

Policy Department  
Economic and Scientific Policy

# **REVIEW OF THE ROAMING REGULATION**

**IP/A/IMCO/FWC/2006-186/C1/SC3**

This study was requested by the European Parliament's committee on Internal Market and Consumer Protection (IMCO)

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## EXECUTIVE SUMMARY

- 1 This report to the European Parliament Committees on Internal Market and Consumer Protection and Industry, Research, and Energy provides briefing in relation to the proposed extension in time and scope of the Roaming Regulation 2007 ('the Regulation'), otherwise due to come to the end of its validity in June 2010. Under the Regulation, an EU-wide limit (the 'Euro-tariff') which declines each year is imposed on the retail charges that mobile telephone companies are allowed to charge per minute of roaming telephone calls made or received, and also to the wholesale charges levied by operators for carrying these calls. There are also requirements for transparency of charges.
- 2 The Commission's proposals are to extend the Regulation for a further three years, with reduced price limits and a limit on call set-up charges, and to broaden its scope to include applying price limits to short text messages (SMS) and data services (including multi-media services, MMS)
- 3 The 2007 Regulation has substantially reduced prices for voice roaming services. Demand elasticity is uncertain but may be lower than the values claimed in the recent EC Impact Assessment, meaning that the reductions in price caused by the Regulation did not cause the volumes of calls made to be much greater than they would otherwise have been.<sup>1</sup> If elasticity is low, this implies that the Regulation has probably reduced profits as well as prices.
- 4 The proposed extension of the Regulation is required in order to give legal effect to regulatory interventions that could not be justified under the normal framework of telecommunications regulation, since no operators have been found to be in a position of dominance or to have Significant Market Power in a relevant market.
- 5 The arguments for the proposed extensions of the Regulation include
  - the fact that most customers place little weight on roaming charges when deciding which mobile operator to use, limiting competitive pressures for price reductions;
  - the fact that prices per second or per message are often far higher for roaming services than for domestic mobile phone use;
  - claims that roaming services are priced far higher in relation to the costs of supply than would be expected in a competitive market; and
  - that the single European market would be better integrated if roaming charges were further reduced.

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<sup>1</sup> Our own empirical analysis estimates the demand elasticity for roaming calls made to be between -0.35 and -0.44, whereas the range considered in the Impact Assessment was between -0.5% and -1.2%. Please see Appendix 1: Overview of the Mobile Telephony Market.

6 The Commission's Impact Assessment concludes that implementing its proposals to extend the Regulation would have a beneficial effect on welfare (meaning the total of consumer surplus and firms' profits). In essence, the Commission thinks that roaming prices are simply too high. However, in our view the Impact Assessment has not been able to establish that the effects of extending the Regulation would be to improve overall welfare.

7 The present economic recession adds significant weight to the arguments against interventions that would reduce profits and discourage investment, unless the need for such regulations is clear and well established.

8 The report also addresses a number of specific questions, as follows:

**What effects could be foreseen if the Regulation is not extended beyond 30 June 2010?**

9 If the Regulation is not extended beyond 30 June 2010 the most likely effects would be:

- Prices would tend to stabilise at the levels of the caps imposed by the Regulation for 2010. In theory they might rise but in practice this seems unlikely, as it would be politically provocative and damaging in terms of reputation with consumers.
- There would be more variety in tariffs offered and more intense competition in provision of roaming services than if further price and probably profit reductions were to be imposed, because the margins would be higher and more attractive to competitors.<sup>2</sup>
- The risk of any "waterbed" effects, meaning increases in prices other than those subject to the limits, would be avoided.<sup>3</sup>

**Should the duration of the Regulation be extended?**

10 There is general expectation among those we consulted that the Regulation will be extended, reflecting widespread beliefs (rational or otherwise) that roaming charges are too high. Were it not for this perception, which may have created a political imperative, there would be strong arguments against extending the Regulation particularly in present and prospective economic circumstances.

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<sup>2</sup> This does not imply that there would be no competition if the Regulation is extended, nor is it a forecast about how strongly competition would develop, but simply the observation that higher margins would attract more entrants. Please also see Appendix 2: Stakeholder Views, which notes the operators' views that the Roaming Regulation has stifled market tariff innovation. However others have observed that the regulatory interventions may have paradoxically provided a spur to some tariff innovation, partly perhaps in order to try to avert the threatened interventions, and partly as a result of heightened consumer awareness of the issue.

<sup>3</sup> According to Valletti and Genakos (2007) the occurrence of the waterbed effect is almost exclusively independent of market competition. (Valletti and Genakos (2007) "Testing the waterbed effect in mobile telephony" CEP Discussion Paper No. 827, London: London School of Economics.)



**To which level should the price caps for voice calls ideally decrease or increase in case of an extension of the Regulation beyond 2010?**

- 11 If the levels imposed by the 2007 Regulation are accepted as the starting point, their extension for a further period might be based on a forecast of possible cost trends. This approach would imply limits broadly similar to those proposed by the Commission, except that we question the validity of imposing a limit to set-up charges equivalent to 30 seconds (which is equivalent to a price cut of about 10 per cent) and that a higher limit would be appropriate for calls received.
- 12 On this basis, Europe Economics recommends the same glidepaths chosen by the Commission with the exception of maximum charges for calls received. Please see Table 0.1.
- 13 If on the other hand the Parliament and Council judge that sufficient protection is given to customers by the price caps that will be in place by 2010, a practical alternative would be to extend these same limits for a further period (giving a wholesale maximum average charge of €0.26 per minute, a retail call origination maximum of €0.43, and a retail call received charge of €0.19).

**Table 0.1: Charges Suggested by Europe Economics if Commission logic and starting point are accepted**

	Wholesale maximum average charge (€ per minute)	Retail maximum average Eurotariff (€ per minute)	
	All calls	Calls made	Calls received (EC proposals in parenthesis)
1 July 2010	0.23	0.40	0.18 (0.16)
1 July 2011	0.20	0.37	0.17 (0.13)
1 July 2012	0.17	0.34	0.16 (0.10)

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

**Should the scope of the Regulation be extended to cover short message services (SMS), multimedia messaging services (MMS) and other data roaming?**

- 14 We agree that if voice is to be regulated, so too should the less commercially important SMS services. However, we would not support the extension of price limits to data services (including MMS), since regulation of a new and rapidly evolving section of the market is likely to do more harm than good.

**Should the Regulation apply at the wholesale and/or the retail level?**

- 15 If the Regulation is applied to SMS this should be on the same basis as voice (i.e. applied to retail and wholesale).

**Is it feasible at this stage to introduce an exchange for trading wholesale data or traffic capacity between operators?**

- 16 Such an exchange may develop from work currently in hand by the industry, but this is not expected to be complete for some time, and would not be relevant to current policy issues.

**Longer term objectives**

- 17 There are strong arguments against the indefinite extension of the Regulation. In order to increase the prospects of bringing it to an end we suggest that it could be extended for a shorter period than three years, perhaps 18 months, during which further analysis could be made of the reasons why roaming prices have been found to be unsatisfactory. An 18 month extension would maintain the regulation in force until the end of 2011, giving time to complete all further studies necessary.
- 18 This analysis should be given focus through a strongly worded review clause, replacing Article 11 in the present draft Regulation, specifying the criteria that should be satisfied before the Regulation could be extended for a third time.

# 1 INTRODUCTION

## Terms of reference

- 1.1 The European Parliament Committees on Internal Market and Consumer Protection and Industry, Research, and Energy requested a study related to the review of the Roaming Regulation (Regulation 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community, amending Directive 2002/21/EC).
- 1.2 The study builds on existing data and research (notably by the European Commission, the European Regulators Group, market research institutions, and the GSM Association). A critical assessment of the available information and documents is provided, and a number of policy options are analysed.
- 1.3 This study reviews the issues involved in extending the duration and scope of the Regulation. The main focus is on the following questions:

### Extension of the duration of the Regulation

- What effects could be foreseen if the Regulation is not extended beyond 30 June 2010?
- Should the duration of the Regulation be extended?
- To which level should the price caps for voice calls ideally decrease or increase in case of an extension of the Regulation beyond 2010?

### Extension of the scope of the Regulation

- Should the scope of the Regulation be extended to cover short message services (SMS), multimedia messaging services (MMS) and other data roaming?
  - Should the Regulation apply at the wholesale and/or the retail level?
  - What should be the basic characteristics of such Regulation?
  - Is it feasible at this stage to introduce an exchange for trading wholesale data or traffic capacity between operators?
- 1.4 A number of appendices support and document the arguments debated in the main body of the report, depicting case studies on best and worst practice as well as tentative parallels between the roaming case and experience from industries with arguably similar characteristics.

## 2 OVERVIEW OF EU MOBILE TELEPHONY MARKET

### The EU Mobile Phone Industry

- 2.1 The total sales revenues of the EU mobile phone industry in 2007 were estimated as €137 billion, of which roaming services contributed €6.5 billion. Within roaming revenues, voice was predominant at €5.2 billion; SMS was €0.8 billion, and data services including MMS were €0.6 billion.<sup>4,5</sup>
- 2.2 Companies in the EU mobile telephony market range from among the world's largest companies to relatively small operators; almost all now offer roaming services. Some of these companies have been formed as spin-offs from the incumbent national operators (BT, France Telecom, etc.) and others as commercial ventures by consumer-oriented businesses in other fields (Virgin, many of the mobile virtual network operators referred to as MVNOs). There are no EU Member States in which fewer than three or more mobile companies are active, and in many countries there are many more; the practicalities of international competition (the need for licences, marketing expenditure, network investment or commercial negotiation etc.) do not appear to create excessive barriers to the point of constraining competition. One sign of market dynamics is that the largest mobile suppliers in each country seem to have experienced a gradual decline in their market shares (although these shares are still frequently quite high).<sup>6</sup>
- 2.3 There are many commercial links between mobile operators within the EU. Some of them are formal, either characterised as direct ownership links or as joint ventures, and others are informal, for instance in the form of marketing and branding agreements, airline-style alliances, and minority shareholdings. Details of some of the main formal links are provided in Appendix 1.
- 2.4 At least until recently industry revenues and volumes had been increasing, and the number of mobile subscribers in the whole of Europe has also increased rapidly. A high proportion of potential customers probably now already own a mobile phone of one sort or another. Technological advance and substantial investments have been prominent features of the development of the industry and the focus for developing mobile markets is shifting from attracting new subscribers to "migrating" subscribers from one section or technology to another, for instance from 2/2.5G to 3G. However, between 2005 and 2007 there was a decline in the development of 3G networks.

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<sup>4</sup> EC Impact Assessment 2008, p 16 and 17.

<sup>5</sup> Note that the industry presents lower figures: data from 2007 provided to us by the GSMA have voice revenues at €3.6 billion, SMS at €0.9 billion, and MMS plus all other data at €0.8 billion.

<sup>6</sup> Please see Appendix 1: Overview of the Mobile Telephony Market.

- 2.5 It is not yet clear how badly the industry as a whole will be affected by the general economic recession, but it would be reasonable to expect a significant reduction in the numbers travelling and wishing to make use of roaming services. There are already reports that some mobile telephone companies are facing the need to lay off staff.<sup>7</sup>

### Roaming Services

- 2.6 As regards voice, the proportion of customers that roam in any one month varies by country within a range of about 2 – 20 per cent, depending on the volume of cross-border movement in each country (typically lower for larger, self - contained land mass countries).
- 2.7 In order to offer roaming services to retail customers, operators need to contract with other operators for wholesale services. The revenues from wholesale services are not of course additional for the industry as a whole but merely redistribution between operators of the retail revenues.
- 2.8 The following table and chart provide a breakdown of retail revenues from roaming services as between voice, SMS and data. Voice revenues account for about 75 per cent of total retail roaming revenues. Please note that the usual observed seasonality in revenues (i.e. that peak season is in the high summer months) is a major factor, in addition to the entry into force of the Roaming Regulation in Q4 2007, explaining the sharp fall in revenues between the third and fourth quarters of 2007.

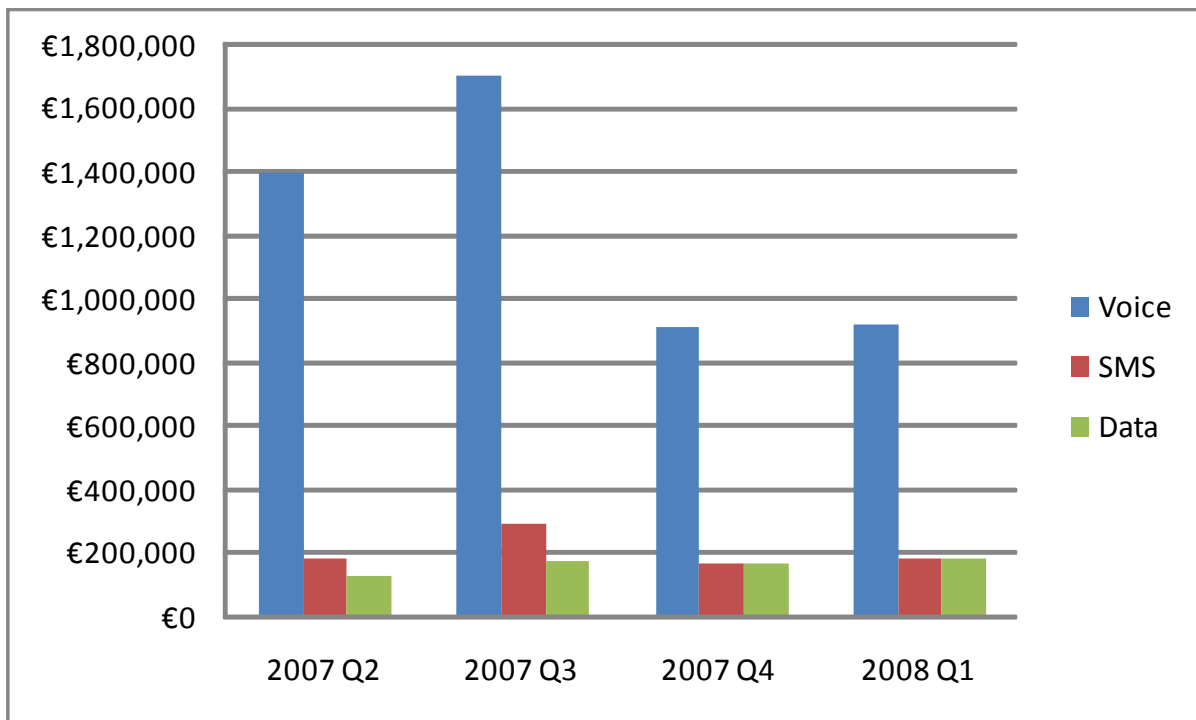
**Table 2.1: EU Mobile Roaming Revenues 2007-2008**

Revenue (€000s)	2007 Q2	2007 Q3	2007 Q4	2008 Q1
<b>Retail</b>	1,723,053	2,185,316	1,264,269	1,295,562
Voice	1,403,038	1,707,916	918,261	920,154
Sms	188,648	295,407	175,724	186,382
Data	131,366	181,992	170,284	189,026
<b>Wholesale</b>	609,154	771,542	383,503	377,510

Source: ERG, 2008

<sup>7</sup> E.g. Sunday Times Business Section 9 November “Vodafone set to cut costs by £1bn”.

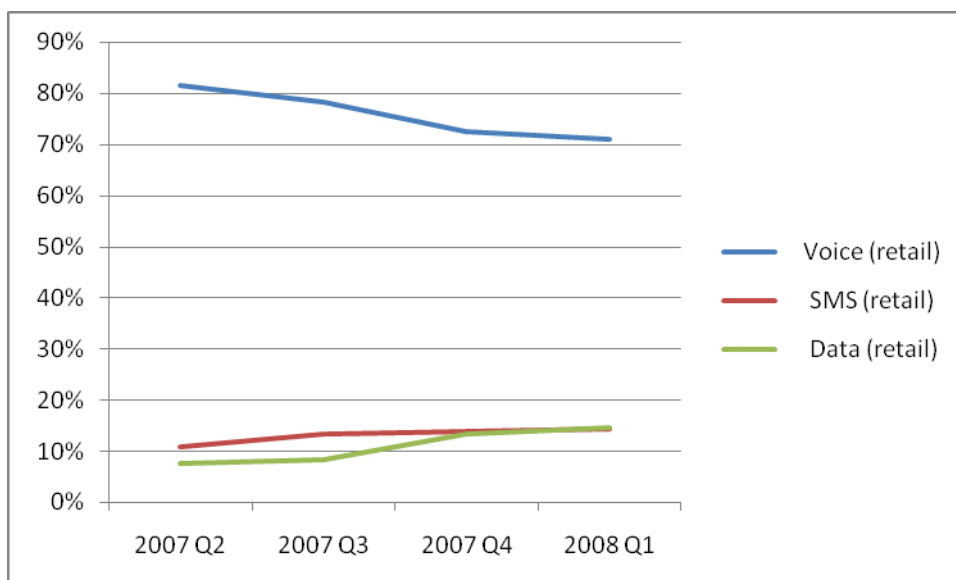
**Chart 2.1: Breakdown of Retail Roaming Revenues (000 €)**



Source: Data received from the ERG, 2008

2.9 The following chart shows the breakdown of the market shares of retail services in each quarter.

**Chart 2.2: Market Share of Retail Roaming Services**



Source: Data received from the ERG, 2008

## Roaming Market Separability

- 2.10 Roaming services are only one among those offered by mobile telephone operators, contributing about 5 per cent of revenues. Roaming is in our opinion not a separate market, but part of the mobile telephone market; it is clearly designated on the demand side, but there are no companies offering solely roaming services (and it is hard to envisage how such a separate roaming market could evolve under normal competitive conditions).<sup>8</sup>
- 2.11 For competition law purposes, according to Form CO and the Relevant Market Notice:  
A relevant product market comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use.<sup>9</sup>
- 2.12 Likewise, according to the Commission Notice on the Definition of the Relevant Market (1997),  
...From an economic point of view, for the definition of the relevant market, demand substitution constitutes the most immediate and effective disciplinary force on the suppliers of a given product, in particular in relation to their pricing decisions. A firm or a group of firms cannot have a significant impact on the prevailing conditions of sale, such as prices, if its customers are in a position to switch easily to available substitute products or to suppliers located elsewhere.<sup>10</sup>
- 2.13 There have been a small number of cases in which the Commission has found the existence of a wider product market owing to possible supply-side substitution, if a manufacturer of one product can easily switch production to produce another product.<sup>11</sup>
- 2.14 It follows that when defining a market the main questions normally relate to demand-side substitutability; and from the customers' point of view, although there are alternatives to roaming services they probably are sufficiently distinct to meet the usual tests. Thus if one considers probable substitutes for roaming to be SIM cards purchased in visited countries, hotel phones/fixed lines, or VoIP, then statistical tests could give information on whether roaming services should be seen as a market in its own right, or included in part of a wider market with the said substitutes.<sup>12</sup>

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<sup>8</sup> The EC Impact Assessment on the other hand comments at p.35 that retail roaming services can be viewed as a separate market.

<sup>9</sup> Form CO, Section 6; Relevant Market Notice, §7.

<sup>10</sup> OJ (1997) "Commission notice on the definition of the relevant market for the purposes of Community Competition Law" OJ C372/5 [1998] 4 CMLR 177.

<sup>11</sup> See, e.g. Case M.160 *Elf Atochem/Rohm and Haas* (Dec. of 28 July 1992); Case M.160 *Avesta/British Steel/NCC* (Dec. of 4 September 1992); Case M.289 *Pepsi Co./Kas* (Dec. of 21 December 1992); Case M.477 *Mercedes Benz/Kässbohrer*, OJ 1995 L211/1; and Case M.554 *Dalgety/The Quaker Oats Company* (Dec. of 13 March 1995). (Bellamy & Child (2001) "European Community Law of Competition" Fifth Edition, London: Sweet & Maxwell).

<sup>12</sup> Interchangeability is typically gauged by looking at the cross-elasticity of demand between substitutes; e.g. if the price of one product should change, how will the demand of its potential substitute react. Conventionally, policy makers look to the SSNIP ("small but significant non-transitory increase in price") or 5 per cent test to assess this. If the resulting substitution effect away from the product is large enough to make a five per cent price increase unprofitable then further substitutes should indeed be included in the market definition.

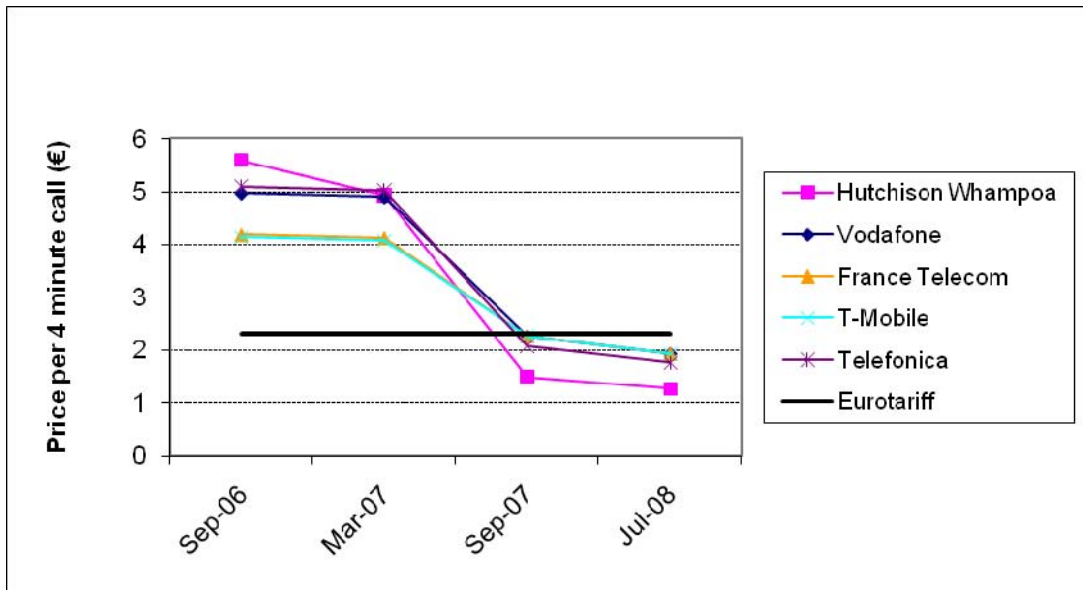
- 2.15 However, this still does not directly answer the question that is relevant for considering the Roaming Regulation, which is whether roaming services can be analysed separately or whether they are to be considered as *components* in a bundle or basket of services one subscribes to when signing up for mobile services overall?
- 2.16 From the costing perspective, it is difficult to envisage that roaming services could be assessed in their own right independently of other mobile services. Roaming is an auxiliary service (albeit now ubiquitous) for domestic mobile services — for voice, SMS and data alike — and requires the same capital and network infrastructure for call origination, transit, and termination. If one is looking at costs of roaming as a basis for pricing, one must therefore take into account both common and fixed costs that are intrinsic to the mobile industry. Therefore, one cannot reasonably assess the prices of roaming services in relation to their costs without taking into account *all* services offered by mobile network operators. This is not least because no operator currently exists which sells just roaming services (and conceptually this is somewhat difficult to imagine, although SIM cards working in different countries have been advertised).
- 2.17 Another caveat stems from the argument that the appeal of voice and SMS roaming services to consumers stems from the ability to use one's domestic number as one would at home when travelling across borders. This is one reason that some see the potential substitutes mentioned above as limited in their competitiveness with roaming. For example, even if a consumer is able to cheaply and easily obtain a foreign SIM card to use in place of roaming services when travelling abroad, receiving calls when abroad is likely to be impossible without first distributing the new number to the person placing the call, say via e-mail or an SMS.
- 2.18 In summary, roaming is best understood as an integral part of the main mobile telephony market from supply and demand sides alike.

### **The effects of the Roaming Regulation 2007**

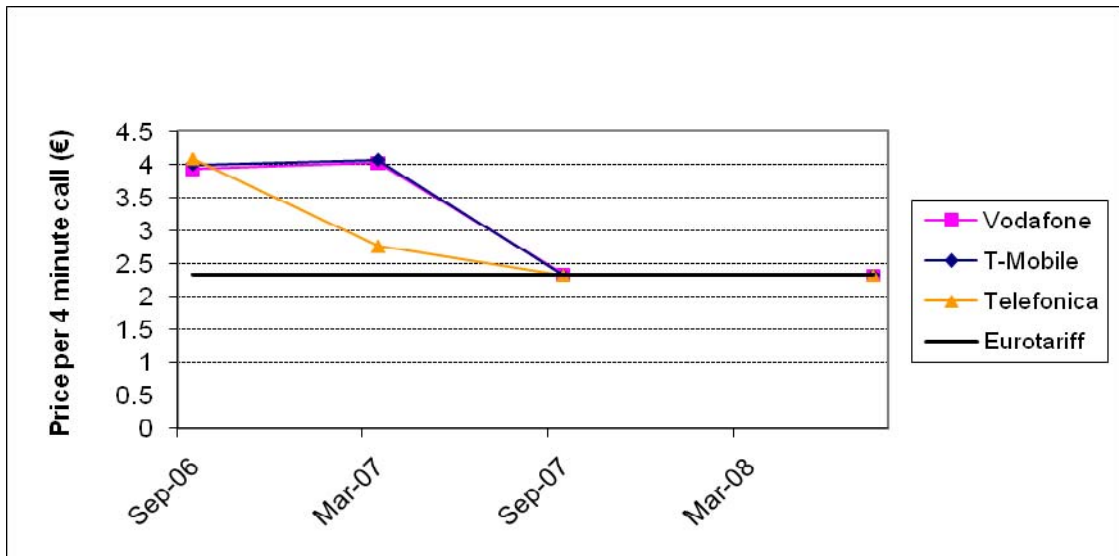
- 2.19 The 2007 Roaming Regulation, applying to voice but not SMS or data services, came into effect at the end of the third quarter of 2007. It reduced prices charged substantially, and by more in some countries than in others as it imposed the same price limits throughout the EU. Illustrations are taken here from UK, Germany, and France; similar charts for all other Member States are provided in Appendix 6.



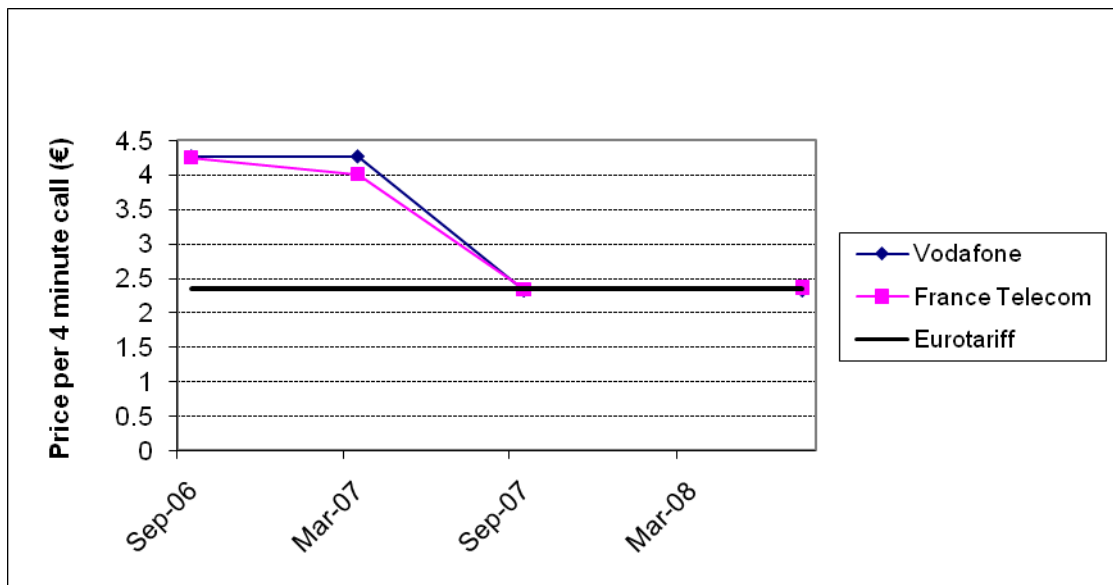
**Table 2.2: Price of outgoing roaming calls in the United Kingdom**



**Table 2.3: Price of outgoing roaming calls in Germany**



**Table 2.4: Price of outgoing roaming calls in France**



Source for above figures: [http://ec.europa.eu/information\\_society/activities/roaming/index\\_en.htm](http://ec.europa.eu/information_society/activities/roaming/index_en.htm).

- 2.20 In considering the effects of the 2007 price reductions on industry revenues and profits it is important to take seasonal factors and possible effects on volumes into account. Table 2.1 shows that revenues from voice services, where prices had been capped, were almost halved between the third and fourth quarters of 2007, but revenues would have fallen sharply between the third and fourth quarters in any event due to the end of the main holiday season; and it is possible that volumes may have been increased as a result of the price cuts.
- 2.21 However, this is a matter of contention, and the industry association, GSMA, says that roaming revenues have been reduced by the Regulation.
- 2.22 A more detailed review of the EU mobile phone industry and mobile roaming services can be found in Appendix 1.

### 3 PROPOSED POLICY OPTIONS

3.1 We assume that the European Parliament would wish the policy options considered in this briefing to be the most serious or useful possibilities, with other issues treated in the discussion (including our recommendations on the preferred policy options to adopt). We therefore limit the list of policy options to the following:

- Option 1: The Regulation is allowed to expire on 30 June 2010 and is not replaced.
- Option 2: The Regulation is extended for a further three years and its scope is also extended to cover SMS and MMS/other data (the full option currently being proposed by the Commission).
- Option 3: The Regulation is extended for a further three years and is also extended in scope to cover SMS, but not MMS or other data services.
- Option 4: The same as Option 3, but with regulation limited to wholesale services.
- Option 5: The same as Option 3, but only for eighteen months whilst full wholesale and retail competition analysis is carried out and the development of competition is fully evaluated. This option would include the introduction of a stronger review/sunset clause, and could pave the way to deregulation if Option 1 is rejected.

3.2 Option 1 is the most liberal or deregulatory; after the expiry of the present Regulation the market would revert to regulation through the standard framework for telecommunications regulation and normal competition law. Option 2 is the package proposed by the European Commission, under which the Regulation is extended both in time and in scope, to apply *ex ante* price limits to SMS and data services as well as voice. Options 3 – 5 are intermediate, considering less severe forms of regulation, and in the case of Option 5, its application for a shorter period than three years. The focus of Option 5 is on finding a route through which it would be practical to bring *ex ante* regulation of roaming services to an end, having dealt with the issues that led it to be introduced.

3.3 This chapter opens by providing a high level review of the five policy options outlined above. The underlying analysis and discussion of other issues, including whether it is feasible to introduce an exchange for the trade of wholesale traffic capacity between operators, are in the following Sections and Appendices. First, we comment on the possible regulation of “passive” calls only.

**Note: On regulation of "passive" calls only**

1. It is convenient to comment here on the question raised in the first EC Impact Assessment (2006), as reiterated on page 40 of the most recent EC Impact Assessment (2008), on whether regulation of "passive" roaming calls (i.e. calls received) but not "active" calls might be a way to avoid excessive regulatory pressure.

2. Some mobile operators are already devising specific tariffs whereby charges for received calls when roaming are completely waived. Such charges are recovered from callers to mobiles via termination charges following the same (European) scheme of calling party's network pays (CPNP), as also observed in the domestic market.

3. Examples of the "free" received roaming calls today in the EU include the following active residential offers:

- Vodafone Passport (including a one-off connection charge);
- 3 Like home (including a one-off access fee to the tariff scheme as a whole);
- Multi-country SIM cards (being planned by some operators and already active in some Asian and EU locations: see Hong Kong/China case study in Appendix 3);
- Independent, pay-as-you-go SIM cards working in more than one country sold on a commercial basis on the Internet, as well as foreign MVNO cards available at relatively low prices for unlocked phones only (but entailing the acquisition of a local mobile phone number).

4. However, we are also aware of several possibilities being considered at a national and European level at the moment on the introduction of receiving party pays (RPP) calling regimes for domestic calls too. These proposals, whilst understandable from an economic and cost attribution standpoint, might encounter strong opposition because of the established mindset of the European consumer about the (seemingly) free nature of receiving calls. Moreover, RPP in the EU would legitimise the current roaming approach that other institutions within the Union are fighting to change.

5. Our expectation is that the arguments in favour of "free" received calls will prevail, but we see this as a matter for the market to decide. Our recommendations and discussion of the policy options therefore relate to both active and passive calls (as well as SMS as applicable).

**Option 1: Regulation allowed to expire in 2010**

3.4. The general view among the stakeholders and experts with whom we have discussed these issues is that it is extremely unlikely that the Regulation will be allowed to come to an end in 2010 without any extension. However, this is a matter of political judgement that should be taken into consideration by the European Parliament and Council rather than in this Report.

3.5. If the Regulation were allowed to expire in 2010, which is what is favoured by the industry with the exception of a few new entrants, both wholesale and retail voice tariff would become unregulated (as before 2007) and both texting and data traffic would still be unregulated (the current situation).

- 3.6 Allowing the Regulation to end without an extension would not necessarily imply that the decision to introduce it was a mistake, since in 2006 official competition policy investigations were taking place under both Article 82 and Article 81 EC Treaty and the national regulatory authorities (NRAs) were in the process of investigating whether any roaming wholesale operators were in a position of significant market power. All of these investigations have now been concluded without finding any operator to be in a position of market power in a roaming wholesale market, and without any adverse findings under Article 82 or 81.
- 3.7 Although it is never possible to be sure that there are no undetected competition problems, in the absence of hard evidence to the contrary one must assume that both the wholesale and the retail roaming markets are operating in a reasonably competitive manner by the standards required by EU competition law and the general framework of telecommunications regulation.
- 3.8 In our view before the Regulation imposed limits roaming was being priced throughout the industry (including per-minute pricing strategies) according to demand elasticity so as to achieve higher contributions to fixed costs and to profits than from other parts of the commercial mobile phone offer. This is in line with industry views (although explicit cross-subsidisation has never been admitted).
- 3.9 Against this background, the effects to be expected on prices if the Regulation is not extended are most likely to be the stabilisation of roaming tariffs per unit around the current Euro-tariff caps and the proliferation of more and more non-unit based bundled tariff based on flat-rate packages including roaming as one of the services on offer.<sup>13</sup> Customers would still be able to buy roaming services on a separate basis at prices in line with the 2010 Euro-tariff. In the absence of an extended Regulation the industry would be under no regulatory pressure to reduce prices below Euro-tariff levels, but on the other hand it would be highly naïve for the industry to raise unit price.<sup>14</sup>
- 3.10 We would not expect further significant reductions in average roaming charges in the short term at least. More tariff dynamism should, however, be observed as roaming becomes priced according to demand rather than regulation, and in time we would expect prices to again reflect different demand and cost conditions in different parts of the EU.

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<sup>13</sup> Our discussions with members of the industry have led us to believe that the market is moving away from per unit pricing in the direction of flat rate plans. This is partly to accommodate more transparent and accessible pricing schemes for data roaming.

<sup>14</sup> It would of course be possible to extend the Regulation without requiring further reductions in price, or allowing higher prices, if this were thought necessary.

- 3.11 With regard to the likely effects on industry profits of allowing the present Regulation to come to an end in 2010 rather than imposing further price cuts, there is contention. A reduction in price (however caused) is almost certain to increase volumes to some extent; and this may help to offset loss of profits on the previous volumes. The Commission Services have advised us that confidential data they have received through ERG suggest that elasticity is quite high, so that the imposed price reductions will not have had a large negative effect on profits.<sup>15</sup>
- 3.12 Industry opinion is, however, that elasticity of demand (the percentage increase in volume of sales resulting from a given reduction in price) for roaming services is low. In time, as technology develops and consumer awareness increases, demand may become more elastic but for the present the anecdotal evidence collected from the majority of industry respondents points to relatively weak substitution possibilities from fixed telephony, foreign SIM cards, hotel phones, e-mailing, VoIP etc. There are some difficulties for a consumer once in a foreign country in avoiding the roaming charges of his or her mobile operator.
- 3.13 There is no obvious evidence from the data collected by ERG that volumes were relatively higher in the countries where the Regulation imposed the sharpest price cuts, as one might expect if elasticity generally were high.<sup>16</sup> The following table compares elasticity estimates between the Commission, industry (GSMA), and Europe Economics.

**Table 3.1: Comparison of Elasticity Estimates**

Commission	-0.55 to -1.2
GSMA	-0.25
Europe Economics	-0.35 to -0.44

*Sources: Commission Impact Assessment 2008, GSMA response to public consultation 2007, Europe Economics, 2008*

- 3.14 If elasticity is indeed low, then allowing the Regulation to come to an end rather than imposing further price cuts would avoid a further negative impact on profits. This consideration probably deserves more weight in a recession than if market conditions were generally buoyant.

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<sup>15</sup> See the Impact Assessment, p. 93. “The profit impact in 2009 – 2010 would then lie somewhere between a decrease of 2.14% and an increase of 0.27%. The impacts on industry are thus rather small”.

<sup>16</sup> See Appendix 1: Overview of the Mobile Telephony Market.

- 3.15 There is next the question whether charges to other customers would be increased if prices to roaming customers are reduced by regulation, referred to as the “waterbed effect”.<sup>17</sup> Demand elasticity should be much higher domestically than for roamers, because domestic tariffs and service standards are the main factors on which potential customers focus when deciding which operator to use and how frequently to use the service. As a result, domestic tariffs tend to be more competitive and varied than roaming tariffs.
- 3.16 This puts a limit on the extent to which operators could succeed in compensating for an imposed reduction in roaming charges by an increase in domestic rates. However, this does not mean that there would be no such waterbed effect. If the overall returns being achieved by the mobile phone industry including roaming are competitive, as seems likely, then a reduction in roaming charges would in time be offset through other charges, maintaining the overall competitive returns required by the market. Such possible waterbed effects would be avoided if the Regulation is not extended (Option 1).

## **Option 2: The Commission proposals**

- 3.17 Option 2 would be the extension of the current Regulation in its present format for another three years, including SMS and wholesale data (both MMS and PSD). This is the full option proposed by the Commission.
- 3.18 The Commission (advised by the European Regulators’ Group (ERG)<sup>18</sup> and we understand also with support from some or all Member States) believes that consumers exert so little constraint on roaming charges, and that prices for roaming services are so high in relation to costs and to the prices for mobile services in domestic markets, that regulatory intervention is justified. Commission websites even include a popular style video illustrating the alleged unfairness of high roaming charges.<sup>19</sup>
- 3.19 There are persuasive reasons for treating SMS roaming services in the same way as voice. It is a relatively simple service, like voice in using little capacity, and is often an alternative to voice messages. However, the data market (including MMS) raises more complex issues and for the reasons discussed below Option 2 is perhaps excessive in that it might jeopardise the development of the data market, which is in its infancy.
- 3.20 Whereas voice and probably SMS may deserve some form of protection at the retail level, another issue with Option 2 is that it would offer a further protection by regulating wholesale as well. This might favour the entry of new players into the market by making wholesale access easier for them. On these grounds, Option 2 might be acceptable in the short run.

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<sup>17</sup> The “waterbed” effect is an increase in prices in one part of a market in response to a price reduction in another.

<sup>18</sup> The European Regulators Group for electronic communications networks and services was set up by the 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.” (ERG website).

<sup>19</sup> [http://212.68.215.195/europa/roaming\\_clip\\_hq\\_03\\_en.wmv](http://212.68.215.195/europa/roaming_clip_hq_03_en.wmv).

