



ETNO Reflection Document on the ERG Broadband market competition report 2006

Executive Summary:

- The ERG broadband market competition report bases itself mainly on an empirical analysis of different broadband markets in the EU. Yet, the report does not attempt a robust empirical analysis of data from these markets nor does it provide a sound economic underpinning for its assertions on the effects of regulation on broadband markets. It is characterised by a patchy analysis of existing data, contestable underlying assumptions and partly subjective conclusions from the presented evidence, which do not respond to the regulatory challenges in today's broadband markets - in particular, as differences in quality /capacity of broadband offers are not considered. This makes it an inappropriate basis for a regulatory policy on EU broadband markets.
- ETNO remains greatly concerned with the ERG policy approach to broadband regulation reflected in the draft report and previous ERG documents. The ladder of investment approach as applied by ERG risks further delaying the emergence of sustainable competition and perpetuating a fragmented and inefficient market structure on European broadband markets.
- ETNO reiterates its proposal for an alternative approach to broadband regulation based on an economic rationale, as submitted to ERG in previous contributions.

I. Introduction ¹

ETNO welcomes the present consultation and positively notes that the procedure for the drafting of the report has changed from the 2005 report. ETNO

¹ BT does not support this document.

had called for a more transparent process for the adoption of the 2005 report, which was not preceded by a consultation.

ETNO supports all attempts to analyse the development of EU broadband markets based on empirical evidence from different Member States. Thorough case studies can greatly assist in understanding differences and similarities between broadband markets and their impact on devising a regulatory approach for specific national or sub-national markets.

However, ETNO believes that the overall conclusions on the ladder of investment in the draft report do neither follow from the data presented nor from the attached country case studies.

The following comments do not address all aspects of the draft that would have deserved more in-depth analysis, but instead focus on the main themes. If we do not mention certain assumptions or conclusions of the draft report, this does not signal agreement by ETNO members.

II. Comments on specific ‘empirical findings’ of the draft report

1. Mandatory access to broadband infrastructure does not encourage inter-modal competition

ETNO is surprised that - following a detailed argumentation on this aspect in our reaction to the last broadband report ⁱ - the ERG repeats its claim that

“Competition is promoted by NRAs through access regulation in the DSL market, which pulls inter-modal competition. Thus inter-modal competition (mainly between DSL and cable networks) is a result of intra-modal competition on the DSL platform pushed by access regulation according to the concept of the “ladder of investment.” ⁱⁱ

The consultation document does not provide empirical evidence – subject to rigorous qualitative and quantitative analysis - from country data and case studies in support of this hypothesis.

Rather, as Commissioner Reding highlighted in a recent speech, inter-modal competition is beneficial in its own right, and limits the need for access-based competition on one of the platforms:

"If we look at the situation in the different Member States, the first conclusion we can draw is that the most significant factor enabling broadband growth is the existence of alternative infrastructures, in particular cable. In all six Member States which have exceeded 20% broadband penetration, cable has an important market share and this regardless of the effectiveness of regulation." ⁱⁱⁱ

Inter-modal competition generally is the result of the investment in the upgrade of existing or the roll-out of new alternative access infrastructure, not of 'the dynamic of the intra-modal competition in the DSL part based on regulated access', as the report claims on p.35.

- The report *inter alia* refers to **Belgium** as a 'good example' for its theory that regulated access on the DSL-platform pushes inter-modal competition. However, competition between Cable and DSL in Flanders (the Dutch-speaking northern part of Belgium) has been strong before and notwithstanding the introduction of access regulation. And it has been the inter-modal competition that has had a strong influence on the intra-modal competition and not the other way round. Indeed, intra-modal competition is less in Flanders, due to strong inter-modal competition, as opposed to Wallonia where inter-modal competition has not reached the same level as in Flanders.
- In **Switzerland**, which ranks high in broadband penetration, no accompanying access regulation on the DSL-platform has been introduced.
- **Countries** with a strictly regulated DSL-market have seen little or no advancement of cable broadband (e.g. **France**).
- In the **Netherlands**, effective competition on parts of the bitstream market due to competition between cable TV networks and DSL platforms, as well as LLU-based competition has developed without a 'ladder'-approach solely as a consequence of market dynamics as bitstream access regulation was never imposed by OPTA in the past due to a court ruling.^{iv}
- In **Austria** first wholesale broadband connections for ADSL were offered voluntarily. Thus a voluntary BSA offer has existed on the Austrian market for years and the so-called "greenfield approach" has been in effect for quite some time. The existence of cable offers (launched already in 1996) in Austria^v is not the result of intra-platform competition as the first DSL broadband offer has been launched in November 1999 when cable broadband was already present on the Austrian market.

