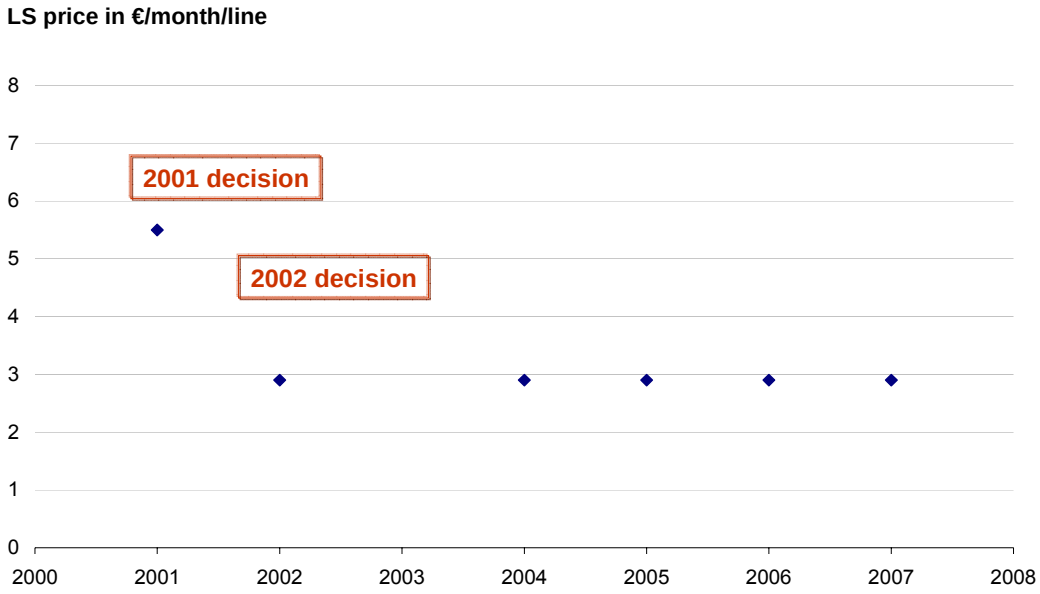
7.1.1 France

In 2001 (Decision No. 01-135) ARCEP considered that there was a risk that shared lines would generate zero fixed line call revenues for France Telecom (owing to voice over broadband proposed by OAOs). As a consequence, this risk for France Telecom not to recover its costs led to the setting of an LS price that would incorporate local loop costs.

In 2002 (Decision No. 02-323), ARCEP stated that the risk identified in 2001 was no longer relevant. ARCEP decided that only incremental costs have to be included (billing, splitter and administration) in LS prices. ARCEP stated that, when the volume of shared accesses is significant, the methodology could be reviewed.

This approach has not been reviewed since.

Figure 23 – Evolution of LS prices in France



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.2 United Kingdom

The initial determination by Oftel regarding LS prices was detailed in 2 documents in 2001:

- LLU: shared access pricing – draft determination – June 2001;
- LLU: final charges for shared access - 18 October 2001.

Oftel considered that LS prices should cover only incremental costs: "*In addition to the above mentioned principles, Oftel also employed an additional principle, specific to shared access, which states that the charges for shared loops shall not include any contribution to the recovery of the joint and common costs incurred by BT in the provision of the loops."*

According to Oftel, this enables the avoidance of any cost over-recovery by BT: *"Under the current tariffs for voice telephony, BT is already recovering all the common costs associated with the provision of local loops through the low frequency portion of the loop (i.e. both through the PSTN rental and the call charges). Therefore, Oftel believes that the inclusion of these costs in the charges for shared loops would lead to double-recovery in the absence of an adjustment to the PSTN charges."*

Oftel also considered *"the possibility that BT adjusts the PSTN charges so to avoid double-recovery, so that high bandwidth services as well as PSTN service can contribute to common costs"* but stated that this process *"would potentially deter the take up of high bandwidth services, while having little impact on telephony charges".*

In 2004, in the document "Review of the wholesale local access market – Identification and analysis of markets, determination of market power and setting of SMP conditions – Explanatory statement and notification", Ofcom confirmed these principles.

In particular, the British NRA explained that any allocation of LL costs to LS would require reductions in BT's retail and WLR charges that would be difficult to implement: *"If some of the common costs of the loop were recovered from the LLU charges for shared access, BT would need to ensure that appropriate reductions were made to BT's retail or WLR narrowband charges so that there was no over recovery of costs. Further, if charges for access to the high frequency portion of a LL contributed to the common cost allocation, consumers not taking up broadband services would pay a higher rental charge for narrowband services than that paid by broadband users. Hence, any split of these costs between the high and low frequency portions of the loop other than*

100% of common costs being recovered from the narrowband channel would be difficult to implement."

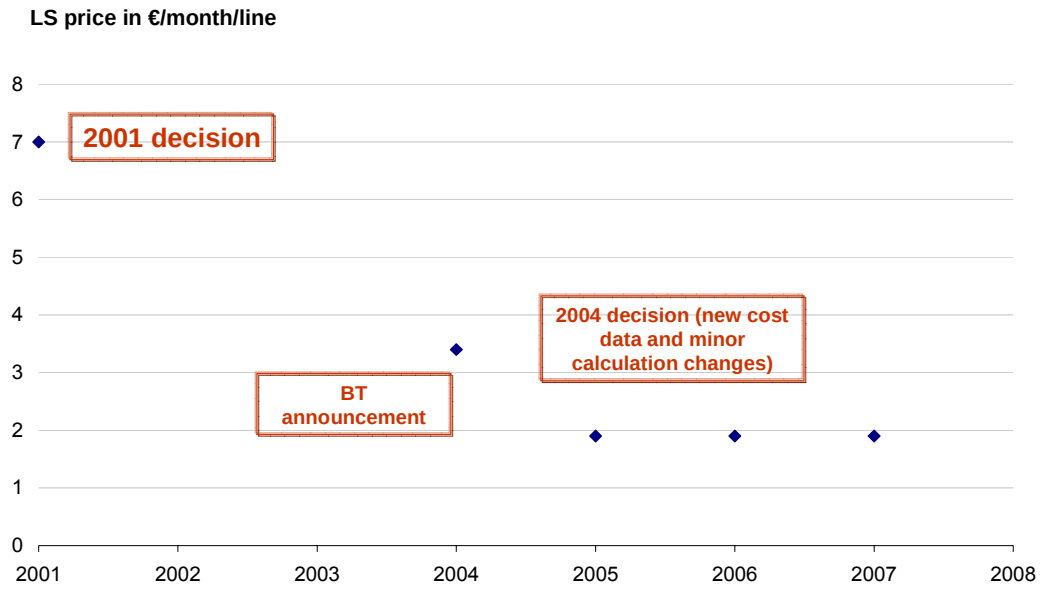
In the same document, Ofcom stated also that an LS customer deciding to cease the voice telephony subscription with BT should be charged the Full LLU price: *"Ofcom is aware that this arrangement (as would any other in which the common costs of the loop are not totally allocated to the higher frequency portion) may give rise to a cost-recovery issue if broadband customers decide to cease their voice telephony subscriptions with BT or a WLR operator. Ofcom considers that, when a customer with a shared loop decides not to take voice services, the loop will then be treated as fully unbundled in respect of charges."*

In 2001 (LLU: final charges for shared access – 18 October 2001), Ofcom described the specific costs that must be covered by the LS price:

- *"Engineering and equipment costs associated with performing line tests when faults are reported to BT by either the sharing operator or the end-user;*
- *fault repair costs;*
- *wholesale selling cost and overheads, (more details on this cost item are provided below in paragraph 1.64);*
- *billing staff costs; and*
- *the engineering costs of:*
  upgrading lines with pair gain equipment which would otherwise not be able to support DSL services (more details on last cost item are provided below paragraphs 1.70 – 1.72); and
  Replacing non-compatible network terminating equipment ("NTE").

For lines with pair-gain equipment, Oftel added that *"BT should average the costs of installing these new lines over all loops and recover it over the assumed life of a copper loop and include it in the rental charge. This approach is consistent with the one taken for fully unbundled loops."*

Figure 24 – Evolution of LS prices in the United Kingdom



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.3 Germany

The LS pricing methodology was determined on 15 March 2002 by RegTP.[58] RegTP tried to answer two main questions:

1. Is it reasonable to allow DTAG to include copper pair costs in the rental?
2. To what extent do "additional specific costs (primarily for installing the splitter at the exchange, additional fault repair, billing and relevant common costs) reflect efficient operator costs?