- 3.21 The current Commission proposal to include data in the Regulation subject to a wholesale “safeguard cap” of €1/MB indicates that data might be subject to more onerous price regulation in the future. We would rather recommend that data be unregulated completely unless there is a compelling case in favour of its price regulation because of continued high prices even after the market has fully developed, which can only be ascertained in a few years from now, typically after 2010.
- 3.22 Moreover, we do not believe that Option 2 is the optimal solution for data in the longer term, in that the data market should be left free to develop and only be subject for the time being to *ex post* competition policy surveillance. The technological advances and preferences of different kinds of consumer, and the products to be developed, should be left to market forces and not constrained by regulation in the absence of very clear evidence that this is necessary.
- 3.23 Discussion of the price levels to which caps should be set if Option 2 is adopted follows later in this report.

**Option 3: The Regulation would be extended for a further three years and cover SMS as well as voice, but not MMS or other data services**

- 3.24 Option 3 may be a more acceptable compromise between the Commission and the industry, if such a compromise is an appropriate way of thinking about the issue. Excluding data services from the scope of regulation should help to ensure that the roaming sector develops towards data traffic and away from simple voice and texts to such an extent that in 2012-2013 the only services of interest to most customers would in fact be for data only, treating voice as a sub-set of data services. This development would also be due to the development of alternative means of international wireless communication that might encompass voice as part of packet data, such as extended VoIP and WiMAX wireless technologies.
- 3.25 To summarise: under Option 3, the proposed Commission package would be stripped of its data and MMS component and be limited to the regulation of traditional voice calls and SMS only.

**Option 4: As Option 3, but only regarding wholesale access (retail tariffs to be liberalised on 1 July 2010).**

- 3.26 Option 4 is the same as Option 3, but with wholesale regulation only. Thus, under Option 4 retail roaming prices would be liberalised starting on 1 July 2010.
- 3.27 This Option is a more liberal alternative to Option 3, and it might be adopted by the European Parliament and Council in combination with competition policy (*ex post*) monitoring of the retail market. This option is the one preferred by new entrants into the mobile phone industry (such as 3G-only network operators) because it would still protect new entry and constitute a valid short-run alternative to a fully-fledged wholesale capacity market mechanism, while keeping retail tariffs free from price regulation both for voice/SMS and data.



3.28 We have already explained our view that if there were no controls on retail prices they would be unlikely to continue to fall on the paths proposed by the Commission. There would then be less short term advantage for roaming customers, to some extent at least balanced in overall welfare terms by the advantage to shareholders. In the longer term, the higher profits from roaming would increase the attractiveness of providing these services and so tend to increase the degree of competitive pressure e.g. from new entrants and new tariff options from the established service providers.

**Option 5: Extension for a limited period, excluding MMS and data, and with a strengthened review / sunset clause**

3.29 A further possibility would be a reduced-form Regulation, to last for a shorter period than three years - say eighteen months - and possibly excluding MMS and data from its scope.

3.30 The extension for a shorter period than three years would be sufficient for a detailed wholesale and retail competition analysis to be carried out and for the development of competition to be fully evaluated. This option would include the introduction into the draft Regulation of a stronger review/sunset clause that could pave the way to deregulation.

3.31 The review clauses in the Commission's present proposals, in Article 11, would require the Commission to 'review the functioning of this Regulation and report ... no later than 31 December 2011'. This review would include considering whether the Regulation has achieved its objectives, and whether in the light of developments in competition and consumer protection there is any need to strengthen it further.

3.32 A stronger version of the clause would be more specific in setting out conditions that would need to be established before any further extension of the Regulation should be proposed; for example:

- (a) Has it been confirmed that the roaming services should be regarded as an integral part of the overall mobile telephony market rather than as a separate market?
- (b) Has any evidence been found of substantial benefits or harm for third parties (positive or negative externalities) from the use of roaming services?
- (c) What are the obstacles if any in the way of either established mobile operators or potential new entrants in offering innovative roaming packages?
- (d) If it is confirmed that roaming services are part of the mobile telephony market, has that market (wholesale and retail) been found to be operating in a competitive manner?
- (e) If the answer to (d) above is in the affirmative, has any good reason been found to justify regulatory intervention in the relative prices charged by competing mobile telephone operators to roaming and other customers?
- (f) Has any evidence been found of consumers being misled about the terms of the roaming component of the packages they select?

3.33 Option 5 would be the most attractive proposition in terms of market liberalisation in that it might justify ending price regulation sooner, and arguably favour the shift of all roaming and other services towards data-only traffic. However, in order to extend the Regulation for less than three years, arrangements for a full competition policy analysis and *ex post* market surveillance should be in place. Otherwise, Option 5 might under-protect roaming customers in the medium run.

3.34 Therefore, our caveats as already expounded for Option 1 also partially apply to Option 5.

3.35 In order to partially strengthen the coverage of Option 5, the Regulation (to be extended for say eighteen months) might present two further sub-options:

(a) The Regulation might cover just voice (Option 5A); or

(b) It might cover voice, SMS, MMS, and other packet-switched data (Option 5B).

### Summary of options reviewed

3.36 The main features of Options 1-5 are summarised in the table below.

**Table 3.2: Summary of five options after 2010**

Price limits applied to:	Option 1: no extension of RR	Option 2: EC proposals	Option 3: 3 years extension +SMS	Option 4 Option 3, but wholesale only	Option 5 (a): 18 month extension	Option 5 (b): 18 month extension
Voice:						
a) Retail	No	Yes	Yes	No	Yes	Yes
b) Wholesale	No	Yes	Yes	Yes	Yes	Yes
SMS:						
a) Retail	No	Yes	Yes	Yes	Yes	Yes
b) Wholesale	No	Yes	Yes	Yes	Yes	Yes
MMS and other data:						
a) Retail	No	No	No	No	No	Yes
b) Wholesale	No	Yes ("safeguard cap")	No	No	No	Yes
Transparency requirements	No	Yes	Yes	Yes	Yes	Yes
Enhanced review clause	N/a	No	No	No	Yes	Yes

Source: *Europe Economics*

3.37 In the remainder of this Report we discuss the main points raised by the Terms of Reference for this study, provide comments on the data and background information collected during the stakeholder feedback analysis for this study, and suggest overall conclusions.

## 4 EXTENSION OF THE REGULATION'S DURATION

### What effects could be foreseen if the Regulation is not extended beyond 30 June 2010?

- 4.1 There is no doubt that the existing Regulation caused sharp reductions in roaming charges. Our Appendix 6: EU Mobile Roaming Price Data provides a detailed description of price trends in the Member States. On each chart, the actual prices are compared to the Euro-tariff price level, including VAT.
- 4.2 These charts also show that before the implementation of the Roaming Regulation in September 2007 roaming prices differed widely between customers in different Member States. For example, in September 2006, citizens of some countries paid on average in excess of €6 to make an outgoing roaming call, while others paid as little as €3.37. Following the Roaming Regulation outgoing calls in each country were in line with each other, and usually between €2 and €2.50.
- 4.3 Thus between March 2007 and September 2007 there were substantial drops in tariffs for both incoming and outgoing calls. However, once the Euro-tariff level was implemented in September 2007 there were very few significant price movements. In many cases, prices stayed virtually unchanged or rose slightly, even across different operators in the same country.
- 4.4 Given this price pattern, the question we start by asking is: how would prices then react if the Regulation were to expire in 2010?

### Would voice roaming prices increase?

- 4.5 In theory, in the light of underlying cost and elasticity estimates circulated in a number of publicly available roaming studies summarised in Appendix 8: Review of Relevant Literature, there is the possibility that operators might tacitly collude and exploit their position as providers of bottleneck facilities. As a result, it is argued, the price of roamed voice calls would increase. Operators might scrap or fail to promote per-unit pricing and try to “migrate” consumers to generally more expensive forfeit (pre-pay) packages that are normally characterised by two-part tariffs (connection fee plus marginal price) and product bundles. Eliminating the unit price component of roaming might blur the pricing picture due to service bundling, and customers would be less able to choose, if they wanted to, their roaming prices in isolation. Moreover, some service bundles give rise to “abundance” offers whereby customers are only able to exploit lower prices if they use up the totality of their allowed “free” minutes and text messages, including those which are roamed. Typically, such offers only allow consumers to “carry over” unused minutes and texts for a limited period of time, and they may complicate comparison of different offers because unit prices will depend on *ex-post* effective usage levels and cannot be easily predicted.
- 4.6 Another typical feature of non-unit roaming pricing which might emerge (or re-emerge) should the Regulation not be extended after 30 June 2010 is two-part tariffs, as well as per-minute billing, forcing consumers to pay fixed call set-up (connection) fees that are independent of the call's duration. It is well known from microeconomic theory that a price-discriminating monopolist can charge a marginal price in line with marginal cost and still extract – either in part or in full – consumer surplus via a fixed fee.

- 4.7 However, the possibilities of collusion or other anti-competitive behaviour should not be exaggerated. Although there are practical constraints on consumers choosing between roaming services the mobile network industry as a whole displays many characteristics of robust competitiveness. The industry is cross-border in nature, and therefore not limited by geographic location. Firms in the industry range from small new entrants to some of the largest companies in the world. The average market share of the leading operator in each country is almost 40 per cent.<sup>20</sup> There are many commercial links between mobile operators within the EU. Some of them are formal, either characterised as direct ownership links or as joint ventures, and others are informal, for instance in the form of marketing and branding agreements, airline-style alliances, and minority shareholdings. There were over 140 operators contributing to the latest ERG data collection. (Appendix 1 provides a detailed overview of the market, and of some of the commercial relationships.)
- 4.8 It would surely damage consumer perceptions of mobile operators if they increased prices, should the Regulation come to an end in 2010. Rising roaming prices following the expiration of the current Regulation would immediately attract political attention and probably provoke the immediate re-regulation of roaming charges. Moreover, the publicity would be harmful to sales; it is unlikely that price increases at that juncture would make business sense although in the longer run there is the possibility of creeping price rises taking different forms.
- 4.9 We cannot be sure that prices would not increase if the Regulation is not extended, but it does not seem likely.

#### **Would voice roaming prices continue to decrease at the rate observed since 2006?**

- 4.10 The GSMA and individual operators claim that roaming prices for both outgoing and incoming voice calls have been decreasing for a longer period than the time covered by the Regulation. This is shown in the AT Kearney report prepared for the GSMA in 2008, which is summarised as a Consultation Response in the literature review (Appendix 7) and gives price per minute for outgoing calls falling from €0.88 in Q1 2006 to €0.69 in Q1 2007, before the Regulation came into effect.<sup>21</sup> (The Commission, however, estimates the cost of a call in that period to have been higher, so that the Regulation had a larger impact).
- 4.11 A counter-argument to the GSMA and industry claim that roaming prices had started decreasing well in advance of the Regulation is that they only did so to respond to the threat of regulation. Some pricing moves observed, for instance, in the French and Spanish mobile phone markets in the run up to the Regulation might point in this direction.

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<sup>20</sup> [http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/annualreports/13th/SEC\(2008\)356DTSV02final.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/annualreports/13th/SEC(2008)356DTSV02final.pdf) .

<sup>21</sup> Exhibit 3, p48 of the Consultation Response.

- 4.12 It has also been observed that the level of price competition in almost all European markets has declined since the introduction of the Regulation, with prices stabilising around the EU-wide levels imposed for outgoing and incoming calls since September 2007. A degree of tariff innovation has, however, continued. Non-Euro-tariff packages have been proposed, and continue being proposed, by incumbent operators in a number of European markets, normally featuring flat rate offers or home marginal pricing plus a connection fee (Vodafone Passport), and — in the case of relatively new entrants such as 3/Hutchison — some packages have reduced the cost of incoming calls abroad to zero.
- 4.13 Some packages are only introduced during the summer season and tend to be withdrawn in the autumn. Seasonal/holiday packages are not shown on the GSMA roaming price comparison website because of their temporary nature. All of these packages are normally characterised by bundled and “abundance” offers, so they are not directly comparable to the Euro-tariff on a unit pricing basis. However, some operators claim that their plans are more convenient than the Euro-tariff and that the existence of such an externally imposed tariff might stifle further tariff innovation and take-up by unduly diverting internal resources and demand attention towards the Euro-tariff.
- 4.14 The price data observed so far (collected by the ERG and by national regulators) are a relatively short time series and do not allow us to infer any statistically significant price trend from which to extrapolate the direction of future prices.
- 4.15 However, it is the opinion of DG Information Society that roaming prices for voice would have not decreased to anything like the extent that is now observed had the Regulation not been introduced; and we agree with this.
- 4.16 If the Regulation is not extended with reduced price caps, we do not expect that prices would continue to fall at the rate observed since 2006.

**Would voice roaming prices stabilise at around current levels (including the Euro-tariff)?**

- 4.17 If the Regulation were not extended, operators might choose to keep existing roaming prices for voice traffic unchanged. This would follow the trend observed since the introduction of the Regulation (see Appendix 6). Prices would only decrease if this were profitable to the operators, which is mainly a function of the own price elasticity of demand for roaming services and of the cross-price elasticity of demand for roaming services as opposed to possible substitutes such as local SIM cards, multi-country SIM cards (where available), fixed telephony on location, hotel services, VoIP and Internet-based communication including e-mails and chat rooms.
- 4.18 Considering the political sensitivities implied by a rise in roaming charges as a result of the Regulation’s expiry, the possibility of prices stabilising around the Euro-tariff level, with tariff innovation largely limited to bundled and flat-rate packages is in our view — in the absence of technological breakthroughs — the most likely outcome.

## Should the duration of the Regulation be extended?

- 4.19 The discussion above has concentrated on the likely effects on prices and pricing transparency if the Regulation is allowed to expire. However, some other important considerations also need to be taken into account, notably the likely overall effects on welfare (meaning the combined effects on consumer welfare and on profits).<sup>22</sup> This is a fundamental point in establishing the merits of the proposal.
- 4.20 The effects on welfare of the Commission's proposals will depend significantly on the shape of the demand curve. If demand elasticity is very low, even a sharp decrease in roaming charges would not lead to a strong increase in consumption and hence the benefit to consumer surplus and the profits of businesses paying reduced roaming charges would be limited to the direct effect of the price cut (equal and opposite to the loss to suppliers). However, if elasticity of demand is pronounced, then a reduction in roaming charges would significantly increase the volumes of services supplied and hence consumer surplus.
- 4.21 The Autumn 2008 Impact Assessment performed by the European Commission argues that, even under the lowest elasticity scenario, consumer benefit would more than offset industry detriment in the case of continued price capping so that overall social welfare would be increased. The Commission thinks that if elasticity is -1.2, meaning that volumes would increase by slightly more than the percentage by which prices are reduced (which it believes is possible) then there would be an increase rather than a reduction in profits.<sup>23</sup>
- 4.22 Although it is not possible to be sure, our own view is that the elasticity of demand for roaming services probably is rather low. This is for several reasons:
- (a) Had elasticity been high for the industry as a whole it would have been higher still for some of the individual companies, which would then have found it profitable to compete by reducing prices aggressively before the Regulation was threatened.
  - (b) For most consumers, even high roaming charges are a small item of expenditure in relation to the convenience of the service, so that relatively few would alter their usage by much in response to a price reduction.
  - (c) Alternatives to roaming services are often likely to be less convenient or more expensive, so that few customers would switch to mobile roaming in response to a price reduction.
  - (d) We can find no evidence that since the introduction of the Euro-tariff volumes have been significantly higher in those countries in which the price reductions were greatest.<sup>24</sup>
- 4.23 In the longer term elasticity may increase, as alternatives are developed, and as consumers become more aware of the issue. However, in considering the likely effects of reductions in price caps in 2010 it is probably best to assume relatively low price elasticity.

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<sup>22</sup> See Impact Assessment p 90, summarising the Commission's welfare analysis: "... The model yields results that enable us to select the policy option that maximizes overall welfare (industry profits *and* consumer welfare").

<sup>23</sup> See Impact Assessment Annex II, e.g. Table 7.

<sup>24</sup> See Appendix.6?

- 4.24 The model used by the Commission to estimate effects on welfare depends on assumptions about the costs as well as the extent of incremental supply. This is important, because if the costs are incorrectly assessed then so would be the effects of any price reduction or increase in volumes on profits, which with consumer surplus are the component of welfare as measured in the model.
- 4.25 It is not entirely clear what cost concepts the Commission is using in reaching its conclusions, although the text states that the methods used by two NRAs have been taken into consideration, and that the costs of capacity used are not taken into account.<sup>25</sup>
- 4.26 Omitting consideration of capacity would in our view be a mistake. It is too short-term a perspective; a cost measure that included the longer term costs of providing capacity in the system would be theoretically preferable. It would lead to a higher cost estimate, and this would necessarily reduce the calculation of any net welfare gain. This is not just a theoretical point; some forms of roaming data service may make significant demands on capacity.
- 4.27 We have discussed with the Danish regulator, NITA, the cost estimates it has provided and recommended by to ERG as the basis for judgements about the appropriate levels of price cap. These estimates rest on calculations of long run incremental cost for defined services of the type that is now conventional in setting regulatory limits for access to essential facilities in the telecommunications industry. NITA's cost estimates apply to SMS and are much lower than the numbers proposed for the price caps.
- 4.28 However, as is usual in modelling of this kind, the model on which NITA's estimates are based uses conventions to allocate those costs that are shared (or "common") between roaming and other mobile services; such allocations do not reflect causality, but are used as a convenient way of ensuring that in a regulatory setting all costs are covered somewhere. They bear no relation to the economic costs that are caused by the provision of roaming services, nor therefore to the welfare analysis. In actuality, once the network costs have been incurred the incremental cost of handling a roaming call are probably very small indeed; but that is irrelevant to the efficient level of charges since any competitive company needs also to recover its investment, according to the market value of the services it provides.
- 4.29 To elaborate on this point, if a regulator has the task of setting price limits for a monopolist, e.g. limiting the maximum price that a fixed line telecommunications operator should be allowed to charge for access to its essential services, this would normally and reasonably be done by calculating the long run average incremental (LRAIC) direct costs of supplying the service, and adding a share of the LRAIC common costs and a normal rate of return. The basis on which the share of common costs is allocated is more or less arbitrary, although it can represent a large fraction of the calculated price limit.

In a competitive market, on the other hand, prices would be set according to the value of the products and services supplied and the long term objectives of the supplier. It would not be reasonable to base a decision to regulate prices in a competitive market on the grounds that prices differ from those that would be set by regulators were the market not competitive.

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<sup>25</sup> See Impact Assessment p90.

- 4.30 If the correct perspective is that roaming is a more or less inseparable part of the overall market for mobile services, and that overall market is generally operating under competitive conditions, then in theory a regulatory intervention to reduce prices for some specific services would lead in time to offsetting price increases (or deferred reductions) for other services, so that the overall bundle of services continues to earn the competitive average price. This “waterbed effect”, if complete, would offset the gains by consumers of roaming services; the regulatory price caps would have redistributed charges between consumers rather than reduced them.
- 4.31 However, this would in our view be too simple an analysis. The fact that the mobile industry clearly charges a higher mark-up on incremental costs in the roaming sector than on average, reflecting the lower demand elasticities, implies that a reduction in roaming charges would not be fully offset elsewhere. There would be some such effect; but by no means a complete offset. In terms of the effects on social welfare, offsetting price increases for some customers reduces but does not completely eliminate the transfer from suppliers to customers. If it leads to a less efficient tariff structure, in which overall output is reduced because higher charges are applied to services subject to higher elasticity of demand, this could reduce overall welfare.
- 4.32 Another important question is what would be the effects on competition in the longer term should the duration of the Regulation be extended. If the Regulation continues to concentrate on a ‘glide path’ menu for reducing marginal prices (units of consumption for voice, text, and perhaps data), then there is the possibility that competition will decrease in the long run, as operators converge towards Euro-tariffs. It is often thought that when price caps are introduced consumers tend to think that the prices suggested by the Regulators should be acceptable and adapt to them; the caps become the norm, and reduce the competitive pressures. For this reason, the effect on long-run competition of an indefinite extension of the Regulation might be deleterious. This includes the possibility of a smaller number of tariff options and the simplification of tariff-making towards marginal pricing, rather than options that give consumers an entitlement to so many minutes for a fixed price per period, which might be better for them.
- 4.33 If the long term effects of regulation are to inhibit competition, then consumers as well as producer interests would suffer.
- 4.34 To recapitulate briefly, the Commission’s Impact Assessment has not been able to establish that its proposals would improve welfare. The reasons include the following:
- (a) Elasticities are probably low, so that the Commission’s proposals would reduce profits.
  - (b) The cost estimates used appear to exclude the costs of capacity and to rely on arbitrary allocations of common and shared costs. They are probably not relevant to welfare analysis.
  - (c) There would be some increases in other prices, due to a partial waterbed effect.
  - (d) Since the model is a static analysis, no account is taken of the long term disbenefits to consumers through distortions of competition or the incentives for investment.



- 4.35 Consumer associations and VoIP operators thought that the Regulation should be extended for one more regulatory period. They were, however, of the opinion that regulation is not optimal in the case of roaming and that it should only be used as a stop-gap until sufficient competition develops. They were therefore in favour of *ex post* competition policy measures to replace *ex ante* price regulation in the medium run, although they believe that 2010 would be too early a point in time to end the Roaming Regulation.
- 4.36 In our view, there are strong economic and regulatory arguments against extending the Regulation for a further period. However, as noted at the outset of this report, there is a general expectation that the Regulation will be extended and we therefore continue by discussing the form it should take on the assumption that it is in fact to be extended.

**To what level should the price caps for voice calls ideally decrease or increase in case of an extension of the Regulation beyond 2010?**

- 4.37 Per-second charging is proposed to be introduced from 1 July 2009 and it is being proposed that any call set-up fee (connection charge) be capped at the value of 30 seconds (Euro-tariff) of a call made. This change in itself would be equivalent to a price reduction of over 10 per cent, since at present the first and subsequent minutes are often charged in full even if the call lasts less than that. ERG has estimated that the effect of per-minute charging is that consumers have been paying approximately 24 per cent more for calls made and 19 per cent more for calls received than if all charges were calculated per second.<sup>26</sup>
- 4.38 However, the justification for this proposal, which was supported by the ERG, seems to us to be weak. The service which a consumer receives is not measured simply by the number of seconds taken in a call, but also includes the availability of the service, so that a combination of ‘set-up’ and per second charging is natural. There is no satisfactory basis in any cost calculations for a regulator to impose a view that the set up charge should be limited to the equivalent of 30 seconds (or any other such number). It is of course important that the operators should make the basis for charges clear to customers. Some customers might then prefer a higher set up charge and lower per second charge; regulation should not seek to frustrate this possibility.
- 4.39 Turning to the question of the per second price caps, if Parliament and the Council is content with the price limits imposed by the present Regulation and wish to take these as the starting point it would be natural to suggest that future price caps should follow likely underlying cost trends. After repeated discussions with the GSMA and individual operators, we have come to the conclusion that – with the exception of NITA, the Danish telecoms regulator – nobody, including operators themselves, has seriously attempted to (bottom-up) model either short or long run average incremental stand-alone cost of roaming because of the underlying technical complexities and the existence of large areas of common and joint costs. (The study carried out by the Danish regulator was particularly focussed on modelling the cost of SMS, MMS, and other data as opposed to voice in particular.)
- 4.40 The operators have, however, criticised the approach followed in Denmark in attempting to isolate the stand-alone (short run) cost of roaming texts.<sup>27</sup> They also stress that roaming

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<sup>26</sup> [http://www.erg.eu.int/doc/publications/erg\\_08\\_36\\_intern\\_roam\\_rep\\_080812.pd](http://www.erg.eu.int/doc/publications/erg_08_36_intern_roam_rep_080812.pd).

<sup>27</sup> Please refer to paragraph 5.5.

cannot be construed as a separate market because it is sold and bought as part of a product bundle and its underlying supply (cost) structure is not easily separable.

- 4.41 The price of a unit (say, a minute) of voice roaming should include an allowance for capital expenditure and depreciation, not only operating cost. Long run cost estimates are, as mentioned, not available but for the purpose of estimating possible trends in future total costs it is reasonable to assume that capital intensity in such an industry would be similar to that observed in fixed line communications and utility industries. These are typically capital intensive industries in which capital expenditure costs may be three times as large as the annual operating expenditures. Let us assume, for the sake of reasoning, that mobile phone operators in the EU should replicate the rate of Total Factor Productivity (TFP) of their telecommunications sectors or their economies as a whole. This rate, at an EU average level, was recently estimated for the European Commission by its Directorate-General for Economic and Financial Affairs in a paper on the EU-US TFP gap by Havik et al. (April 2008) and published in *European Economy/Economic Papers* no. 339 (September 2008).<sup>28</sup> The analysis concerned 9 EU countries<sup>29</sup> plus the US over the period 1980-2004 and covered a total of 28 industries, including Information and Communication Technology (ICT), according to the NACE A31 industry taxonomy. The international TFP frontier was determined by the country exhibiting the highest TFP level in that particular industry, in one particular year, accounting for capital expenditure as well as labour, energy, materials, and services following the established EU KLEMS database.
- 4.42 Considering all input factors and the ICT sector only, the leading country in one particular year for the EU shows an ICT TFP growth at the frontier of 13 to 15 per cent. More traditional industries did not grow in terms of TFP by more than 5 to 6 per cent each year at the best of times and traditional capital intensive industries might grow as little as 1.5 to 3 per cent a year. The mobile phone industry is showing signs of maturity in the EU but cannot be defined as being a fully mature industry yet, and is indeed quite competitive as opposed to more traditional network industries. It does share technological features with the fixed line industry and it would be unrealistic, considering network activities as well as retail, to assume an annual TFP growth for this industry within the EU of more than 5 per cent a year. However, in order to allow for cost reduction possibilities (both opex and capex) at the frontier due to technological shift, we might assume that the frontier shifts out more quickly in mobile telecommunications than in the ICT industry as a whole, and perhaps assume a pre-tax improvement potential, in nominal terms, of 8 per cent a year. Assuming 2 per cent theoretical Euro core (ex-fuels, ex-food) inflation a year (which is nowadays a high estimate) would lead to a nominal ex-VAT unit price reduction of 6 per cent a year.
- 4.43 In an economic recession, or even a period of low growth, increases in productivity are likely to be harder to achieve. On the other hand, any nominal price cap becomes less onerous as inflation declines (this was the reason for the use of the RPI-X formulation in UK utility regulation, an approach widely followed in other countries also.)
- 4.44 The current ex-VAT retail charge reductions are (for voice calls made) projected to fall under the current Regulation from €0.49 per minute to €0.43 (1 July 2009), and further decrease to €0.40, €0.37, and €0.34 at yearly intervals until 1 July 2012 according to the Commission's proposal. Similarly, for received calls charges limits are proposed to

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<sup>28</sup> [http://ec.europa.eu/economy\\_finance/publications/publication13143\\_en.pdf](http://ec.europa.eu/economy_finance/publications/publication13143_en.pdf).

<sup>29</sup> These are Denmark, Germany, Spain, France, Italy, the Netherlands, Austria, Finland, and the UK.

decrease, at the same intervals, from €0.24/minute to €0.22, €0.19, €0.16, €0.13, and €0.10 to 1 July 2012.

- 4.45 These nominal, ex-VAT unit price reductions are therefore in the order of around 8 per cent a year for calls made and almost 24 per cent a year (on average) for received calls from 2009 to 2012, on top of a substantial reduction from the requirement for per – second charging. The values for received calls are in excess of TFP estimates used by utility regulators at a national level, whereas the proposed changes in the values for calls made are more in line with what would be expected.
- 4.46 The high level of reduction proposed by the Commission reflects its view on Mobile Termination Rates (MTR) in the EU and its willingness to reduce roaming charges for received calls in line with MTR reduction at a national level. By requiring substantial reductions the Commission might, however, induce a significant “waterbed effect” in both mobile services (leading, for instance, to an increase in domestic tariffs) and fixed line communications, since the costs that are not recovered via receiving charges might be passed on to other customers.

**Table 4.1: Charges Set by Roaming Regulation**

	Wholesale maximum average charge (€per minute)	Retail maximum average Eurotariff (€per minute)	
	All calls	Calls made	Calls received
<b>29 June 2007</b>	0.30	0.49	0.24
<b>30 August 2008</b>	0.28	0.46	0.22
<b>30 August 2009</b>	0.26	0.43	0.19

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

*Source: OJEU 29/06/07*

- 4.47 In order to limit any “waterbed” effect and the likely adverse effects on profits, if the 2009 price caps and the logic of cost-reflectivity in changes in those caps used by the Commission is accepted the price caps for calls made might still go down by an average of about 8 per cent a year in nominal terms (the Commission’s current proposal), although this is slightly more than the figure of 6 per cent discussed in paragraph 4.42 above. However, charges for receiving calls might have to decrease by less than the Commission proposes. Reductions of the rate indicated by trends in TFP say 6 per cent a year would lead to a final glide-path value for July 2012 of around €0.16 rather than €0.10. It is intended that mobile operators would still be able to compete below these targets and that MVNOs and new entrants (“challengers”) will be able to undercut incumbents without being subject to a “margin squeeze”. This assumes that wholesale charges (in essence, those charges agreed between operators as part of IOT negotiations) would still be regulated in the medium run (4-5 years) as also suggested by the new entrants we contacted.
- 4.48 The Commission proposed in September 2008 that the Regulation extend its coverage of wholesale charges at a yearly rate of reduction from July 2009 to July 2012 of around 15 per cent (nominal pre-tax). We are inclined to agree with the Commission on the rate of reduction for wholesale charges because we believe that the latter should be higher than the rate of imposed retail price reductions in order to encourage entry and avoid margin squeezes.

4.49 The following tables and charts map out possibilities for glide paths of voice telephony if the regulation is extended in duration. It should, however, be clear that the glide paths suggested, by the Commission and here by ourselves, rest on judgement about what seem reasonable numbers if the price caps set for 2009 are accepted as the starting point and if the basic logic of the Commission's approach is accepted, rather than on any exact economic calculation. Less severe reductions could be considered if the change to per – second charging with a limit of 30 seconds for set-up charge is imposed.

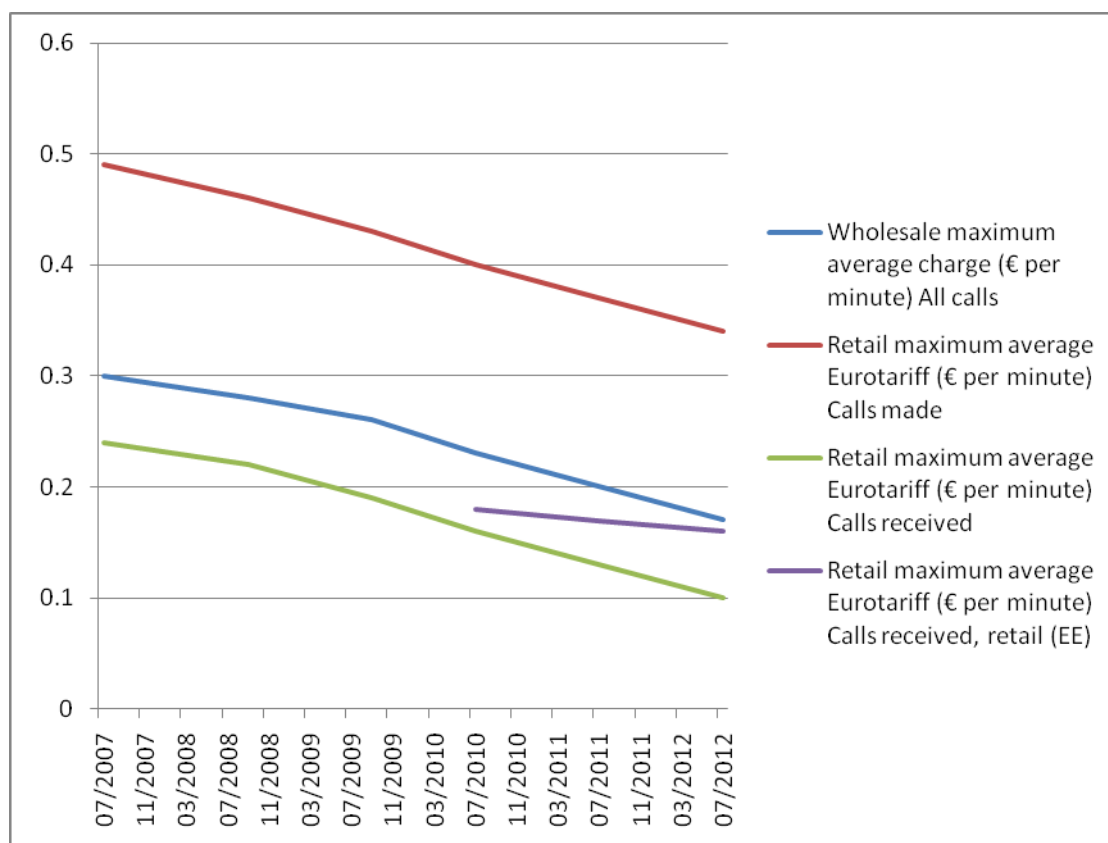
**Table 4.2: Charges for Voice Telephony Proposed by EC in Extended Roaming Regulation**

	Wholesale maximum average charge (€per minute)	Retail maximum average Eurotariff (€per minute)	
	All calls	Calls made	Calls received
<b>1 July 2010</b>	0.23	0.40	0.16
<b>1 July 2011</b>	0.20	0.37	0.13
<b>1 July 2012</b>	0.17	0.34	0.10

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

*Source: [http://ec.europa.eu/information\\_society/activities/roaming/docs/regulation/reg\\_en.pdf](http://ec.europa.eu/information_society/activities/roaming/docs/regulation/reg_en.pdf)*

**Chart 4.1: Voice Telephony Roaming Caps in Current Regulation and its Proposed Extension**



*Source: European Commission, Europe Economics, 2008*

**Table 4.3: Charges for Voice Telephony Suggested by Europe Economics: option 1**

	Wholesale maximum average charge (€per minute)	Retail maximum average Eurotariff (€per minute)	
	All calls	Calls made	Calls received
<b>1 July 2010</b>	0.23	0.40	0.18
<b>1 July 2011</b>	0.20	0.37	0.17
<b>1 July 2012</b>	0.17	0.34	0.16

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

- 4.50 Chart 4.1 above visualises the caps implemented by the current Roaming Regulation, along with the proposed caps for its extension, in addition to which there would be the effects of the proposed reduction in the minimum charge for the first minute of a call. Overall, with the Commission's proposals the cumulative percentage reductions between 2007 and 2012 would be: 43 per cent in the average price cap for wholesale calls, 44 per cent in the price cap for retail calls made, and 58 per cent in the price cap for retail calls received.
- 4.51 The chart also shows Europe Economics' alternative proposed retail caps for calls received, which differ from those of the Commission. These suggestions are on the basis that the Parliament and Council decide to accept the price caps in the present Regulation as a starting point and to extrapolate on the basis of plausible estimates of cost trends.
- 4.52 If on the other hand Parliament and the Council wish to extend the Regulation but do not think it appropriate to make such fine calculations, one practical alternative would be to maintain both retail and wholesale price caps at the limits reached under the present Regulation by 2010. This would maintain a level of regulatory protection for customers while avoiding the risk of imposing further reduction in profits in difficult economic circumstances.

**Table 4.4: Charges for Voice Telephony Suggested by Europe Economics: option 2**

	Wholesale maximum average charge (€per minute)	Retail maximum average Eurotariff (€per minute)	
	All calls	Calls made	Calls received
<b>1 July 2010</b>	0.26	0.43	0.19
<b>1 July 2011</b>	0.26	0.43	0.19
<b>1 July 2012</b>	0.26	0.43	0.19

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

## 5 EXTENSION OF THE REGULATION'S SCOPE

### Should the scope of the Regulation be extended to cover SMS, MMS and other data roaming?

- 5.1 In addition to voice services, mobile phones generally provide Short Messaging Services (SMS), Multimedia Messaging Services (MMS), and data services. An SMS refers to the transfer of short text (usually alphanumeric) messages between mobiles. SMS can also be transferred between fax machines and IP addresses. An MMS refers to the transmission of graphics, video clips, sound files, often accompanied by short text messages over wireless networks. The distinguishing feature between SMS and MMS is the utilisation of multimedia services. Finally, mobile phones now offer the feature for transmitting digital data through internet protocol.
- 5.2 From a supply perspective MMS and data differ little: both depend on the same network capacity and both rely on packet switching, the method of splitting data for transmission and then re-aggregating it afterwards. SMS is also based on data transfer, but it uses minuscule capacity amounts and does not generally utilize packet switching. However, from a demand point of view, SMS and Voice are usually grouped together by the consumer as they both provide straightforward and immediate communication services, the only differences being in medium and continuity (SMS are discrete). MMS and data are seen by consumers as similar, although MMS are extremely limited in capacity and efficiency in comparison with data services, and it is unlikely that the long run consumer would prefer MMS in isolation to SMS or data.
- 5.3 Regarding MMS and other (typically, packet switched) data including heavier mobile (laptop) usage, the Commission is proposing a safeguard level of €1/MB wholesale cap but no retail caps, whereas most operators including new entrants are generally against the idea of regulating data services (mobile broadband) at this stage.
- 5.4 As already mentioned the Danish NRA (NITA) has undertaken a study on SMS, MMS and other data services highlighting modelled marginal costs per unit (160-character SMS) of no more than €0.02/0.03.
- 5.5 The NITA report has been greeted with some criticism by those opposed to the Regulation. The main costs that the report has been criticised for overlooking include:<sup>30</sup>
- (a) Interconnect costs between the home operator and the host network via (eventually) fixed line or satellite trunk networks;
  - (b) Signalling costs, as applicable;
  - (c) Interconnect costs to the external IP network, if the call transits over the Internet;
  - (d) Inter-operator billing and settlement costs, including clearing-house costs;

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<sup>30</sup> These criticisms do not necessarily reflect the views of Europe Economics. Please see Appendix 10 for more detail.

- (e) Other infrastructure costs (e.g., pre-pay billing check for prepaid SIM card customers, retail billing);
  - (f) Application of content lock when roaming on another network (for instance, parental control);
  - (g) Cost of roaming fraud losses and investment in specific roaming fraud tools and staff; and
  - (h) Foreign exchange cost/risk, as applicable.
- 5.6 It should be noted that the €0.11/text final unit price for SMS as proposed in the glide path regime by the Commission in September 2008 would be lower than the domestic SMS level (including international SMS texting from a domestic base) currently observed in a few high-price Member States.<sup>31</sup> These Member States are those driving the European average. There is the theoretical possibility that in some high-price Member States the SMS Euro-tariff might make it possible for arbitrageurs to resell low-price pre-pay SIM for domestic usage. Our talks with Commission Services and ERG highlighted no concerns with respect to this issue, which indeed seems a theoretical rather than a practical possibility.
- 5.7 Considering modelling difficulties and the lack of transparency with regard to SMS and data costing, we conclude that if voice charges continue to be regulated then SMS pricing should be regulated at a price that bears a reasonable relation to the rate for making or receiving a roaming voice call. Sending a text message when roaming may in some circumstances be a substitute for making a call or it may request a call-back.
- 5.8 Currently, operators tend to price unregulated roaming SMS within the pricing interval of an incoming and outgoing roamed call (Euro-tariff). We propose that price limits for roaming SMS follow a path that is in line with that proposed for received calls: €0.18 in 2010, €0.17 in 2011, and €0.16 in 2012. Imposing a sudden reduction to €0.11 per message might prompt some operators to try to make up for lost revenues on their domestic markets and/or delaying investment and tariff innovation in advanced data services (PSD and MMS).
- 5.9 It would not seem necessary to impose a regulatory limit on wholesale charges for SMS, since these are the outcomes of negotiations between businesses and in the absence of evidence to the contrary it is reasonable to assume that they would be settled in a normal competitive context. Any alleged abuses against competition law would be pursued in the usual way.
- 5.10 Table 5.1 compares suggested caps for SMS, and Chart 5.1 visualises it.