ETNO invites the ERG to return to a more facts-based understanding of the relationship between access-based and platform-based competition and drop unclear wording about parallel infrastructures "not competing" with each other (p. 4). Instead, ERG should start to develop a policy that helps to foster inter-platform competition, something that the ladder of investment does not achieve (s. below, pt. III.).

2. Usefulness of tables / diagrams 1a and 1b for analysis

Tables 1a and 1b are not suitable for drawing conclusions about the effects of access-based intra-platform competition on the DSL platform as they do not differentiate between countries where competition is mainly based on competing infrastructures and those where it is based on regulated access to the DSL platform. The tables therefore do not control for the positive effects of sustainable infrastructure based competition on penetration. The report, therefore, does not provide a more detailed and more meaningful analysis of the finding that 'competition pushes penetration'.

The tables do not support policy conclusions on the ladder of investment in particular. The statement on p. 4 that "*differences in the effectiveness of access regulation explain differences in competition and accordingly in penetration growth*" cannot be inferred from the empirical part of the report.

3. Broadband investment - the missing dimension

The ERG treats the market share of new entrants as a proxy for effective pro-competitive regulation and **broadband penetration as a proxy for investment** (p. 12, bottom).

As the share of “new entrants” includes cable, ETNO wonders how it can be taken as a direct proxy for “effective” regulation on the DSL platform in the first place. Moreover, effective competition can take place on highly concentrated markets where an incumbent is forced by competition to innovate and adapt to competition, yet keeps a significant share of the market. The aim of the NRF is not to reduce market shares of network operators but to promote competition, innovation and investment to the benefit of the end-user.^{vi}

Even more contestable is the claim that broadband penetration can be taken a proxy for investment. Clearly, the different levels of investment for low-bandwidth broadband (such as simple ADSL) and for high-speed broadband access lines (VDSL, FTTH) lead to different investment levels in countries where only low-bandwidth broadband is offered and those where the next generation of DSL or FTTH is deployed.

The broadband report limits itself to drawing conclusions on the relationship between regulation and broadband penetration. The task of regulators also includes fostering investment in broadband infrastructure and thereby allowing new and innovative services to be brought to the consumer. High-speed broadband can create considerably higher consumer benefits than traditional forms of broadband. It is a major drawback of the present draft report that it does not analyse incentives for investment in high-speed access networks and development of fibre deployment in the EU as compared to other economic regions and a deeper analysis of the relationship between investments and the development of FTTx networks.

4. Other factors influencing broadband penetration

The ERG Report still overestimates the contribution of the degree of regulation-based competition on the rate of broadband penetration. While competition clearly plays a role, the fundamental relationship between broadband penetration and available household income, PC-penetration, availability of public services, etc. cannot be ignored, as the revised report now recognises at one occasion. This observation is further emphasised by the fact that we observe different levels of penetration in countries with a comparable level of competition^{vii} and by empirical work showing that price is not the most important factor when it comes to broadband take-up^{viii}.

Broadband development has to be assessed with a view to the individual economic circumstances in each member state. The report should thus analyse whether different regulatory approaches are advisable in circumstances where factors such as PC-penetration, fixed-line penetration and available income, described as “endogenous” in the draft report, such as the behaviour of market

players and the strategies followed, users' preferences, the technology adoption rate and demand side stimulation for broadband services, differ.

The OECD^{ix} in analysing "What policy principles should guide broadband development?" concludes that - next to a technologically neutral approach to competing technologies - in particular the following principles have been demonstrated to assist the development of broadband markets, promote efficient and innovative supply arrangements and encourage effective use of broadband services:

- The need to address also demand-based approaches, such as demand aggregation in sparsely populated areas, as a virtuous cycle to promote take-up and effective use of broadband services.
- Encouragement of research and development in the field of ICT for the development of broadband and enhancement of its economic, social and cultural effectiveness.

III. The 'ladder concept' – not suited for tomorrow's broadband markets

1. Explaining market development of the past

ETNO continues to reject the ERG's promotion of the "ladder of investment" concept. As we argued in our submission in relation to the first version of the ERG's broadband report, ^xthe concept of a "ladder of investment" was originally set out in a number of policy papers in Europe^{xi} but does not appear to have a rigorous theoretical underpinning in Economic literature.