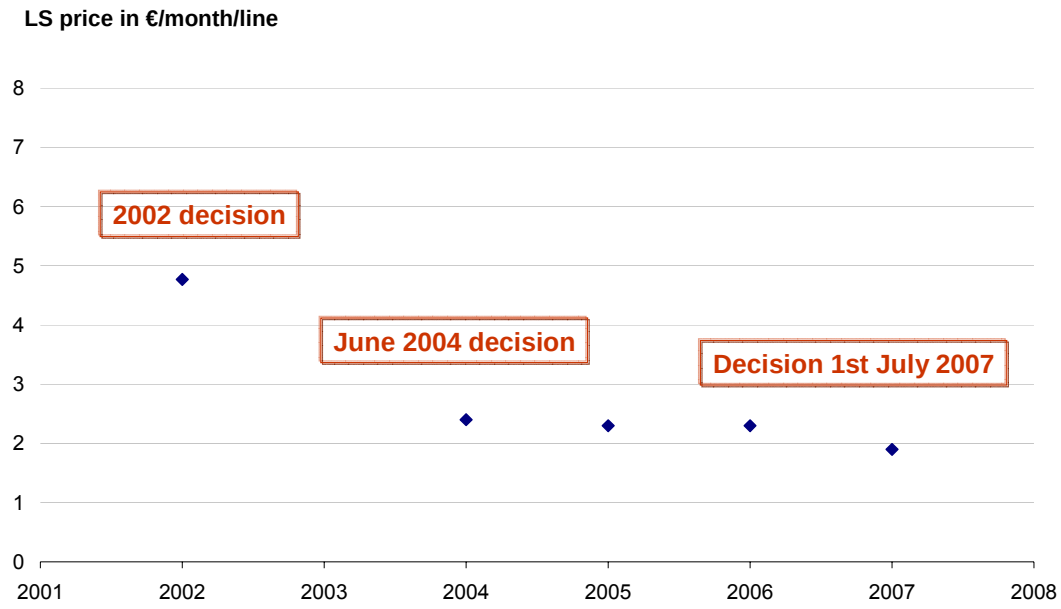
The answer of the first question was negative for two reasons: because the cost of the line is not increased by the shared use and because the cost of the line is fully recovered by Deutsch Telekom AG and DTAG has not included any *pro rata* line costs in calculating its retail broadband prices.

In answer to the second question, RegTP defined additional specific costs as *"the cost of installing the splitter at the exchange and the cost of special LS products and services including higher fault repair charges".*

[58] BK 4a-02-001/E of 7 January 2002.

The final cost for LS in 2002 was €4.77 per line and per month while DTAG proposed €14.65 per line and per month.

Figure 25 – Evolution of LS prices in Germany



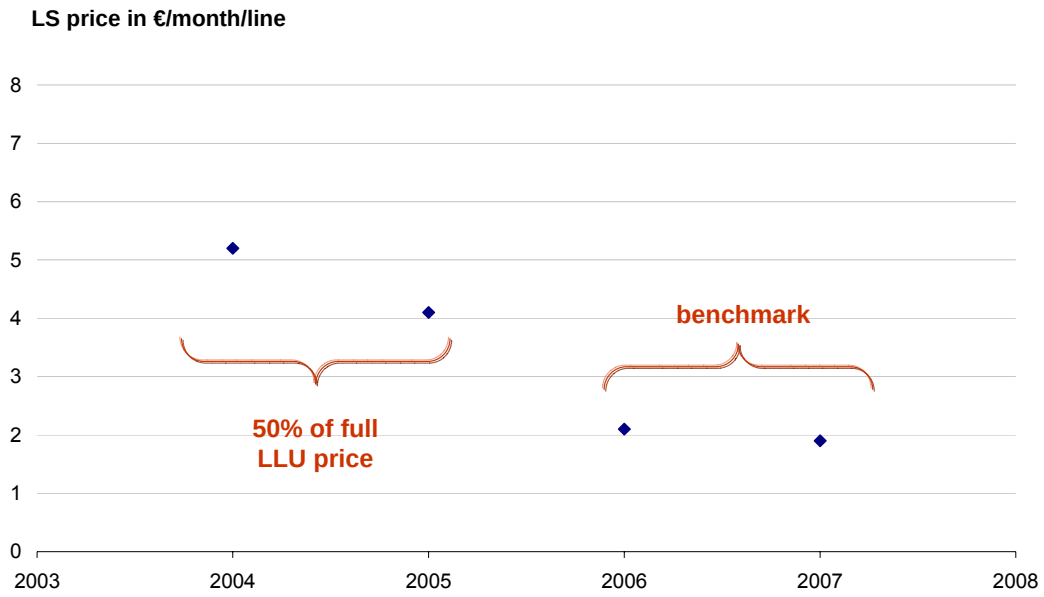
Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.4 Greece

In the decision of 31 May 2006 (Decision No. 381/1), EETT changed the methodology used for LS pricing. The LS price was 50% of the Full LLU price before this decision. But it is currently determined on the basis of a benchmark:

> *"With regard to the LS monthly charge, the result of the cost account system is not considered since the consultation of the LS monthly charge is completed by allocating to the shared line 50% of the expenses of the full line. Using the methodology of up to date international comparative reports (benchmarks), the results are as follows: 2. 08€/line/month"*

Figure 26 – Evolution of LS prices in Greece



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.5 Portugal

In the 17/01/2002 decision on LS pricing,[59] Anacom considered that there were two ways to set LS prices:

- the allocation of common costs between PSTN and broadband;
- the incremental cost approach (called the "incurred approach").

Anacom considered that the latter methodology was too recent and chose the first one. The LS price was set at €7.82/line/month.

In the 19/06/2003 decision on the Access and Interconnection Reference Offers,[60] Anacom changed its pricing methodology for LS, and the price was set at €2.95: *"Costs should be borne by the entities that implement them; this implies adoption of an incurred cost approach in broadband, in the case of shared access, an approach already considered in the determination of 17 January 2002".*

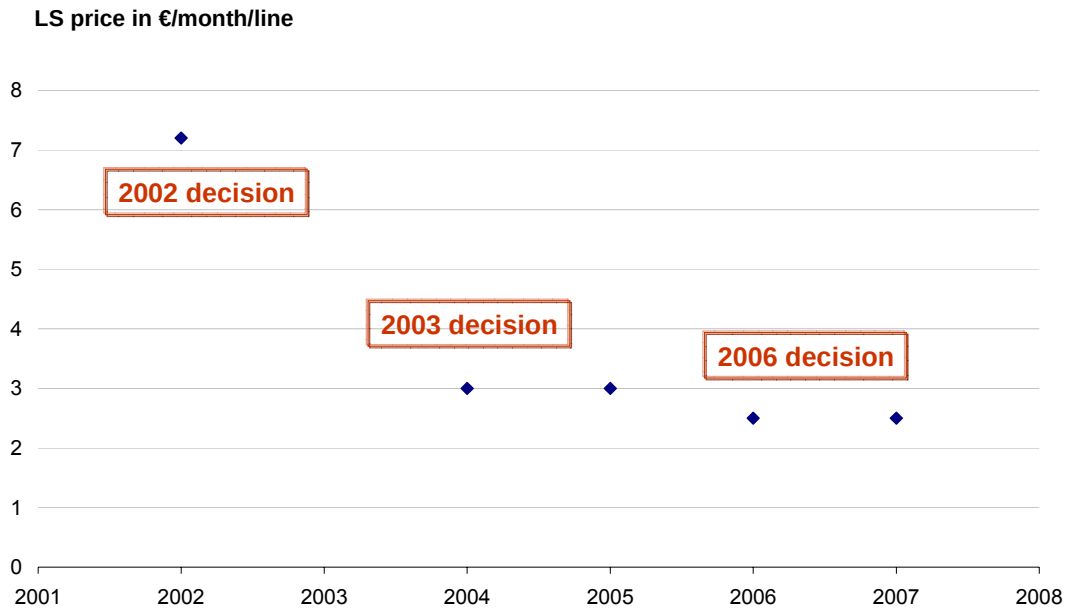
[59] Aalterações a introduzir nos preços do serviço de acesso partilhado prestado no âmbito da orall.

[60] Alterations to be introduced in the RIO and in the RUO.