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<sup>31</sup> Belgium, Italy, and UK for example.

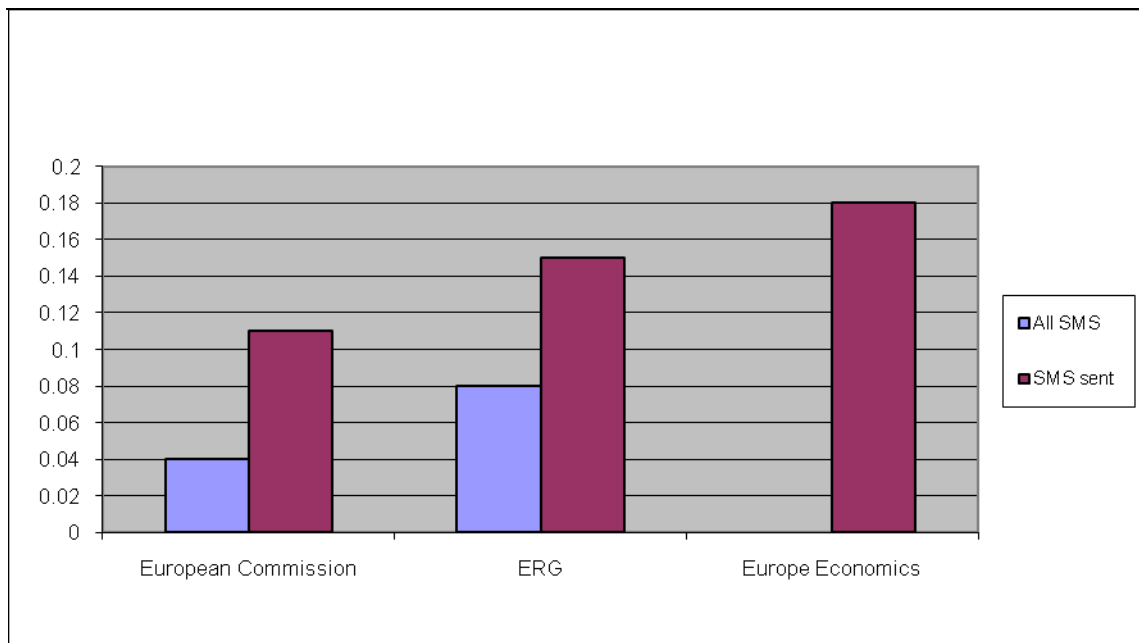


**Table 5.1: Suggested Charge Caps for SMS in Extended Roaming Regulation, 2009/2010**

	Wholesale maximum average charge (€per message)	Retail maximum average Eurotariff (€per message)
	All SMS	SMS sent
<b>European Commission</b>	0.04	0.11
<b>ERG</b>	0.04 — 0.08	0.11 — 0.15
<b>Europe Economics</b>	--	0.18 (2010), 0.17 (2011), 0.16 (2012)

Source: EC, Europe Economics and ERG

**Chart 5.1: Maximum Suggested SMS in an Extended Regulation, 2009/2010**



Note: For ERG figures, maximum caps are used.

Source: EC, Europe Economics and ERG

5.11 Regarding MMS and other data roaming, we do not recommend that the Regulation be extended. According to all parties and stakeholders consulted, the data market is in a phase of rapid growth and development. Regulating data at this stage might in effect “kill off” the data market and discourage future investment in fast data packet transit infrastructure. Although current prices are still high, we believe that the industry is already shifting towards more credible tariff plans and flat-rate packages as opposed to per-MB pricing.

- 5.12 It is also clear from recent developments that an increasing number of operators are installing cut-off software on advanced mobile devices and laptop computers (not on older 2 and 2.5G handsets) to monitor data usage. In addition to cut-off pop-up messages, operators are also in favour of flat-rate packages subject to fair usage conditions that would in fact replicate in the roaming field the tariff schemes already adopted on a domestic basis. Finally, the data market (as compared with traditional voice and SMS) is much more exposed to competition from other broadband providers such as fixed links, wireless Internet (also providing VoIP), wide hotspots featuring WiMAX technology, private networks etc. In the data market, there is also an important role being played by business users (international travellers), for whom there should be no regulation at all in any case as their companies negotiate data traffic packages with the operators in a business-to-business relationship. However, SMEs would have to be treated as small commercial users, hence similar to residential rather than business customers.
- 5.13 For the reasons explained above, we believe that, if the Regulation is extended it should cover both voice and SMS for one more regulatory period, while MMS and other data – such as PSD – should not be regulated *ex ante*.
- 5.14 We doubt whether per-MB pricing has a future, since the industry is already moving towards flat-rate packages for data services, which is arguably the best way to go to ensure pricing transparency and to avoid “bill shocks” in the future. Per-MB regulation might just stay as a nominal stop-gap, but we see no substantial role for it to play in the foreseeable future, as tariff design is evolving away from per-unit data traffic pricing. Tariff design should, in the future, reflect the nature of the service being provided, which is basically access (connection). Therefore, we expect tariffs to evolve in the form of two-part schemes whereby an access (connection) fee is paid for upfront, plus a marginal price if usage exceeds a previously agreed threshold. Non-threshold usage should be priced marginally and be subject to the prior agreement of the final user in order to avoid bill shocks. This two-part tariff principle is frequently followed in capital-intensive (network-based) industries such as the mobile phone industry.
- 5.15 Policy to protect consumers’ interests with respect to MMS and other data should be based on competition policy instead of *ex ante* regulation. Part of competition policy enforcement should include transparency requirements (pricing, data usage, cut-off points, real-time metering) of the kind already identified by the Commission in its most recent proposals.
- 5.16 Table 5.2 summarises a comparison of our suggested SMS and data caps with those of ERG, EC, and NITA.

**Table 5.2: Comparison of Suggested SMS, MMS and Data Price Caps (€)**

<b>2009/2010</b>	<b>ERG</b>	<b>EC</b>	<b>Europe Economics</b>	<b>For comparison: NITA cost estimates</b>
<b>SMS (per text)</b>				
Wholesale	0.04-0.08	0.04	--	0.01
Retail	0.11-0.15	0.11	0.18	0.04
<b>MMS</b>				
Retail				
Send	--	--	--	0.28
Receive	--	--	--	0.12
<b>Data (per MB)</b>				
Retail	--	--	--	0.95
Wholesale	--	1.00	--	0.45

*Sources: ERG (2008) and NITA (2008)*

**Should the Regulation apply at the wholesale and/or the retail level?**

5.17 Regulating retail prices without regulating wholesale prices might in theory lead to wholesale access agreements (IOTs) between traditional operators being kept artificially high in order to keep out new entrants (“margin squeeze”); however, there is no compelling evidence that this is occurring and, indeed, some IOTs reflect quantity discounts that, if justified by underlying costs, are certainly not illegal and cannot easily be challenged by new entrants on purely economic grounds. It would seem preferable to rely on competition law to prevent any occurrence of anti-competitive pricing at the wholesale level.

### **What should be the basic characteristics of such Regulation?**

5.18 If it is decided to apply both wholesale and retail regulation after 2010 the basic characteristics should be the following:

- (a) At the wholesale level, in the absence of a practicable wholesale capacity exchange (see below in this document), the Regulation should be limited to Inter-Operator Tariffs (IOTs). It is well known that such tariffs are rather secretively determined and that bilateral contracts are in theory the preferred option. This status quo tends to favour traditionally established operators (network incumbents) and their sister companies throughout the EU. Outsider companies such as new entrants and 3G-only operators may say that they face difficulties in replicating the terms and conditions negotiated, often on a quantity discount basis, between the main operators.

However, quantity discounts are a perfectly legitimate means of price differentiation as long as they are justified by underlying cost differences. If one believes that the provision of capacity enjoys economies of scale due to its ‘lumpy’ nature, then quantity discounts on IOTs have an economic rationale (cost reflectivity). Therefore, the Regulation should not set flat unit wholesale rates as is currently being proposed by the Commission. Rates should be expected to decline as quantities exchanged increase. To impose this would, however, amount to regulatory micro-management. We therefore recommend that the unit values currently being assessed by the Commission be presented only as maxima for small transactions, and that quantity discounts be allowed otherwise.<sup>32</sup>

- (b) At the retail level, quantity discounts are not as relevant but they can still be allowed as part of flat-rate bundles with extra usage allowances. Otherwise, unit price caps as currently being proposed may be acceptable as a regulatory stop-gap in the short run.

### **Is it feasible to introduce at this stage an exchange for trading wholesale traffic capacity between operators?**

5.19 The idea of introducing an exchange for capacity trading is theoretically attractive. Similar applications exist, in the commodity sector, in Europe and elsewhere. For instance, power exchanges are active in the Netherlands, Germany, France and other EU Member States, whereas Great Britain which pioneered the approach moved from a compulsory power pool on to a system of bilateral contracts with non-compulsory exchange-based trading in 2001. Similar trading takes place at some gas hubs.

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<sup>32</sup> The alternative would be to make trading fully public via a wholesale capacity exchange whereby minutes are traded on both a spot and forward basis (see IPX Appendix featuring a description of current GSMA arrangements, keeping in mind that the IPX is not a compulsory capacity exchange).

- 5.20 The advantages of a capacity exchange for wholesale traffic would be price transparency, openness to new entrants, and (arguably) increased price competition as opposed to the current bilateral contracts (IOTs). The disadvantages of a capacity exchange would be administration and transaction costs, price determination issues in the presence of different trading values of a minute or MB of capacity at different locations and different points in time (giving rise to location-based and time-dependent pricing issues), and – more generally – coordination and settlement costs. It would need to be overseen by a market surveillance authority in order to prevent risking the abuse of market power. A voluntary exchange would probably be deserted by some of the crucial operators in favour of bilateral dealing, which might lead to consideration of making membership compulsory.
- 5.21 A trading scheme that might eventually develop into a fully-fledged exchange is currently being tested by the GSMA. This scheme, known as the IPX, is not an exchange at this moment and of course is not compulsory. It is organised as an Internet Protocol (IP) electronic platform with trading and settlement facilities. The IPX is designed to exchange IP-based traffic among all kinds of service providers in a secure environment. The IPX environment consists of a number of carriers and service providers. The carriers will be mutually interconnected when there is demand from a service provider. This eventually forms an inter-working chain, in which all parties maintain technical and commercial agreements and settlement is centralised. (The IPX is described in more detail in Appendix 8 to this document.)
- 5.22 At this stage, given practical difficulties we do not believe that the introduction of a fully-fledged, compulsory exchange for trade is feasible. We do, however, believe that the introduction of a wholesale capacity exchange might be reassessed at the end of the period covered by the Roaming Regulation (2010), also in view of any progress being made by the IPX following its testing phase. Technological advances and real-time billing and metering at wholesale and retail levels, in addition to the gradual migration of all mobile services towards pure data via IP (including what is today known as VoIP), might make an exchange perfectly feasible and transparent in a few years from now. When feasible, this exchange might eventually replace the current wholesale schemes based on relatively un-transparent IOTs.
- 5.23 We do believe, however, that the introduction of a wholesale mobile exchange at this stage is still premature, both for roaming and for more general trading of minutes of voice and MB of data. The technological development of fully IP-based communications in the future might, however, change the status quo relatively quickly so it is advisable for the policy-maker to monitor the situation closely.

## 6 CRITICAL INFORMATION ASSESSMENT

6.1 This section provides a critical assessment of the available data, research papers, analyses, Commission and ERG documents. We also discuss data reporting requirements and show some preliminary data matrices we have compiled for the ERG on price information and for the consumer associations, including BEUC, on perceived quality of service information.

### Evaluation of background information

6.2 The information collected as a background information-gathering exercise for this study came from a number of sources:

- The ERG and, to a lesser extent, NRAs;
- the European Commission itself;
- the industry, including its international representatives GSMA;
- academic and commercial sources; and
- case studies from other countries.

6.3 The information collected was assessed according to the criteria of objectivity; data quality; understanding of the industry being analysed; and apparent “usability” of information for regulatory and competition policy purposes.

6.4 Regarding quality as well as price data, the individual consumer representatives from Member States and their EU-wide coordinator BEUC might try to collect information about their individual jurisdictions on a systematic and coordinated basis. A first example of how this could be reached is the quality matrix that we prepared when asking individual Member State organisations for customer feedback information in their own, respective countries. This matrix is shown in what follows.

	<i>Number of tariffs significantly different tariffs available per country (expressed in 1-2-3)</i>	<i>Price transparency/clarity index; (expressed in 1-2-3)</i>	<i>Geographical coverage ratio of the 2G, 2.5G, and 3G Networks; (expressed in %)</i>	<i>Customer satisfaction index; (expressed in 1-2-3-4-5)</i>
	<i>1 = Small number of tariffs: from 1 to 3</i>	<i>1= Low level</i>		<i>1= Very bad level ; 2= Low level</i>
	<i>2 = Acceptable number of tariffs: from 4 to 7</i>	<i>2 = Acceptable level</i>		<i>3= Acceptable level</i>
	<i>3 = Large number of tariffs: 8 or more</i>	<i>3= Good level</i>		<i>4= Good level; 5= Excellent level</i>
<i>Austria</i>				
<i>Belgium</i>				
<i>...</i>				
<i>UK</i>				

- 6.5 A good publicly available EC Information Society consumer-oriented website allowed us to calculate the per-roaming prices in our Appendices. This website is partly mirrored by a similar one that is sponsored by the GSMA.<sup>33</sup>
- 6.6 There are, however, some problems with these website sources: first of all, the time series of data available is quite short. Only a few pieces of information are available that pre-date the introduction of the Roaming Regulation. Secondly, some information is missing, for instance all the offers and prices, where applicable, of MVNOs. (Many of these offers are seasonal.) In terms of quality, for instance network coverage, some of this information could also be centralised at an EC level and perhaps be provided on the website. However, in our dealings with BEUC we found that this information is not widely available (on perceived quality and the like) or otherwise is not available to the public. When asking individual consumer organisations, we found out that many of them were not available to respond and the data response rate turned out to be quite low.

### **Stakeholder positions**

- 6.7 The main stakeholders whose positions were considered in this study were:
- (a) the European Commission;
  - (b) the ERG;
  - (c) the GSMA (industry body);
  - (d) the national regulatory authority of Denmark (NITA); and
  - (e) European telecommunications consumer representative BEUC.
- 6.8 Subject to respecting requests for confidentiality, views of the stakeholders are reported in Appendix 2 and summarised briefly in what follows.

### **The European Commission**

- 6.9 The European Commission is convinced that roaming prices are currently well above underlying costs. It is of the opinion that companies should price the services more closely to underlying cost and not to price elasticity.
- 6.10 As stated in its Impact Assessments of 2006 and 2008, the Commission believes that the own price elasticity of roaming may be as high as -1.2 (in absolute value) although lower elasticities are also used in the analysis.
- 6.11 Finally, the Commission believes that regulation is required in the absence of sufficient competition in the supply of roaming services, resulting from the special features of the mobile telephony market.

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<sup>33</sup> <http://www.roaming.gsmeurope.org/>.

## **The ERG**

- 6.12 Within the ERG, Scandinavian NRAs and countries facing particularly high prices (such as Poland and Portugal) would like to have tighter regulation whereas countries where competition is already leading to lower prices are interested in lifting any regulation sooner rather than later.
- 6.13 The Commission's recent roaming proposals reflected ERG recommendations with a few exceptions,<sup>34</sup> namely:
- (a) The Commission, but not ERG, favour the regulation of wholesale data; and
  - (b) The Commission calls for the regulation of per-unit billing (typically, per second plus a connection fee not to exceed 30 seconds' worth of a per-second billed roaming call), while ERG merely analyses the problem.
- 6.14 The ERG is currently revisiting its analysis, and trying to better understand some costs. The third benchmark data collection exercise has been launched, and the report will be published by Christmas 2008 (but we should not expect elasticity data). One issue ERG is looking into is the scope for applying the Danish/NITA cost level estimates (focussed on a Scandinavian set of assumptions) in other Member States.
- 6.15 Our understanding is that ERG has not addressed the IA (2008) in any detail.

## **The GSMA**

- 6.16 The GSMA (industry association) has an official policy position where its members agree but remains silent on those issues where its members have different commercial views.
- 6.17 The unified GSMA position states that the Regulation should be repealed; that roaming cannot be thought of as being a separate market; that roaming services are sold as a bundle and not in isolation (although incidentally customers can buy roaming packages in isolation if they want to); that the industry is competitive and roaming prices had been coming down already before the Regulation was announced; and that billing and tariff-making should be left to the industry.
- 6.18 The Regulation has already reduced revenues and profits all over the industry, generating not only direct reductions of profits, but a set of other indirect but significant costs. The reduction in revenues also affected the quality of the service. The regulation had a huge administrative cost for operators across the industry. GSMA estimated from €1 to €2 million of cost per main operator, and €150 million for the entire industry. Investment has been jeopardised due to the fact that the regulation reduced revenues has been forgone, and thus implied a reduction of resources allocated for innovation.

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<sup>34</sup> It should be noted that during our interviews, ERG made it abundantly clear that their proposals should be read as just that; that the Commission could use them or discard them at its own choice. The specific proposed caps are discussed in detail in Appendix 7: Review of the Relevant Literature.



- 6.19 It is important to be aware of the significant differences in the role of roaming among operators and countries. For operators of countries in which tourism has a strong importance, the roaming services can be more important than domestic. For other countries roaming services (and their regulation) have less impact on revenues.
- 6.20 The Regulation does not take into account the differences in costs and markets across Europe. This presents problems for operators; for example, areas of tourism that have many seasonal outgoing calls (Malta, Austria) have been hit quite hard by the Regulation. It has also become harder for operators to justify further network investments in areas where the terrain makes it expensive establish the required infrastructure (e.g. Alpine regions in Austria).
- 6.21 As a result of the Regulation, GSMA estimates that the retail voice roaming market in the EU has shrunk by around 30 per cent from its 2005 level. This is a considerable source of concern for an industry which has been experiencing significant strains on profitability in recent years.
- 6.22 The GSMA also believes that regulatory compliance will divert the industry from future investment and might lead to a waterbed effect. Moreover, the GSMA claims that tariff innovation might be stifled as all operators converge to the Euro-tariff.
- 6.23 Finally, the GSMA is convinced that the price elasticity of roaming is very low, and has published a paper saying that roaming is priced within a bundle of service according to inverse price elasticity, thus following the principle of “Ramsey” pricing.<sup>35</sup> The GSMA also states that the mobile phone industry as a whole is not more profitable than an average of comparable network industries, including traditional utilities.

#### **NITA, the national regulatory authority of Denmark**

- 6.24 The Danish National IT and Telecom Agency (NITA) has recently analysed the prices and costs for mobile data services abroad. The following table compares current prices, the Commission’s proposals and the results of the Danish analysis:<sup>36</sup>

**Table 6.1: SMS and Data Prices/Costs**

	<b>Current Prices</b>	<b>Commission’s Proposals</b>	<b>Danish Cost estimates</b>
<b>SMS wholesale</b>	€ 0.154	€ 0.04	€ 0.01
<b>SMS retail</b>	€ 0.285	€ 0.11	€ 0.04
<b>Data wholesale</b>	€ 2.004	€ 1	€ 0.45
<b>Data retail</b>	€ 5.408	-	€ 0.95

*Sources: EC, ERG, NITA (DK), 2007-8*

<sup>35</sup> AT Kearney and CRA International (2006) “Review of the Commission’s Impact Assessment”, GSMA: London.

<sup>36</sup> All prices are taken from the latest ERG report.

6.25 NITA is of the opinion that the Commission's initiative on per-second billing is very positive. However, it believes that the proposed minimum billing interval of 30 seconds (equal to €0.23 on average) by far exceeds the cost of setting up the call. Furthermore, NITA finds it positive that the Commission has proposed to extend voice roaming regulation until after 2010, and to reduce the price caps further, noting that mobile termination rates (MTRs) throughout Europe have been reduced by more than expected.

**BEUC (EU consumers' representative)**

6.26 BEUC shares many of the Commission's views on the extension in both duration and scope of the Roaming Regulation. We therefore take BEUC's position as being substantially aligned to the main Commission stance. Some national consumers associations were consulted to cross-check their views with special respect to market openness and transparency. Unfortunately, only a handful of consumer associations responded, notably France and Belgium from established European markets and Hungary and Slovenia from newer EU markets. All of them pointed out similar feedback in terms of:

- (a) Relatively high customer satisfaction;
- (b) acceptable transparency levels (apart from "bill shocks"), which might, however, be improved upon;
- (c) relatively low roaming tariff proliferation (operators tend to stick with the Euro-tariff);
- (d) acceptable quality of service in terms of network coverage ratios; and
- (e) acceptable tariff availability on domestic service bundles.

6.27 The results obtained from customer associations, while taken from a relatively restricted sample, are surprising in that customer feedback on roaming – as well as the mobile phone experience more generally -- seems to be slightly more positive than the Commission appears to believe. Further survey analysis from BEUC on this matter, as well as a larger sample of countries, might be useful.

**Review of Academic Papers Considered**

6.28 The academic papers we reviewed<sup>37</sup> recognise that roaming might be defined as a separate market from the demand side. However, from the supply side the allocation of common costs remains a huge issue.

6.29 Academic sources also agree in clarifying that the data market is still in its infancy, and that it would probably be a bad idea to regulate it at this stage. Some technical sources also drew attention to the likely convergence of voice and text messaging towards data. Once all traffic is dealt with as data, then (essentially 3G) mobile operators will probably compete directly with Internet service providers and Web-based wireless traffic.

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<sup>37</sup> See Appendix 7 for a literature review.

- 6.30 Ewan Sutherland argues that roaming might or might not be a separate market, but is definitely a separate product sub-set which is easily identifiable by consumers. He points out that some non-EU jurisdictions are looking at the EU to set a precedent in terms of regulation. He recalls the example of free roaming in a group of African countries and of some regulatory coordination currently planned in the GCC area (Arabian/Persian Gulf). He also underlines that, in the US, roaming prices are even higher than in the EU on average, especially to faraway destinations.<sup>38</sup>
- 6.31 Tommaso Valletti states that competition is in fact a matter for concern in mobile EU roaming, especially at the wholesale level, because IOTs are not transparent and intra-industry information sharing can easily be orchestrated by the GSMA, leading to the possibility of tacit collusion (collective dominance).<sup>39</sup> Valletti also thinks that NRAs cannot easily coordinate on a cross-border basis, and that this deficiency can be exploited by the operators via the set-up of sister companies and other trans-national agreements that cannot be policed easily by individual regulators and/or competition authorities.
- 6.32 Another peculiarity discussed by Valletti stems from a combination of poorly informed consumers and a technological constraint through weak capacity for traffic steering, together which result in operators having little incentive to offer attractive wholesale rates to networks — and consumers having little incentive to seek out the best tariffs when roaming. Both of these statements are heavily debated by interested parties. One certainty, however, is that transparency provisions can help to offset these distortions.
- 6.33 Academics do not agree on whether investment and quality in mobile roaming will go up or down in the future as a result of the introduction of regulatory caps. Foros presents a three-stage game, where investment is an outcome of Stage 2 (the first and third stages determine roaming quality and prices, respectively), and draws specific conclusions about possible dynamics, but this model is heavily predicated upon the possibility of market collusion.<sup>40</sup> Since the whole market is technologically converging towards data, quality degradation (in terms of video/data transfers for instance, or territorial coverage) should not really become a problem in the future.

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<sup>38</sup> Sutherland, Ewan (2008) “The Regulation of international mobile roaming” *Info*, Vol X, No 1, pp.13-24.

<sup>39</sup> Valletti, Tommaso (2004) “Obligations that can be imposed on operators with Significant Market Power under the new regulatory framework for electronic communications” *Journal of Network Industries*, Vol 5, No 1, pp51-81.

<sup>40</sup> Foros et al. (2002) “Demand-side spillovers and semi-collusion in the mobile communications market” *Journal of Industry, Competition and Trade*, Vol 2, No 3, pp259-278.

- 6.34 An academic working as consultant to the industry, David Newbery in his paper with AT Kearney for the GSMA, argues that roaming cannot be viewed as a separate market, for the roaming service is rather part of a bundle, and as such it is priced according to elasticity of demand (price discrimination) and not according to underlying cost.<sup>41</sup> In order to reinforce this idea, Newbery compares the mobile phone industry to other multi-product network-based industries and to low-cost airlines. He notes that price discrimination (as opposed to cost-based pricing) is not in itself something to condemn unless the policy-maker were able to prove that there is a dominant position being abused when price discriminating; in other words, the competition authority (or regulator, as applicable) should be able to prove that consumers being price-discriminated against have no alternative choices, i.e. that the price discriminator is also a monopolist (or part of a cartel, whether explicit or not). This is a correct argument in our view, although there is room for debate about whether the customer of a mobile phone company has realistic alternatives to paying its roaming charges.
- 6.35 A piece of analysis which we believe is of relevance to this Report is the roaming market research report by Paul Budde and Associates, which is extensively quoted in Appendix 1.<sup>42</sup> This provides an overview of EC and ERG data on roaming and on the European mobile phone industry as a whole.
- 6.36 Some papers we reviewed offer important insights into the technicalities of the roaming sector. The interested reader can find a detailed literature review in the Appendices.

### **Case Studies from Other Countries**

- 6.37 Appendix 3: Case Studies examines the mobile roaming markets and regulatory framework in the United States and Hong Kong.
- 6.38 From our review of mobile roaming within the US, we see the power of the “bill and keep” system in eliminating roaming charges. Unfortunately, because of too many other structural and historical differences between the two unions it would be too simplistic to envisage superimposing a similar system onto the European market; that is not to say that certain components cannot be borrowed. We have also seen from the US the recklessness in retail pricing that can stem from the absence of international frameworks. From Hong Kong, we come to appreciate the synergies that are made possible by adopting a multiple-number single-SIM system across an area of frequent roaming.

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<sup>41</sup> AT Kearney and Newberry, David (2008) “Demystifying the European mobile industry: facts and insights on the economics of a major European industry” GSMA: London.

<sup>42</sup> Paul Budde Communications Pty Ltd (2008) “Europe – mobile market – overview and statistics” New South Wales.

## 7 CONCLUSIONS AND RECOMMENDATIONS

- 7.1 This report discusses the main features of the provision of roaming services and the effects of the Regulation, concluding that:
- (a) It does not seem realistic to us to treat roaming simply as a market in its own right, separate from the market in mobile telephony. Although the roaming service is quite distinct in a technological sense, the economies of scope in providing roaming services together with other mobile phone services are in our view likely to be very great. There are some alternative services, but no companies apart from mobile phone companies offer roaming.
  - (b) The 2007 Regulation has substantially reduced prices for voice roaming services.
  - (c) Demand elasticity is uncertain but may be lower than the values claimed in the recent EC Impact Assessment, meaning that the reductions in price caused by the Regulation did not cause the volumes of calls made to be much greater than they would otherwise have been.<sup>43</sup>
  - (d) If elasticity is low, this implies that the Regulation has probably reduced profits as well as prices.
- 7.2 The proposed extension of the Regulation is required in order to give legal effect to regulatory interventions that could not be justified under the normal framework of telecommunications regulation, since no operators have been found to be in a position of dominance or to have Significant Market Power in a relevant market.
- 7.3 The arguments supporting the extensions of the Regulation include
- the fact that most customers place little weight on roaming charges when deciding which mobile operator to use, limiting competitive pressures for price reductions;
  - the fact that prices per second or per message are far higher for roaming services than for domestic mobile phone use;
  - the claim that roaming services are priced far higher in relation to the costs of supply than would be expected in a competitive market; and
  - that the single European market would be better integrated if roaming charges were further reduced.
- 7.4 The Commission's Impact Assessment concludes that implementing its proposals to extend the Regulation would have a beneficial effect on welfare (meaning the total of consumer surplus and firms' profits). In essence, the Commission thinks that roaming prices are simply too high.

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<sup>43</sup> Our own empirical analysis estimates the demand elasticity for roaming calls made to be between -0.35 and -0.44, whereas the range considered in the Impact Assessment was between -0.5% and -1.2%. Please see Appendix 1: Overview of the Mobile Telephony Market.

- 7.5 However, these arguments are not in our view decisive. Customers may quite rationally place little weight on a service they do not expect to use much, and, provided that roaming tariffs are made clear, the fact that they are given less weight than other aspects of the overall service offered is not a market failure such as would justify regulatory intervention. The fact that roaming prices are above domestic prices may reflect cost differences and / or differences in the elasticity of demand; both of which factors will normally and legitimately be taken into account by competing suppliers in setting prices. Once the investments have been made that permit roaming services to be offered, the incremental cost of providing the services is very low; but charging prices significantly higher than such costs would not justify regulatory intervention since a return on the investment is needed and it has not been established that the overall profitability of mobile companies is excessive. The operation of the EU single market is not likely to be much affected by roaming charges, nor are there any other obvious positive externalities for society from encouraging the use of roaming services (although some people might leave their phones on more if charges for receiving calls are reduced or abolished). Transferring money from producers to consumers is of course not in itself a valid regulatory objective.
- 7.6 In our opinion, the Commission's Impact Assessment has not been able to establish that the effects of extending the Regulation would be to improve overall welfare. This is for several reasons, notably:
- (a) dynamic factors such as the effects on innovation and investment are explicitly excluded from the model used;
  - (b) capacity costs are excluded from the cost concept employed in the calculations;
  - (c) exclusion of any "waterbed" effects (meaning consequential price increases) in other parts of the mobile phone market; and
  - (d) uncertainty about elasticity of demand, i.e. the strength of any market response to imposed price reductions. If elasticity is low, then the benefits to consumers resulting from price reductions are largely limited to a transfer of money from supplier interests which in itself would not improve welfare in the short term (because it is merely a transfer) and could significantly damage it in the longer term by inhibiting investment and by discouraging competition.
- 7.7 The preferred long-run scenario from the perspective of most interested parties would be de-regulation at both wholesale and retail level. This is our view too.
- 7.8 There are three (not mutually exclusive) areas in which developments may make the Regulation clearly superfluous in the medium term.

- 7.9 The first line of thinking is technologically based. Because of data convergence and the introduction of real time metering and billing, together with a non-compulsory exchange for data traffic currently being developed, as an IP platform, by GSMA, roaming will converge towards data. Data is a very competitive market segment that does not need to be regulated, and the roaming customer using data services has more alternatives than the roaming voice customer, not being constrained by the practical wish to use the same phone number.<sup>44</sup> Roaming (including the traditional segments of voice and SMS) will therefore transit on the Internet and will directly compete with VoIP or any evolution of it within the next five years. At that stage, roaming will cease to be perceived (and priced) as a separate service.
- 7.10 The second and related line of thinking is about new entry. Substitute products to roaming are already appearing: international or local SIM cards (pre-paid), Internet-based telephony, MVNOs negotiating separate roaming packages, and — to a limited extent — tariff innovation brought about by traditional mobile operators. The development of wireless broadband in municipal areas might compete directly with roaming, as is being observed in some cities already. Roaming-only operators might come into existence to compete with integrated mobile phone companies to resell roaming capacity at a retail level.<sup>45</sup> Coupled with data convergence and the increased awareness of consumers, and backed by technological developments at the wholesale level (industry-led capacity market mechanism), we believe that in the medium run any perceived need for direct price regulation should vanish.
- 7.11 A third line of argument is that a more thorough discussion of the competitive conditions in the relevant parts of the mobile market, as suggested in the context of Option 5 considered here, might lead to a general acceptance that it is inappropriate for regulation to intervene without very clear justification in the relative charges for services supplied from a common asset base. This would see deregulation of roaming services as part of a general move towards lighter and better regulation by the EU.

### **Overall conclusion**

- 7.12 In considering the Commission's proposals, the Parliament and Council may have political considerations in mind in addition to the economic and technical points reviewed in this paper.

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<sup>44</sup> GSMA (2008) "GSM Association response to the public consultation for the Review of the functioning of the Regulation (EC) No 717/2007 (the "Roaming Regulation") and of its possible extension to SMS and data roaming services" London.

<sup>45</sup> These operators are already visible in the tourist market, where inter-country SIM cards are being proposed (anecdotally, some of these cards can be bought on both traditional and budget airlines as part of in-flight shopping). Our case study on China and Hong Kong (Appendix 3) is an interesting case in point.

- 7.13 Purely on economic grounds, however, the case for an extension of the Regulation is weaker than that for introducing the existing Regulation. There are no outstanding competition investigations, and no evidence that the mobile industry as a whole is not effectively competitive. Unless an investigation by the competition authorities shows that there are reasons for concluding to the contrary, policy formation must presume that the industry is normally competitive.
- 7.14 It is not clear that roaming services can realistically be assessed as if they constituted a separate market, since they could not be provided by any other than mobile phone companies. Their full costs cannot therefore be satisfactorily separated from those of the networks as a whole, although their prices are certainly high in relation to those of comparable domestic services.
- 7.15 The Commission Impact Assessment has not established that extension of the Regulation would improve social welfare, when dynamic effects and the costs to shareholders are balanced against the advantages of lower prices. The disadvantages of risking reducing profits and discouraging investment unless the need is clearly well established are greater in a serious general economic recession.
- 7.16 If the Regulation is extended in time, it should reasonably also cover SMS services. However, it should not extend to MMS and other data services, which are a new and evolving market in which regulation would be inappropriate and unnecessary.
- 7.17 If the Regulation is extended, it should be for a shorter period than three years, during which a deeper competition review should be conducted. This, in conjunction with continued technical developments, may help to justify the removal of price controls.



## **APPENDIX 1: OVERVIEW OF THE MOBILE TELEPHONY MARKET**

### **Market Overview: the Mobile Phone Industry**

- A1.1 About 140 operators contributed to the most recent ERG data collection exercise, representing about 90 per cent of the EU market.
- A1.2 Companies in the mobile market range from among the world's largest companies to relatively small operators. Some have been formed as spin-offs from the incumbent national operators (BT, France Telecom, etc.) and others as commercial ventures by consumer-oriented businesses in other fields (Virgin, many of the mobile virtual network operators, referred to as MVNOs). There are no EU Member States in which fewer than three or more mobile companies are active, and in many countries there are many more; the barriers to international competition seem relatively small.
- A1.3 Technological advance and substantial investments have been prominent features of the development of the industry.
- A1.4 The total sales revenues of the industry in 2007 were estimated as €137 billion, of which roaming contributed €6.5 billion. Within roaming revenues, voice was predominant at €5.2 billion; SMS was €0.8 billion, and data services including MMS was 0.6 billion.<sup>46</sup>

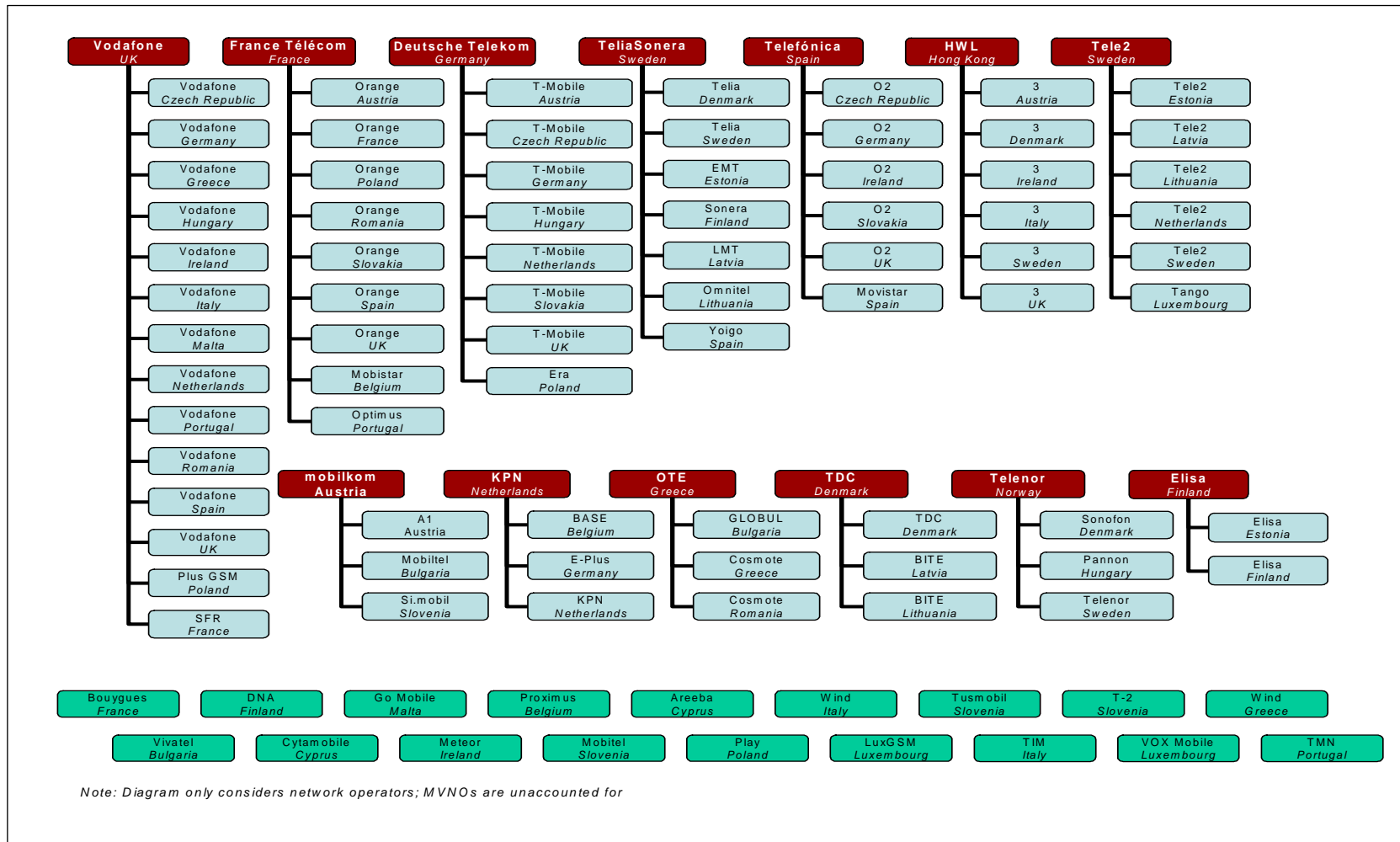
### **Commercial Links between Operators**

- A1.5 There are many commercial links between mobile operators within the EU. Some of them are formal, either characterised as direct ownership links or as joint ventures, and others are informal, for instance in the form of marketing and branding agreements, airline-style alliances, and minority shareholdings. For the sake of simplicity, in the chart that follows we only list formal commercial links whereby the leading company or brand has a controlling interest in the remaining operators, whether as formal subsidiaries or majority-controlled (asymmetric) joint ventures.

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<sup>46</sup> EC Impact Assessment 2008, p 16 and 17.