It is useful to recall that the first influential examination of the ladder-concept was based on market developments in the Netherlands up to the year 2000.^{xii} In the meantime, market entry has taken place on several or all levels of the value chain, i.e., on each or most "rungs" of the "ladder" and considerable opportunities for replication already exist.^{xiii}

The ladder concept moreover appears at odds with experience in European and international markets where entry has occurred without a "ladder" in place, either on the basis of inter-modal competition or on the basis of a provision of access to remaining non-replicable network facilities (in particular the local loop). The ERG interprets and applies the ladder concept largely retrospectively to justify regulatory interventions on EU broadband markets where actions by regulators have rarely been governed by a consistent application of the concept.

ETNO acknowledges that notably in one market where the NRA has deliberately followed a ladder of investment approach, France, this policy has resulted in a move by new entrants from resale and bitstream products to more ULL-based competition. However, this leaves open the question whether to maintain or not all the rungs at the same time as such an approach can distort the market.

2. No answer to Europe's investment challenge

Moreover, even a “functioning” ladder of investment in this sense does not provide a model for NRAs or policy makers who intend to encourage investment in new and alternative broadband infrastructure. The ladder does not provide a solution for how to encourage investment in alternative and/or new infrastructure. The claim in the ERG broadband report that access-based competition on the DSL-platform fosters inter-platform competition is neither supported by economic theory nor by empirical evidence (s. above, pt. II, 1.).

To achieve sustainable competition in Europe that spurs investment in new access infrastructure constitutes the core challenge for industry and policy makers at the moment, as high-speed broadband investment soars in other economic regions of the world and Europe is left behind.^{xiv}

Most experts, regulators and market players agree that investment and innovation in the field of broadband access and services are best achieved not by mere service-based competition but by full infrastructure-based, sustainable competition.^{xv} The European Commission has repeatedly reiterated this view^{xvi} and the EU New Regulatory Framework (NRF) obliges NRAs and the Commission to pursue a regulatory policy that *inter alia* encourages efficient investment in infrastructure and promotes innovation.

A regulatory policy that wants to encourage these investments cannot rely on finding ‘just the right’ cost-oriented price for wholesale products on all levels of the value chain as proposed in the context of the ‘consistent pricing regime’. Price-regulation should only apply to remaining non-replicable assets, if any, in broadband provision on a given market. Economic studies regularly show that cost-regulated access to infrastructure can make investment in new and alternative infrastructure less attractive.^{xvii} To an investor, any prospect of immediate mandatory access to its assets by competitors acts as a strong disincentive to taking the risks involved in such new investments.^{xviii}

The ERG broadband report does not discuss this risk. Instead it states that “NRAs ensure the pro-competitive introduction [of new technologies] through appropriate regulatory measures”, overlooking the fact that a technology or infrastructure first has to be introduced / built before it can be regulated.^{xix}

3. So-called “Migrations”

A policy measure linked to the ‘ladder of investment’ that is of particular concern is that of so-called “migrations,” or processes that allow for an alternative operator to transfer from the use of indirect access wholesale services, such as wholesale line rental (WLR) and/or wholesale broadband access (WBA), to local loop unbundling (LLU).

One could argue that there is a fundamental contradiction between the ‘ladder of investment’ and the supposedly separate relevant markets under the EU regulatory framework. The premise for many NRAs’ mandating the three forms of network access was that alternative operators would not use them as substitutes for one another. The premise underlying ‘migrations’ is, conversely, that wholesale services and LLU are substitutes. Either NRAs’ market review

analyses of the relevant markets were wrong, or the imposition of migrations is wrong, but they cannot both be right.

The theme of the ERG's policy position on 'migrations' is that an operator found to have significant market power (SMP) in the market of "wholesale unbundled access (including shared access) to metallic loops and sub-loops for the purpose of providing broadband and voice services" has obligations to provide 'migrations' pursuant to the regulatory remedy, or obligation to provide unbundled local loops. We maintain that this is not correct.

ETNO maintains that 'migrations' are not accommodated by the current SMP regime – governing mandated access to the SMP operator's fixed access network in most Member States – i.e., the composite of regulation resulting from EU NRF market reviews – because that regime was devised without reference to them.