Finally, in its 13/04/2006 decision (determination of icp-anacom regarding prices of the LLU to enter into force as from 01.01.2006), this latter methodology was also preferred:

> *"Taking into consideration costs incurred with broadband adopted in the referred determination of 19.06.2003, resorting to the same assumptions made to calculate estimate costs of monthly LL payment, in the full access modality, referred to in the previous section, withdrawing costs resulting from the access network and adding quality of service costs, the following unit costs are estimated for the monthly LL payment, in the shared access modality."*
>
> *"In the case of shared access monthly payment, it is necessary to take due regard of specificities of shared access offers in Member States (e.g. in some Member states, the incurred costs approach has not been adopted, in some cases the monthly payment does not include splitter costs and in Ireland costs resulting from faults are paid in separate)."*

Figure 27 – Evolution of LS prices in Portugal



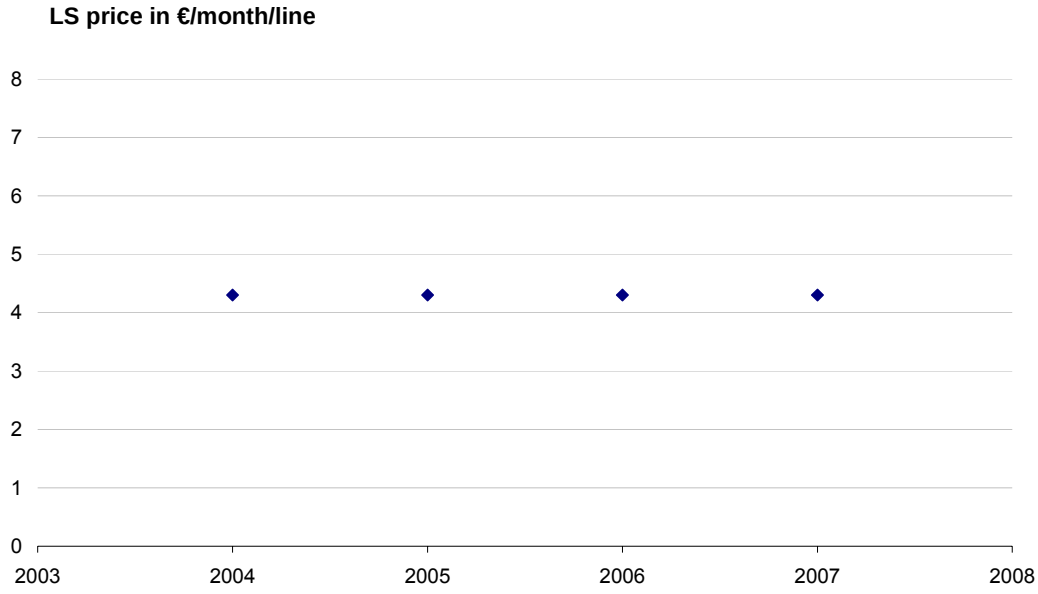
Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.6 Austria

In Austria, the LS price equals 50% of the Full LLU price. This price was introduced by the Austrian incumbent in 2001 and is part of Annex 12 of the Reference Unbundling Offer.

There have not been any cost considerations yet, as no dispute with regard to the monthly rental for a shared line has been brought before the NRA. As a consequence, a reference decision by the NRA does not exist (source: Communications with RTR).

Figure 28 – Evolution of LS prices in Austria

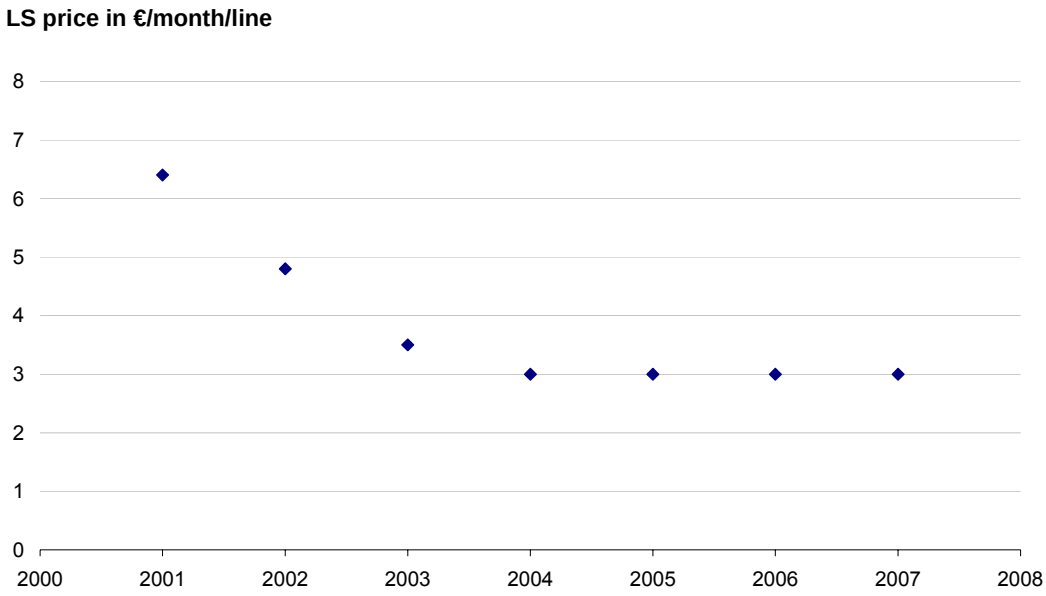


Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.7 Spain

In December 2000, the CDGAE set the first LS prices on the basis of audited accounts from Telefonica.[61] In its 20 January 2001 decision on the modification of Telefonica's ARO,[62] the CMT explained that LS prices were set by considering only the incremental costs related to LS, as this ensures non-discrimination between OAOs customers and Telefonica's customers and enables the avoidance of cost over-recovery by Telefonica.

Figure 29 – Evolution of LS prices in Spain



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

[61] ORDEN de 29 de diciembre de 2000 por la que se dispone la publicación del Acuerdo de la Comisión Delegada del Gobierno para Asuntos Económicos, por el que se establecen los precios de la primera oferta de acceso al bucle de abonado en las modalidades de acceso completamente desagregado, de acceso compartido y de acceso indirecto, a la red pública telefonica fija de Telefónica de España, Sociedad Anónima Unipersonal.

[62] Resolución por la que se insta la modificación de la oferta de acceso al bucle de abonado publicada por telefónica de España, s.a.u. en fecha 20 de enero de 2001.

7.1.8 Denmark

Since January 2003, the LS price is equal to 50% of the Full LLU price.

In the document "Telekonkurrenceredegørelse 2003 Bilagssamling" (May 2003) the Danish regulatory authority explained that three possible methodologies were considered:

- LS price does not cover any local loop cost (only incremental costs);
- LS price covers a fair part of the local loop cost;
- other attribution methodologies based on, for example, the bandwidth.

NITA considered that only the first two methodologies were used in Europe at that time and that the first option could be harmful to operators providing broadband on the basis of other technologies and chose the second approach (50% of the Full LLU price).

In this document, NITA considered also that this solution would lead to cost over-recovery by the incumbent.

As a consequence, a reduction in the incumbent PSTN revenues should be completed. Two options were considered:

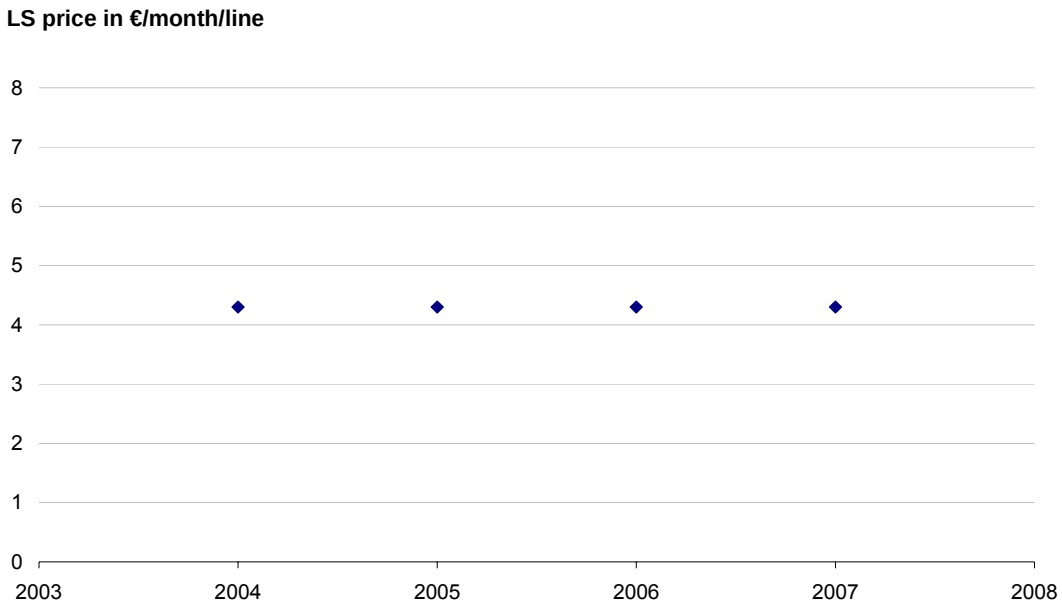
- individual reduction in the PSTN monthly rental charge for "LS users";
- collective reduction in the PSTN monthly rental charge.