**Chart A1.1: Commercial Relationships between EU Mobile Operators**

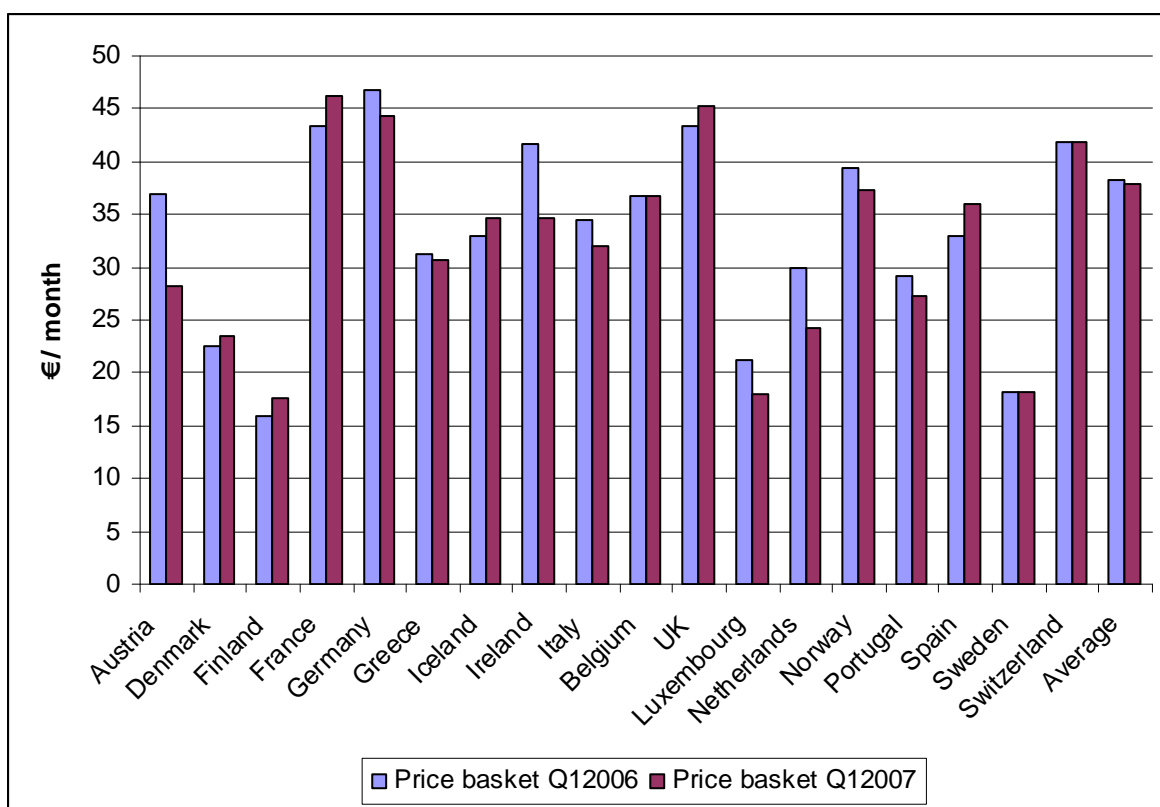


Source: Europe Economics

## Price Trends: Voice

A1.6 Before the introduction of the Euro-tariff mobile telephony prices and annual changes varied in the EU countries as indicated by the following two charts.<sup>47</sup>

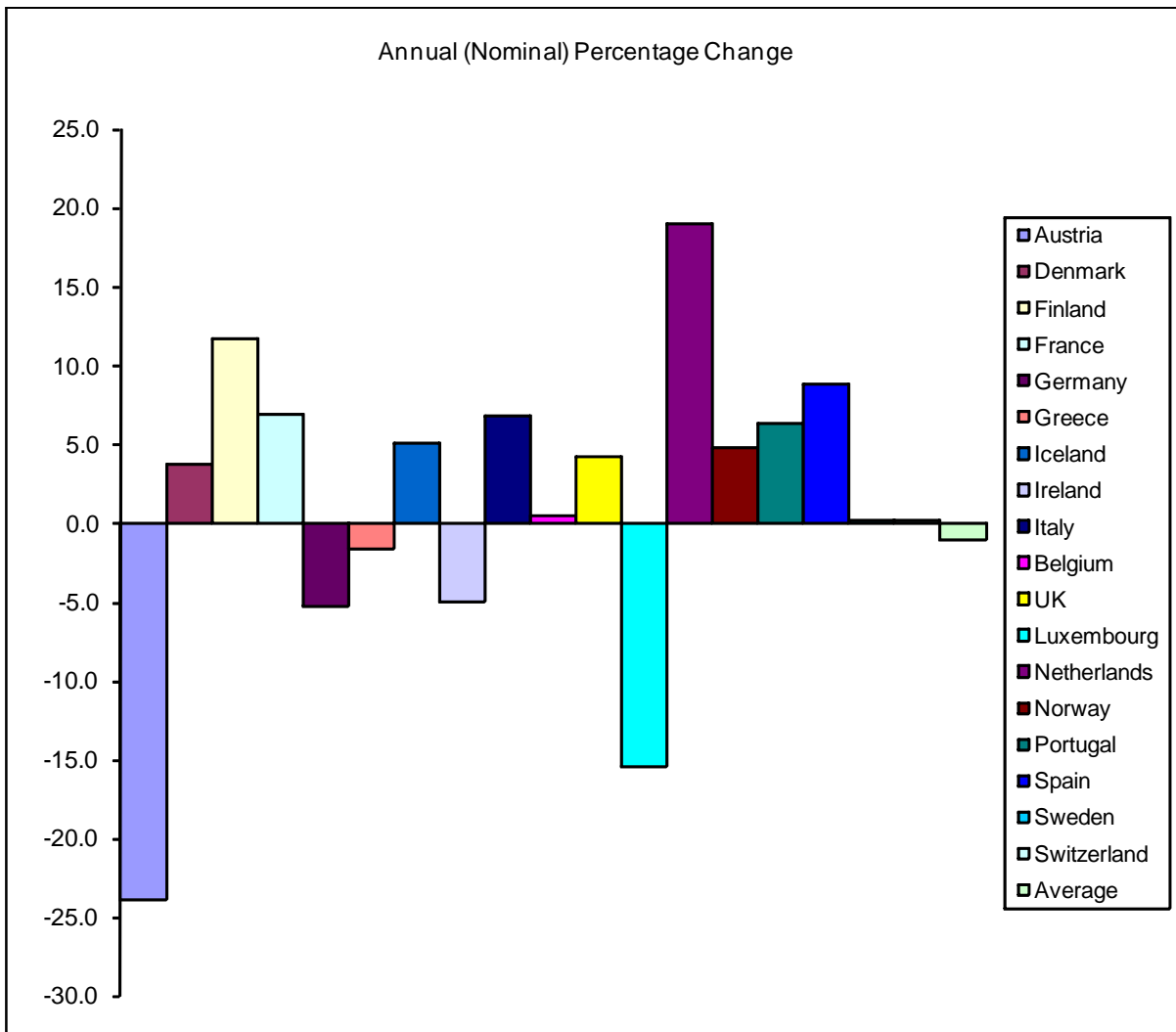
**Chart A1.2: GSM Price Basket (2006-2007)**



Source: Paul Budde Communication Pty Ltd (2008) "Europe - Mobile Market - Overview & Statistics", page 4, based on FICORA data

<sup>47</sup>Paul Budde Communication Pty Ltd 2008 data has been used heavily in this section. It incorporates ERG data with its own market research and fills a significant gap in available data on the EU mobile roaming market.

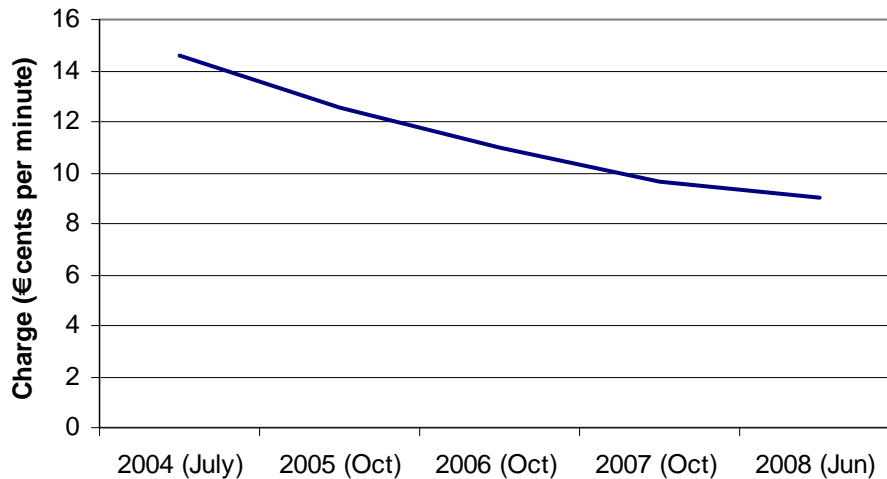
**Chart A1.3: Annual Change in the GSM Price Basket (2006- 2007)**



Source: Paul Budde Communication Pty Ltd (2008) "Europe - Mobile Market - Overview & Statistics", page 4, based on FICORA data.

A1.7 The trend of mobile termination charges is a downward one. For example, the EU average mobile termination charge in June 2008 is € 0.09 cents per minute compared with € 0.15 cents per minute in July 2004.

**Chart A1.4: EU Average Mobile Termination Charges, 2004 - 2008**



Source: Paul Budde Communication Pty Ltd (2008) "Europe - Mobile Market - Overview & Statistics", page 11.

### Price trends

A1.8 Appendix 6: EU Mobile Roaming Price Data provides a collection of charts summarising data collected by the European Commission with regard to roaming prices across EU Member States. The data were collected at six-monthly intervals from September 2006 to July 2008 and made available at [http://ec.europa.eu/information\\_society/activities/roaming/index\\_en.htm](http://ec.europa.eu/information_society/activities/roaming/index_en.htm).

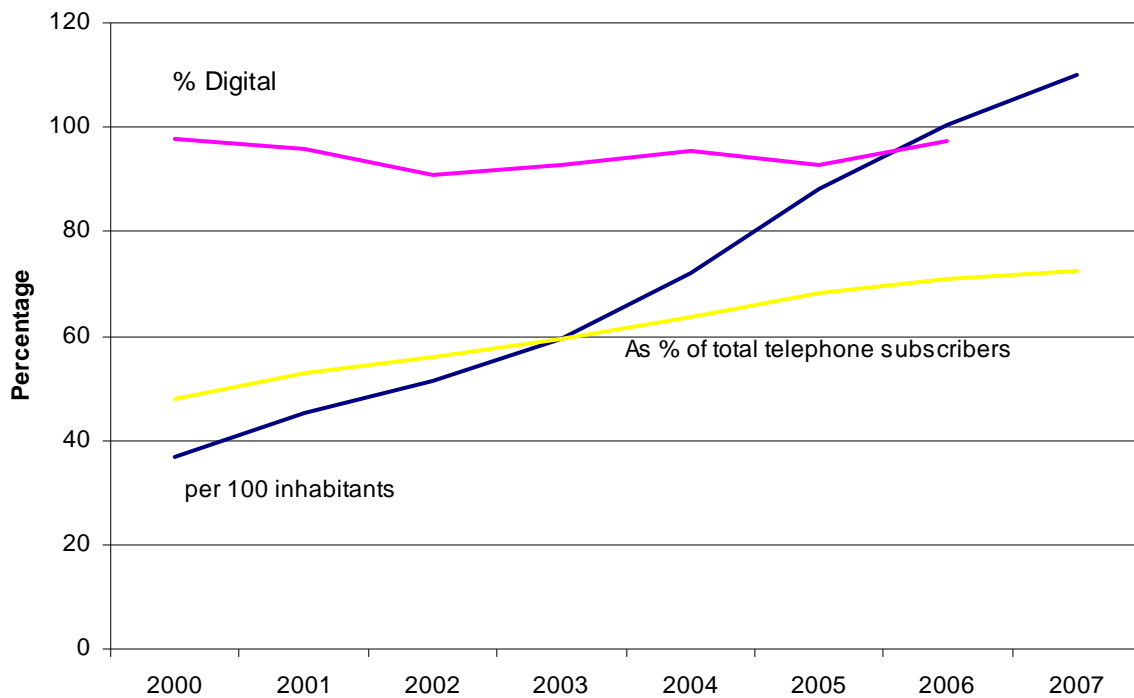
### Number of subscribers

A1.9 The number of mobile subscribers in the whole of Europe has increased rapidly in recent years. The number of mobile cellular SIM cards has increased from 36.9 per 100 inhabitants in 2000 to 110.2 per 100 inhabitants in 2007. The ratio of mobile cellular subscribers to total telephone subscribers increased from 48.1 per cent to 72.6 per cent, again indicating the increasing importance of the mobile business in the telephone industry. The percentage of mobile calls that are digital (2G or higher)<sup>48</sup> is high, which represents good quality of communication through mobile cellular networks.

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<sup>48</sup> Second generation 2G cellular telecoms refers to those networks commercially launched on the GSM standard in Finland by Radiolinja (now part of Elisa) in 1991. The three commonly acknowledged benefits of 2G networks over their predecessors were that phone conversations were digitally encrypted, 2G systems were significantly more efficient on the spectrum allowing for far greater mobile phone penetration levels; and 2G introduced data services for mobile, starting with SMS text messages.

**Chart A1.5: Number of Mobile Cellular Subscribers in 44 Countries of Europe  
(per Hundred Inhabitants, Digital Percentage, and Percentage of Total Telephone Subscribers)**

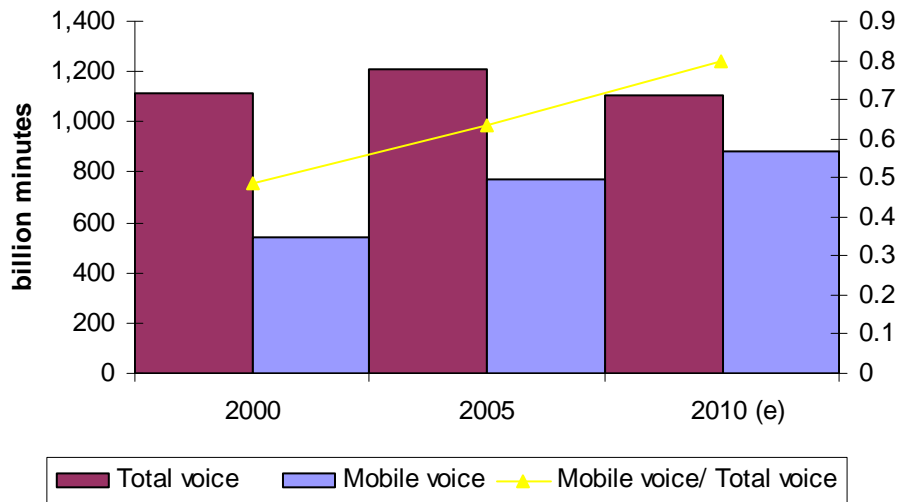


Source: International Telecommunication Union, see <http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx>. The data include 44 countries in Europe.

### Volumes

A1.10 Mobile voice volumes (measured in billion minutes) have been increasing rapidly, from 541 billion minutes in 2000 to 770 billion minutes in 2005, and are estimated to reach 885 billion minutes in 2010. As is shown by the line in Chart A1.6, mobile voice accounted for 63.5 per cent of total voice in 2005 instead of 48.5 per cent in 2000, and is estimated to grow to 80 per cent in 2010.

**Chart A1.6: The Mobile Voice Market in Europe**

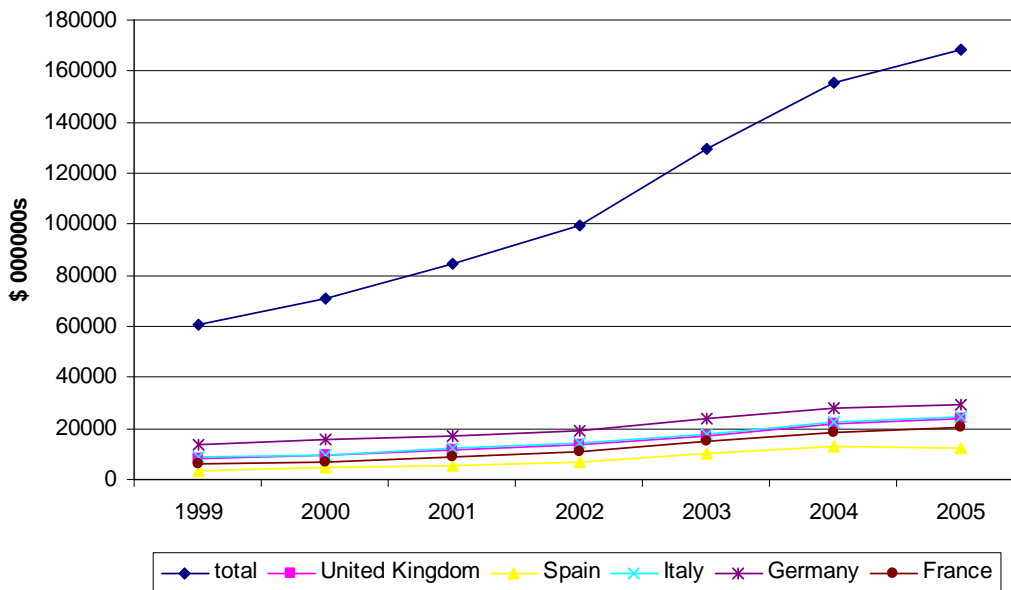


Source: Paul Budde Communication Pty Ltd (2008) "Europe - Mobile Market - Overview & Statistics", page 1,2,3.

**Revenues**

A1.11 The following chart is taken from OECD data, and shows total revenues from mobile services in 23 European countries between 1999 and 2005.

**Chart A1.7: Revenues from Mobile Services in 23 European Countries (\$ million), 1999 - 2005**



Source: OECD statistics

A1.12 Total revenues in the 23 countries (19 out of the 23 European countries considered belong to EU 27) have increased from \$60.7 billion (€45 billion) in 1999 to \$168.2 billion (€124.5 billion) in 2005. Five countries (France, United Kingdom, Spain, Germany, and Italy) account for nearly 66 per cent of total revenues from the mobile industry within the 23 European countries, all of which saw an increasing trend in revenues.

A1.13 With regard to average revenue per user (ARPU), a look at the revenues of several main operators might also be helpful.<sup>49</sup> ARPU has been decreasing for the main operators according to their annual reports and accounts. Table 1.2 shows that, from Q4 2005 to Q1 2008, Vodafone's Blended ARPU was in continuous decline in Germany, the UK, Greece and Portugal. Telefónica's blended ARPU decreased from €33.2 per month in 2005 to €30.5 per month in 2008 (March datum). The Blended ARPU of Telefónica in 2006 saw a 0.6 per cent decrease on 2005, in 2007 a 3.6 per cent decrease on 2006, and in 2008 (March) a 4.1 per cent decrease on 2007 (see Chart below).

**Table A1.1: Vodafone's Blended ARPU (Principal Markets) and Yearly Rate of Decrease (2005 – 2008)**

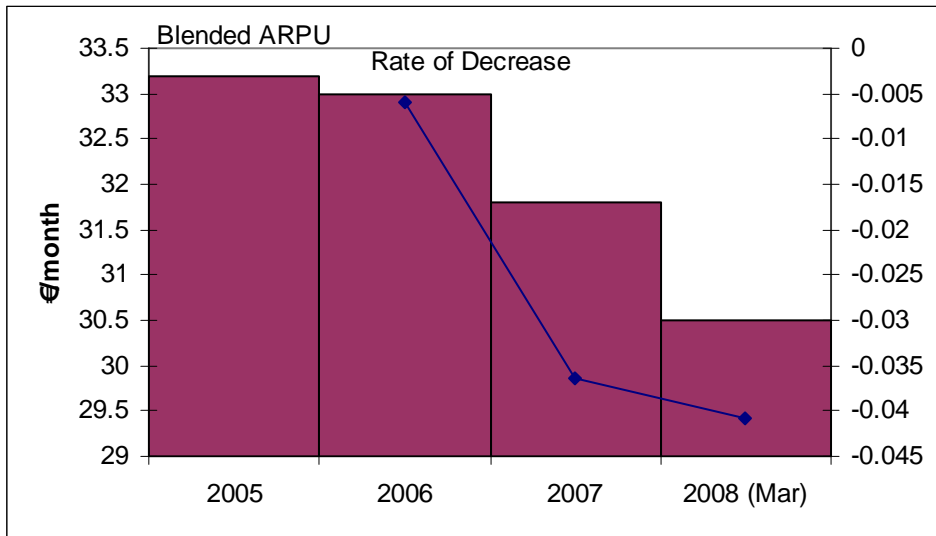
Country	Q4 2005	Q4 2006	Q4 2007		Q1 2008		
	Blended ARPU (€/month)	Blended ARPU (€/month)	2006 on 2005 (%)	Blended ARPU (€/month)	2007 on 2006 (%)	Blended ARPU (€/month)	2008 on 2007 (%)
Germany	22.9	20.9	-8.73	18	-13.88	17	-5.56
Italy	27.7	25.8	-6.86	22.3	-13.57	22.5	0.90
Spain	35.3	35.3	0	34.7	-1.70	34.2	-1.44
UK (£)	23.8	23.6	-0.84	22.7	-3.81	21.8	-3.96
Greece	31.3	27.6	-11.82	22.9	-17.03	21.6	-5.68
Ireland	50.2	45.6	-9.16	43.9	-3.73	44	0.23
Netherlands	34.5	31.7	-8.12	36.3	14.51	35.8	-1.38
Portugal	24	22.8	-5.00	22.4	-1.75	21.5	-4.02

Source: Blended ARPU data are from Paul Budde Communication Pty Ltd (2008) 'Europe - Mobile Market - Overview & Statistics', page 30. Here, ARPU denotes Average Revenue per User. Yearly rate of decrease data are our own calculations.

<sup>49</sup> Based on data at hand, we discover that different companies have adopted different structures in their financial reports. At present, we only found two companies who are relatively compatible, Vodafone and Telefónica Mobile. The two companies both reported "Blended" ARPU in their reports, or the weighted average of pre-paid ARPU and post-paid ARPU. However, their principal markets are different, so it is meaningless to compare the exact charts between the two groups.



**Chart A1.8: Telefónica Mobile's ARPU Statistics, 2005 - 2008**

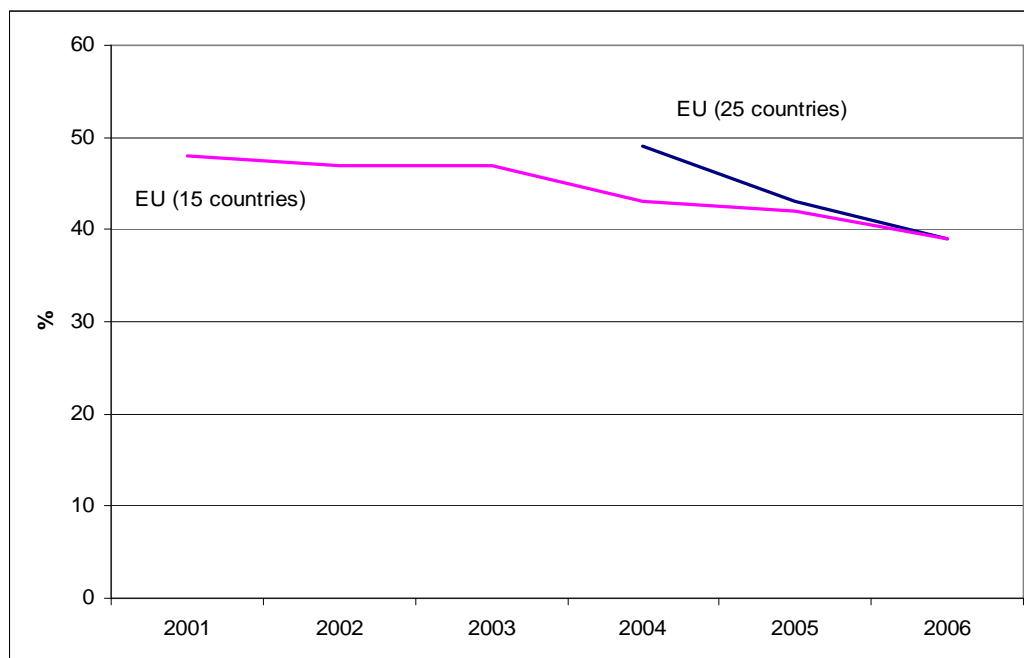


*Source: Paul Budde Communication Pty Ltd (2008) "Europe - Mobile Market - Overview & Statistics", page 27. Note: the "rate of decrease" piecewise line indicates the percentage decrease in ARPU over the year-on-year time span considered.*

### **Market shares**

A1.14 The main mobile suppliers in each country seem to have experienced a gradual decline in their market shares.

**Chart A1.9: Market Share of the Leading Operator in Mobile Telecommunications  
(Percentage of the Total Market), 2001 - 2006**



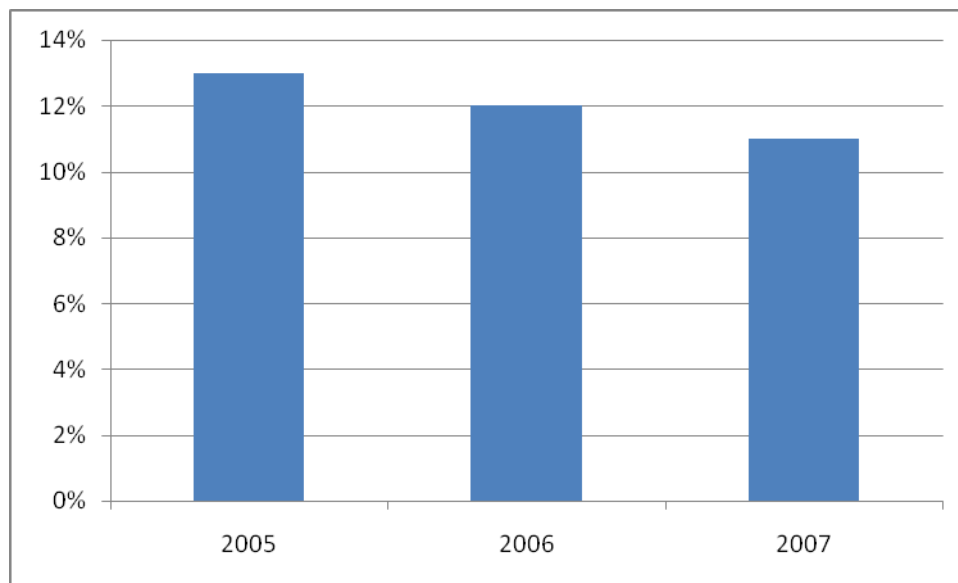
Source: Eurostat. See website as follows :  
[http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=1996,39140985&\\_dad=portal&\\_schema=PORTAL&screen=detailref&language=en&product=EU\\_MAIN\\_TREE&root=EU\\_MAIN\\_TREE/tb/t\\_icts/t\\_isoc/t\\_isoc\\_si/tsier080](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,39140985&_dad=portal&_schema=PORTAL&screen=detailref&language=en&product=EU_MAIN_TREE&root=EU_MAIN_TREE/tb/t_icts/t_isoc/t_isoc_si/tsier080)

### Investment

A1.15 As the chart of mobile penetration indicates, some (especially Western and Central) European mobile markets are now entering a saturation period. As a result, the focus for developing mobile markets is shifting from attracting new subscribers to “migrating” subscribers (to one section or technology to another, for instance from 2/2.5G to 3G). With regard to network capital expenditure (Capex), operators are expected to spend \$27 billion (€20 billion) by 2010 compared to \$39 billion (€29 billion) spent since 2000.<sup>50</sup> We can also observe a downward trend in Capex/sales of the mobile industry in Europe in Chart A1.10: Trend in Capex/Sales of Mobile Industry (Europe), 2005-2007.

<sup>50</sup> Source: Paul Budde Communication Pty Ltd (2008) “Europe - Mobile Market - Overview & Statistics”, page 6.

**Chart A1.10: Trend in Capex/Sales of Mobile Industry (Europe), 2005-2007**



*Source: Confidential Operator Data; Bloomberg; A.T. Kearney analysis.*

*Note: Weighted average Capex / Sales. Reproduced from: GSM Association response to the public consultation for the Review of the functioning of Regulation (EC) No. 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and data roaming services; July 2, 2008, page 61.*

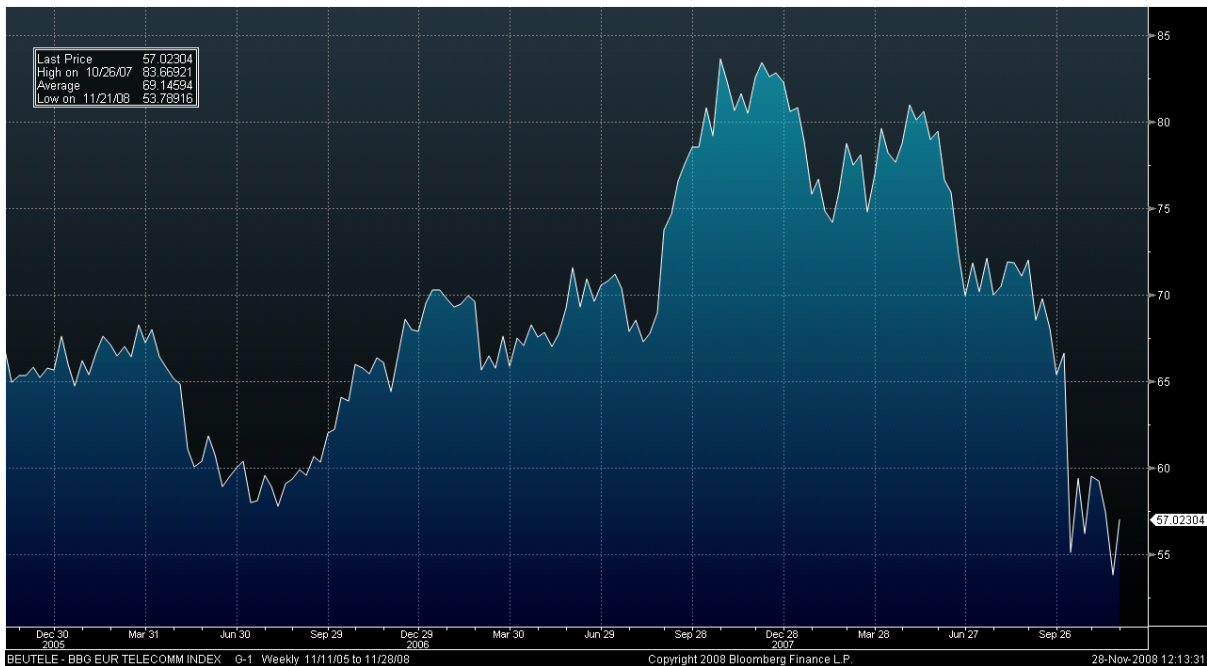
- 7.18 Europe Economics was not able to locate data on the profitability of the roaming market.<sup>51</sup> However, Charts A1.11 and A1.12 show the performance of European Telecommunications securities. The Bloomberg Europe Telecommunication Index is a capitalisation-weighted index of the leading telecommunications equipment stocks in Europe.<sup>52</sup> We compare it for reference with the FTSE Eurotop 100 index.
- 7.19 The period over from 2005 to 2008 shows some variation within the overall trend of stability in the performance of the stocks. Where downturns in the market do occur, they are likely to be resulting from developments in the current global economic crisis. It seems that while European financial markets turned downward in the summer of 2007, there was a slight lag before this trend was seen in European markets. As the Roaming Regulation took effect during this period, it is difficult to disentangle any possible negative consequences of the Roaming Regulation from those of the overall crisis.

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<sup>51</sup> It may be that as operators generally do not view roaming as a separate market, and therefore would not evaluate profitability separately from the mobile market in general, that these data do not exist.

<sup>52</sup> The index was developed with a base value of 100 as of 31 December, 1998. The parent index is BWORLDEU.

**Chart A1.11: Bloomberg Europe Telecommunications Index (2005-08)**



Source: Bloomberg, 2008

**Chart A1.12: FTSE Eurotop 100 Index (2005-08)**

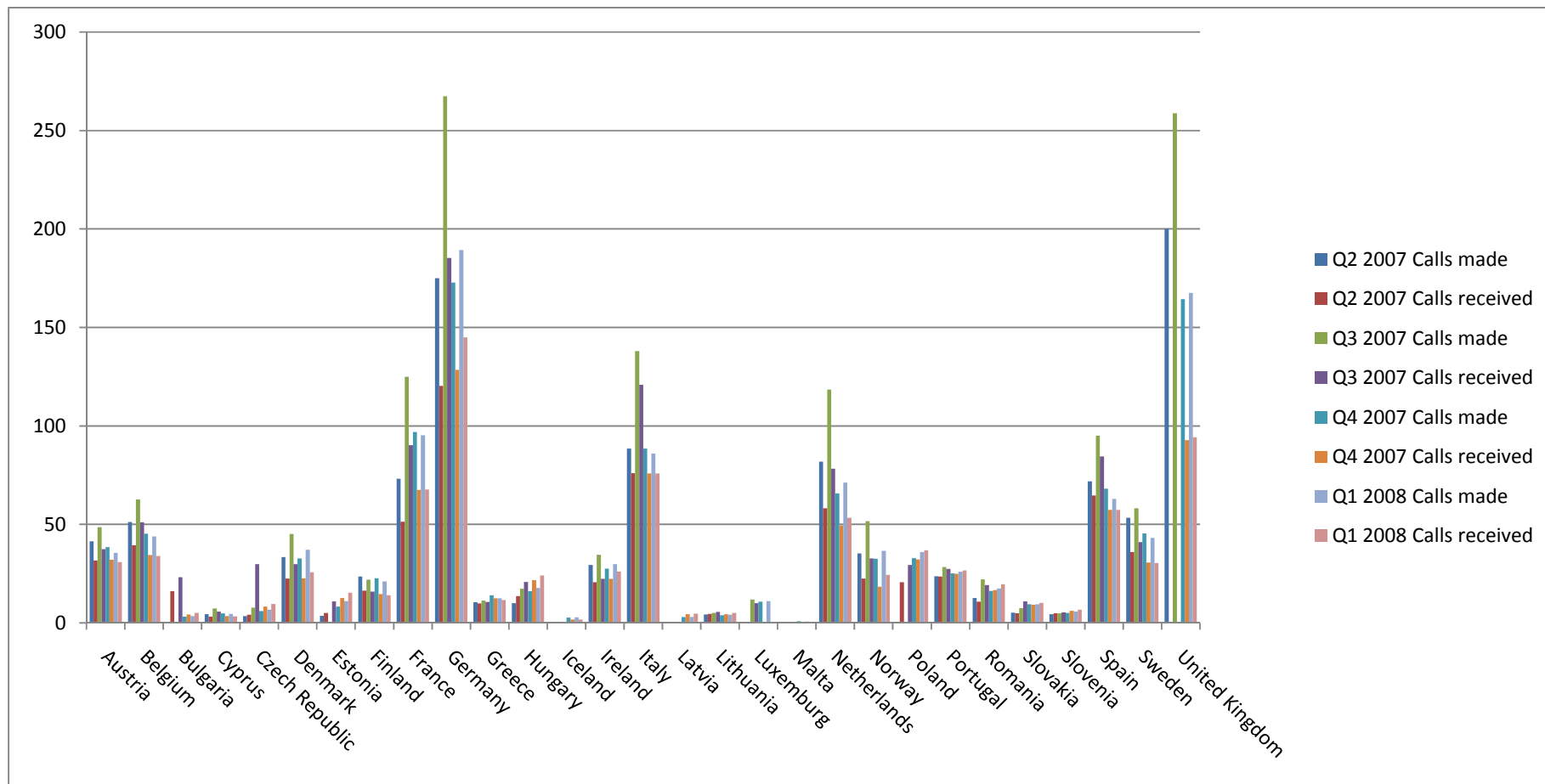


Source: Bloomberg, 2008

**Mobile Roaming**

A1.16 As discussed in the main report, there is a scarcity of detailed data dealing with the market for mobile roaming services. Therefore Europe Economics is extremely grateful to the ERG for providing us with specially requested data. For a comprehensive discussion of price trends in the market since 2007, please refer to the ERG Benchmark Data Reports, summarised in Appendix 6: Review of the Relevant Literature. The following tables and charts analyse market data from the ERG that has not already been presented in the benchmark reports.

**Chart A7.13: Volume of Retail Roaming Voice Calls (Billions of Actual Minutes)**



Source: ERG, 2008

A1.17 Chart A1.13 shows that roaming calls made and received are almost across the boards highest in the third quarter, or high summer months. In terms of country comparisons, Germany and the UK are the leading countries for calls made, with Germany showing slightly more calls received. However, it is important to note that because the data for the chart above do not control for populations, this does not say anything about the relative numbers of minutes used per customer.

A1.18 The following table displays a breakdown of revenues in the market for roaming.

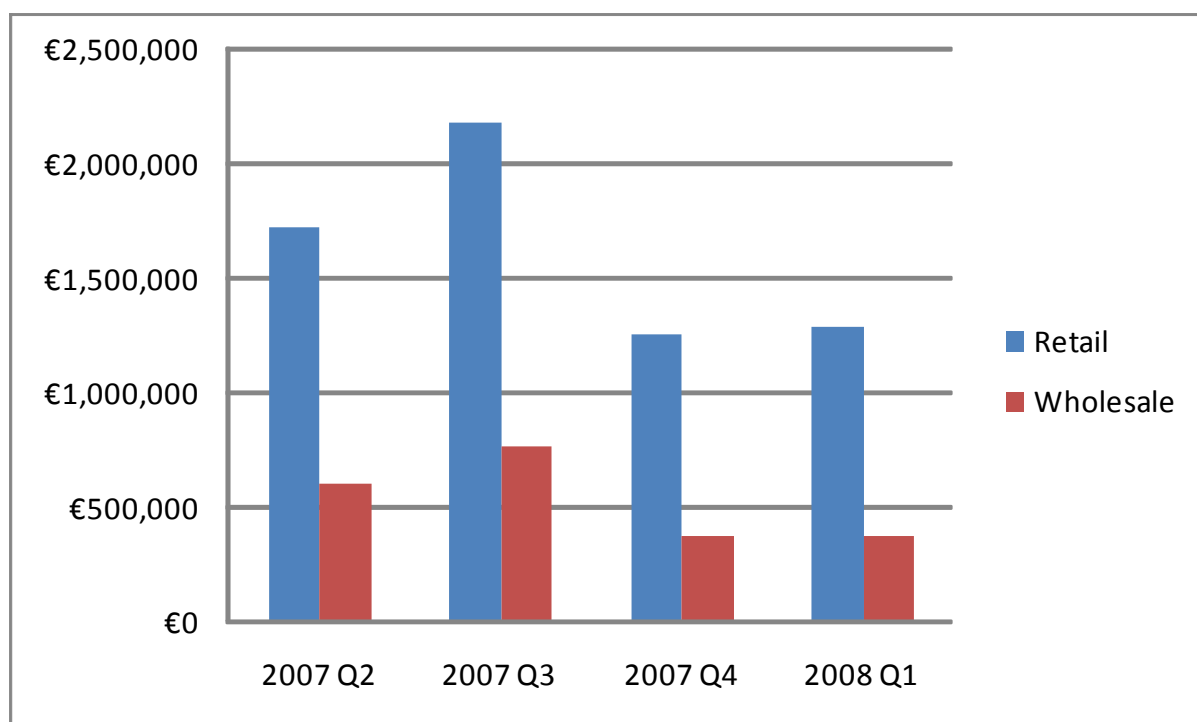
**Table A1.2: EU Mobile Market Revenues (2007-2008)**

REVENUE (€ 000s)	2007 Q2	2007 Q3	2007 Q4	2008 Q1
Retail	1,723,053	2,185,316	1,264,269	1,295,562
Voice	1,403,038	1,707,916	918,261	920,154
Sms	188,648	295,407	175,724	186,382
Data	131,366	181,992	170,284	189,026
Wholesale	609,154	771,542	383,503	377,510

Source: ERG

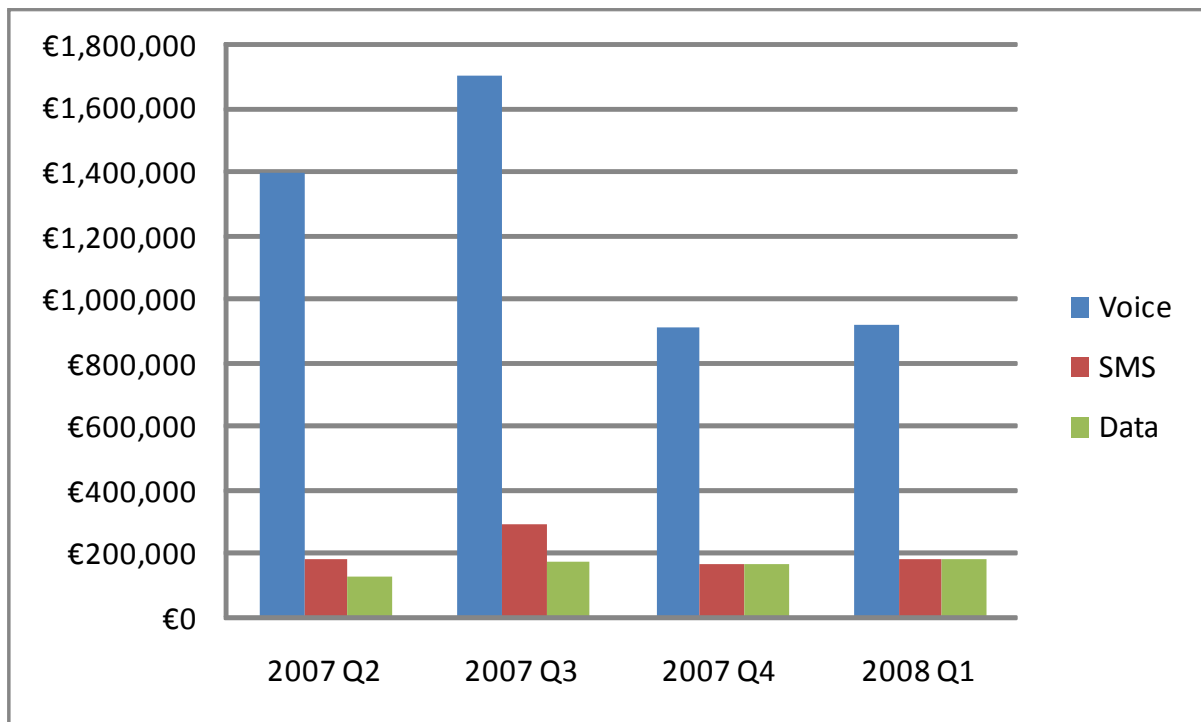
A1.19 We see immediately that voice revenues account for about 75 per cent of total retail revenues in the market. Revenues were highest in Q3 of 2007.