4. A single rung instead of a 'ladder' - an alternative approach to broadband

ETNO has repeatedly outlined and submitted to ERG an alternative approach to broadband regulation that is better suited to foster innovation and investment in new and alternative broadband infrastructure than the current ERG approach. It relies on limiting access to the (single) non-replicable legacy infrastructure (if any) in a given national or sub-national market. Regulators should differentiate between replicable and non-replicable assets and treat the two types of assets differently. Replicability should be assessed in a forward looking manner, taking into account regional differences.^{xx}

This would be in line with the Commission guidance on what is known as the "modified greenfield approach" in market reviews and in the imposition of proportionate regulatory remedies. It foresees that NRAs take into account the ex ante regulation imposed on a relevant upstream market (if any) when assessing whether there still is the need to regulate other products for broadband access on a forward-looking basis.

The ERG should take account in this context of the analysis made by Indepen, in particular their suggestion that in those areas where ex ante regulation is warranted,

"the ladder concept be progressively replaced by access at a single point (...). The point of access may differ in different locations, for example, in urban areas Unbundled Local Loops (ULL) may be appropriate while in a non-urban area] ULL may prove uneconomic and bitstream may be more appropriate."^{xxi}

For instance, ETNO is of the view that the imposition on the SMP operator of an access obligation by way of WBA can only be considered to be reasonable, justified and proportionate, if it is imposed taking into account: the operators' current LLU obligation; the relationship between these forms of access; and their relationship with other forms of access.

When eventually formulating access obligations and related regulatory remedies, NRAs should ensure that the wholesale services provided by an SMP

operator to competitors allow them to compete effectively with the SMP operator on retail markets.

While ETNO members are not opposed to providing wholesale broadband products in principle, we are concerned by the absence on NRAs' part of an overall strategy for the development of sustainable competition in the electronic communications markets in their respective national (and sub-national) jurisdictions

The current application of the ladder by NRAs favours what could be described as 'overlapping' regulation or 'mini-rungs' in the ladder, resulting in an increased micromanagement of access products, migration processes and prices. There is a tendency for rungs on the ladder to be defined in terms of physical routing of traffic rather than economic value, so that illusionary rungs and markets are created (as illustrated for example by market '12bis' in France). An example for this is presented in the ERG Common Position on bitstream-access which advocates the introduction of various types of ATM and IP transport. ^{xxii} As a consequence, the withdrawal or loosening of regulation of intermediate access products becomes even more difficult since some of the options have only been introduced recently.^{xxiii} An excessive number of rungs also significantly increases the complexity of squeeze and predatory tests. Regulating the higher rungs of the ladder introduces a risk of effectively intervening in retail markets by monitoring the retail price. ^{xxiv}

The described alternative approach to broadband regulation would avoid these drawbacks while ensuring better conditions to meet the upcoming investment challenge for the sector.

5. Geographic differentiation – overlap of the rungs

The proposed approach can lead to a differentiation according to geographies, whether in the form of definition of sub-national markets in line with competition law methodology or at the level of remedies.

The draft report recognises that in some countries, *"bitstream access is used complementary to unbundling in areas with less density to get national coverage and complete the offer [...] Especially in countries with large differences in population density between the various areas of the national territory, it may be that new entrants would need to serve either the whole country or none of it; "*

The conclusion of the draft report that

"Nevertheless, this does not imply that geographical limitation of the bitstream remedy would be appropriate...".

is surprising, however, as especially in countries with differences in population density geographical limitation of the bitstream remedy would be appropriate. It is important to recall that the regulatory issue as concerns existing broadband infrastructure is to give access to the remaining non-replicable facility, if any, which can be either the local loop or in some geographies bitstream access. Especially in countries with density differences, the cost function differs in the

different areas and replicability varies from some areas to others. So in such cases, it is especially important to differentiate regulation and eliminate bitstream regulation wherever LLU exists.

IV. Comments on country reports:

1. Comment on Austrian country report

The following points are those raised by ETNO member Telekom Austria.

The country case study reflects the situation in Austria quite well but fails to mention the strong and quick development of mobile broadband which actually amounts to more than 12 % of all broadband connections in Austria and continues to rise very quickly. Therefore the description of the situation on the retail market is not complete. Taking into account that nomadic/mobile broadband connections like FWA/W-LAN are included in the analysis, an in depth report would have to mention also the significant competitive constraints of mobile broadband to the fixed net broadband business which also includes broadband connections via mobile data cards.

2. Comment on Belgian country report

The following points are those raised by ETNO member Belgacom S.A..