The first option was preferred as indicated on TDC's website for broadband offers.[63] However, it is to be noted that this option was difficult to implement operationally as indicated in NITA's 2006–2007 annual report.[64]

[63] http://privat.tdc.dk/popups/publish.php?id=14960.

[64] The main difficulty raised by NITA for the implementation of the mechanism set in Denmark for LS prices came from the pieces of information that have to be exchanged between TDC wholesale division and TDC retail division for offering discounts to end users. See Annual Report 2006-2007, Annexes, NITA, pages 24, 25, 26 and 27.

Figure 30 – Evolution of LS prices in Denmark



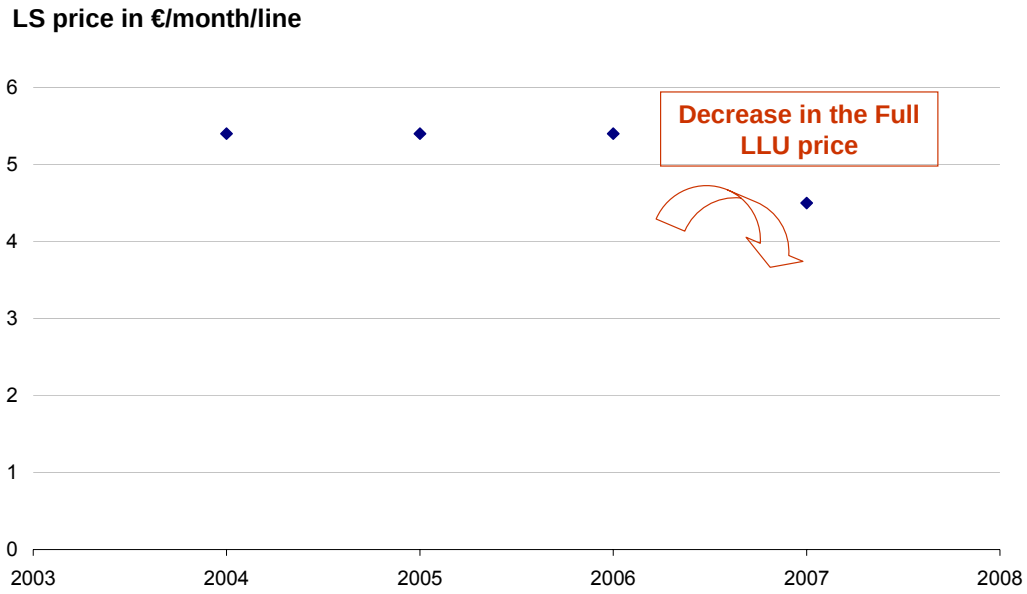
Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.9 Sweden

In the document "Update to LRIC pricing methodology – shared access – 14 November 2003", PTS decided to allocate 50% of the local loop costs to the LS product:

- *"From a costing point of view, the only difference between full copper access and shared copper access is that the buyer of shared access returns the copper line to the SMP operator after it has passed a splitter (of the buyer). The costs of providing stand-alone full access and stand-alone shared access are thus the same.*
- *"There is no unique theoretically correct way to allocate the shared costs of the copper line between PSTN access and shared copper access. However, PTS considers the most reasonable approach to be one where the costs are allocated equally between PSTN and shared access."*

Figure 31 – Evolution of LS prices in Sweden

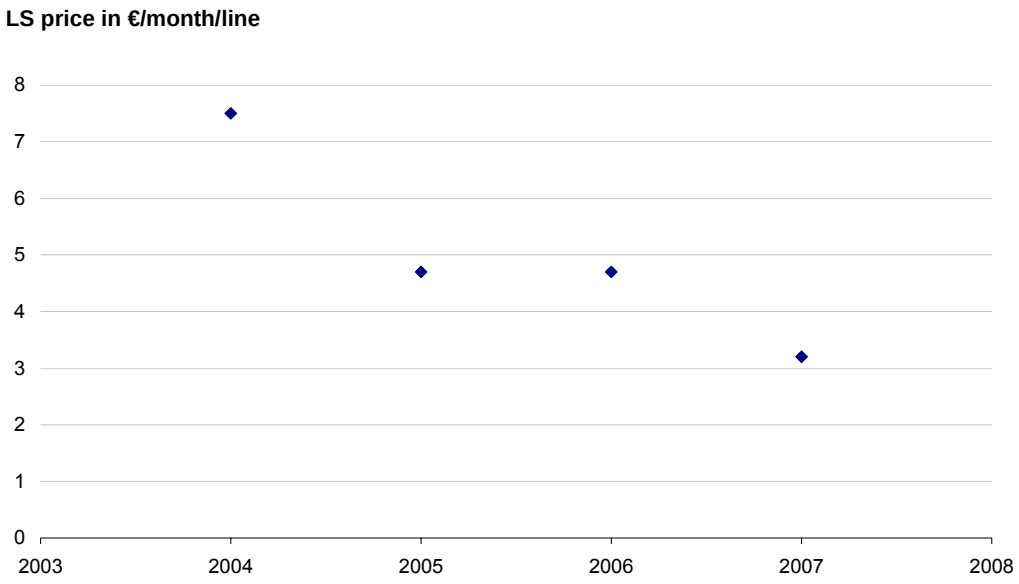


Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.10 Luxembourg

In Luxembourg, the LS price is set as a percentage of the Full LLU price (interview with Institut Luxembourgeois de Régulation). This percentage has been calculated by the incumbent (EPT) (30% in 2007).

Figure 32 – Evolution of LS prices in Luxembourg



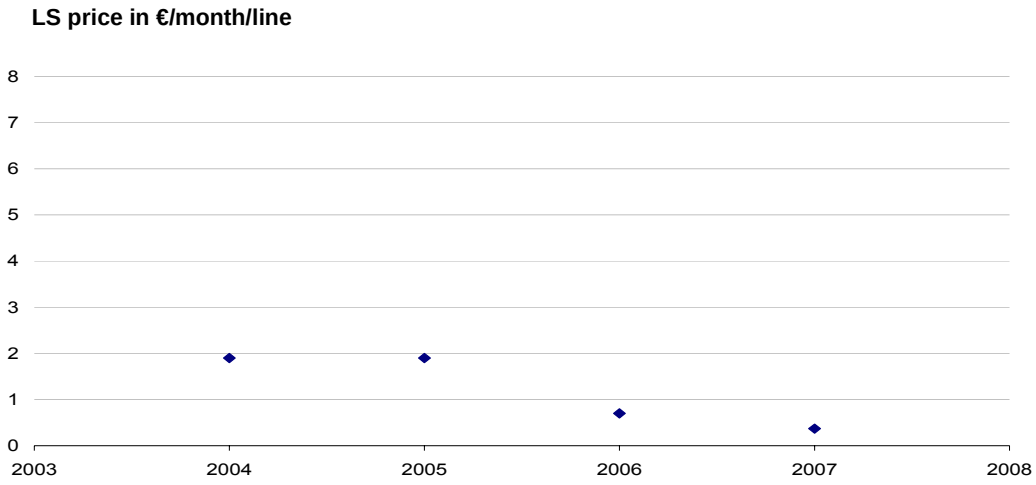
Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.11 Netherlands

OPTA sets LS prices on the basis of incremental costs only. This methodology is detailed in the 2005 analysis of the market for wholesale unbundled access:

- OPTA explains that the best approach is that KPN is paid only once for the local loop costs, on the basis of the causality principles and knowing that local loops costs do not depend on the service they support;
- OPTA stated also that an "LS" customer that decides to cease the voice telephony subscription with KPN should be charged the Full LLU price.

Figure 33 – Evolution of LS prices in the Netherlands

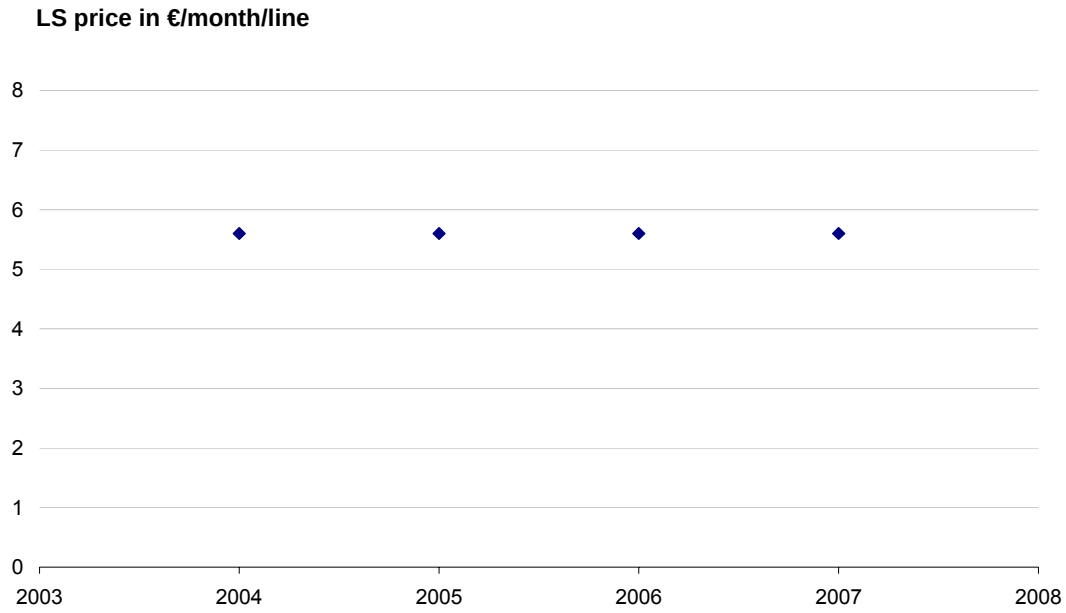


Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.12 Finland

In Finland, the LS price equals 50% of the Full LLU price.