**Chart A1.14: Retail and Wholesale Roaming Service Revenues (2007-2008)**



Source: ERG

**Chart A1.15: Breakdown of Retail Roaming Revenues**

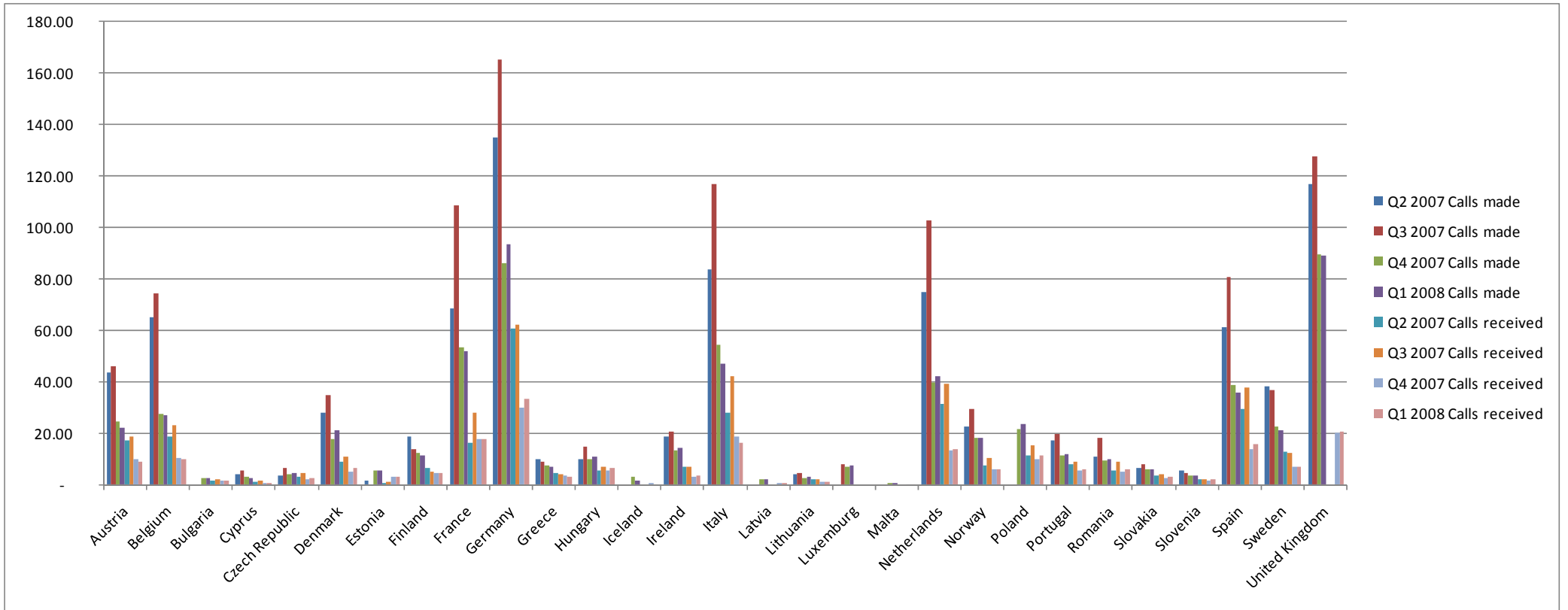


*Source: ERG*

A1.20 From the above chart we also see that data revenues increased for the operators, while voice and SMS revenues have been more directly affected by the implementation of the Roaming Regulation.

A1.21 In terms of Member State revenue breakdowns, the following chart displays a comparative illustration.

**Chart A1.16: Breakdown of Retail Roaming Revenue by Member State**



Source: ERG

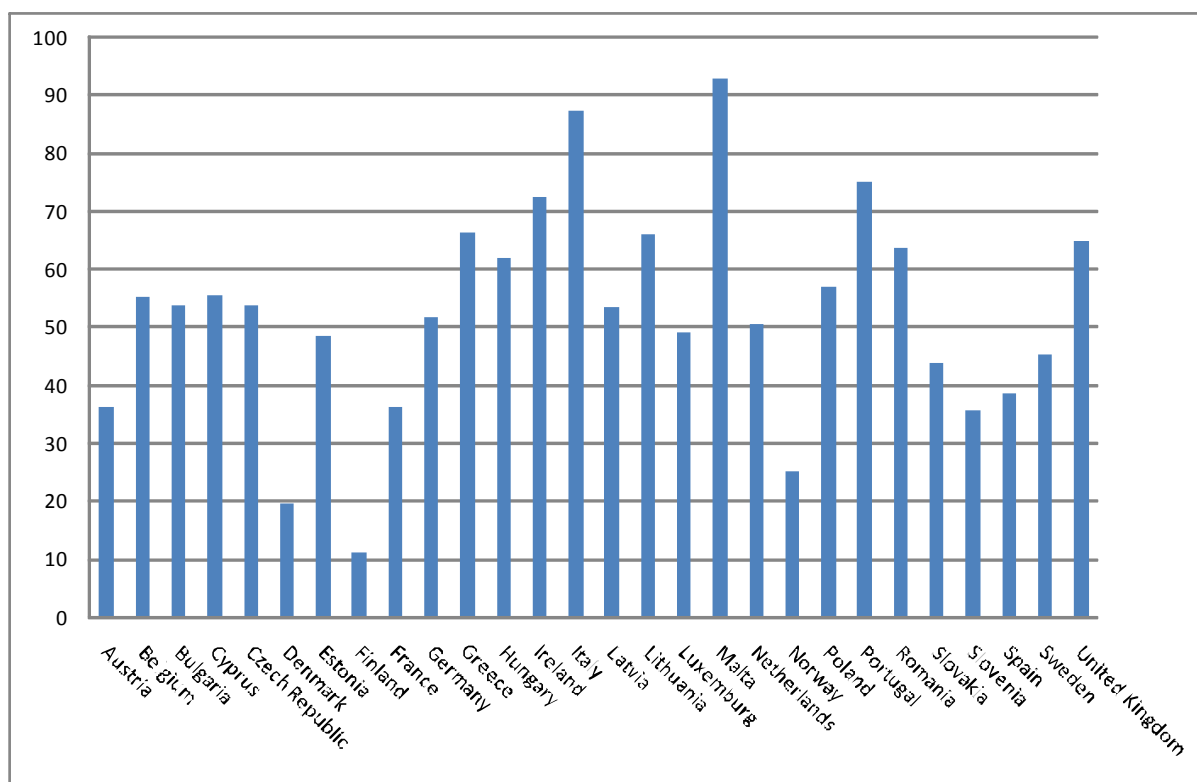


A1.22 Germany, Italy, and the UK have the highest percentages of revenues from calls made. Germany has the highest share of revenue of calls received, followed by the Netherlands and Spain.

A1.23 Chart A1.17: Prepay Share of Subscribers (%) displays the percentages of subscribers in each country that opt for prepay plans.

A1.24 The countries displaying the largest percentages of prepay subscriptions, Malta, Italy and Portugal, are indeed popular holiday destinations. Still, it is not correct to assume that all the largest prepay subscribing countries are in this group due to purely touristic reasons. For example, it may be owing to cultural norms, regulatory regimes, or infrastructure characteristics that mobile users pay as they go. Those countries with the lowest percentages of prepay customers are the Scandinavian countries of Finland, Norway and Denmark (Sweden, by exception, has about 45 per cent of prepay customers). Again, this could well be because of reasons apart from that these countries may not have as many holiday-makers, such as the rate of mobile phone use or the frequency of banks offering special offers for the use of direct account services. Therefore it is not possible to draw any firm conclusions from this information about roaming in the Member States.

**Chart A1.17: Prepay Share of Subscribers (%)**



Source: ERG and Informa Telecoms Media

A1.25 Although there are several mobile network operators within the EU, many of them have common ownership. The following table lists the major players in the Member States.



A1.26 Of the mother companies above, the following are those with the largest number of Member State branches or subsidiaries:

**Table A1.4: Major Operators with Greatest Member States Presence**

Firm	Incidences
<b>Vodafone</b>	11
<b>Deutsche Telekom</b>	7
<b>Telefónica</b>	6
<b>Hutchison Whampoa</b>	4
<b>France Télécom</b>	4
<b>Mobilkom Austria</b>	3

*Source: ERG, Wikipedia*

A1.27 Vodafone, Deutsche Telekom, and Telefónica are the mobile network operators in the EU with branches or subsidiaries having central market positions in the greatest number of Member States. Vodafone far exceeds the others in presence, with operations occupying top positions in 11 Member State markets.

### **Elasticities**

A1.28 In economic theory, the price elasticity of demand refers to the degree to which a change in the price of a good impacts its consumption. For example, if the demand for roaming services is relatively elastic, then one would expect that subscription numbers and call volumes would increase significantly with imposed price caps. Mathematically, elasticity is expressed by the percentage change in the quantity of a good demanded in response to a percentage change in price, or:

$$E_d = - \frac{\Delta\%Q_d}{\Delta\%P_d}$$

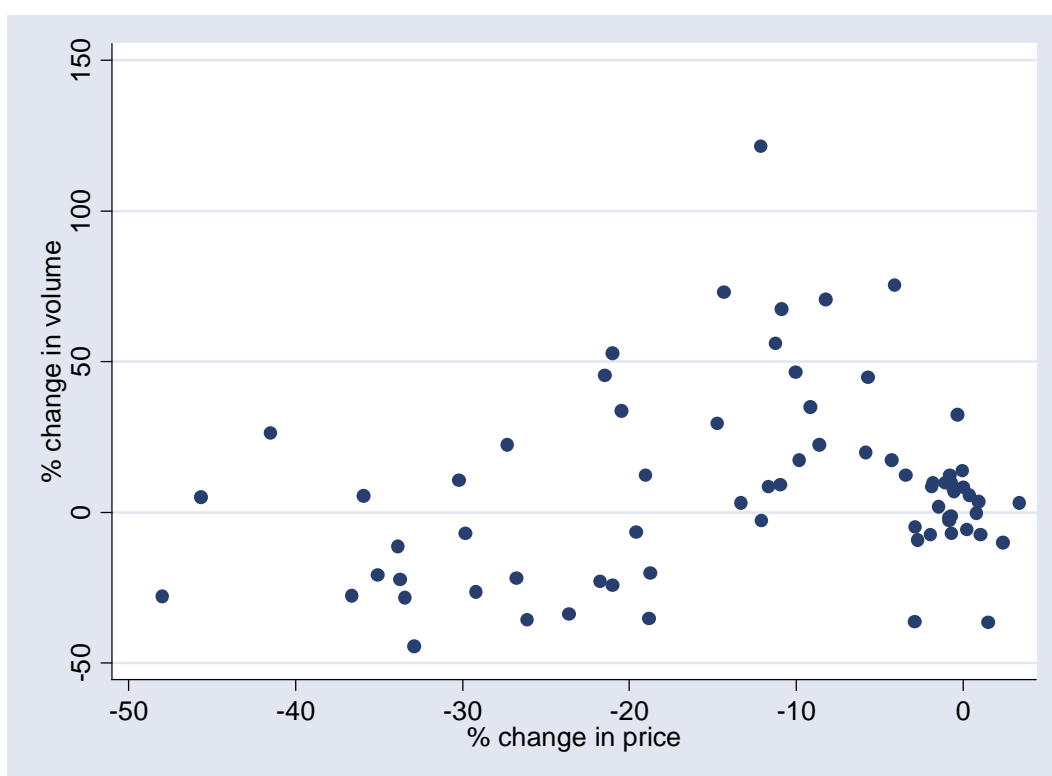
A1.29 With the data provided to us by the ERG, we have the opportunity to compare prices and volumes of (actual) minutes sold in the four quarters between Q2 2007 and Q1 2008 for each of the 27 EU Member States for which data were provided (most but not all). The data are on minutes of calls made, and do not include calls received. These data are those on which the aggregate charts published in the ERG report were based. From these we calculate the percentage change between each quarter in both price and volume, for each Member State.

A1.30 By plotting these percentage changes into a simple scatter diagram, we gain a first impression of the degree to which changes in the variables are correlated with each other. Each dot on this diagram represents the percentage changes in price and volume in a particular quarter and in a particular country (for example, the outlier dot towards the top right hand part of the diagram shows that in one Member State and in one quarter, prices went down by about 12 per cent and volumes increased by about 120 per cent).

A1.31 It must be noted when examining the charts that much of the magnitude of the volume changes observed between quarters is likely to be due to seasonality, and that the seasonal effect will differ to some extent between countries. However, the price changes were not similar; thus if there were a strong price effect this might be evident in the scatter diagrams.

A1.32 Due to confidentiality considerations we abstain from labelling individual Member States in the scatter plots.

**Chart A18: Percentage Change in Roaming Price v. Percentage Change in Volumes (Entire Period)**



A1.33 If there were a strong connection between price reductions and volume increases, then one might expect a pattern in the scatter diagram showing this (a diagonal line from the top left corner to the bottom right); a tendency for large price cuts and large volume increases to occur together.

A1.34 In the above diagram there is no visible support for such a correlation.

A1.35 However, the true relationship could be somewhat clouded by the fact that there is likely to be a small lag between changes in price and volume. It may be reasonable to assume that consumers require time to adjust their behaviour in response to a price change signal (it is also possible that transparency SMS stipulated by the Regulation to inform the roaming customer of the rates has accelerated the reaction of some consumers, although many of our stakeholder interviews have hinted at relatively low levels of attention paid by the consumer to these messages).

A1.36 The diagram below therefore examines the same relationship as the above, but for the price variable lagged one period with respect to volume. More concretely, while the above chart plots the following relationships,

$$\% \Delta P_d(Q_2 2007) \rightarrow \% \Delta V_d(Q_2 2007)$$

$$\% \Delta P_d(Q_3 2007) \rightarrow \% \Delta V_d(Q_3 2007)$$

$$\% \Delta P_d(Q_4 2007) \rightarrow \% \Delta V_d(Q_4 2007)$$

$$\% \Delta P_d(Q_1 2008) \rightarrow \% \Delta V_d(Q_1 2008)$$

A1.37 The diagram below looks at the relationships between

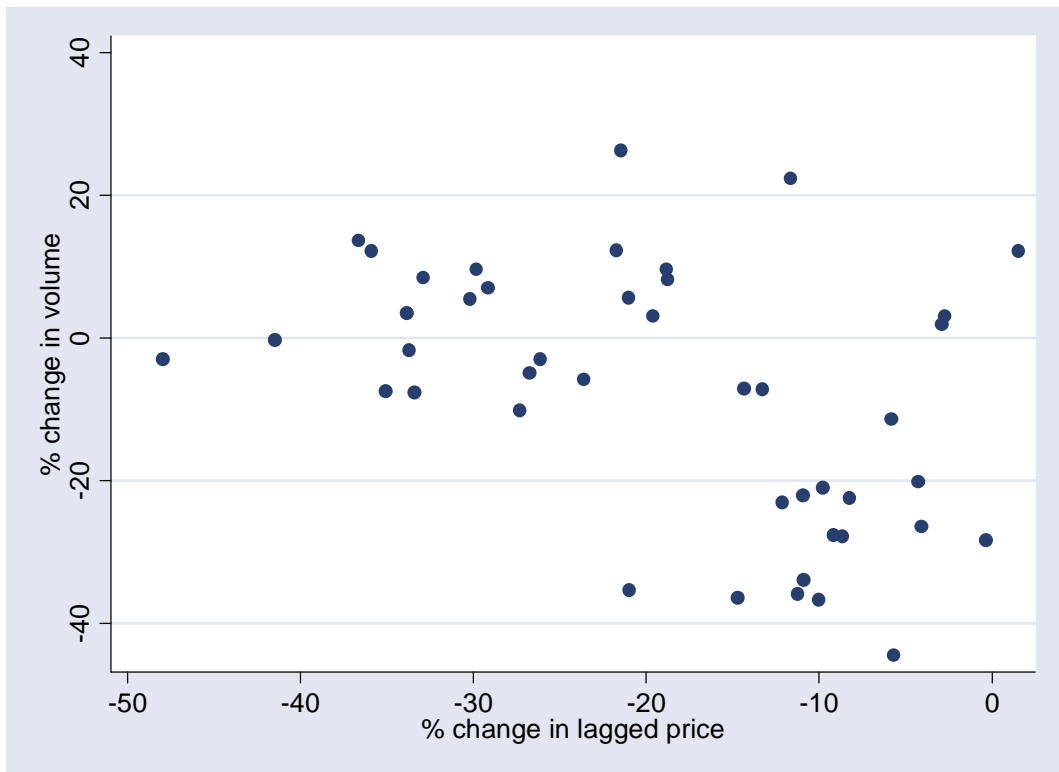
$$\% \Delta P_d(Q_2 2007) \rightarrow \% \Delta V_d(Q_3 2007)$$

$$\% \Delta P_d(Q_3 2007) \rightarrow \% \Delta V_d(Q_4 2007)$$

$$\% \Delta P_d(Q_4 2007) \rightarrow \% \Delta V_d(Q_1 2008)$$

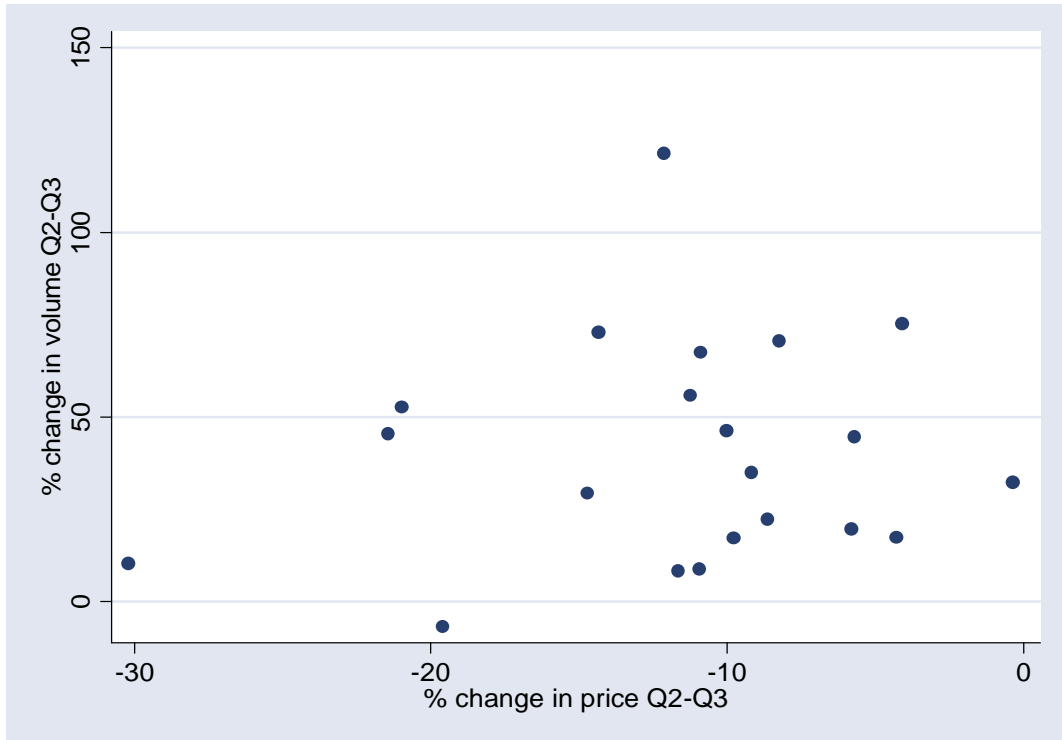
A1.38 (Note that due to the lag there is necessarily one period-worth less of data points available for examination.)

**Chart A19: Percentage Change in Roaming Prices Lagged One Period v. Percentage Change in Volume (Entire Period)**

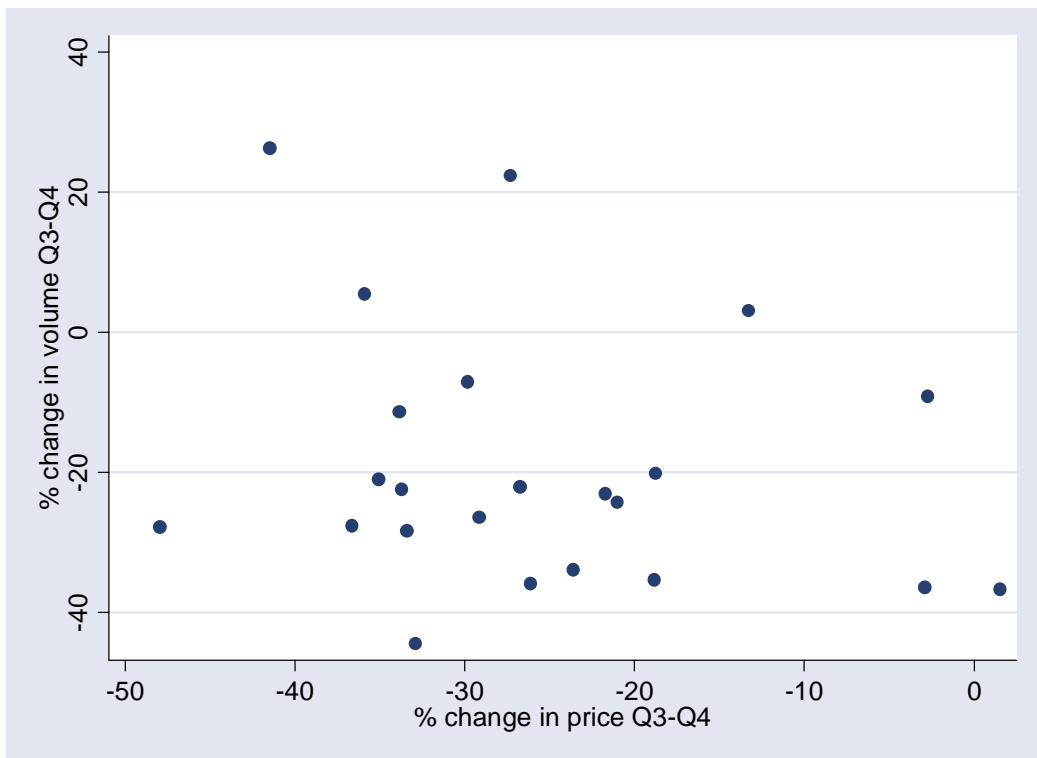


- A1.39 There is slightly more coherence here in the sense that changes in volume may follow an inverse relationship with changes in price; however, it is still difficult to gauge whether the relationship is significant, or due to chance or other “noise” variables.
- A1.40 To explore this in more depth, we examine each of the quarters individually; contemporaneous, and lagged, respectively.

**Chart A20: Percentage Change in Roaming Price v. Percentage Change in Volume (Q2-Q3, 2007)**

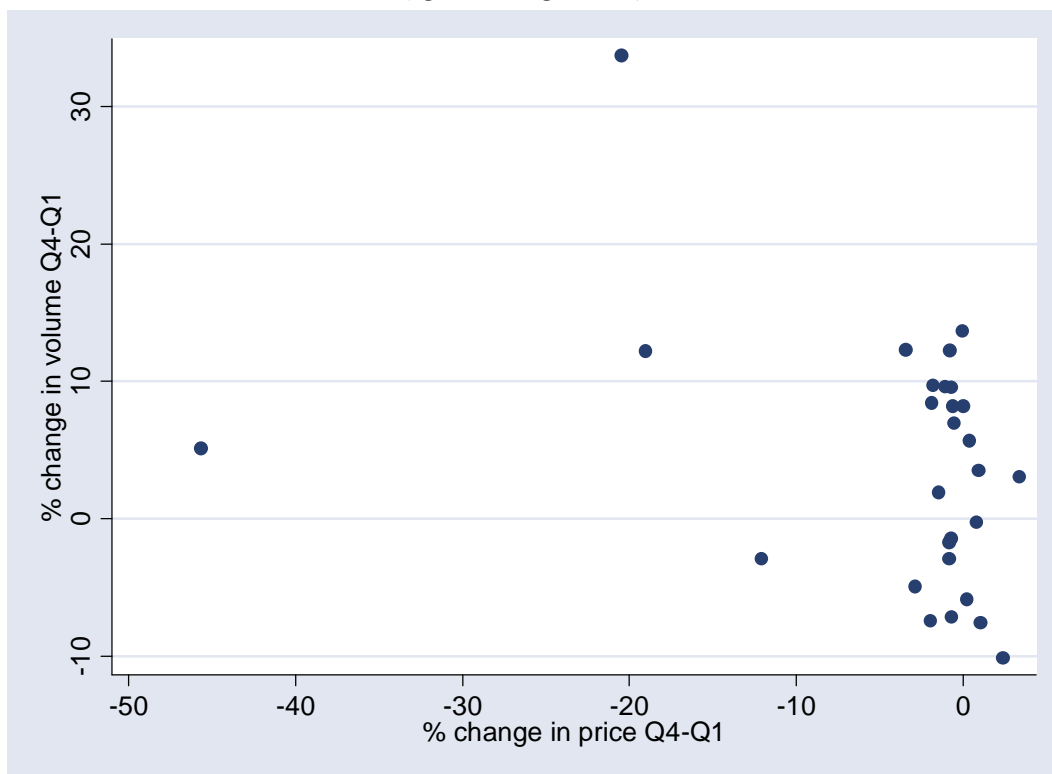


**Chart A21: Percentage Change in Roaming Price v. Percentage Change in Volume (Q3-Q4, 2007)**



A1.41 (The Roaming Regulation went into effect at the end of Quarter 3.)

**Chart A22: Percentage Change in Roaming Price v. Percentage Change in Volume (Q4 2007-Q1 2008)**

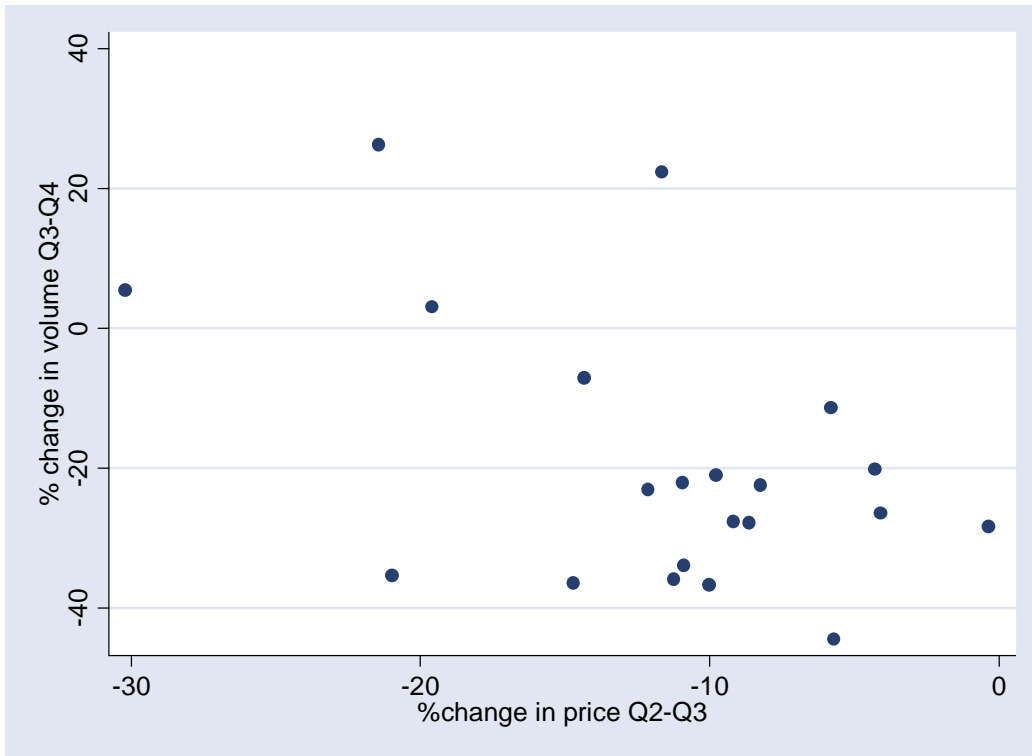


A1.42 Just after the Regulation came into place, there was a clustering of prices with those of the previous quarter (or, 0 per cent change). This reflects the price data presented in the ERG Benchmark Data reports. Changes in volume were occurring mainly for other reasons.

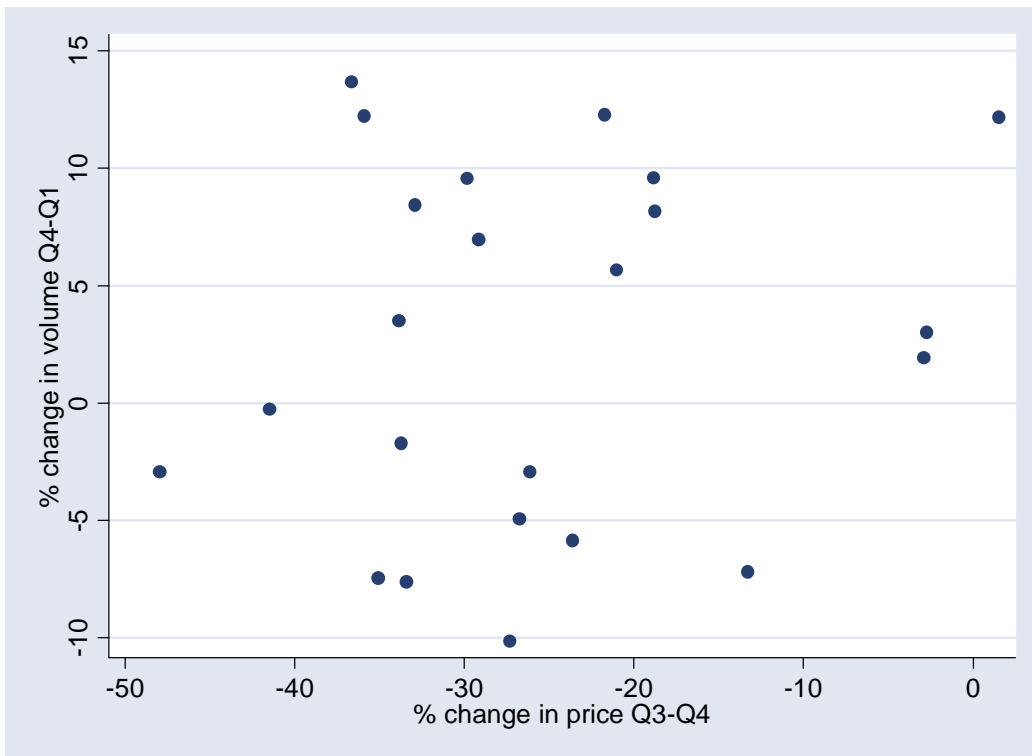
A1.43 We now turn to the lagged relationships.



**Chart A23: Percentage Change in Roaming Price Lagged One Period v. Percentage Change in Volume (First Change)**



**Chart A24: Percentage Change in Roaming Price Lagged One Period v. Percentage Change in Volume (Second Change)**



A1.44 From a cursory eyeballing, neither of the above periods shows strong evidence for a close correlation between changes in lagged roaming tariffs and volume.

A1.45 An alternative way to examine the data is as follows.

A1.46 The expression for elasticity can be re-written as follows:

$$E_d = -\frac{\Delta Q_d / Q_d}{\Delta P_d / P_d}$$

A1.47 (Note that because the elasticity for any good is generally negative, reference to elasticities greater than zero typically refer to the absolute value of  $E_d$ , or  $|E_d|$ .)<sup>53</sup>

A1.48 By taking the logarithmic values of the variables in our model, we will be able to use regression analysis to interpret the relationship as one of percentage change. The simple proof is as follows.

$$\frac{\partial \ln V_d}{\partial \ln P_d} = \frac{\partial V_d}{V_d} * \frac{P_d}{\partial P_d} = \frac{\partial V_d / V_d}{\partial P_d / P_d} = \frac{\Delta \% Q_d}{\Delta \% P_d} = |E_d|$$

A1.49 Therefore, the ratio of the rate of change of the logarithmic values of volume ( $\ln V_d$ ) and the logarithmic values of prices ( $\ln P_d$ ) can indicate the degree of demand elasticity for roaming. For example, if volume and prices change one-to-one (in percentage terms), then  $E_d=1$ , or the elasticity of demand for roaming is unitary: For every percentage in price reduction caused by the Regulation, operators can expect to make up the same percentage in increased volume. On the other hand, if there is no discernable ratio of change in the variables, then  $E_d=0$ , and the prices are perfectly inelastic. In other words, demand is completely unresponsive to price changes.

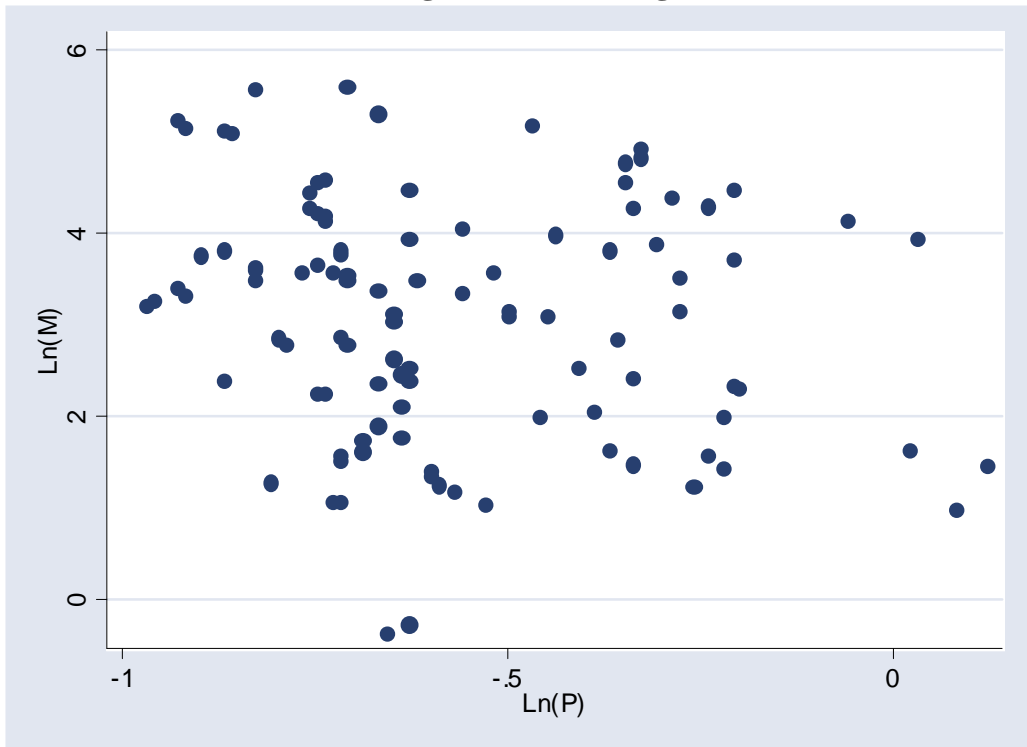
A1.50 Using the ERG data, we plotted logarithmic values of volume ( $\ln V_d$ ) against those of roaming tariffs ( $\ln P_d$ ), in order to see whether there is a discernable trend between changes in the variables. As in the charts above, if there were a trend, then we would expect to see the points clustering together around a line.

A1.51 The following charts display some of our results.

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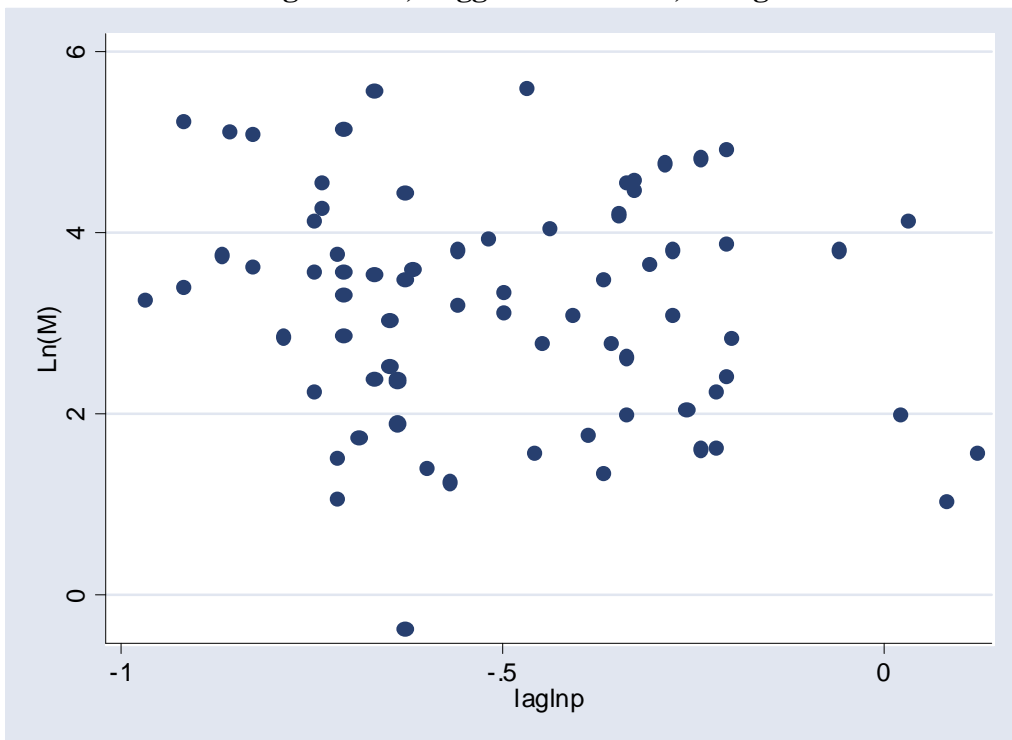
<sup>53</sup> There are exceptions to this statement, notably when goods become less preferred when consumer income exceeds a certain threshold (“Giffen goods”), or if consumers indulge in outrageously priced goods to demonstrate social or economic standing (“Veblen goods”). Neither is relevant here.