2.1 It is crucial to note that, as a starting point, a correct definition of the relevant broadband market is indispensable; any statement on the relative market power of DSL vis-à-vis Cable and any conclusion on the possible link between regulation, competition, investment and penetration may prove to be erroneous if the market definition is based on wrong economic and legal premises. This is particularly true in case of defining the relevant market from a geographical point of view. In Belgium the territory of Flanders (and not Belgium) has been identified as relevant geographical market for (retail) broadband by the Competition Council. Important to mention is that, in the same decision, the latter considered cable operator Telenet as dominant operator on this market.

2.2. As opposed to markets in other countries where , according to the ERG report, DSL would have taken over (in terms of market shares) since cable operators have first launched broadband offers, in Flanders cable operator Telenet, that started with the offering of broadband, still has the lead.

2.3. It is thus also erroneous to conclude on this basis (see p.21 of the ERG report) that in all those countries, including in Belgium, competition is coming from intra-modal competition based on regulated access rather than inter-modal competition between alternative infrastructures (s. above II pt. 1 for more detail).

2.4. We take good note of the ERG statement on p.36 that 'widening of the scope of the regulatory framework and the possibility of technological neutral regulation now provided for by the ECNS framework can stir broadband market dynamics when used appropriately by NRAs.' We note however that

cable bitstream, as mentioned on p.37, is still exempted from regulation through the Commission Recommendation on relevant markets. We understand that ERG is thus pleading to have this exemption lifted from the new Recommendation.

3. Comment on Ireland country report

The following points are those raised by ETNO member, eircom Ltd.

3.1 *Relation of WLR/WBA and LLU*

In addition to the reasoning on broadband remedies set out above, for the case of Ireland we would like to underline the need for a more careful balancing of access obligations, in particular in the context of WLR. Indeed, some NRAs when imposing a WLR obligation have been careful to devise the obligation taking into account its impact on other available types of access and the consequences for the development of alternative infrastructures and market dynamics in general. Thus, in Italy, WLR obligations appear to be restricted to local exchanges where full LLU is not available. In Spain, the NRA recently observed that a WLR obligation was not suitable for the time being in view of the focus placed by alternative operators on local loop unbundling^{xxv}. In effect, the question of whether an access remedy is appropriate in any given case is examined in the overall context of the electronic communications markets as part of a structural solution and not in isolation.

A very careful approach to intervention is warranted in this regard. In particular, to treat LLU and WBA and/or WLR access remedies as being substitutes or as complementary without any limit in time to their concurrent availability is inappropriate and counter-productive from both a theoretical perspective^{xxvi} and an empirical perspective^{xxvii}. Rather, to the extent that LLU should at all be available in light of the conditions in a national market -- and this is something that NRA must reconsider in an access markets context, an assessment should be made of the timeframe within which various access remedies should be available, the migration paths that it would be appropriate to establish if any, the conditions for their availability, if any, their costs, and sunset clauses for the removal of either or both obligation over time. The activity of OAOs is very relevant in this regard and is absent from most NRAs' analyses to date. Their actual and planned investments, service roll-out proposals, and target markets, both from a service and geographic perspective must feature in the process for designing the structure of access in the local access market.

3.2 Irish Government's metropolitan area networks (MANs) programme

In its state aid Decision of 8 March 2006, the European Commission approved the Irish Government's plans to proceed with Phases 2 and 3 of its MANs programme, i.e., the construction of MANs in a further 80 towns in addition to the current 26 MANs towns and cities. The Commission decision^{xxviii} recognises, in fact, that the MANs programme does constitute state aid and therefore risks distorting the market. However, the Commission is allowing the programme to proceed on the basis that this distortion is minimised by specific

undertakings given by the Irish Government regarding how the project will be implemented.

3.3 “Developments to existing LLU product” section

In regards to the statements on “limitations of the LLU product,” it should be noted that LLU has been offered by eircom and availed of effectively and efficiently by OAOs since 2001.

3.4 “Migrations between wholesale products” section

See above comments in main section of ETNO’s submission on ‘migrations.’

eircom’s position consistently has been that ‘migrations are not accommodated by the current SMP regime governing mandated access to eircom’s network – namely, ComReg D12/03, D3/05, D1/06 and D8/04 -- because that regime was devised without reference to them. Migrations thus are new forms of access, which eircom has no existing obligation to provide.