Figure 34 – Evolution of LS prices in Finland



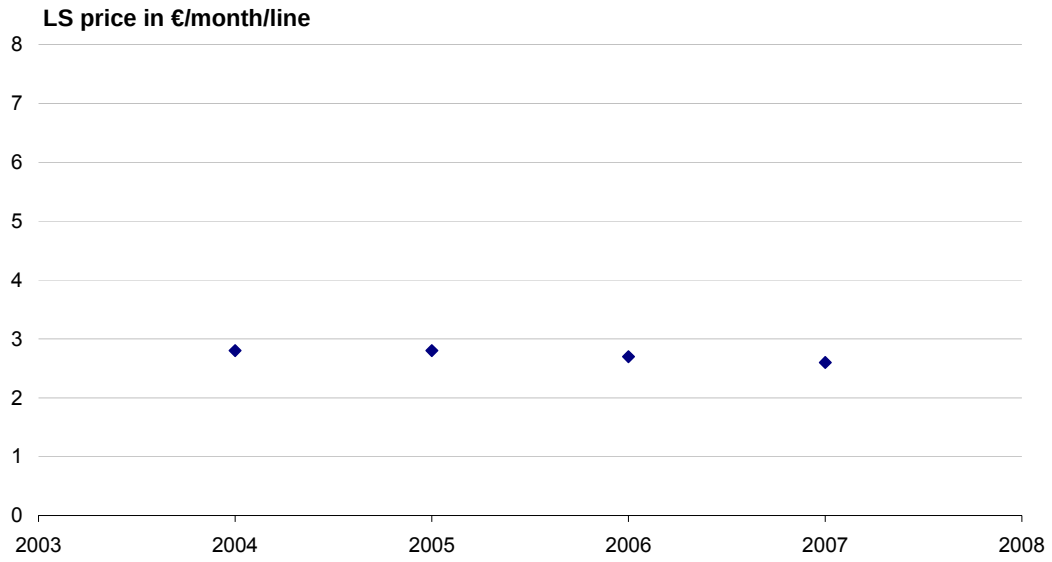
Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.13 Italy

In December 2001 (Decision No. 24/01/CIR), AGCOM decided that LS prices should be equal to the incremental costs. AGCOM also detailed the incremental costs that could be covered by the LS price:

- cost of the splitter (if supplied by the incumbent);
- cost of the feeding of the splitter (for active spiltters);
- cost of space for splitters;
- cost of cables between splitters and OAO's equipment;
- cost of jointing cables;
- supplementary maintenance for the shared access;
- cost of creation of the line (if necessary).

Figure 35 – Evolution of LS prices in Italy



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.14 Belgium

Before 2007, the pricing methodology in Belgium allocated some local loop costs to the LS product:

- a network incentive fee was calculated to give incentives to the incumbent to maintain and renew its network;
- in order to avoid any cost over-recovery by the incumbent, the Full LLU price was reduced: this reduction was calculated in year *N* on the basis of the estimation of network incentive fees that will be received by the incumbent in year *N*+1.

The IBPT considered (see Decision No. 13/06/2007[65]) that this could lead to cost under- or over-recovery (depending on the forecast estimation).

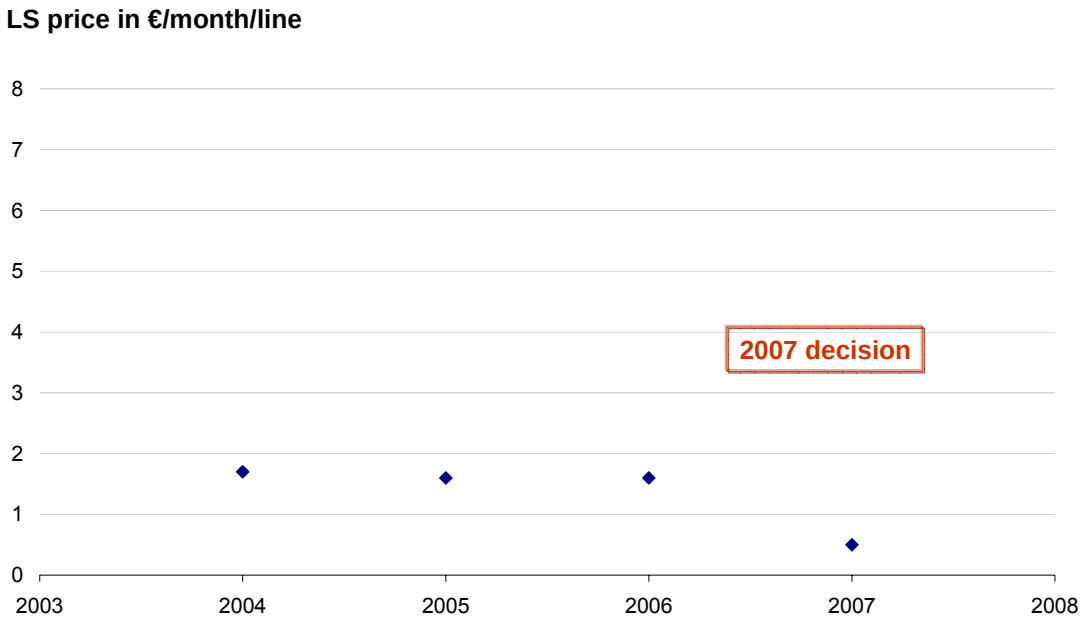
In this 2007 decision, the IBPT changed the methodology used for LS pricing and chose the incremental approach. The IBPT considered that some countries in Europe (Ireland, Sweden and Denmark were cited) used the 50:50 allocation rule. The IBPT stated that this allocation rule seemed to be the best if some

[65] IBPT, décision on the "bruo rental fee", 13 June 2007.

local loop costs were to be allocated to LS but that in the three countries cited above it was not certain that this methodology would be kept.

The IBPT considered also that some countries used a "marginal approach" (France, Netherlands) and that this approach was the best in the current regulatory framework and avoided any over-recovery of costs by the incumbent. Finally, IBPT stated that, historically speaking, it was logical that the retail monthly rental charge would cover local loop costs.

Figure 36 – Evolution of LS prices in Belgium



Source: TERA Consultants from progress report on the single European electronic communications market 2007 (13th REPORT) of the European Commission

7.1.15 Australia

In August 2002 the ACCC issued a first decision on LS pricing principles. These principles were:

- a TSLRIC pricing methodology as the most appropriate for pricing the LS;
- *"some form of incremental specific cost of providing the LSS […] should be included in the price for the LSS";*
- *"while there may be efficiency gains from including an allocation of line costs in the LSS price, it would be inappropriate to include such an*

allocation where the access provider is already recovering its line costs from other revenue sources";

- *"if an allocation of the cost of a line was included in LSS charges, the allocated component should be geographically de-averaged*".

The ACCC did not propose a tariff for LS. Since 2007, the ACCC notices that some changes have occurred among which rebalancing of Telstra's retail tariffs and resolution of disputes.

In the document "Review of the LS Service Declaration – Final Decision – October 2007", the ACCC proposed a detailed analysis of LS pricing principles. The ACCC considered that the inclusion of specific costs in the LS price is not controversial whereas the inclusion of the local loop cost is: "*The inclusion of a cost component for the specific costs of providing a LSS is relatively non-controversial, although the measurement and appropriate recovery of the costs has been the subject of significant debate. The inclusion of some allocation of the cost of a line has been a controversial issue".* The ACCC noted that, although it is clear that local loop costs are always recovered by Telstra (through the monthly rental charge), the question is to allocate local loop costs to the different services it supports.