**Chart A25: Log of Minutes v. Log of Price**



*Source: Europe Economics, using data provided by ERG, 2008*

**Chart A26: Log of Price, Lagged One Period, v. Log of Minutes**



*Source: Europe Economics, using data provided by ERG, 2008*

A1.52 Now using panel data econometric analysis, we can attempt to fit a line through these points.

A1.53 The model can be described by the following equation:

$$\ln V_{it} = \alpha_i + \ln P_{it} \beta + D_t \varphi + \varepsilon_{it},$$

A1.54 where  $V_{it}$  represents the volume of actual minutes consumed in country  $i$  at time  $t$ ;  $\alpha_i$  captures country-specific effects  $P_{it}$  is the average retail price of roaming tariffs in country  $i$  at time  $t$ ;  $D_t$  is a vector of “dummy” variables to capture time-specific effects; and  $\varepsilon_{it}$  is a random component. By estimating a model such as the one described above we are trying to understand what the impact of a change in the price of roaming services would be on the volume of minutes consumed. The  $\beta$  variable therefore expresses the incremental impact of this relationship.

A1.55 Notice that we also control for a time trend effect:  $\varphi$ . This enables us to take into account the seasonality of demand for roaming services. Because summer periods see both the highest demand and special tariffs for roaming, not controlling for seasonality may yield spurious elasticity estimates. Moreover, because Roaming Regulation came into effect in Q3 of 2007, it is likely that the data would show the significant price drop while demand was starting to drop off due to the end of summer — without controlling for such transient shocks, the regression may actually lead to a positive elasticity.

A1.56 Econometric literature has developed a number of techniques to estimate panel data models. The two most widely used models differ with respect to the way in which they treat the individual effect  $\alpha_i$ . They can be viewed either as “fixed” or “random”. Fixed effects analysis is appropriate when the unobserved individual (country) heterogeneity is constant through time and is correlated with the explanatory variables of the regression ( $P$ ); for example, it may be that prices are higher in some Member States than others. For example, the fixed effects regression would control for differences in countries that are not likely to change during the time period, such as GDP. Random effects analysis is appropriate when it can be assumed that these unobserved differences are uncorrelated with the explanatory variables, but due to other effects not controlled for in the specified model. In practice, the choice between fixed and random effects is tested using the Hausman test.<sup>54</sup> In this case, we display both results because they are so close in size.

A1.57 Our results are presented in the following table.

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<sup>54</sup> The Hausman test evaluates the significance of an estimator versus an alternative estimator. Per Hausman, only over-identifying restrictions (assumptions) can be tested (Test of Identifying Restrictions). Given a model and data in which fixed effects estimation would be appropriate, a Hausman test tests whether random effects estimation would be almost as good.

**Table A1.4: Panel Data Regression Analysis Results<sup>55</sup>**

Random Effects	Coefficient
<b>laglnP</b>	-0.35** (0.18)
<b>timed2</b>	(dropped)
<b>timed3</b>	-0.29** (0.04)
<b>timed4</b>	-0.37** (0.09)
Fixed Effects	
<b>laglnP</b>	-0.44** (0.19)
<b>timed2</b>	(dropped)
<b>timed3</b>	-0.29** (0.04)
<b>timed4</b>	-0.12* (0.07)

*Note: Standard errors listed in parentheses; \*denotes statistical significance on a 10 per cent level, and \*\* denotes significance on the 5 per cent level. Time periods dropped automatically to avoid multicollinearity, otherwise known as the “dummy variable trap”.<sup>56</sup>*

A1.58 All time periods included appear to be significant on the 5 or 10 per cent levels, meaning that there is a strong seasonality effect affecting the dependent variable. Reflective of the accepted trend, the point estimates for the winter periods (timed3, timed4) were negative. This would reflect dropping overall consumption of roaming services. One should be warned against interpreting seasonal effects too literally, as there are almost surely other time-specific factors at work here apart from seasonal demand change. Therefore for the sake of the analysis, we emphasise the direction of change over the magnitude.

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<sup>55</sup> Our sample contained 74 observations with 29 different groups; therefore the random effects regression had 73 degrees of freedom and the fixed effects regression had 1.998.

<sup>56</sup> A **dummy variable** (also known as indicator variable or just dummy) is one that takes the binary values 0 or 1 to indicate the absence or presence of some categorical effect that may be expected to shift the outcome. **Multicollinearity** arises when a high correlation between two or more explanatory variables in an econometric model results in an increased incidence of receiving erratic and inefficient coefficient estimates. If there are dummies in all observations, the constant term has to be excluded. If a constant term is included in the regression, it is important to exclude one of the dummy variables from the regression, making this the base, or reference category against which the others are assessed. If all the dummy variables are included, their sum is equal to 1 resulting in perfect multicollinearity. This is referred to as the **dummy variable trap**. For this reason, the computer will automatically drop a dummy when necessary.

- A1.59 Our elasticity estimates are - 0.35 and - 0.44, both statistically significant on the five per cent level. Therefore for each percentage decrease in the average price of EU roaming voice tariffs (laglnP), the volume of minutes consumed in the next quarter increased by somewhere between 0.35 and 0.44 per cent.<sup>57</sup>
- A1.60 This result, if true, is a lower elasticity estimate than used in the Commission Impact Assessment, where three alternative scenarios are used: a) the “industry scenario” (elasticity -0.55); b) the “minus one” scenario (elasticity – 1.00) and c) the “optimistic scenario” (elasticity – 1.20). The Commission Services work led to the view that the optimistic scenario “reflects recent experience drawn from data on the international roaming markets by the ERG”.<sup>58</sup>

## Legal context

### The Roaming Regulation (RR)

- A1.61 Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007, sponsored by Viviane Reding, EU Commissioner for Information Society and Media, is a Regulation by the European Commission which limits the charges for mobile phone use when abroad in the EU. The Regulation applies both to the rates operators can charge each other while roaming in the EU (wholesale rates) and to the ex-VAT retail tariffs an operator can charge from customers.
- A1.62 This Regulation introduces a common approach to ensuring that users of public mobile telephone networks, when travelling within the Community, do not pay “excessive prices” for Community-wide roaming services when making or receiving calls, thereby “contributing to the smooth functioning of the internal market while achieving a high level of consumer protection, safeguarding competition between mobile operators and preserving both incentives for innovation and consumer choice”.<sup>59</sup> It limits the charges that may be levied by mobile operators for the provision of international roaming services for voice calls originating and terminating within the Community, and applies both to charges levied between network operators at a wholesale level and to charges levied by home providers at a retail level. This Regulation also lays down rules aimed at increasing price transparency and achieving other improvements in the provision of information on charges to users of Community-wide roaming services.

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<sup>57</sup> Incidentally, running the same regressions using a price variable lagged two periods did not yield significant results.

<sup>58</sup> Impact Assessment p 85.

<sup>59</sup> European Commission (2007) “REGULATION (EC) No 717/2007 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC” Preamble, to the Regulation, paragraph16, Brussels.

A1.63 The Roaming Regulation applies only to voice calls. It makes the following stipulations:

- **Wholesale charges for making of regulated roaming calls.** The average wholesale charge that the operator of a visited network may levy from the operator of a roaming customer's home network for the provision of a regulated roaming call originating on that visited network, inclusive *inter alia* of origination, transit and termination costs, shall not exceed €0.30 per minute. This average wholesale charge shall apply between any pair of operators and shall be calculated over a twelve month period or any such shorter period as may remain before the expiry of this Regulation. The maximum average wholesale charge shall decrease to €0.28 and €0.26, on 30 August 2008 and on 30 August 2009, respectively.
- **Retail charges for regulated roaming calls.** The retail charge (excluding VAT) of a Euro-tariff which a home provider may levy from its roaming customers for the provision of a regulated roaming call may vary for any roaming call, but shall not exceed €0.49 per minute for any call made or €0.24 per minute for any call received. The price ceiling for calls made shall decrease to €0.46 and €0.43, and for calls received to €0.22 and €0.19, on 30 August 2008 and on 30 August 2009, respectively. (Although the caps had to enter into force on 30 September 2007 at the latest, many operators decided to offer these tariffs to their customers slightly earlier.)
- **Transparency.** The EU Roaming Regulation also introduced the requirement for operators to inform customers of prices free of charge by SMS when they enter a different Member State (“push” SMS).

A1.64 The Regulation will expire on 30 June 2010 unless the European Parliament and the Council decide to extend it beyond this date, on the basis of a proposal from the European Commission. The Commission must carry out a review and report to the European Parliament and the Council by the end of 2008.

A1.65 The European Regulators’ Group (ERG) reported in August 2008 that the Regulation has been implemented with a high level of compliance in all EU Member States. All consumers have access to a Euro-tariff with capped maximum rates for voice calls. Information gathered by the ERG suggests that wholesale charges are also being reduced in line with the regulated caps. The ERG data collection provides evidence that national averages for wholesale and retail Euro-tariff prices were in full compliance with the Regulation in all Member States. Average retail prices remain at, or just below, the maximum cap in around two thirds of Member States. At the wholesale level, there has been a clear decrease in the average rate in all countries compared to the level of charges before the Regulation came into effect.

A1.66 As noted, the Commission is to review the functioning of this Regulation and report to the European Parliament and the Council no later than 30 December 2008, evaluating in particular whether the objectives of this Regulation have been achieved. For its report, the Commission will review developments in wholesale and retail charges for the provision to roaming customers of voice and data communication services, including SMS and MMS, and if appropriate it will make recommendations regarding the need to regulate these services in the future.

## Summary of the Legal Situation

A1.67 Here follows a brief history of the legal and regulatory developments in the EU market for roaming:

- **1997:** The EC granted a “letter of comfort” to the GSM Association, under Article 81(3) of the EC Treaty, allowing mobile network operators to use a framework agreement for inter-operator roaming contracts. The EC then negotiated the introduction of a new system of wholesale Inter Operator Tariffs (IOTs) to replace the Normal Network Tariffs (NNTs) then in use. This was with a view to better complying with Article 81 and in the expectation of a significant reduction in retail charges. By removing what it considered to be an inappropriate coupling of NNTs to retail prices (the operators charged foreign visitors a typical domestic business tariff), DG Competition hoped to create a competitive wholesale market.
- **1999:** The EC launched a sector inquiry into roaming charges under Article 11 of Council Regulation 17 of 1962. This was later narrowed to operators in Germany and the United Kingdom.
- **2000:** As part of the sector inquiry, the EC scheduled a private hearing with national regulatory and competition authorities in November. The day before, the GSM Association launched a code of conduct to improve the provision of information to customers. This own code of conduct was never fully developed.

A1.68 The same year the EC imposed obligations on Vodafone required for the approval of its acquisition of Mannesmann, in the form of wholesale access arrangements for third parties for three years to any trans-national mobile services it might offer on the retail market.

- **2002:** The New Regulatory Framework for Electronic Communications, composed of the following Directives, aimed to create an internal market for electronic communications within the Community while ensuring a high level of consumer protection through enhanced competition:
  - Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive);
  - Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive);
  - 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 (Framework Directive);
  - Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive);
  - Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications).



- A1.69 The Framework drew on the principle that *ex ante* regulatory obligations should only be imposed where there was not effective competition. It provided for a process of periodic market analysis and review of obligations by National Regulatory Authorities (NRAs) leading to the imposition of *ex ante* obligations on operators designated as having Significant Market Power (SMP). In addition to this, the competition authorities were granted power to address the competitive failures within certain markets on an *ex post* basis.
- A1.70 The wholesale market for international roaming is covered under the regulatory framework in the Commission's Recommendation on relevant markets.
- **2004:** In July the Commission sent two separate "statements of objections" to two UK mobile network operators, O2 and Vodafone UK, relating to wholesale international roaming rates.
  - **2005:** In February the European Commission sent two separate 'statements of objections' to the German mobile network operators T-Mobile and Vodafone DE, believing that the companies' practices might be contrary to EC Treaty rules on the abuse of monopoly power (Article 82), particularly with regard to the high rates charged for international roaming services at a wholesale level.
- A1.71 Then in June, discussions between the Commission and the ERG resulted in the development of a common position by the ERG, which was launched for consultation in 2005. ERG noted that:
- Retail charges were very high without clear justification; this appeared to result both from high wholesale charges levied by the foreign host network operators and also, in many cases, from high retail mark-ups charged by the customer's own network operator.
  - Reductions in wholesale charges were often not passed through to the retail customer.
  - Consumers often lacked clear information on the charges for roaming; and
  - The markets in the different Member States were strongly linked.
- A1.72 Following the discussions with the ERG, in October 2004 the Commission urged NRAs to hasten the process of market analysis.
- A1.73 In October 2005, the European Commission had repeatedly urged mobile operators to reduce the charges for using mobile phones abroad. However, as late as 2005 such charges remained on average four times more expensive than domestic mobile phone calls. To highlight the continuing problem, the Commission launched a consumer website on roaming tariffs. It exposed roaming prices of up to €12 for a four minute call.
- **2006:** The NRAs of several European countries completed their analyses of the roaming markets. No regulator imposed SMP status on any operator, nor was any regulator able to identify the root cause of the problem. While they were able to point to well-established phenomena such as high prices and the apparent lack of retail competition, they did not identify or prove an underlying market failure.

A1.74 In recent years, the Commission and Parliament have puzzled over ways of dealing with high roaming prices on a number of occasions:

- At the GSM Association World Congress in Cannes in February 2005, DG Information Society and Media Commissioner Viviane Reding told mobile operators' CEOs that she was particularly concerned about international roaming charges and that she wanted to see progress.
  - In March 2005, a hearing on international roaming was organised by the Industry, Research and Energy (ITRE) Committee of the European Parliament, at which representatives of NRAs and market players were invited to speak.
  - In October 2005, the Commission drew attention to the problem of high international roaming charges and the lack of price transparency by publishing a consumer-oriented website. The European Parliament, in a resolution on 1 December 2005 on European Electronic Communications Regulation and Markets, welcomed the Commission's initiative on transparency in the international roaming sector and called on the Commission to develop further initiatives in order to reduce the high costs of cross-border mobile telephone traffic.
  - In December 2005, the ERG alerted the Commission to its concern that measures being taken by NRAs would not resolve the problem of high prices. The ERG described the problem as 'not trivial'. It further noted that roaming creates an exceptional instance where an apparent case of consumer detriment is not solved by the application of the 2002 framework.
  - Concurrently, at the end of 2005, the DG Competition opened an *ex officio* investigation in Member States under Article 81 EC Treaty in order to ascertain whether exclusive dealings between mobile network operators existed, and why mobile network operators were not necessarily buying roaming minutes from the mobile network operator which sells them at the lowest price.
  - On 8 February 2006, at the ERG plenary session in Paris, Commissioner Reding noted that, despite warnings, operators had not acted to bring about a decrease in consumer prices for roaming, and stated that determined action was required. In March 2006 the European Council noted in its conclusions the importance for competitiveness of reducing roaming charges.
  - In a first round of consultation, from 20 February to 22 March 2006, general feedback on wide-ranging principles to tackle the unjustifiably high prices for roaming was sought. The Commission services launched a second round of consultation, from 3 April to 12 May. The consultations confirmed that there was widespread support among Member States, NRAs, consumer groups and even some non-incumbent operators for the Commission's goal of reducing roaming charges. While many operators argued that the market was competitive and that prices were falling, some proposed either self-regulation or other forms of non-intrusive regulation.
- **2006:** July, the proposal for a centralised regulation to reduce international roaming charges within the EU was eventually published by the Commission.

- **2007:** the EC abandoned the cases against Vodafone UK, O2 UK, Vodafone Germany and T-Mobile Germany, dropping the objections and ignoring any alleged wrongdoing in the period 1997-2003.

A1.75 Regulation 717/2007, the current version which came into effect in September 2007, declares that regulation should be imposed at both retail and wholesale level to protect the interests of roaming customers in the field of voice calls only. The rationale behind this Regulation was that the high prices for roaming calls at both wholesale and retail levels were not justified by the underlying costs of providing the service, and that NRAs were not able to act in view of the cross-border nature of the service.<sup>60</sup>

- **2008:** In June the Commission issued a Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU to respond to remarkably divergent mobile termination rates (MTRs) between Member States. The Recommendation laid groundwork for termination service costs to be based strictly and only on stand-alone call termination services. Furthermore, it challenged the current EU-wide Calling Party Network Pays (CPNP) principle on grounds that it may result in excessive pricing of fixed-to-mobile calls as fixed telephony operators (and their customers) subsidise receiving mobile customers (and mobile operators);<sup>61</sup> instead, call termination charges/payments should be two-sided.
- Concurrent with the publication of the Recommendation, the Commission launched a public consultation on the proposal (summer-autumn 2008).<sup>62</sup> Issues looked into included:
  - Removing price caps, but introducing more stringent transparency requirements, also making it possible for consumers to choose which network they want to roam on.
  - Introduction of an exchange for the trade between operators on wholesale level for traffic capacity for voice and data.
  - Reliance on *ex post* penalties for any anti-competitive behaviour (market monitoring/surveillance; enhanced regulatory powers and heightened coordination between sector regulators and competition authorities in each Member State and at the EC level).

A1.76 Finally, on 23 September 2008, the Information Society and Media DG released a proposed amendment for the extension of the Roaming Regulation in both duration and scope. The main provisions of the proposal are as follows:

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<sup>60</sup> European Commission (2007) “REGULATION (EC) No 717/2007 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC” Brussels: Official Journal of the European Union.

<sup>61</sup> This externality can be internalised at a company level if the fixed and mobile operators are owned by the same entity (this is, for instance, the case of France Telecom/Orange and O2/Telefónica), but it will remain at a customer level. The alternative is to lower fixed-to-mobile termination charges and introduce mobile Receiver-Party-Pays (RPP) instead, which is the system currently adopted in the USA and parts of Asia.

<sup>62</sup> DG Information Society and Media (2008) “Public Consultation on a Review of the Functioning of Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and Data Roaming Services” Brussels: European Commission.

- The introduction of a “Euro-SMS tariff” of €0.11 excluding VAT. Wholesale charges for sending SMS must not exceed €0.04. There is no permissible charge for receiving SMS abroad.
- Transparency provisions now require roaming customers to receive notification messages upon crossing borders of the charges they will incur, including for SMS and data.
- €1.00 per MB wholesale cap for data roaming services.
- Voice calls will see increased reductions in the Euro-tariff: the prices for making calls would decrease from 43 cents on 1 July 2009, to 40 cents, 37 cents and 34 cents for each of the following years. The price for receiving a call would decrease from 19 cents on 1 July 2009 to 16 cents, 13 cents and 10 cents for each of the following years.
- The maximum average wholesale charge levied between operators must decrease to €0.28 on 30 August 2008, €0.26 on 1 July 2009; and then to €0.23, €0.20, and €0.17 on 1 July 2010, 1 July 2011, and 1 July 2012, respectively.
- After the first 30 seconds of calls made, consumers would be subject to per-second billing, and per-second billing for the entirety of all calls received.

## APPENDIX 2: STAKEHOLDER VIEWS

A2.1 This section is intended to provide a balanced and accurate picture of the variety of views seriously considered among professionals in this field.

The following table summarises the views held by the major parties involved in this issue.

**Table A2.1 Views of Major Parties**

	Position on...								
Stakeholder	Option 1	Option 2	Option 3	Option 4	Option 5	Two-part pricing	Per-second billing	Data price transparency enhancements	
EC	No	Yes	No	No	No	Yes, but regulated	Yes	Yes	
ERG	No	No	Yes*	No	No	Yes	No	Yes	
GSMA/Industry	Yes (most)	No	No	No (many)	No (with very few exceptions)	Yes	No	Yes	
NITA/Denmark	No	Yes	No	No	No	No	Yes	Yes	
BEUC	No	Yes	No	No	No	No	Yes	Yes	

\*ERG would like us to note here that the proposal for wholesale data roaming is currently under investigation.

### DG Infosoc

#### Data and Model

A2.2 As mentioned in the main report, Europe Economics had several questions about the model used by the European Commission for the 2008 Impact Assessment of the Roaming Regulation.

A2.3 The model used for the EC Impact Assessment assumes a flat growth trend of the roaming market as counterfactual, in case of hypothetical absence of regulation. It assumes that if the Regulation had not come into effect, the volumes of outgoing roaming calls would not have changed.<sup>63</sup> The Impact Assessment also assumes a non-declining trend in prices in the roaming market, in case of hypothetical absence of regulation, e.g. that prices for roaming calls would not have changed throughout 2007. For the Commission, the evidence of a declining trend before the Regulation came in (shown by the first report from ERG and especially by GSMA researches) is easily explained as an announcement effect, but not from increases in competition. In 2007 the operators felt it was impossible to avoid the Regulation and so anticipated its effects by decreasing prices.

<sup>63</sup> Annex I, page 80 of the Impact Assessment.

- A2.4 As a result of these assumptions, the counterfactual is the status quo before mid 2007, rather than a projection of what would have happened on unchanged policies.
- A2.5 Regarding the assumptions on elasticity, the model takes into consideration three different elasticity scenarios, since there are probably no valid scientific results on the demand elasticity. The IA considers an industry scenario ( $|\xi| < 1$ ), a minus one scenario ( $|\xi| = 1$ ), and an optimistic scenario ( $|\xi| > 1$ ). The Commission argues that even in the case of the lowest elasticity scenario the regulation is justified, since the model they carried out shows social welfare improvements would occur under all three scenarios.
- A2.6 Regarding operator costs, in the IA model capacity constraints are not considered. This may create an underestimation problem on costs which could potentially affect the model's outputs. Yet the Commission did not seem to believe that these considerations are relevant since its capping approach is "not cost-based" and the caps chosen are perceived by them to be generous, especially compared to NITA's cost estimations.

### **Rationale for Regulation?**

- A2.7 Europe Economics discussed the possible rationale for regulating roaming services. As we see it, the key questions lie in the ability to evaluate the supply and demand for roaming services apart from the rest of the mobile market, in order to justify regulating it in isolation from the other mobile services.
- A2.8 Before the Roaming Regulation, several competition investigations had been carried out. The investigations were not able to identify competition issues, even though it was thought that prices were extraordinarily high in relation to costs. So, national authorities imposed remedies to operators suggesting price reductions (especially retail prices). Since the operators seemed to ignore these remedies (perhaps influenced by the fact that the roaming market is international and no effective remedy can be imposed by national authorities), action at a European level became necessary.
- A2.9 Therefore the main rationale of the Regulation seems to be an excessive level of prices compared to domestic prices and to some measure of costs. The fact that roaming is an intrinsically international market implied the necessity of a European regulation.

### **Other Points**

- The proposed SMS cap of €0.11 implies that in some Member States roaming SMS would be less than domestic SMS. EC does not see any problem with this as for EC, the cap has been set at a "really generous" level. Moreover this kind of problem may exist for one or two countries and so it seems not to be so relevant at a European level.
- The Commission recognises that the data market is different from SMS and voice. Evidence of a decreasing trend in prices and increasing of competition is visible. So from its perspective, the rationale behind the data roaming caps is only an attempt to reduce in the short run what it sees as extraordinarily high prices (e.g. €15 per MB). It believes that it has proposed a cap high enough to leave room for competition.
- The Commission believes that there is no trade-off by the operators between compliance costs and tariff innovation. It is basically convinced that caps are high enough allow large profits to be made.

- The Commission feels the per-second billing issue important, since it believes that the consumer should pay just what they use.
- When questioned about the application of uniform prices all over Europe despite relevant differences between countries, the Commission replied that sustaining the Roaming Regulation is not introducing fixed prices, but simple caps. These caps have been defined to leave room for competition beneath them.

### **GSM Association (with AT Kearney)**

A2.10 GSMA is the global trade association representing over 750 GSM mobile phone operators across 218 countries and territories worldwide. It has headquarters in Atlanta and London. In addition to the GSM representative, Europe Economics spoke to a member of AT Kearney, the management consultancy employed by GSMA to assist them in their dealings regarding the Roaming Regulation.

### **Extension of the duration of the regulation**

A2.11 GSMA does not agree with the Commission's justification for the Regulation (prices are too high because there is not enough competition). To GSMA the roaming market is competitive. Moreover it does not agree also with the abrupt manner with which the Regulation has been authorised (only 6 weeks for consultations).

A2.12 GSMA notes that there have been articles in the media that indicated that some operators were raising prices on other services. According to the GSMA official view,

If such an effect ("waterbed" effect) were to be shown conclusively, there is a risk that operators, unable to earn sufficient margins on some services, may have to raise prices on other services, and/or cease to make attractive offers on, for instance, handset upgrades, or else, may make offsetting cost and investment reductions with service implications for all customers.<sup>64</sup>

A2.13 The Regulation should not be extended because competition is present in the market and extending the Regulation will distort competition in the market and hinder innovation. Roaming prices came down consistently quarter on quarter prior to the regulation from market forces. Furthermore a large portion of all roaming tariffs (approximately 40 per cent of all call traffic) still subscribes to non-Euro-tariff plans.

A2.14 The Regulation has already reduced revenues and profits all over the industry, generating not only direct reductions of profits, but a set of other indirect but significant costs. The reduction in revenues also affected the quality of the service. The regulation had a huge administrative cost for operators across the industry. GSMA estimated from €1 to €2 million of cost per main operator, and €150million for the entire industry. An opportunity cost for investment due to the fact that the regulation reduced revenues has been forgone, and thus implied a reduction of resources allocated for innovation.

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<sup>64</sup>AT Kearney and Professor David Newbery (2008) "Demystifying the European mobile industry: facts and insights on the economics of a major European industry" London: GSMA.

A2.15 Expectations for revenues (retail market) from roaming market depend heavily on the regulatory choices which will be taken by the European Parliament and Council. If price caps must be set, they should be set to a level which permits the creation of a reasonable profit for operators. Otherwise quality of services and innovation will suffer from a lack of resources to reinvest. In the case that the policy remains unchanged GSMA forecast a flat growth for voice. Data on the revenues brought in by the roaming market are represented in the following table. The data refer to roaming market among the EEA Countries.

**Table A2.2: Roaming Revenues**

<b>Amounts of money for Roaming Market</b>	<b>Value (Retail Revenues)</b>	<b>Sales</b>	<b>Period of Reference</b>
Voice	€3.6bn (EU 25 only)		Q407 – Q308 – October 2008 (Forecast)
SMS	€850m		2007
Other Data (PSD <sup>65</sup> )	€750m		2007

*Source: approximately 50% of European Operators (representing approximately 80% of total European subscribers)*

A2.16 As regards the percentages of revenues represented by roaming market out of the total revenues, the interviewees had no precise data, but thought that the total market may size around €174 bn (with €156 bn service revenues).<sup>66</sup> Specific data on customers' features (and so on business/non business customers breakdown) were unavailable, however the general impression of the interviewees was that business customers market is much more important than non-business users market.

A2.17 It is important to be aware of the strong differences in the role of roaming among operators and countries. For operators of countries in which tourism has a strong importance, the roaming market can be more important than the domestic one. For other countries roaming market (and its regulation) has less impact on their revenues. The Regulation does not take into account the differences in costs and markets across Europe. This presents problems for operators; for example, areas of tourism that have many outgoing calls (Malta, Austria) have been hit quite hard by the Regulation. It has also become harder for operators to justify further network investments in areas where the terrain makes it expensive establish the required infrastructure (e.g. Alpine regions in Austria).

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<sup>65</sup> The term "Packet Switched Data" (PSD) refers to protocols in which messages are divided into packets before they are sent. Each packet is then transmitted individually and can even follow different routes to its destination. Once all the packets forming a message arrive at the destination, they are recompiled into the original message.

<sup>66</sup> GSMA (2008) "European Mobile Industry Observatory 2008" [http://www.gsmworld.com/europe\\_observatory/index.shtml](http://www.gsmworld.com/europe_observatory/index.shtml).



- A2.18 GSMA believes the Regulation has had a negative impact on industry. It estimates that as a result of the Regulation the retail voice roaming market in the EU has shrunk by around 30 per cent from its 2005 level. Based on its sample, it estimates that the retail market size (post-regulation) is now €3.6 billion compared to around €5 billion which it estimated for 2005 in a submission to the Commission in 2006. This is a considerable source of concern for an industry which has been experiencing significant strains on profitability in recent years.
- A2.19 GSMA and ATK believe that emerging alternative service providers (such as Skype) can play the role of substitutes, and that the threat of substitutes is real. Operators are having to contend with strong substitutes for roaming services. For example, Voice over Internet Protocol (VoIP) is becoming an increasingly credible threat to mobile roaming services. Skype has introduced mobile VoIP services in partnership with mobile operators such as 3 in the UK and E-Plus in Germany.

### **Extension of the scope of the regulation**

- A2.20 For GSMA there is no economic justification for the regulation of roaming charges in any market considered (Voice, SMS, MMS and other data). Voice and SMS markets are stable markets, with a good degree of competition and so a regulation is not needed. Data market is a really dynamic and growing market, and a regulation on this may have several bad economic implications and risks.
- A2.21 The distinction between Prepay and Postpay customers raises an interesting point. Prepay customers are subject to a more transparent roaming system, and thus can enjoy obvious advantages in terms of transparency (and avoiding the bill-shock problem). This issue moreover feeds into differences among countries: some countries have a larger proportion of prepay customers (Italy, UK), and this may be an interesting variable to be considered when analysing the transparency issue. In summary transparency obligations should not be too restrictive since there are strong technical differences among operators and uniform requirements run the risk of distorting costs incurred.

### **On exchange for trade**

- A2.22 GSMA has explicit opinions regarding the topic of exchange for the trade between operators on wholesale level for traffic capacity, and thinks that this system would not create any benefit for the consumers. It would foster more transparency at a wholesale level, and perhaps facilitate the businesses of some small operators. But nowadays the transactions among operators of a certain scale are able to carry out big discounts and savings.
- A2.23 The introduction of IPX systems would only create more transparency and advantages for the small operators, without lowering the costs. Furthermore some concerns regarding the technological feasibility of these systems make the issue problematic.

## **Ofcom and ERG**

- A2.24 The Office of Communications (Ofcom) is the independent regulator and competition authority for the communication industries in the United Kingdom. Ofcom was a member of the Board of the ERG during 2007, having been its chair during 2006. During 2008, the ERG continued to engage in close dialogue with the Commission over the future of regulation in Europe, as the Commission developed its thinking on the review of the Regulation. As Chair of the ERG Project Team on roaming, Ofcom contributes significant resources to the ERG's work.
- A2.25 Since the new Regulation amendment has been proposed, the official ERG position stands as the one from 28 July, and has not been updated. The Commission's proposal was heavily based on the ERG recommendation with a few exceptions, namely:
- (a) The Commission proposes the price regulation of wholesale data roaming services from 2009, while ERG said the issue was finely balanced and would refer to ERG data on roaming prices over a year of Regulation, due in December 2008, to inform its views; and
  - (b) the Commission proposes that the billing intervals for making voice calls should be regulated at a maximum set-up charge of 30 seconds, followed by per second billing, while ERG said a set-up charge was justified on economic and commercial grounds, noted that a maximum set-up charge of 60 seconds would seem high compared to the fixed costs of setting up the call, but did not suggest another charge.
- A2.26 A Representative of the present Chairman of ERG was in attendance at the time of Ofcom's interview with Europe Economics.

## **Extension of the duration of the Regulation**

- A2.27 Ofcom agrees with the ERG position that it was early to fully assess the impact of the current Regulation given factors like seasonality that cannot be fully measured until the end of 2008, or to be making decisions about the regime that might be applied from mid-2010, given the likelihood of changing market conditions and costs. However, on the basis of the evidence available, the interviewees believed that the duration of the Regulation should be extended in order to ensure that all operators are able to access lower wholesale prices and that falling wholesale prices result in lower retail prices. This might not otherwise occur because of the lack of significant competition pressures observed for roaming services (despite the foreseen consistent cost savings). The limited variation seen in tariff structures and levels below the regulated caps provides evidence for the view that there is limited market competition to date.
- A2.28 Moreover, the Regulation is easy to enforce, and apparently not an excessive ongoing burden for the operators, once initially complied with. Ofcom has not seen clear evidence of alleged "waterbed effects" so far, although this might change in the future, and noted that tariffs change all the time and it is impossible to directly link any variations to the roaming Regulation. The recent report from ERG showed roaming charges outside the EU to be more or less stable, whilst there continue to be reductions in the EU.

- A2.29 Ofcom does not consider there is a strong case to suggest that roaming retail prices would increase if the Regulation was not extended beyond 2010, because consumers would have become used to the lower prices, and regulatory pressure might also play a part. At the same time, in the absence of regulation, competitive pressure is unlikely to be strong enough to bring further retail charge cuts. Still, there is general agreement that the costs of termination and other costs of the provision of roaming services are decreasing and will decrease in the future.
- A2.30 Some retail competition has been seen in the form of price levels below the cap, but not yet enough to justify withdrawing from regulation. Ofcom accepts that there might be a risk that the caps will become “targets”, and that this will make it easier for suppliers to persuade customers that prices are reasonable, even if they are higher than would be possible within a competitive market. There is more evidence of competition at the wholesale level as prices are further below the caps. However, whether these lower wholesale prices are motivated by the lower price caps due to come into effect in July next year is an open question: wholesale tariffs are negotiated for a year at a time.
- A2.31 Speaking about possible competitive forces on the Voice Roaming Market, Ofcom said that it did not expect VoIP services to provide significant competition to voice roaming services in the time scale of the proposed Regulation. Currently, providing access to VoIP services does not form part of the strategy of most mobile companies, although one MNO in the UK has entered into an agreement with a VoIP provider<sup>67</sup>.
- A2.32 For the current regulation of voice roaming services, ERG proposed that the level of the average wholesale cap should be derived from the average MTR in the EU. An alternative approach is to take the current cap as a starting point and allow for the foreseen cost reductions over the period 2010-2013, based on falling mobile termination rates, and access and origination costs. During the period leading up to 2013, the fall in input costs is expected to justify a €0.02 to €0.03 unit price reduction each year.

### **Extension of the scope of the Regulation**

- A2.33 The SMS roaming market is similar to Voice Call roaming market in that at the retail level there are low competitive forces, which implies the need for an extension of the regulation also to SMS retail prices. At the wholesale level, SMS roaming wholesale services are usually sold together with voice roaming services. Negotiations are focused on voice prices because voice generates greater volumes, limiting the scope for reductions in SMS rates.

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<sup>67</sup> Many 3G mobile devices are already Skype-enabled to work via wireless Internet (where available) in alternative to standard 3G radio frequency. However, when these mobile phones or handheld devices are provided free of charge or are heavily subsidised by traditional mobile operators as part of prepaid 3G voice/data packages, their Skype/VoIP functionalities will typically be disabled or locked.

A2.34 At this stage, ERG considers the question of price regulation of data roaming is finely balanced. On the one hand, the market is relatively young and growing at a very fast rate, and both its cost structure and dynamics are not yet well understood. Effective business models have yet to be defined. Prices are falling across the EU and becoming more heterogeneous at the wholesale level, and are falling in most countries at the retail level. There are competitive forces for data services that do not exist for voice and SMS services: fixed Internet access in hotels and cafés; WiFi in public spaces; for laptops, data does not have to be bundled with other mobile services (consumers can buy a roaming or local USB stick or dongle from any supplier and not affect their phone number). On the other hand, retail data prices are seen to be still much higher than likely underlying costs, and so far have not fallen in a few countries in the EU.

A2.35 The extended Regulation should not be much different from the present one, apart from the price cap levels and the extended scope to SMS. Some new transparency requirements may be introduced, especially to prevent the bill-shock problem for customers. Some EU operators have proposed to include a meter with laptop and phone software to tell customers how much they have spent so far in real time, as well as a cut-off device asking for explicit client permission before further data are handled when roaming.

### **On exchange for trade**

A2.36 This option has not been seriously considered by Ofcom or ERG at this point.

### **Bureau Européen des Unions de Consommateurs (BEUC)**

A2.37 BEUC was created in 1962 to represent consumers' interests at EU level. In 2008, it included 41 independent national consumer organisations from some thirty European countries (EU, EEA and applicant countries) as members. As a Brussels-based representative for these organisations, it sees its task as defending the interests of all of Europe's consumers.

### **Extension of the duration of the Regulation**

A2.38 BEUC accepts the rationale of the Regulation and its extension owing to a lack of competition and the presence of unjustifiably high prices in the market.

A2.39 The Regulation should be extended for another three years in all respects. The Euro-tariff represents a positive contribution to the consumer, but it does not set optimal tariffs: price caps should decrease at both the wholesale level and retail level. Retail price caps should be based on the actual costs that operators bear.

### **Extension of the scope of the Regulation**

A2.40 It is important that regulation should drive down SMS call termination rates. Caps should also be imposed at the retail level in order to lower the prices and reduce the huge disparities in prices between European countries. The differences in roaming outgoing SMS tariffs in Europe are truly worrying to BEUC, since the price can vary from €0.15 to €0.50. Yet, following a cost-based approach in relation to SMS tariffs, BEUC does not see reason for prices to exceed €0.07 per message.

- A2.41 Regarding data roaming, various operators' initiatives are meant to be dealing with this issue, specifically to solve the bill shock problem by communicating to the customer in real time how many megabytes he or she is downloading. This idea is admirable, but BEUC sees the real problem with data roaming as being the enormously high unit prices. BEUC is aware that the data roaming market is growing very fast. Nonetheless, it remains in favour of the extension of the Regulation and the setting of safeguard unit price caps (per MB), even though they should be set at levels high enough to create room for new entry.
- A2.42 BEUC suggests two parallel ways to assist the SMS and other data markets: extension of the voice price caps to these services; and the implementation of self-imposed codes of conducts from the operators, which may result in a set of fair prices as a benchmark for the market.
- A2.43 BEUC has expressed many concerns on the price transparency and clarity issues, especially considering the customer perceptions on quality of service.

**On exchange for trade**

- A2.44 This option was not covered in detail by this interview.
- A2.45 Below is the table of results received from NRAs to our Price-Quality matrix. Unfortunately the response levels were too low to draw any firm conclusions.