References

- ⁱ ETNO RD227- ETNO Reflection Document on re-assessing the "ladder of investment" in the context of broadband access regulation
- ⁱⁱ ERG (05) 23_rev1, p. 1
- ⁱⁱⁱ Viviane Reding, "From Service Competition to Infrastructure Competition: the Policy Options Now on the Table", speech at the ECTA conference, 16.11.2006
- ^{iv} Cf. Martin Cave, not Regulating Broadband Wholesale Access in The Netherlands, Paper of 9 March 2004.
- ^v Austria, besides the Netherlands and Belgium is the country with the highest share of cable modem connections.
- ^{vi} As Professor L. Waverman (LBS) put it in an intervention at the ETNO Annual conference 2006: "*NRAs should not ask why DSL is dominant but why is cable lagging*".
- ^{vii} For example, it could be noted that Greece has a high level of competition which is not reflected in the level of broadband penetration.
- ^{viii} "Broadband Internet access, awareness, and use: Analysis of United States household data."
Scott J. Savage and Donald Waldman Telecommunications Policy Volume 29, Issue 8, September 2005, pp. 615-633
- ^{ix} OECD: Broadband driving growth: policy responses (DSTI/ICCP(2003)13/FINAL)
- ^x ETNO RD227- ETNO Reflection Document on re-assessing the "ladder of investment" in the context of broadband access regulation
- ^{xi} Martin Cave and Ingo Vogelsang. November/December 2003. "How access pricing and entry interact". Telecommunications Policy, Volume 27(10-11), pp. 717-727; the concept has been further developed in M. Cave, "Making the ladder of investment operational", paper presented to European Commission December 2004.
- ^{xii} M. Cave, I. Vogelsang, *How access pricing and entry interact*, Telecommunications Policy 2003, p. 717 ff.
- ^{xiii} This is also demonstrated in the country case studies attached to the report, ERG (05) 23_rev1 Annex A
- ^{xiv} S. data on fibre connection in RD 248, Position on the Commission Communication on a Review of the EU Regulatory Framework for electronic communications networks and services, p.15
- ^{xv} See ERG remedies CP, ERG (03) 30rev1, p. 69, which talks of the "...generally held view that to promote innovation, growth and efficiency all the way through the value chain, infrastructure based competition delivers more sustainable consumer benefits in the long run."; OECD Working Party on Telecommunications and information services policies, The development of broadband access in OECD Countries , October 2001, p. 4
- ^{xvi} Cf. extended impact assessment to the i2010 Communication, SEC(2005) 717/2, p. 30
- ^{xvii} See for example, for access network investment in the United States, Brattle Group report by Woroch et. al., Access Pricing and Investment in Local Exchange Infrastructure, March 2005; dot.econ, "competition in broadband provision and its implications for regulatory policy", study prepared for the BRT, October 2003
- ^{xviii} S. P. Baake, U. Kamecke, C. Wey, Efficient Regulation of Dynamic Telecommunications Markets and the New Regulatory Framework in Europe, Berlin, April 2005, p. 28
- ^{xix} ERG broadband report ERG (05) 23_rev1, p. 44.
- ^{xx} For a detailed guidance on how to identify non-replicable assets pls. s. ETNO RD 227 on the ladder of investment, p. 1
- ^{xxi} Indepen, "Restoring European economic and social progress: unleashing the potential of ICT", A report for the Brussels Round Table (January 2006), Appendix F "The "ladder of investment" revisited", p.37.
- ^{xxii} ERG (03) 33rev2, as amended 25th of May 2005

^{xxiii} CF. price regulation of BSA moved to LRAIC in Denmark or change in LLU pricing announced by BIPT, as quoted on p. 41 of the report.

^{xxiv} Cf. M. Cave (2005), Encouraging infrastructure competition via the ladder of investment, 2005, p. 21 – 22; Oldale, Padilla (2004); from state monopoly to the “investment ladder”: competition policy and the NRF, p. 72; a different regulatory treatment of ‘replicable’ and ‘non-replicable’ assets is also justified in view of the different degree of entry barriers existing in the two cases.

^{xxv} Comision del mercado de las telecomunicaciones, “Definición del mercado de originación de llamadas en la red telefónica pública facilitada en una ubicación fija, el análisis del mismo, la designación de operadores con poder significativo de mercado y la propuesta de obligaciones específicas” (March 2006)

^{xxvi} M. Cave, “Making the ladder of investment operational”, paper presented to European Commission December 2004; M. Cave and I. Vogelsang, “How access pricing and entry interact”. *Telecommunications Policy*, Vol.27(10-11), 2003, 717-727.

^{xxvii} J. Hausman and G. Sidak , “Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries”, *Journal of Competition Law and Economics*, 1(1), 2005, pp.173-245.

^{xxviii} State Aid N 284/2005 – Ireland Regional Broadband Programme Brussels, 08.11.2006 C(2006)436 final