As a consequence, in this document, the ACCC discusses further the allocation of common local loop costs. According to the ACCC, the inclusion of local loop costs in the LS price can enable to promote competition and encourage the efficient use of infrastructure:

- the ACCC considered that, to the extent that including a line cost component better reflects the costs of provisioning the LS, it may be likely to promote competition in the provision of broadband services;
- the inclusion of a line cost component may be, in particular, relevant to the LTIE [Long-Term Interest of End-user] objective of encouraging the efficient use of infrastructure. Allocative efficiency might be expected to be more appropriately promoted if an allocation of line costs is included in the LS monthly charge, as the price of the LS would then reflect its underlying cost of provisioning.

The ACCC explained that the goal of allocating local loop costs to the LS price is to avoid wrong use of LS or PSTN:

- *"This would tend to discourage over-consumption of the LSS as compared to other related services (such as ULLS, HFC and/or wireless alternatives)";*

- *"Furthermore, PSTN charges (whether retail or wholesale), and particularly line rental charges, may currently be higher than they would be if the LSS absorbed some of the line costs, which may tend to discourage the efficient use of PSTN voice services by end-users. The effect of removing some line cost contribution from PSTN prices on demand for PSTN voice services would depend on the price elasticity of PSTN voice services. As this is likely to be relatively inelastic, the changes in demand would be relatively small."*

The ACCC considered also that there are several ways to achieve the allocation of local loop costs: *"However, the ACCC also notes that, as the allocation of line costs can happen in a number of ways, there may not be a single "correct" allocation of line costs to the LSS. Accordingly, whether any given allocation better reflects cost of provisioning may be doubtful".* The ACCC considered that a wrong allocation of costs can be inefficient: *"It is important to note that, while allocative efficiency gains may be achieved by a "correct" allocation of line costs to the LSS charge, allocative inefficiency would equally be incurred by an "incorrect" allocation of line costs."* Also, the ACCC noted that it would be difficult to modify the pricing methodology for investment decision making: *"An additional issue is that the LSS has been priced for five years without an allocation of line costs. Access seekers have relied on the previous pricing structure in making investment decisions."*

The ACCC recognised that Ramsey pricing could provide allocative efficiency, but this is difficult to implement and would lead to an allocation of the local loop costs to LS that is close to 0:

- *"the ACCC has noted in the past in the context of MTAS prices that Ramsey pricing has significant informational and practical difficulties."*
- *"While the ACCC has sought to obtain the necessary information to calculate a line cost allocation, including seeking submissions from parties, it does not have sufficient information available to it to calculate a line cost allocation."*
- *"Given the likely price elasticities of ADSL and of PSTN voice services, it could be expected that any allocation of line costs to the LSS would be a relatively small amount and close to 0 per cent under a Ramsey pricing method."*
- *"Given that broadband service demand would be expected to be relatively price elastic, a too-large line cost allocation would significantly reduce LSS and hence xDSL service consumption. There would also be an inefficient over-consumption of PSTN services. As discussed below,*

the appropriate allocation of line costs is likely to be relatively small (for example, Telstra has in the past argued for an allocation of line costs of 77c). As such, the risk of allocative inefficiency in the absence of a robust allocation method is likely to be high".

In case where the LS price covers some local loop costs, **the ACCC considered also that a rebate system may create difficulties in allowing customers to understand the different offers:**

- *"The ACCC considered in its 2002 review the issue raised by Oftel that a rebate system may lead to "presentational difficulties" where different end-users are charged different line rental charges depending on whether they are acquiring broadband over the LSS."*
- *"Two potential approaches could be used – either a rebate system on a particular line or an allocation of a total cost across all voice lines."*

As a consequence, the ACCC preferred not to allocate any local loop costs to the LS service, even if there might be benefits in doing so:

- *"The ACCC considers that, under the relevant legislative matters, there may be benefits from the inclusion of an appropriate rebalancing of line costs to the LSS monthly charge from PSTN charges. In particular, the inclusion of a "correct" amount of line costs would be likely to lead to allocative efficiency gains and may lead to increased competition for voice services."*
- *"However the ACCC notes that, under the legislative matters, the inclusion of line costs may have negative competition effects on downstream services if brought in without a transition period, and would be likely to have negative dynamic efficiency effects. It also notes that the appropriate amount of line costs is likely to be relatively small under an efficient rebalancing allocation method, and that allocating a too-high amount of line costs to the LSS would equally lead to allocative inefficiencies and decreased competition."*

One of the arguments by the ACCC is that access seekers provide dynamism in the competitive environment and an LS price that incorporates some local loop costs would discourage them: *"The ACCC notes that an introduction of a line cost component may discourage access seeker investment in DSLAM infrastructure, leading to a potential decrease in dynamic efficiency. In this respect, the ACCC notes its discussion above about the LSS providers being first to market with ADSL2+ technology."*

7.1.16 United States

Despite the fact that the FCC published an order in August 2003 to relax the unbundling obligations of incumbent local exchange carriers (FCC, 2003c), in 1999, in the document FCC99355, the FCC set the methodology for LS pricing. The FCC considered that there were 5 types of costs incurred by the incumbent in the provisioning of LS:

- loop;
- OSS;
- cross-connects;
- splitters;
- line conditioning.

In this document, the FCC proposed that only the *"amount of loop costs the incumbent LEC allocated to ADSL services when it established its interstate retail rates for those services"* be covered by LS prices.

The FCC considered that:

- *"this is a straightforward and practical approach for establishing rates consistent with the general pro-competitive purpose underlying the TELRIC principles."*[66]
- *"If an incumbent LEC allocates zero loop costs to xDSL service when it offers such services over a voice line, then it cannot charge the competitive LECs any loop cost for access to a line for the purpose of offering those same xDSL services".*

The FCC decided that this will not prevent incumbents recovering their costs: *"To the contrary, we conclude that requiring LS and pricing it on the basis of TELRIC should not affect the ability of the incumbent LEC to recover costs associated with providing voice service. Currently, incumbent LECs are recovering the full embedded cost of their loops through revenues received from intrastate business and residential voice services, interstate access charges, and intrastate access charges. Nothing we do today affects the ability of incumbent LECs to continue to receive revenues from those services."*

[66]"TELRIC: "Total Element Long-Run Incremental Cost".

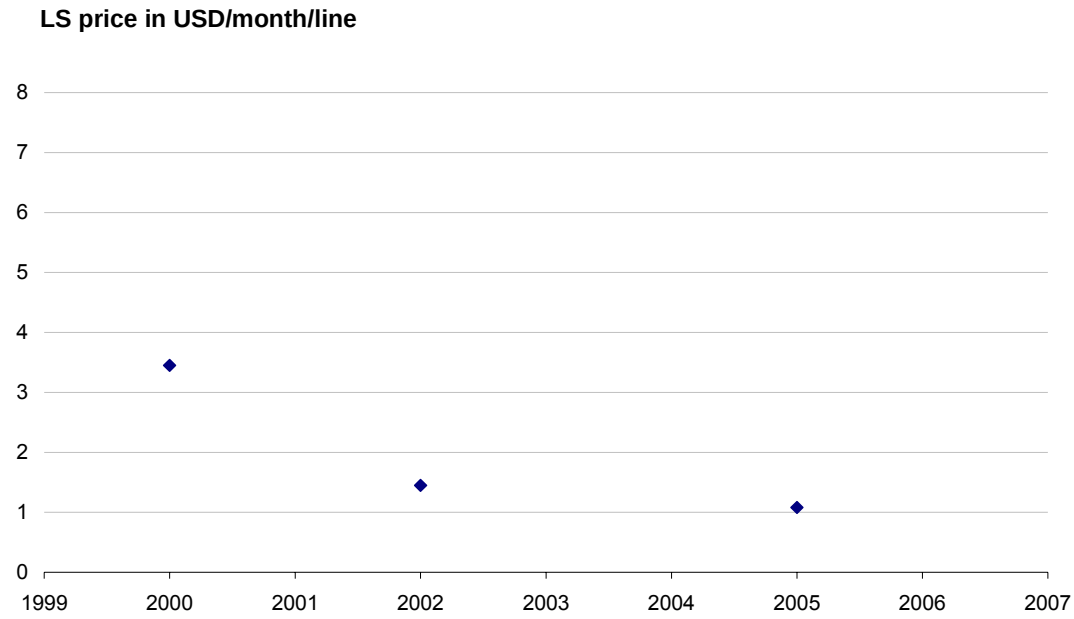
7.1.17 Japan[67]

Following disputes between NTT and access seekers in the 90s, LS was enforced in September 2000. The price for LS was determined by the Ministry of Internal Affairs and Communications (MIC, formerly MPT) on the basis of TELRIC principles in December 2000. The calculation of this price was based on the idea that local loop costs are covered by traditional revenues from voice services (fixed line call revenues and monthly rental charge) and that costs incurred by shared access are the only ones specific to LS.