**Questions for BEUC and national consumer associations: Table for Price/Quality matrix for the Roaming Service – Qualitative assessment, as many countries as possible from EU-27 and EEA (thus including CH, Iceland, Norway, Liechtenstein); in € multiples or**

	<i>Number of tariffs significantly different tariffs available (expressed in 1-2-3)</i>	<i>Price transparency/clarity index; (expressed in 1-2-3)</i>	<i>Geographical coverage ratio of the 2G, 2.5G, and 3G Networks; (expressed in %)</i>	<i>Customer satisfaction index; (expressed in 1-2-3-4-5)</i>
	<i>1 = Small number of tariffs: from 1 to 3</i>	<i>1= Low level</i>		<i>1= Very bad level ; 2= Low level</i>
	<i>2 = Acceptable number of tariffs: from 4 to 7</i>	<i>2 = Acceptable level</i>		<i>3= Acceptable level</i>
	<i>3 = Large number of tariffs: 8 or more</i>	<i>3= Good level</i>		<i>4= Good level; 5= Excellent level</i>
<i>Belgium</i>	Only 1 specific roaming oriented tariffs has been created (Zoniq, from Base), the other ones have maintained their "options" like Vodafone passport for Proximus and "Traveller advantage" from Mobistar.	2 (some operators have reviewed their roaming page to stick to the new regulation. But in general, It is really difficult to collect information. A good case is the increasingly amount of complaints in Belgium about data roaming billing due to lack of cle	No official figures	3
<i>France</i>	1, no competition on tariffs roaming	2	2g = around 95%, 3 g around 70% for Orange and SFR, Bouytel telecom have an important delay they are working hard to fill the gap.	3
<i>Slovenia</i>	3	1	2G: 95%, 2,5G: 95%, 3G: 70%	4

## Operator A

### Extension of the duration of the Regulation

- A2.46 The Regulation should be extended. Overall, this operator accepts the rationale for the Regulation, and believes the industry has been given plenty of time for lowering prices. It believes such prices are difficult to justify when wholesale charges on international rates are so much lower.
- A2.47 There should certainly be caps on wholesale tariffs to ensure access to all players. This operator believes caps on retail prices are good for consumers. While it would like to believe that savings from wholesale regulation will be passed onto retail consumers, there is evidence in some countries to indicate the contrary. Caps should be set using the same methodology as with MTR regulation, namely a transparent — possibly bottom-up — cost-based model.
- A2.48 If the Regulation were not extended beyond June 2010, data would be more expensive to use and fewer people would subscribe. Moreover, “bill shocks” would continue as well to affect the consumer.
- A2.49 This operator thinks the Regulation should bring about increases in traffic in countries where prices have been high, but it is difficult to quantify any increases without exact charts.

### **Extension of the scope of the Regulation**

A2.50 This operator would like to see the Regulation extended in scope to data services in accordance with the current increases in broadband subscriptions through 3G, etc. It would like to see prices to fall sharply and would like consumers to have as much access as possible to mobile roaming software on mobile devices.

### **On exchange for trade**

A2.51 This operator understands that GSMA is currently experimenting with building one now (IPX). It has not been monitoring it so carefully, but agrees that operator participation depends heavily on the conditions set by the GSMA.

### **Operator B**

#### **Extension of the duration of the Regulation**

A2.52 This operator is aware that it holds a different position with respect to its main competitors about the Roaming Regulation: it supports the European Parliament's decision for regulatory intervention at a wholesale price level. As a new entrant, it feels it has been experiencing strong disadvantages at the wholesale level in the roaming market, due to the presence of what it perceives to be strong alliances among the largest carriers. The operator believes that wholesale price caps will help to alleviate some of the market's existing anti-competitive dynamics and agreements. Wholesale price caps should be the same throughout the EU (regional differences are too complicated to account for), and should be based on MTRs.

A2.53 This operator does not, however, support the European Parliament's decision to regulate retail prices. Because of the retail charge caps it has been unable to undersell its competitors without increasing an already present risk of suffering a margin squeeze. Therefore it would like to see the Regulation extended, but on a wholesale level only — by pushing retail prices artificially low the operator sees the Regulation as hindering its competitiveness. If Euro-tariffs must remain in place, then Operator B would prefer to see their levels increased.

A2.54 The operator fears that if the Regulation is not extended, average wholesale prices will increase between firms where there are not yet preferred deals, resulting in higher barriers to new entrants and increased threats of margin squeezes. The average retail price will increase too, although not suddenly and immediately. Competitive forces are not always sufficient to keep prices low, which is confirmed by the fact that today the largest operators prices hover at or around the set Euro-tariffs.

#### **Extension of the scope of the Regulation**

A2.55 The Regulation should be extended to cover SMS, MMS and data. The MMS and data roaming markets are laden with the same problems as the market for voice roaming, namely anti-competitive practices at the wholesale level. The data market especially is growing rapidly and plays a significant role in the operator's business. It firmly believes that data roaming presents huge potential for the future, but sees a regulatory framework fostering competition as a necessary pre-condition to securing these opportunities. Moreover, it believes that if this does not succeed, once the market takes off it will face even higher discriminatory prices from the incumbent operators.

By contrast, the operator does not see the SMS roaming market as being vital in the long run because the main markets will soon be for voice and data.

A2.56 Almost all operators have now shifted to per-minute roaming billing. As such this operator feels that by not making this change it is needlessly losing revenue.

### **On exchange for trade**

A2.57 The operator has not yet seriously considered this possibility, although one of its branches has been involved in the assessment of this option, but without any significant result. At this point the operator is not a great supporter of exchange because it seems to be a way to maintain Calling Party Pays (CPP) over the internet. An additional complication stems from the heterogeneity in voice minutes resulting from demographics, as a minute of roaming on Oxford St is not the same as a minute of roaming in, say, Norfolk.

A2.58 Wholesale exchange for SMS services seems much more feasible, because of the technical features of SMS (low capacity requirements) and the presence of “SMS warehouses” in the telecom market, although these do not yet exist for roaming. Furthermore there is a key difference between exchanges for SMS and voice, since SMS termination fees are paid by the retailer, while voice termination fees are paid by the service provider.

### **Operator C**

A2.59 According to this operator, Europeans are travelling less due to the economic crisis, and the industry is facing a general downturn in Roaming. The future of roaming revenues now is uncertain as ever.

A2.60 The mark-up on Roaming calls is much higher than the mark-up on other calls. However in a general competitive market there is no reason to expect that margins on related products would be equivalent. Incidentally the Commission argues that the market is competitive, and that there will be no rebalancing effect from the price caps.

A2.61 Operator C does not believe there is a separate market for roaming. Now that traffic steering technology is adequate, lowest price networks are chosen through network operator’s technology, in a manner that is invisible to the consumer. While there exists a degree of substitutability in the Roaming market (e.g. using public payphones, hotel phones, buying new SIM cards), it is less likely that business customers will use these than, for example, someone with a holiday home in Europe, or students who are going to be spending the summer there. Roaming tariffs are priced to make it cheaper for customers to use mobiles than their hotel phones — the benefit of roaming is that it is easy. Roaming is a very good product, much better for consumers than what went before; that was not easy for the industry to achieve. So the operator prices according to demand.

### **Extension of the duration of the Regulation**

A2.62 This operator conceded that in the past there has been a real problem in the wholesale markets. Five years ago, when traffic steering was not very good, visited networks could effectively charge whatever they wanted. DG Competition had believed that each network operator was a monopolist rather than taking part in collusion. Now, most stakeholders agree that the market is sufficiently competitive (there is a minimum of three companies in each country); and with traffic steering there is no incentive for anyone to turn away business. In general wholesale prices today have operated below the cap.



- A2.63 The main criticism the operator has of the Roaming Regulation was that it felt that it could design better tariffs than the politicians could. Migrating all customers onto the Eurotariff has not left enough time to communicate with customers to “unlock elasticity for roaming”. There has been a bunching of tariffs up to the Euro-tariff, as one would expect. For example the price for customers using one roaming tariff it offers is 30 per cent below the Euro-tariff, and it’s concern was that the Regulation would make customers migrate to the Euro-tariff against their best interests. In addition, the operator thinks that it was the wrong choice to set one tariff for the 27 Member States, but that it was probably the only way the politicians were able to push the legislation through. (It did not know of any other situation where price caps in the EU are set identically across countries, with the exception of international Euro bank transfers below €50,000.)
- A2.64 The regulation has diverted resources to compliance and away from innovation of tariffs and services.
- A2.65 Now that it has been put into place it does not matter much one way or the other to Operator C whether the Regulation is extended. Politicians have underestimated the opportunity costs incurred by the need to comply with the Regulation. The operator revealed to us that before the Regulation was launched it had intended to launch new innovative roaming products, but these largely had to be scrapped in order to have sufficient resources to comply with the Regulation. Operators have only just got to the point where they can do things besides complying with the Regulation, so this one is interested to see what will happen to innovation, which was previously deferred.

### **Extension of the scope of the Regulation**

- A2.66 There is zero commercial benefit to network operators of bill shock. All they do is get in the papers, and they do not even recover costs. Moreover the operator sees the cross-border “Welcome SMS” as free marketing for politicians: the text does not solve the problem of bill shock, which should be done through tariff structures. The operator has no difficulty with transparency objectives, but it is concerned that the Commission is not going to achieve them as well as the companies could do on their own.
- A2.67 Retail prices in the data market have been falling 40 per cent year on year. The notion of intervening here would imply that there is no reason against regulating everything. Even if a Regulation were introduced, there would be no effective way to design a retail cap.
- A2.68 SMS prices have not moved very much, and the operator does not think there is any elasticity. There is not a tariff transparency issue here. If prices were cut all that would happen is that the companies would lose revenues, and in a competitive environment there is no reason to do this. The operator is not hugely resistant to the wholesale cap – it has little effect, and may provide some reassurance.
- A2.69 The industry’s general attitude is however weary resignation.

### **On exchange for trade**

- A2.70 This option was not covered in detail by this interview.

## **Operator D**

A2.71 The provision of roaming services is part of a broader market and should not be considered and treated separately. As indicated by the Impact Assessment Board, the Commission's Impact Assessment had not sufficiently explained the rationale for analysing roaming as a market in its own right, as opposed to viewing the purchase of a mobile phone package as a relevant market.

A2.72 Operator D is further concerned that the impact assessment of the Commission disregarded a number of hard facts provided by the industry. For example, although the GSMA (based on actual operator data) proposed to use an elasticity of -0.25, the Commission continued to use unrealistic elasticity assumptions that significantly understated the negative impact on industry of the Regulation.

### **Extension of the duration of the regulation**

A2.73 The voice roaming prices have constantly been decreasing and are currently well below the regulated Euro-tariff. According to the latest ERG report, the actual EU/EEA average Euro-tariff (during the first quarter of 2008) was 8 per cent below the regulated Euro-tariff for calls made and 10 per cent below the regulated Euro-tariff for calls received. The other (non regulated) voice tariffs were set even lower; respectively 13 per cent and 24 per cent below the regulated Euro-tariff.

A2.74 The operator's most recent roaming offers are providing even lower rates with discounted or national rates for roaming calls and discounted or free bundles of incoming calls for an upfront monthly fee.

### **Extension of the Scope of the regulation**

A2.75 The SMS roaming prices are not unusually high when compared to SMS domestic tariffs. The relation between domestic and roaming SMS prices is indeed already similar to the relation between domestic and (regulated) roaming voice calls. In addition, even if the provision of SMS roaming services is not as mature as the domestic markets - where SMS is often used as a "pull product" to attract new customers – it is common across Europe to find domestic SMS prices above the 11cts Euro-SMS tariff proposed by the Commission.

A2.76 The data roaming services' prices are considerably decreasing while, in terms of volume of traffic, they show an unprecedented growth rates. According to the Commission's impact assessment, data roaming retail prices dropped from €5.8 to €3.6 and wholesale prices from €3.2 to €2.0 per MB between Q2 2007 and Q1 2008, implying more than a 50 per cent decline per annum in both cases. In those circumstances, the operator does not believe that a regulatory intervention in the form of data roaming price controls is warranted.

### **On exchange for trade**

A2.77 This option was not covered in detail by this interview.

## **Operator E**

A2.78 Roaming represents circa 5 per cent of this operator's revenues. Voice is the most important market, but in the last six months it bore flat growth in volumes and huge losses in revenues. The volumes did not increase at all (despite the cut in prices imposed by the Regulation), but revenues dropped because of the price cuts. This brings them to the conclusion that demand elasticity for roaming services might in fact be very close to zero.

A2.79 It is not correct to say that the mark-up on roaming calls is higher than on other calls. The costs are much higher than the values that some stakeholders assessed (i.e. Danish Regulator, European Commission) and they are so huge that the mark-ups are normal compared to the telecom market. The cost is so high because of the interconnection costs (creating links with every single network - more than 500 partners) and also frauds and risks. Hence the prices are high just because to costs are really high.

A2.80 This operator believes that roaming does not represent a separate market at all.

### **Extension of the duration of the Regulation**

A2.81 The Regulation should not be extended.

A2.82 The Regulation has had a significant effect in reducing roaming prices. Since price elasticity is probably not much greater than zero, its effect has just been that of creating big revenue losses for the operators. The loss in revenues cut the resources for innovation and especially tariff innovation, since every player just aligned to Euro-tariff (with one exception).

A2.83 Also the competitive scenario suffered since the RR is distorting the market dynamics, killing the product, making the market less profitable, and leaving no room for competition.

A2.84 One of the results of the Regulation is indeed a rebalancing effect, because prices for non-regulated services increased (e.g. voicemail prices). The creation of these types of cross subsidies has moreover a bad effect on the society, since it will not allow any more the poorest customers to access all the services.

A2.85 Also compliance costs have been really high and reduced resources for innovating.

### **Extension of the scope of the Regulation**

A2.86 The Regulation should not be extended to SMS for the same reasons contemplated in the discussion on Voice. SMS and Voice are really similar from a market perspective.

A2.87 As regards data and MMS, this operator believes that the extension at this level would destroy these markets. The market for data is growing a lot and should not be regulated because it could be seriously damaged in terms of competition and innovation.

A2.88 Moreover the data market is evolving towards flat-rate pricing model. This would introduce a lot of troubles in terms of application of a potential Regulation, because the Regulation's price caps are meant to be expressed in units (per megabyte).

A2.89 This operator is against the proposed anti-bill shock measures. It believes that the problem does not exist, since it has not received any complaint regarding the voice market and just few and dubious ones on data. Moreover these measures would imply many technical difficulties. On the data market, to provide alerting information about how many megabytes customers are downloading in real time seems difficult and ineffective. The use of SMS to do this would not be effective since they would not be considered, data would interrupt the downloading process, and e-mails could not be effective since they could be late and not 100 per cent sure to arrive. Finally there would also be many technical compatibility problems with (especially older) handsets.

### **On exchange for trade**

A2.90 This option was not covered in detail by this interview.

### **NITA – The Danish Telecoms Regulator/Danish ministry**

#### **Reflections on the Commission roaming proposal**

A2.91 The Danish National IT and Telecom Agency (NITA) have recently analysed the prices and costs for mobile data services abroad. The analysis has proven very useful in evaluating the Commission’s proposal.

A2.92 In this light the Danish ministry would like to express its view on the Commission’s roaming proposal. The following table compares the current prices<sup>68</sup>, the Commission’s proposal and the results of the Danish analysis:

**Table A2.3: Proposed Price Caps and NITA Cost Estimates**

	Current Prices	Commission’s Proposal	NITA cost Analysis
SMS wholesale	€ 0.154	€ 0.04	€ 0.01
SMS retail	€ 0.285	€ 0.11	€ 0.04
Data wholesale	€ 2.004	€ 1	€ 0.45
Data retail	€ 5.408 <sup>69</sup>	-	€ 0.95

A2.93 Regarding SMS it seemed evident that there is room for even lower prices than the Commission has proposed, while still ensuring operators make a fair profit. In relation to data services, it seems that the Commission could have proposed an even lower wholesale price cap. In the light of the very high retail prices, it is probably necessary to impose retail regulation to ensure the consumers fair prices. The regulation of voice services has proven that the wholesale regulation alone is insufficient to guarantee consumers reasonable prices.

<sup>68</sup> All prices are taken from the latest ERG report.

<sup>69</sup> Non-group price.

## **Voice services**

A2.94 The Danish ministry finds the Commission's initiative on billing utilisation very positive. However a minimum billing interval of 30 seconds (equal to €0.23) far exceeds the cost of setting up the call. The billing interval should be reduced. Furthermore the Danish ministry finds it positive that the Commission has proposed to extend the voice regulation after 2010, and reduce the price caps further. However the proposed wholesale glide path far exceeds the underlying cost, since MTRs have been reduced by more than expected. The wholesale glide path should reflect underlying cost more closely.

## **Prof T. Valletti**

A2.95 Professor Tommaso Valletti is one of Europe's foremost academic experts on the economics of the telecommunications market and its regulation. He has advised the European Commission, OECD, and World Bank; sits as a member of the academic advisory panel to Ofcom (UK telecoms regulator); and has written numerous journal articles. Valletti is currently Professor of Economics at Imperial College Business School and at the University of Rome "Tor Vergata", Italy.

## **Extension of the duration of the Regulation**

A2.96 Valletti emphasises the importance of distinguishing between regulation at the wholesale and retail level. He believes that retail regulation is not motivated by economic analysis, and that grounds for regulation are "very shaky". The case for wholesale regulation differs in that it was justifiable in the past, when markets were under investigation for anti-competitive behaviour. If there is to be wholesale regulation it should be at the EU level; and, for this to be possible, regulators would need to do analysis at national levels.

A2.97 The most plausible justification for wholesale regulation today is the possibility of joint dominance (and the fear of retaliation from major players at home or abroad against smaller operators giving preferable deals to others). But it is difficult to prove joint dominance, and regulators are understandably reluctant to go down this route. Moreover NRAs have little incentive to invest resources into these inquiries, which have more international implications. Therefore Valletti can understand why it may be some relief for regulators to see this Regulation on the wholesale level. At the end of the day however, the economics and econometrics behind this too have been very limited.

A2.98 Regarding a possible rationale, Valletti does not see any serious market failure in the mobile roaming market. Consumers may be insufficiently informed about prices, but that, he thinks, does not on its own justify regulating. Nor do stories or anecdotal data. He understands that international prices are high compared to costs, but economic efficiency does not mean that prices should necessarily be aligned with costs.

A2.99 Professor Valletti has not seen any formal study estimating the elasticity of demand for roaming services. Personally he tends to believe that business users have relatively elastic demands about their choice of roaming service provider, while residential users (who typically know little about roaming prices) do not.

### **Extension of scope of the Regulation**

A2.100 With regards to extending the scope of the Regulation to SMS and data services, Valletti does not see a big difference in the fundamental problem stemming from the lack of a rationale.

### **On exchange for trade**

A2.101 This option was not covered in detail by this interview.

## APPENDIX 3: CASE STUDIES

A3.1 This section reviews some case studies of policies outside Europe, which may help provide some insights into good practice for regulation of roaming services. The cases examined are:

- (a) **USA**; and
- (b) **Hong Kong**.

### USA

A3.2 The United States is both unique and similar to the EU in that it is comprised of a number of states having borders within the union. Therefore a case study of the United States market for roaming demands an examination not only of roaming internationally, but also nationally (e.g. between states). However, the picture presents radical differences in roaming dynamics within the United States from those it shares with foreign network operators.

### Introduction

A3.3 CMRS (Commercial Mobile Radio Services) provider is a Federal Communications Commission (FCC, or Commission) designation for any carrier or licensee whose wireless network is connected to the public switched telephone network and/or is operated for profit. For FCC, “roaming” occurs when the subscriber of one CMRS provider utilises the facilities of another CMRS provider with which the subscriber has no direct pre-existing service or financial relationship to place an outgoing call, to receive an incoming call, or to continue an in-progress call. Roaming occurs when a subscriber places or receives a call while physically located outside of the service area of its “home” CMRS provider.

A3.4 There are basically two forms of roaming – manual and automatic. With manual roaming, the subscriber must establish a relationship with the host carrier on whose system he or she wants to roam in order to make a call. Typically, the subscriber accomplishes this in the course of attempting to originate a call by giving a valid credit card number to the carrier providing the roaming service. With automatic roaming, instead, the roaming subscriber is able to originate or terminate a call without taking any special actions. Automatic roaming requires a pre-existing contractual agreement between the home and the roamed-on host system.

### Regulatory background

A3.5 The Commission first adopted manual roaming requirements in 1981 as part of the original cellular service rules. In 1996, in the *Interconnection and Resale Obligations Second Report and Order*, it extended the manual roaming rule to include other CMRS providers that offer competitive telephony services comparable to cellular service. The rationale behind these rules was the attempt to favour the development of nationwide, ubiquitous and competitive wireless voice telecommunication.

In 1996, the Commission also stated in the *Interconnection and Resale Obligations Third NPRM* that the market might impose any roaming rule only for a transitional period i.e. until five years after the last group of initial licenses was issued for broadband PCS spectrum.<sup>70</sup> The Commission's belief was that once broadband PCS providers' build-out periods were completed there would likely be sufficient wireless capacity available. In October 2000, with the 2000 CMRS roaming NPRM, the Commission recognised the importance of roaming requirements at a competitive level, only when market forces alone are not enough to ensure the widespread availability of competitive roaming services.

### **Market features**

A3.6 In the US, the mobile telephony sector has shown consistent growth over the last decade. During 2003, it generated over \$87 billion (€64.4 billion) in revenues, increased subscription numbers from 141.8 million to 160.6 million, and produced a nationwide penetration rate of roughly 54 per cent.<sup>71</sup> The data show a significant growth also at a competitive level, since a number of competing national, regional and local network operators have emerged. The competitive pressure has led the mobile telephone carriers to exploit the next generation technologies (2.5G and 3G), that allowed them to offer mobile data services at a higher data transfer speed.

### **National roaming**

A3.7 The United States mobile compensation scheme has evolved quite differently from that of the current European system.

A3.8 Today mobile operators, or CMRS as they are known inside the US, do not enjoy the same terminating monopolies as their European counterparts. This goes for monopoly power over either fixed network operators (for fixed-to-mobile calls) or over other mobile network operators (mobile-to-mobile). This stems from competition legislation imposed by the FCC on fixed competitive local exchange carriers (CLEC) in 2001;<sup>72</sup> however, because under the 1996 Telecommunications Act mobile operators providing interconnection access or call termination are treated in the same manner as CLECs, the legislation applies equally to terminating CMRS.<sup>73</sup>

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<sup>70</sup> *Interconnection and Resale Obligations Third NPRM*, 11 FCC Rcd at 9479 ¶ 32. The last group of initial licenses for broadband PCS spectrum was awarded on November 24, 1997. Thus, the hypothetical sunset date discussed in the *Interconnection and Resale Obligations Third NPRM* would have fallen on November 24, 2002. See 2000 CMRS Roaming NPRM, 15 FCC Rcd at 21631 n.15.

<sup>71</sup> See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, WT Docket No. 04-111, Ninth Report, 19 FCC Rcd 20597, 20691, Appendix A, Table 1, at A-2 (2004) ("Ninth Annual CMRS Competition Report").

<sup>72</sup> FCC (2001), *In the Matters AT&T Corp., Complainant, versus Business Telecom, Inc., Defendant. Sprint Communications Company, L.P., Complainant, Business Telecom, Inc., Defendant*, Section III.B1. Memorandum Opinion And Order, EB Docket EB 01-MD-001.

<sup>73</sup> Marcus J. Scott (2004) "Call termination fees: the U.S. in global perspective" 4th ZEW conference on the Economics of ICT, Mannheim.



A3.9 Because one can assume roughly symmetric flows of traffic between mobile operators, it is more economically efficient to implement a “bill-and-keep” system, whereby operators exchange no money at all. In eradicating the need to account for traffic and settle disputes, the bill-and-keep system minimises transaction costs to network operators. According to the FCC,

An alternative to such [Calling Party’s Network Pays] arrangements, however, is a “bill-and-keep” arrangement. Because there are no termination charges under a bill-and-keep arrangement, each carrier is required to recover the costs of termination (and origination) from its own end-user customers.<sup>74</sup>

A3.10 As such, US mobile termination rates in 2003 were less than \$0.01 (about €0.007) in most cases and often zero. (By contrast, in 2003 the average European MTR was about €0.14).

A3.11 The breakthrough in the application of bill-and-keep was seen in AT&T Wireless’ (a CMRS) offer of Digital One Rate in 1998. For a flat rate, customers would receive a fixed quantity of minutes of air time —no per-minute charges — with which they could make or receive calls to and from *any point in the continental United States*. Long distance and roaming charges were free. As this set the new precedent for roaming charges within the United States, since Digital One Rate, competition has since made new inroads. While roaming charges comprised 14 per cent of total US CMRS revenues in 1995, in 2002 they made up five per cent. By 2004 roaming charges represented four per cent of total revenues.

### **Recent roaming issues**

A3.12 In recent years, roaming has emerged as an issue because of some merger transactions. In 2004 AT&T Wireless/Cingular merger was allowed by the Commission, as the ALLTEL/Western Wireless merger and the Spring-Nextel merger. Despite the Commission’s approval, a number of smaller carriers asserted that the mergers are detrimental to roaming. Roaming arrangements can only be made with a technologically compatible network, and the mergers resulted in a reduction in analogue carriers in many geographical markets, reducing the competition at a wholesale level and increasing the risk of anticompetitive roaming practices carried out by the big operators. Small and local operators were concerned about the possibility that this sort of market consolidation may lead larger carriers to favour each other with cheap roaming deals or to charge higher premiums for customers of small rural carriers to roam on their network.

### **International roaming**

A3.13 In stark contrast to national pricing schemes, the US market for international roaming shows the highest prices all over the world. That is probably due to combined effect of the lack of competition at this level (larger operators have SMP) and the lack of regulation at an international level.

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<sup>74</sup> FCC (2001) “In the matter of developing a unified intercarrier compensation regime (hereinafter unified intercarrier compensation NPRM), §§8-9, CC Docket 01-92” Washington, D.C.

A3.14 In an article by Grahame Lynch (2005) entitled, “The great mobile roaming rip-off: premiums charged for overseas roaming gain new regulatory scrutiny”, the author provides a telling description of what transpired overseas during the early inquiries into the European market.<sup>75</sup> The first lines of the article read,

U.S. operators have successfully scapegoated foreign termination rates for too long. Now their bluff has been called.

A3.15 The author cites a couple of factors that have contributed to a reversal of fortune for U.S. operators. Primarily the advent of GSM, which increased consumer roaming capabilities; and (then) new European and American regulatory inquiries.

A3.16 According to Lynch, when grievances were raised over prices charged for international roaming calls, the U.S. telecom operators routinely blamed charges levied by overseas visited networks. This rhetoric was apparently facilitated by the national telecom regulator, the FCC, which helped to focus consumer attention on termination rates paid by domestic companies to visited networks whilst overlooking the high mark-ups passed onto consumers.

A3.17 However, a report submitted to the FCC by the Brussels-based International Telecom Users Group (INTUG) in December 2004 revealed that mark-ups charged to U.S. roaming customers appear to have no relation to costs — and that North American operators charge the highest roaming prices “in the world”. For example, one finding of the report showed that for roaming in Greece, [U.S.] T-Mobile and Cingular roamers paid over \$1 (€0.74) per minute, while roamers from Australia, Denmark, Norway and Belgium did not pay above \$0.50 (€0.37).

A3.18 This result demonstrates that if Europe is ahead of the U.S. in competition regulation for roaming charges, the U.S. is beginning to follow suit.

## **Hong Kong**

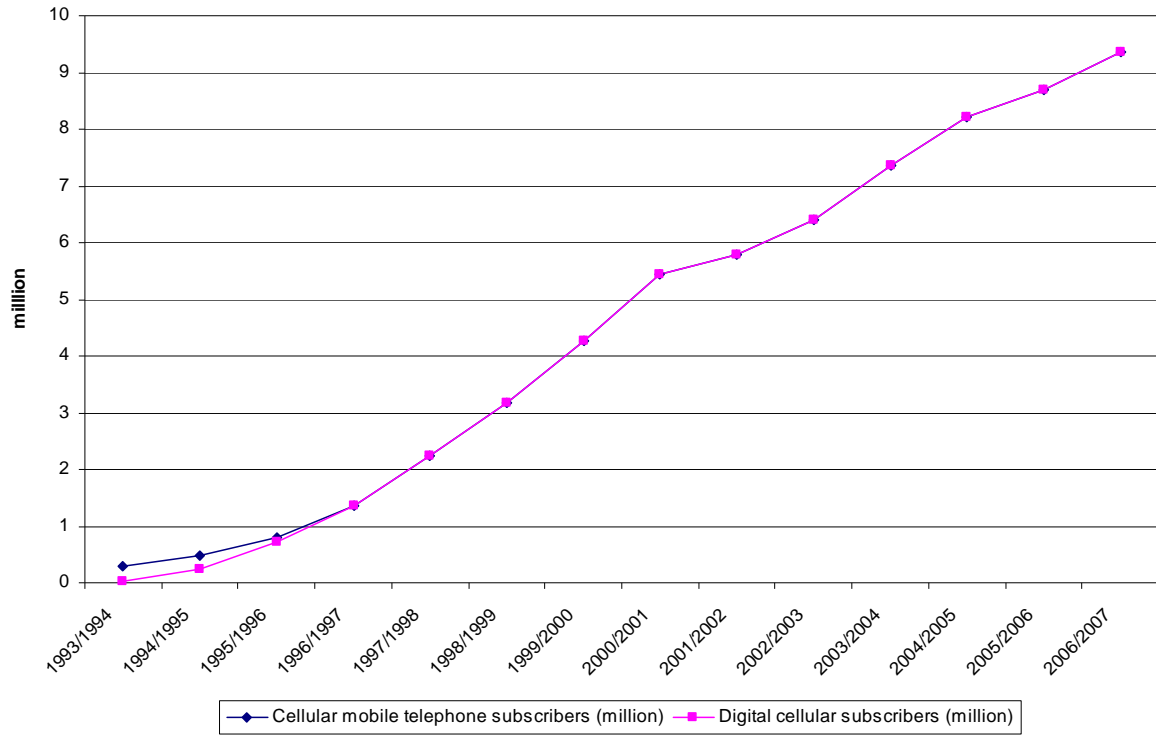
### **Mobile industry indicators in Hong Kong**

A3.19 The Hong Kong mobile market is highly developed. Cellular mobile telephone subscriber numbers have increased from 0.29 million (1993-1994) to 9.37 million (2006-2007), while population coverage has increased from 4.9 per cent (1993-1994) to 135.4 per cent (2006-2007), with an average yearly growth of 10 per cent.

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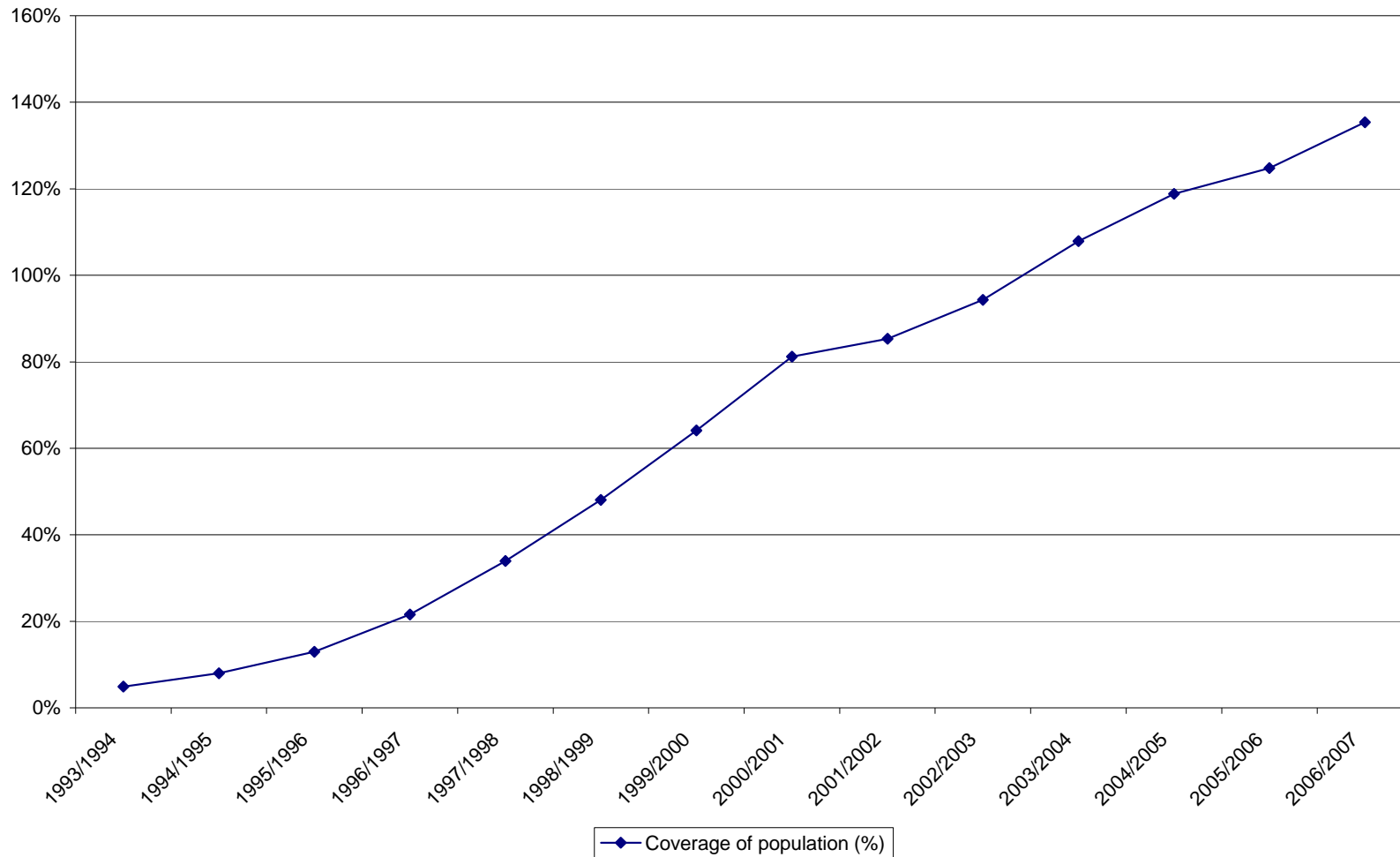
<sup>75</sup> Lynch, Grahame (2005) “the great mobile roaming rip-off” [www.america'snetwork.com](http://www.america'snetwork.com).

**Chart A3.1: Mobile Industry Indicators in Hong Kong (1)**



*Source: OFTA (Office of the Telecommunications Authority, Hong Kong) website.*

**Chart A3.2: Mobile Industry Indicators in Hong Kong (2)**



Source: OFTA website.

## Main operators

A3.20 With a 6.9 million population, there are 5 main mobile operators in the Hong Kong mobile market: HK CSL, Hutchison/3, Smartone, PCCW MOBILE, and PEOPLES76. Differences exist among the present 5 operators in terms of prices and target consumer groups. For instance, Peoples and PCCW MOBILE set relatively lower prices than most of the other competitors, arguably targeting young audiences.

## Regulatory environment

A3.21 The Hong Kong telecommunication regulator OFTA (Office of the Telecommunications Authority) does not normally regulate the roaming service. The regulatory framework that OFTA adopted does not entail price capping of roaming charges, but instead aims to set fair competition rules (on an *ex post* basis) in the market. To ensure fair competition in the Hong Kong mobile market, OFTA has adopted a technology-neutral approach in licensing (1996) to facilitate customer switching to alternative networks, to process consumer complaints and examine the fairness of retail practices. OFTA also assesses the impact of restructuring in the market, monitors mobile number portability (MNP), which ensures freedom of choice, and helps relax the entrance barriers for new entrants such as PEOPLES.

## Degree of competition

A3.22 In 2002, Hong Kong had a Herfindahl-Hirschman Index (based on the number of subscribers) of just 1,368, while Germany had a Herfindahl-Hirschman Index of 3,330, and China Mainland had an HHI of over 5,000.<sup>77,78</sup>

**Table A3.1: Hong Kong Market Statistics (2005)**

	Sunday	PEOPLES	CSL	Hutchison	SmarTone	New World
Number of Subscribers (000s)	684	1130	1300	2195	1033	1300
Percentage of Number of Subscribers (%)	8.95	14.79	17.01	28.72	13.52	17.01

*Source: Subscriber numbers are all taken from the annual reports of operators. Quoted from ITU report "The regulatory environment for future mobile multimedia services".*

A3.23 Based on our own calculations, in early 2005 the Herfindahl-Hirschman Index (HHI) was 1,885, which indicates that market was relatively competitive.

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<sup>76</sup> There were 6 operators in the Hong Kong mobile market in early 2005, but then turned into 5 as NWPCS was bought by CSL in June.

<sup>77</sup> Cf. Liu Kangfa, "A Market structure Theory Perspective: Looking into the Structure of the Mobile Market", 2006.

<sup>78</sup> The Herfindahl-Hirschman Index or HHI, is a measure of the size of firms in relationship to the industry and an indicator of the amount of competition among them. It is defined as the sum of the squares of the market shares of each individual firm, when the market shares are expressed as percentages; the result is proportional to the average market share, weighted by market share. It can range from 0 to 10,000, moving from a very large amount of very small firms to a single monopolistic producer. Increases in the Herfindahl index generally indicate a decrease in competition and an increase of market power.

A3.24 Based on the number of subscribers, by the end of 2005 the Herfindahl-Hirschman Index (HHI) for Hong Kong had risen to 2368. While higher than before, this chart is relatively close to the lowest possible theoretical HHI (2000) for 5 providers in the market. Competition remained relatively strong in the Hong Kong mobile market.

### **Roaming prices**

A3.25 With respect to the roaming sector, mobile competition is also relatively strong. We selected 21 representative countries and regions to roam in for Hong Kong based customers (subscribers) across Europe, the Middle East, the Americas, Asia-Pacific, and Africa. We collected charges for different roaming services from the five operators active in Hong Kong today, as shown by the Tables below.