At the end of 2005, the prices were:

- NTT East: 1.09 USD for LS and 9.4 USD for Full LLU;
- NTT West: 1.03 USD for LS and 12.4 USD for Full LLU.[68]

Figure 37 – Evolution of LS prices in Japan



Source: TERA Consultants from OECD Communications Outlook 2007

[67] Sources: The Spectacular Growth of DSL in Japan and its Implications, Hidenori FUKE, Faculty of Informatics, Kansai University, The Telecoms Policy for the Spread of Broadband Services: A Case Study in Japan, Koshiro Ota, Faculty of Economic Sciences, Hiroshima Shudo University, Network Paradigm Shift – deployment of Ultra-high speed Access – Seki Keiichiro – MIC.

[68] OECD Communications Outlook 2007.

7.2 Assessment of the allocation of local loop costs to LS with the Ramsey-Boiteux rule

In order to assess the LS prices that would be derived from the Ramsey-Boiteux pricing methodology, it is necessary to assess:

- the price elasticity of PSTN monthly rental charge;
- the price elasticity of broadband.

The calculation of price elasticity for the determination of LS prices has never been completed by any NRA and is considered to be particularly difficult to estimate.[69] It is proposed here to collect economic information and to complete simple calculations to obtain an overview of what the price elasticity of both broadband and PSTN is.

7.2.1 NRAs' views on broadband and PSTN elasticities

Among the documents published by NRAs across the world, 2 documents indicate that ADSL is more price-elastic than PSTN.

According to Copenhagen Economics, which produced an analysis for NITA in 2005,[70] ADSL is more price-sensitive than PSTN, but the difference in price elasticity is limited: "*We believe that ADSL is more price sensitive than PSTN, but that the difference in price sensitivity for the two services is limited. As a consequence, an allocation of shared costs based on an optimal Ramsey model is very probably closer to a 50/50 model than a 100/0 model*."

[69] Among the difficulties related to the implementation of the Ramsey-Boiteux methodology are that:

- long-term demand and price information are required;
- it is important to use market information on prices and demand rather than company information;
- for PSTN, it is difficult to determine whether full PSTN prices (fixed line calls + access or just access) should be considered;
- ADSL broadband is not available in Ireland without PSTN, which makes cross-elasticities difficult to assess.

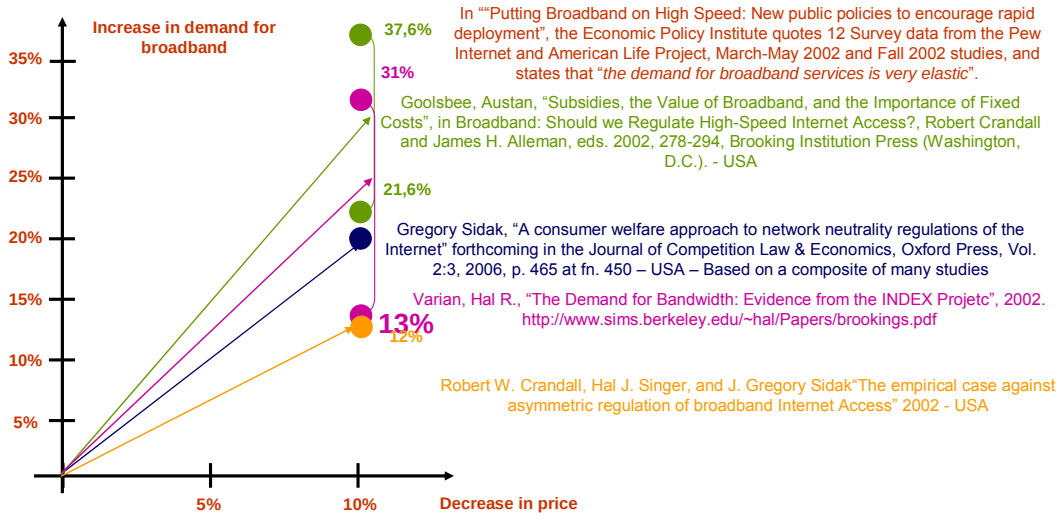
[70] Copenhagen Economics (2005).

In contrast, a document published by the ACCC in Australia suggests that PSTN elasticity is very low compared to that of ADSL: *"Given the likely price elasticities of ADSL and of PSTN voice services, it could be expected that any allocation of line costs to the LSS would be a relatively small amount and close to 0 per cent under a Ramsey pricing method".*[71]

7.2.2 Economists' views on broadband elasticity

Statistical studies completed for the US market show that broadband is highly price-elastic. Even in the study that shows the lowest price elasticity, the authors state "*The own-price elasticity of broadband demand is statistically significant and has a substantial coefficient value*."

Figure 38 – Broadband price elasticity in the US market measured by economists



Source: TERA Consultants

[71] Review of the Line Share Service Declaration – Final Decision – October 2007.

7.2.3 Assessment of PSTN price elasticity in Ireland

During the last 8 years, Eircom's PSTN monthly rental charge has increased and was rebalanced. There has been no reduction in the PSTN monthly rental charge on a macro basis or for ADSL customers, despite the launch of ADSL products, which may mean that Eircom anticipates high price elasticity for broadband in comparison to the price elasticity of PSTN access.

Also, between 2001 and 2008, the number of PSTN lines in Ireland has been stable (around 1,600,000 PSTN lines) while the PSTN monthly rental charge has increased by 40%, from €15 to €21 (VAT excluded).[72] The demand for access to voice services has not decreased:

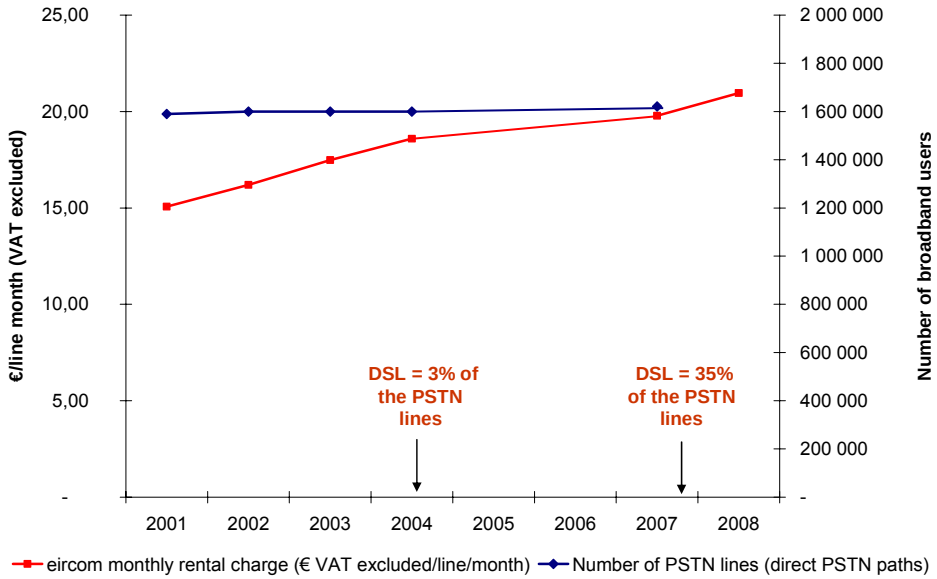
- despite the strong development of mobile telephony. The development of mobile telephony may generate some substitution with PSTN as, with prepaid offers, access to mobile telephony is cheaper than access to PSTN but calls are more expensive. However, the substitution is observed for calls but not for access;

- despite the 40% increase in prices for access to PSTN (VAT excluded).

This absence of a decrease in the demand for access to fixed voice services cannot be explained by DSL demand because DSL was very low in 2004, for instance (3% of PSTN lines).

[72] These figures do not take into account the fact that PSTN services are not always sold by Eircom with the SB-WLR wholesale product. However, PSTN WLR accounted for 18% of PSTN lines and the PSTN WLR monthly rental charge is at most 8.5% below the Eircom PSTN monthly rental charge.

Figure 39 – Evolution of PSTN monthly rental charge and number of PSTN lines in Ireland



Source: TERA Consultants from Eircom press releases and ComReg quarterly reports

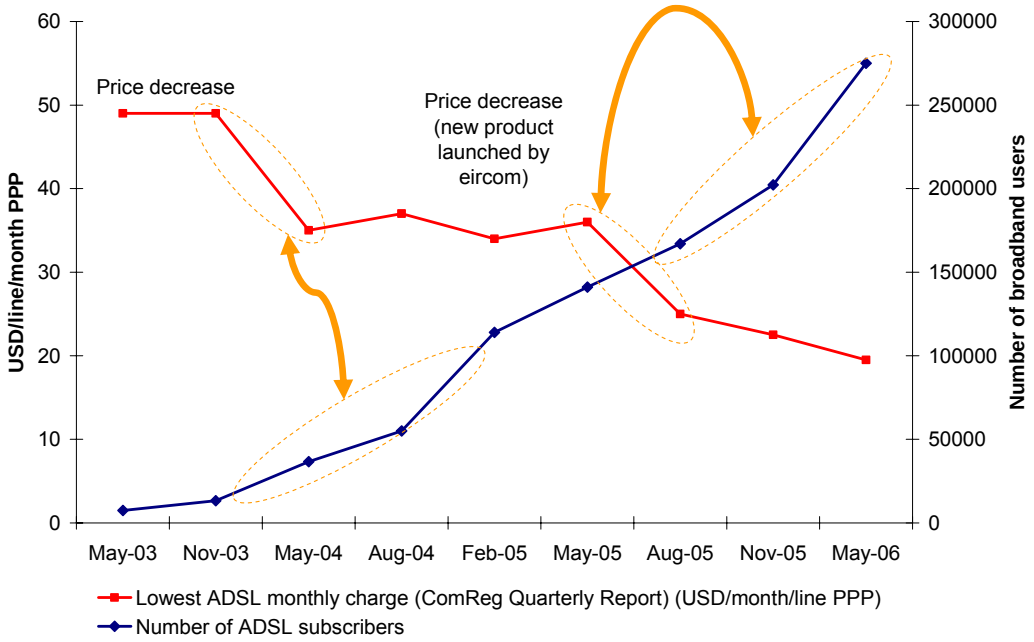
7.2.4 Assessment of broadband price elasticity in Ireland

Between November 2003 and May 2006[73] the number of broadband users increased by 261,000 customers to 275,000 customers. Two major price decreases for the lowest ADSL monthly rental charge occurred: one at the beginning of 2004 and one in mid-2005. These two major price evolutions have increased the speed of ADSL adoption in Ireland as lowest prices decreased by 60% (in parity of purchase power).

It appears that the two major price decreases have been followed by major increases in the number of ADSL lines, even if this latter fact must also be related to the product adoption trend: even without price decreases, some new customers would have subscribed to ADSL (see the increase in ADSL subscribers between May 2003 and November 2003).

[73] Period of time during which ComReg published in its quarterly reports the "Lowest Monthly Rental ADSL Basket (Minimum)" in USD/PPP.

Figure 40 – Evolution of lowest ADSL monthly rental charge and number of ADSL lines in Ireland



Source: TERA Consultants on the basis of ComReg quarterly reports

As a conclusion, the evidence available suggests that the Ramsey-Boiteux pricing methodology should lead to a local loop cost allocation close to 0%.

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9 Glossary

Acronym	Full title	Description
ACCC	Australian Competition and Consumer Commission	Australian government organisation responsible for ensuring compliance with the Trade Practices Act 1974
ADSL	Asymmetric Digital Subscriber Line	A data communications technology that enables faster data transmission over copper telephone lines than a conventional voiceband modem can provide
AGCOM	Autorità per le Garanzie nelle Comunicazioni	National regulatory agency for Italy
Anacom	Autoridade Nacional de Comunicações	National regulatory agency for Portugal
Arcep	L'Autorité de Régulation des Communications Électronique et des Postes	National regulatory agency for France
ARO	Access Reference Offer	Offering of access services from the incumvent to all access seekers
Bitstream	Bitstream	A system whereby the wireline incumbent installs a high-speed access link to the customer's premises (e.g. by installing ADSL equipment in the local access network) and then makes this access link available to third parties, to enable them to provide high-speed services to customers. This type of access does not entail any third-party access to the copper pair in the local loop.
Broadband	Broadband	Telecommunication in which a wide band of frequencies is available to transmit information. Because a wide band of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time
CMT	Comisión del Mercado de las Telecomunicationes	National regulatory agency for Spain
ComReg	Commission for Communications Regulation	National regulatory agency for Ireland
DSL	Digital Subscriber Line	A family of technologies that provide digital data transmission over the wires of a local telephone network

DSLAM	Digital Subscriber Line Access Multiplexer	Allows telephone lines to make faster connections to the Internet. It is a network device, located near the customer's location, that connects multiple customer Digital Subscriber Lines (DSLs) to a high-speed Internet backbone line where multiple data streams are combined into one signal stream over a shared medium.
ECPR	Efficient Component Pricing Rule	The ECPR represents the incremental cost plus the opportunity cost that the incumbent incurs when the OAO provides the service. This opportunity cost is computed as revenues less all incremental costs.
EETT	Hellenic Telecommunications and Post Commission	National regulatory agency for Greece
EPMU	Equal Proportionate Mark-Up	Allocation methodology leading to the recovery of common costs through the addition of a mark-up on top of incremental costs. These mark-ups are defined so that each service bears a share of the common costs that is proportionate to the incremental costs of the service.
EPT	Entreprise des Postes et Telecommunications	Incumbent in Luxembourg
ERG	European Regulators Group	Established by the European Commission to provide a suitable mechanism for encouraging cooperation and coordination between national regulatory authorities and the Commission, in order to promote the development of the internal market for electronic communications networks and services, and to seek to achieve consistent application, in all Member States, of the provisions set out in the Directives of the new regulatory framework.
EU15	European Union 15	15 first countries in the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands Portugal, Spain, Sweden, United Kingdom
FICORA	Finnish Communications Regulatory Authority	National regulatory agency for Finland
High frequencies	High frequencies	The high-frequency band of a copper cable is above about 25KHz. ADSL signals are transmitted within this frequency band.
IBPT	Belge des Service Postaux et des Telecommunications	National regulatory agency for Belgium
Incumbent	Incumbent	Existing companies often first established as regulated monopolies

LLU	Local loop unbundling	The regulatory process of allowing multiple telecommunications operators to use connections from the incumbent's telephone exchanges to the customer's premises.
Local Loop	Local loop	The physical circuit connecting the network termination point at the subscriber's premises to the main distribution frame or equivalent facility in the fixed public telephone network provider's network
Low frequencies	Low frequency	The low-frequency band of a copper cable is below 4KHz. POTS signals are transmitted within this frequency band.
LS, LSS	Line Share, Line Share Service	Line share provides OAOs with shared use of a metallic path between an Eircom exchange facility and a customer's premises. Eircom retains the voice-band frequency spectrum of the circuit and continues to provide voice services, and the OAO is able to use the remainder of the frequency spectrum.
MDF	Main distribution frames	A signal distribution frame for connecting equipment (inside an exchange) to cables and subscriber carrier equipment (outside an exchange).
MIC	Ministry of Internal Affairs and Communications	Ministry of Internal Affairs and Communications in Japan
NITA	National IT & Telecom Agency	National regulatory agency for Denmark
Low frequencies	Low frequencies	Enables provision of narrowband services
NRA	National regulatory agency	A state or government agency that regulates businesses in the public interest
OAO	Other authorised operators	Operators, other than the incumbent, providing telecommunication services
ODTR	Office of the Director of Telecommunications Regulation	Predecessor of ComReg
OfCom	Office of Communications	National regulatory agency for the United Kingdom
Oftel	Office of Telecommunications	Predecessor of OfCom
POTS	"Plain old telephone service"	Standard telephone service that most homes use. In contrast, telephone services based on high-speed, digital communications lines are differentiated by speed and bandwidth
PSTN	Public switched telephone network	PSTN refers to the international telephone system based on copper wires and carrying analogue voice data. This is in contrast to newer telephone networks based on digital technologies such as ISDN.
PTS	Post & Telestyrelsen	National regulatory agency for Sweden
RTR	Rundfunk & Telekom Regulierungs-GmbH	National regulatory agency for Austria

SB-WLR	Single Billing Through Wholesale Line Rental	Enables OAOs to provide their new and existing Carrier Preselection 'all-calls' customers with a single bill covering all aspects of voice services. For SB-WLR, the OAOs can provide their own ancillary services or purchase Eircom ancillary services on a wholesale basis and charge the customer for those services at their own rates.
SMP	Significant market power	A position that is equivalent to dominance of that market, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and, ultimately, consumers
Splitters	Splitter	Equipment that splits low frequencies and high frequencies of the local loop
TELRIC	Total Element Long-Run Incremental Cost	Calculation method that the FCC requires the incumbent to use to charge OAOs for interconnection and collocation. It provides a price ceiling for such services.
TSLRIC	Total Service Long-Run Incremental Cost	TSLRIC is the additional cost incurred by a firm when adding a new service to its existing line-up of services (holding the quantities of all of those other services constant). TSLRIC is used in Australia and is equivalent to the concept of total element long-run incremental cost (TELRIC) used in the United States.