**Table A3.2: Roaming Charges for Received Calls by Visited Country**

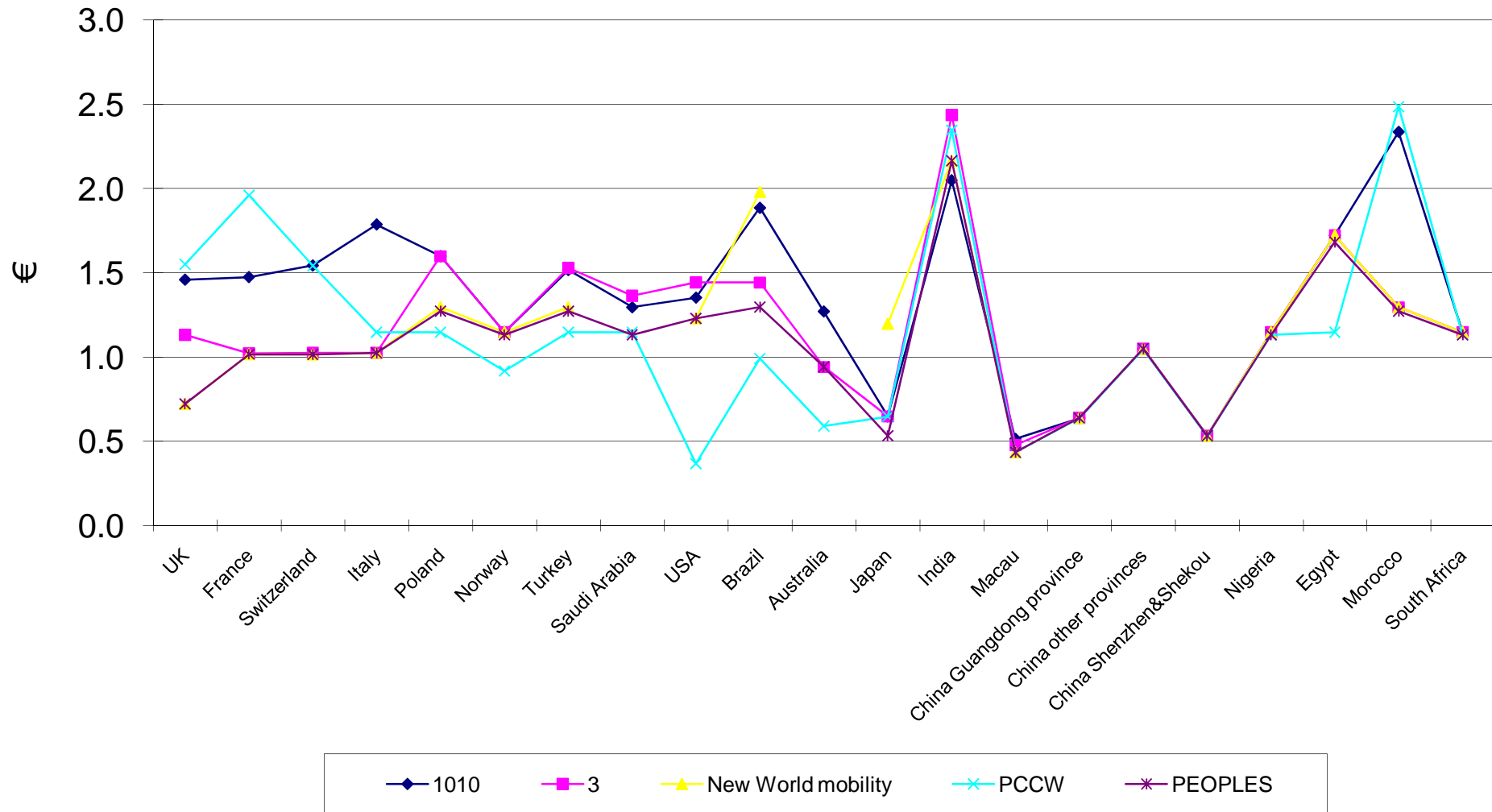
Received calls (€ /min)	1010 <sup>79</sup>	“3”	New World Mobility	PCCW	PEOPLES
UK	1.46	1.13	0.72	1.55	0.72
France	1.47	1.02	1.02	1.96	1.02
Switzerland	1.54	1.02	1.01	1.54	1.01
Italy	1.79	1.02	1.02	1.15	1.02
Poland	1.60	1.60	1.30	1.15	1.27
Norway	1.15	1.15	1.15	0.92	1.13
Turkey	1.52	1.53	1.30	1.15	1.27
Saudi Arabia	1.30	1.36		1.15	1.13
USA	1.35	1.44	1.23	0.37	1.23
Brazil	1.89	1.44	1.98	0.99	1.30
Australia	1.27	0.94		0.59	0.94
Japan	0.65	0.65	1.20	0.65	0.53
India	2.05	2.44	2.16	2.35	2.16
Macau	0.51	0.48	0.43	0.43	0.43
China - Guangdong province	0.64	0.64	0.64	0.64	0.64
China - other provinces	1.05	1.05	1.05	1.05	1.05
China - Shenzhen&Shekou	0.53	0.53	0.53	0.53	0.53
Nigeria	1.15	1.15	1.15	1.13	1.13
Egypt	1.72	1.72	1.72	1.15	1.68
Morocco	2.34	1.30	1.30	2.49	1.27
South Africa	1.15	1.15	1.15	1.13	1.13

*Source: selected and processed from the respective company Websites.*

A3.26 International (i.e., non-China) roaming charges are relatively high. The chart below presents the above charts in a graphical format.

<sup>79</sup> 1010 is a brand of CSL, and 3 is a brand of Hutchison. New World Mobility is a brand of Smartone. The prices listed are calculated using the nominal annual exchange rate of the Euro to the HKD. The nominal annual average exchange rates were taken from: [www.ers.usda.gov/data/exchangerates/Data/NominalAnnualCountryExchangeRates.xls](http://www.ers.usda.gov/data/exchangerates/Data/NominalAnnualCountryExchangeRates.xls)

**Chart A3.3: Roaming Charges for Received Calls**





- A3.27 New World Mobility and PEOPLES offer the lowest prices when roaming in Western and Southern Europe. In Eastern Europe (Poland), Northern Europe (Norway), the Middle East, the USA and Australia, PCCW charges the lowest prices. Prices for China/Guangdong province, other provinces in mainland China, and Shenzhen/Shekou tend to be highly similar, probably resulting from the high degree of similarity of local host networks and deals (China Mobile and China Unicom).
- A3.28 Prices in India and the African countries are relatively high for all the five operators compared with prices in other world regions. One possible reason is, for instance, that mobile termination rates and wholesale roaming agreements in, say, Africa are comparatively high vis-à-vis other regions.

**Table A3.3: Roaming Charges for Outgoing Calls**

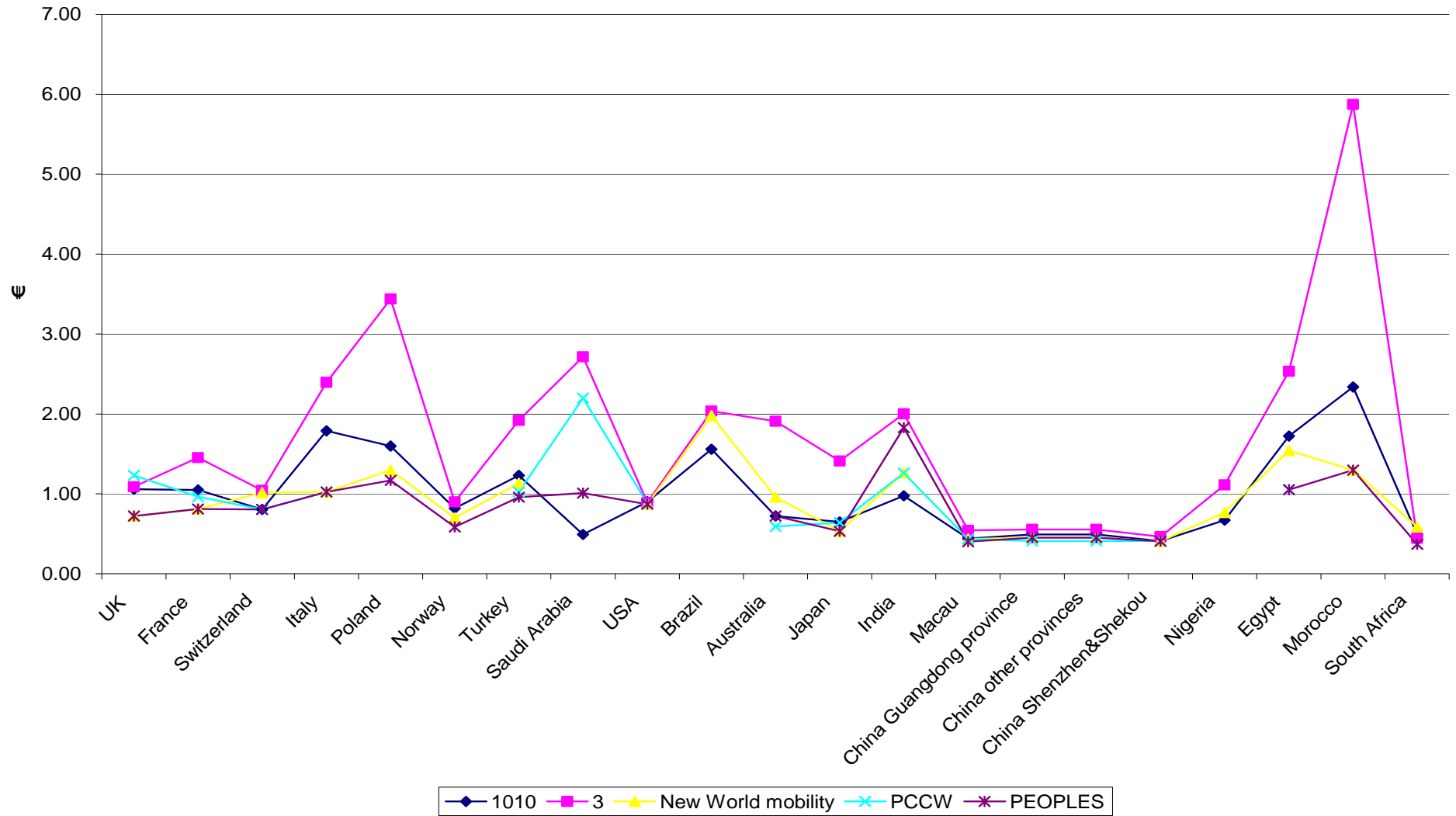
Outgoing calls when roaming (€ /min) <sup>80</sup>	“1010”	“3”	New World Mobility	PCCW	PEOPLES
UK	1.06	1.09	0.72	1.23	0.72
France	1.05	1.45	0.81	0.96	0.81
Switzerland	0.80	1.04	1.01	0.80	0.80
Italy	1.79	2.39	1.02	1.02	1.02
Poland	1.60	3.44	1.30		1.17
Norway	0.82	0.90	0.70		0.59
Turkey	1.23	1.92	1.13	1.02	0.96
Saudi Arabia	0.49	2.71	0.00	2.20	1.01
USA	0.90	0.89	0.87	0.88	0.87
Brazil	1.56	2.04	1.98		
Australia	0.72	1.91	0.96	0.59	0.72
Japan	0.65	1.41	0.53	0.64	0.53
India	0.97	2.00	1.26	1.26	1.83
Macau	0.44	0.54	0.43	0.44	0.40
China - Guangdong province	0.49	0.55	0.45	0.41	0.45
China - other provinces	0.49	0.55	0.45	0.41	0.45
China – Shenzhen/Shekou	0.41	0.46	0.41	0.41	0.41
Nigeria	0.67	1.11	0.77		
Egypt	1.72	2.53	1.54	1.05	1.05
Morocco	2.34	5.87	1.30	0.00	1.30
South Africa	0.49	0.44	0.59	0.00	0.37

*Source: Europe Economics' elaboration on selected and processed information from company websites.*

A3.29 It is clear from the charts that “3” (Hutchison) charges the highest rates among the five operators. New World Mobility, PCCW and PEOPLES offer relatively lower prices for outgoing calls when roaming (“homecalls”). Finally, calling while roaming in African countries can be very expensive.

<sup>80</sup> Referred to calls back home (Hong Kong).

**Chart A3.4: Roaming Charges for Outgoing Calls (Roaming by Host Country -> Home Calling) (€min)**



**Table A3.4: Roaming Charges for Sending an SMS<sup>81</sup>**

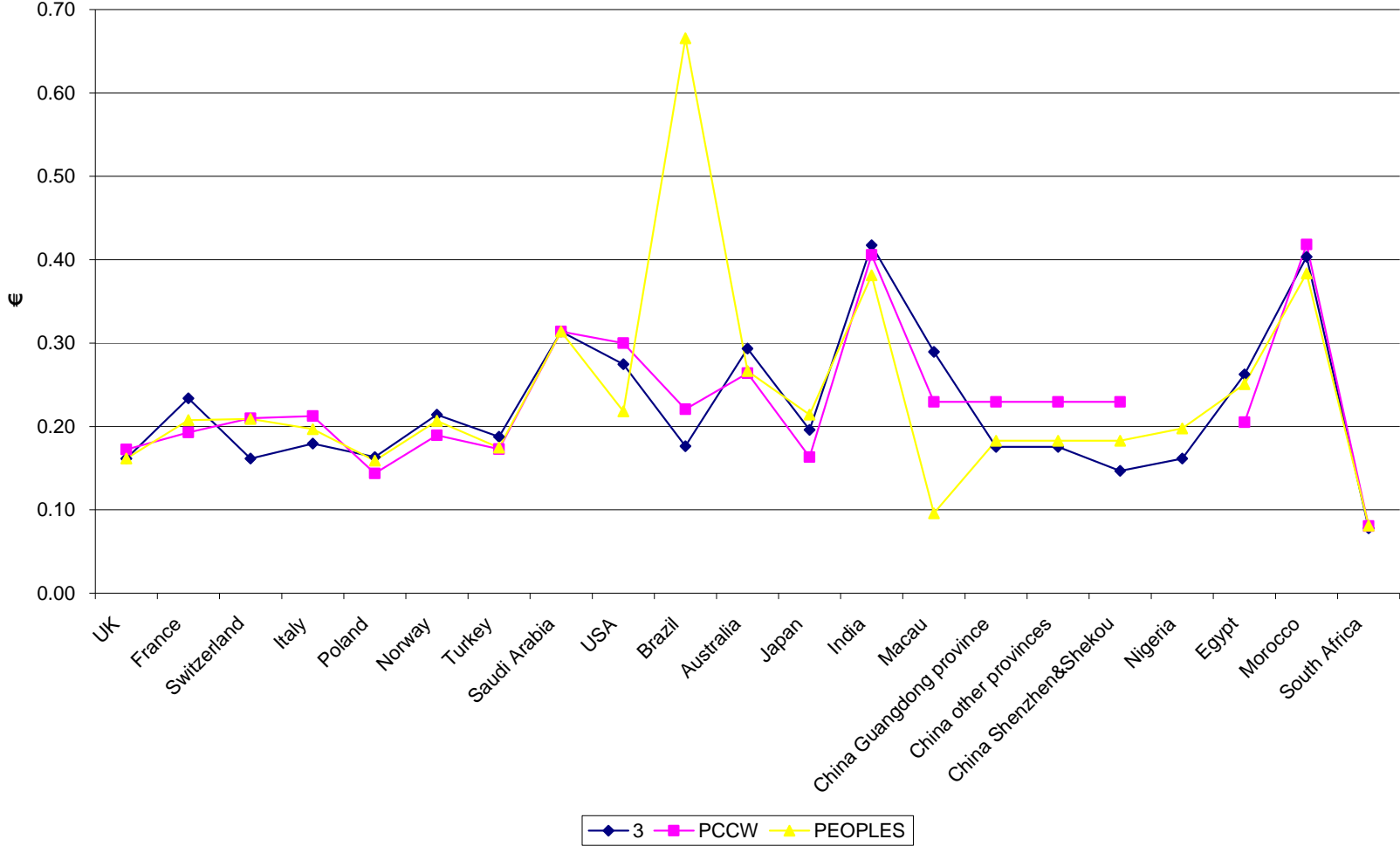
SMS(sending) (€ /message)	3	PCCW	PEOPLES
UK	0.16	0.17	0.16
France	0.23	0.19	0.21
Switzerland	0.16	0.21	0.21
Italy	0.18	0.21	0.20
Poland	0.16	0.14	0.16
Norway	0.21	0.19	0.21
Turkey	0.19	0.17	0.17
Saudi Arabia	0.31	0.31	0.31
USA	0.27	0.30	0.22
Brazil	0.18	0.22	0.67
Australia	0.29	0.26	0.27
Japan	0.20	0.16	0.21
India	0.42	0.41	0.38
Macau	0.29	0.23	0.10
China - Guangdong province	0.18	0.23	0.18
China - other provinces	0.18	0.23	0.18
China – Shenzhen/Shekou	0.15	0.23	0.18
Nigeria	0.16		0.20
Egypt	0.26	0.20	0.25
Morocco	0.40	0.42	0.38
South Africa	0.08	0.08	0.08

*Source: Europe Economics' elaboration based on company websites.*

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<sup>81</sup>Only three HK operators offer this service while roaming.

**Chart A3.5: SMS (sending) Charges by Visited Country (€/message)**



Source: Table above.

A3.30 From the table and chart on SMS roaming charges, one can easily see that roaming charges for sending SMSs are highly similar across operators, except for PEOPLES, which charges €0.67 for sending an SMS when in Brazil.

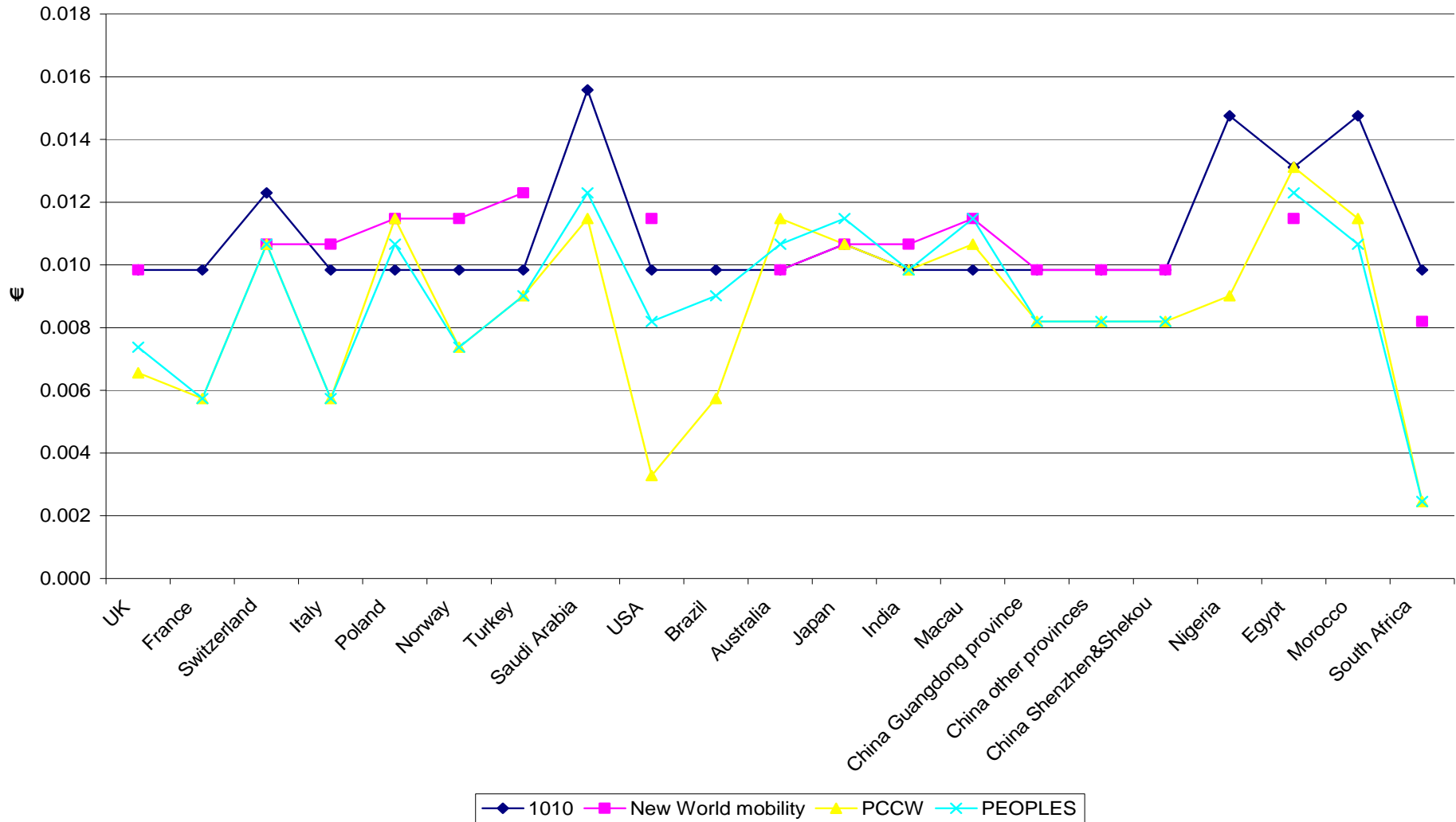
**Table A3.5: Data Roaming Charges**<sup>82</sup>

Data roaming/visited country (€/kB )	1010	New World Mobility	PCCW	PEOPLES
UK	0.0098	0.0098	0.0066	0.0074
France	0.0098		0.0057	0.0057
Switzerland	0.0123	0.0107	0.0107	0.0107
Italy	0.0098	0.0107	0.0057	0.0057
Poland	0.0098	0.0115	0.0115	0.0107
Norway	0.0098	0.0115	0.0074	0.0074
Turkey	0.0098	0.0123	0.0090	0.0090
Saudi Arabia	0.0156		0.0115	0.0123
USA	0.0098	0.0115	0.0033	0.0082
Brazil	0.0098		0.0057	0.0090
Australia	0.0098	0.0098	0.0115	0.0107
Japan	0.0107	0.0107	0.0107	0.0115
India	0.0098	0.0107	0.0098	0.0098
Macau	0.0098	0.0115	0.0107	0.0115
China - Guangdong province	0.0098	0.0098	0.0082	0.0082
China - other provinces	0.0098	0.0098	0.0082	0.0082
China – Shenzhen/Shekou	0.0098	0.0098	0.0082	0.0082
Nigeria	0.0148		0.0090	
Egypt	0.0131	0.0115	0.0131	0.0123
Morocco	0.0148		0.0115	0.0107
South Africa	0.0098	0.0082	0.0025	0.0025

*Source: Europe Economics' elaboration based on company websites' data.*

<sup>82</sup> Hutchison information on data roaming not available per kilobyte.

Chart A3.6: Data Roaming Charges (€/kilobyte)

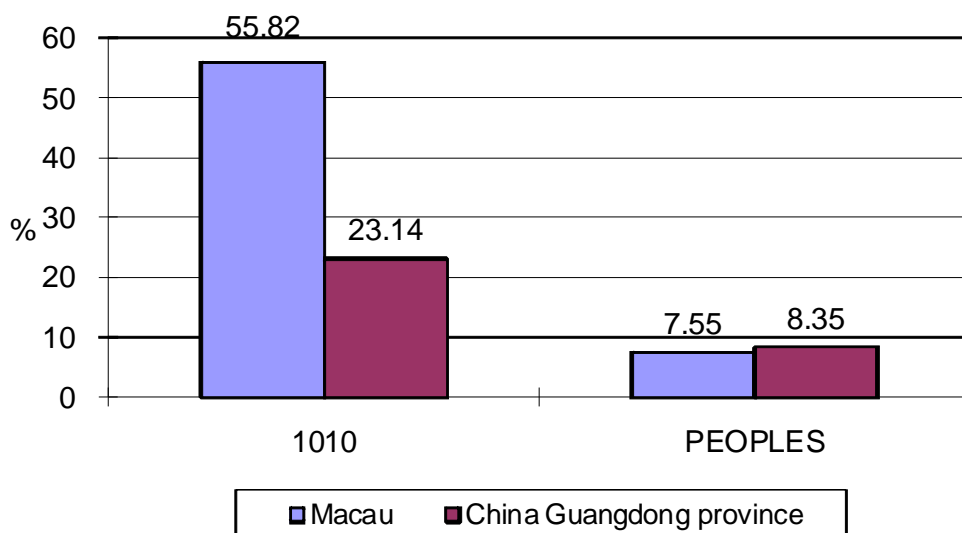


A3.31 PEOPLES and PCCW offer the lowest possible prices for data roaming among the four operators. When looking at prices for data roaming in China (HK-bordering Guangdong province as well as other regions in China), we can see that PCCW’s charges are similar to PEOPLES’ and among the lowest. The reason might be that PCCW and PEOPLES both target young consumers (quantity effect at lower prices), while CSL and SmarTone compete for consumers at higher price levels, perhaps based on service bundles and business usage all-inclusive deals.

**Introduction of the “One-Card” service**

A3.32 As the trade among Hong Kong, Macau and Mainland China boomed, in 2003 a new service called “One-Card” was introduced to the Hong Kong mobile market which can help customers save as much as 90 per cent on their roaming charges. Operators CSL and PEOPLES have implemented this particular service. As Chart A3.7 shows, the One-Card Service of CSL makes it possible for customers to save 77 per cent of charges on roaming in China/Guangdong (bordering Hong Kong), and 44 per cent on roaming in Macau. PEOPLES allows customers to save over 90 per cent on roaming in both Macau and China/Guangdong. PEOPLES and China Mobile share operations, thus facilitating network connections. Savings on the “One-Card” roaming package are visualised in the Chart below.

**Chart A3.7: “One-Card” Service Charge percentage savings versus Standard Roaming Charges**



Source: Peoples and CSL brand websites and own calculations. The charts show the percentage of One-Card Service charges in terms of standard roaming charges.



- A3.33 The implementation of this service involves the so-called Single IMSI Multiple MSISDN Service (SIMM) method, which supports many Mobile Subscriber Integrated Service Digital Network (MSISDN) numbers on a mobile device with a Subscriber Identity Module (SIM) and an International Mobile Subscriber Identity (IMSI). In other words, with this method, subscribers do not have to switch SIM cards or carry redundant mobile devices when making and receiving calls and sending SMS messages, because a single SIM card now contains multiple “locally attributed” geographical numbers corresponding to both the home network (SIM) number and to local mobile numbers for those networks where customers happen to roam most often. Subscribers do not have to worry about changing numbers either, because when their mobile device hits a roaming area, the local MSISDN number will be selected automatically; when in a partner country outside of the home country or calling area, the partner MSISDN number will be selected automatically, thus avoiding any roaming charges. Callers can choose to call any enabled MSISDN number on the “smart” SIM card, but charges for the owner of the smart SIM card (receiver) will not vary (clearly, call charges for the calling party will).
- A3.34 With this system, receiving charges when roaming are cancelled and calling charges will be the same as the calling charges incurred by a local subscriber (“visited country” principle).
- A3.35 Hutchison Telecom (Macau) – owners of the company trading as “3” in Europe and elsewhere -- promoted a One-Card-Dual-Number service in Macau and Hong Kong. China Mobile responded by introducing this same service between mainland China and Hong Kong, in partnership with Hong Kong operators SmarTone and PEOPLES.
- A3.36 The introduction of the one-card multiple-number SIM service is rather an outcome of competition in the market and of the integration of regional economies than a result of strict *ex ante* regulation. Although this service might reduce revenues from roaming charges in the short run, it might nonetheless help Hong Kong based operators reach a larger customer base from South-East China, and obviously Macau, such that the benefits of introducing the service might eventually outweigh the costs (and any forgone short-run roaming revenues).

## **APPENDIX 4: EXPERIENCE FROM INDUSTRIES WITH SIMILAR CHARACTERISTICS**

A4.1 In this section, we look at industries which may share similarities with the mobile roaming market. We suggest that insights may be gained through comparison might then be relevant to the evaluation of the Roaming Regulation. We examine the following markets:

- Fixed line telecommunications; and
- Industries in which transparency of charges to end customers may be key.

### **Fixed Wholesale Access (Telecommunications)**

A4.2 Certain common features enable a comparison between the mobile roaming market and the fixed line market which can shed useful insights. Here, we compare wholesale markets: the wholesale market for mobile roaming and the wholesale market for access to fixed line telephony. To answer questions relevant to the regulation of roaming services in the EU on a wholesale level today, we consider the historic case for regulation of the market for fixed wholesale access.

A4.3 Is this comparison justified? While not identical, we see sufficient similarities between the two markets to draw a few basic comparisons: both industries require infrastructure to originate, transit, and terminate calls; both industries depend on fixed lines to complete call transit; both industries have separate retail and wholesale markets; and, importantly, for both industries the calling party's network pays a call termination fee to the network that terminates the call. (In the case of mobile roaming, the fee is paid by the home network to the visited network.)

A4.4 This dynamic fosters a "terminating monopoly", which is typically found in networks adhering to the calling party's network pays (CPNP) system, such as the EU.<sup>83</sup> The terminating monopoly refers to the complete market power which arises from the bottleneck access control had by the wholesaler termination provider. Network operators in this position have an incentive to price termination rates in excess of real costs because doing so raises the prices charged by their competitors. The limiting constraint of prices charged by wholesale access providers is the demand elasticity of end-level consumers, who will eventually curtail calls to all networks (including to the terminating monopolist) if and when the prices charged exceed their willingness to pay.

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<sup>83</sup> Marcus, J. Scott (2004) "Call termination fees: the US in global perspective" 4<sup>th</sup> ZEW Conference on the Economics of ICT, Mannheim.

- A4.5 Under the New Regulatory Framework for Electronic Communications in the EU, implemented in 2002, regulation applies to the fixed line market for wholesale access. The concept underlying the New Regulatory Framework is that certain markets in the electronic communications sector may be prone to anti-competitive practices, and therefore cannot be left entirely up to market forces. Based on chosen criteria, the Commission identified 18 such markets.<sup>84</sup> Among the markets identified are the **wholesale level market for fixed call termination** and the **wholesale market for international roaming**.
- A4.6 According to the Framework, there may well be need for *ex ante* regulatory measures in any of the eighteen markets, but “it is essential that [they] should only be imposed where there is not effective competition”.<sup>85</sup> Towards this end, the Framework refers to very specific guidelines for determining whether a market is sufficiently competitive; and, if not, if the firm(s) in question possess SMP. If regulation is judged necessary then remedial *ex ante* regulation will be formulated as the final step in a process of market definition, identification, and analysis. A fundamental provision of the Framework is the mandate that where a market has been assessed to be effectively competitive, and no firm enjoys SMP, *ex ante* regulatory measures will be lifted.
- A4.7 The co-existence of both the industries for wholesale roaming and fixed line access in this Framework serves to enforce the parallel illustrated here: both industries, each subject to terminating monopolists, should be examined through a competitive regulatory framework before *ex ante* regulation is levied. If, following this, markets are found to be effectively competitive then there is no rationale for regulation. If the converse is true, and regulatory obligations are called for on the wholesale level, then they should not be seen as permanent impositions but as transient measures aimed at correcting the markets in question so they can be made competitive.
- A4.8 In fact, after the New Regulatory Framework was implemented, no regulator imposed SMP status on any operator in the market for wholesale mobile roaming. Therefore, in the context of the New Regulatory Framework, any *ex ante* regulation would not have been justified. Today the current price caps under the Roaming Regulation, a type of *ex ante* regulation, are quite possibly temporary. However, owing to the absence of any equivalent kind of Framework to the 2002 structure, there may a somewhat less concrete benchmark for judging when the Regulation should be rolled back.

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<sup>84</sup> Criteria for identifying markets for *ex ante* regulation are:

1. The structural existence of high and non-transitory entry barriers;
2. A market structure that does not tend towards effective competition over time; and
3. Where competition law alone would not adequately address the market failure(s) in question.

<sup>85</sup> European Commission (2002) “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 (framework directive)”. *Official Journal of the European Communities* L 108/33, Brussels.

## **Transparency in Industry**

A4.9 Transparency issues are important in a wide range of industries. Transparency plays a key role in the economy since it is one of the theoretical conditions required for a free market to be efficient. The reduction of asymmetries of information between consumers and suppliers is a key method for addressing certain market failures. Market transparency in particular refers to information disclosure at a customer level, i.e. the amount of valuable information that a customer can access on the price and quality of a product.

A4.10 We examine this issue as it applies to both general sectors and specific industries.

### **General requirements**

A4.11 Two examples of general transparency requirements are general advertising law and reasonability requirements in contracts.

### **General advertising law in the United States**

A4.12 Advertising might be seen as a subset of sales activity, which can be understood as involving an attempt by a firm to convince actual or potential consumers to purchase its products that went beyond the production of the product itself. As advertising has the potential to persuade people into commercial transactions that they might otherwise avoid, many governments around the world use regulations to control false, deceptive or misleading advertising. False advertising involves the use of false or misleading statements in advertising.

A4.13 In the United States, the Federal Trade Commission reserves the power to prohibit "unfair and deceptive acts or practices in commerce."<sup>86</sup> The Federal Trade Commission Act regulates advertising activities through three different requirements:

A4.14 Advertising must be truthful and non-deceptive. An advertisement is deceptive if it contains a statement or omits information, that is likely to mislead consumers acting reasonably under the circumstances; and at the same time is "material" - that is, important to a consumer's decision to buy or use the product.

A4.15 Advertisers must have evidence to back up their claims.

A4.16 Advertisements cannot be unfair. An advertisement or business practice is unfair if it causes or is likely to cause substantial consumer injury which a consumer could not reasonably avoid; and it is not outweighed by the benefit to consumers.

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<sup>86</sup> Federal Trade Commission Act 1914, U.S. Code, Title 15, §45 (15US45).

- A4.17 As regards the first requirement, the actual statute defines false advertising as a "means of advertisement other than labelling, which is misleading in a material respect; and in determining whether an advertisement is misleading, there shall be taken into account (among other things) not only representations made or suggested by statement, word, design, device, sound, or any combination thereof, but also the extent to which the advertisement fails to reveal facts material in the light of such representations or material with respect to consequences which may result from the use of the commodity to which the advertisement relates under the conditions prescribed in said advertisement, or under such conditions as are customary or usual."<sup>87</sup>
- A4.18 Advertising must be truthful and non-deceptive to ensure transparency at a customer level. For this reason, general advertising laws are diffused also in Europe<sup>88</sup>, Australia<sup>89</sup> and New Zealand<sup>90</sup>, and elsewhere.

### **Reasonability of contracts in the United States**

- A4.19 Contracts are often signed and executed within the boundaries of the so-called *Reasonability Rule* (i.e. are the terms reasonable to both parties). This very general, but ubiquitous Reasonability Rule often comes into play in the realm of commerce. Contracts are often signed and executed within the boundaries of the Reasonability Rule (are the terms reasonable to both parties, for example). The so called "meeting of minds" requirement under contract law is usually considered the codification of the Reasonability Rule.
- A4.20 In the United States for example a contract is defined as
- A4.21 "an agreement [...] founded upon a meeting of minds, which, although not embodied in an express contract, is inferred, as a fact, from conduct of the parties showing, in the light of the surrounding circumstances, their tacit understanding."<sup>91</sup>
- A4.22 The parties subject to the contract must have a mutual understanding of what the contract covers. Transparency on the terms of the contract and implications is a necessary condition. If, for example, in a contract for the sale of a Mustang, the buyer thinks he will obtain a car and the seller believes he is contracting to sell a horse, there is no meeting of the minds and the contract will likely be held unenforceable. Each side must be clear as to the essential details, rights, and obligations of the contract, otherwise the contract is null.

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<sup>87</sup> Wilson, Lee (2000) "The Advertising Law Guide: A Friendly Desktop Reference for Advertising Professionals" Allworth Press, New York.

<sup>88</sup> Directive 2005/29/EC, the Unfair Commercial Practices Directive.

<sup>89</sup> In Australia the corresponding agency is the Australian Competition and consumer Commission or the individual State Consumer Affairs Agency.

<sup>90</sup> In New Zealand the corresponding agency is the Ministry of Consumer Affairs and the New Zealand Commerce Commission.

<sup>91</sup> Baltimore & Ohio R. Co. v. United States; 261 U.S. 592, 597, 58 Ct.Cl. 709, 43 S.Ct. 425, 67 L.Ed. 816 (1923).

## Specific requirements

A4.23 For some specific industries, transparency issues play particularly delicate roles for the functioning of the market; therefore a need for additional specific requirements to the general laws able to address these issues is necessary. Such requirements could come either from the industry itself (voluntary codes of conducts, agreements, setting up of specific association which aim at controlling and providing information) or through laws and regulations. The following cases provide three examples that address industry-specific transparency issues. In the pharmaceutical industry in European Union, specific regulatory interventions were needed to regulate the advertising activity. In the taxi industry in London some rules regulating transparency of information are in place to improve safety on the users' side. Finally, in the banking sector in the United Kingdom, voluntary codes of conduct have been carried out by the industry in order to protect and deliver fair and accessible valuable information to customers.

## Pharmaceutical industry advertising in the European Union

A4.24 In the pharmaceutical industry, information about drugs sold to customers represents a key issue. Because of their potential strong effects on consumers' health (and potentially lives), drugs are not treated as "normal" goods. Hence many regulatory requirements are in place to regulate advertising activity in this industry. In Europe, in 1984, an EU Directive regulating misleading advertising was adopted. The Directive included measures concerning the advertising of medicinal products. After that, in 1989 the 89/552/EEC Directive prohibited television advertising of prescription medicinal products. In 1992, the European Directive 92/28/EEC introduced strict conditions regarding the advertising of prescription drugs.

A4.25 Given the important role of medical sales representatives in the promotion of medicinal products, certain obligations were introduced. This included, for example, the "obligation to supply the person visited with a summary of product characteristics"<sup>92</sup>. Qualified professionals entitled to deliver medicinal product prescriptions should not be influenced by any financial compensation, they should not be too familiarised with new products, and finally they should also have access to a "neutral, objective source of information about products available on the market"<sup>93</sup>. The Member States must guarantee such a source of information. Conditions regarding the provision of medicinal product samples were also imposed. Finally, medicinal product manufacturers and importers must guarantee that the information about the medicinal products "conforms with the approved conditions of use".

A4.26 These Directives try to face specific issues in advertising drugs, issues which cannot be simply addressed by general advertising laws and which need additional and specific requirements and controls given the nature of the products on market.

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<sup>92</sup> Council Directive 92/28/EEC (1992) on the advertising of medicinal products for human use.

<sup>93</sup> Council Directive 92/28/EEC (1992) on the advertising of medicinal products for human use.

### **Taxis' safety in London**

- A4.27 In the Taxicab Market user safety is a fundamental aspect to the exchange for services. In London, in order to limit risks and dangers for users during their journeys, some legal requirements (among others) to improve information towards the users are in place. It is strongly recommended to use always licensed Taxi or Private Hire Operators, since "touts" (unauthorised cabs) are risky and uninsured. Taxi and licensed Private Operators are recognisable by their Transport for London (TfL) license, which must be displayed on the drivers' vehicle. Licensed private hire drivers must have a PCO (Public Carriage Office) license or temporary permit and their vehicles must display the yellow PCO licence disc on the front and rear windscreens. Taxi drivers must wear their distinctive metal drivers badge, instead. All these formal requirements are in place to provide information to users and ensure them on the drivers' regular (and hence safer) legal position. These requirements are really important for signalling and safety.
- A4.28 Other requirements for the taxi industry concern instead transparency in price. For taxis in London, the price for hiring which begins and ends in the metropolitan police district and City of London must be calculated on the taxi meter. Fares for hirings which take a driver outside this area must be negotiated in advance. Fares for London taxi cabs are set by the Department of Transport, Local Government and the Regions (DTLR) and regulated by the TfL.

### **Banking Code in the United Kingdom**

- A4.29 In March 1992, in the United Kingdom the first voluntary Banking Code took effect. It was introduced by the British Bankers Association (BBA) for UK banks, the leading association for the UK banking and financial services sector. It introduced the voluntary code in order to set standards of good banking practice for financial institutions to monitor their dealing with personal customers in the UK. It is a voluntary code and it provides valuable information and protection for customers. The Code applies to current accounts, savings and deposit accounts, payment services, cards and PINs, and loans and overdrafts. As a voluntary code, it allows competition and market forces to work to encourage higher standards for the benefit of customers. Financial institution which signed up this code currently include banks, building societies, credit card companies, National Savings & Investments, the Post Office and a number of credit unions.

## **Transparency in the market for roaming**

A4.30 As regards the roaming market we may say that self-imposed transparency requirements have not proven enough, and this may be considered one of the reasons behind the Roaming Regulation. European Commission thinks that prices for services in this market were too high compared to underlying costs and that this problem was compounded by lack of transparency. This scenario made it more difficult for consumers to understand and control their expenditures and to prevent 'bill-shocks'. The transparency issue has therefore had consequences on the industry dynamics as well as on the customers' side. Indeed, before the regulatory interventions GSM Association launched a code of conduct to improve the provision of information to customers.<sup>94</sup> This could be seen as an effort similar to Banking Code introduced by British Bankers Association (BBA) in 1992, but unfortunately the code seems to have been quietly disregarded.<sup>95</sup> So after this the operators produced a further initiative in July 2005 and created a web site with roaming prices.<sup>96</sup> It seems that these voluntary initiatives have been sufficiently effective, and this is perhaps partially why European Parliament made the transparency issue one of the pillars of the Roaming Regulation in 2007.

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<sup>94</sup> GSMA (2003), Code of Conduct for Information on International Roaming Retail Prices, revised version, GSM Association Europe, London.

<sup>95</sup> Sutherland, E. (2008), "The Regulation of International Mobile Roaming", Emerald Group Publishing Limited, ISSN 1463-6697.

<sup>96</sup> GSMA (2006), "New web site helps consumers to find best mobile roaming rates", press release, 10 July, GSM Association Europe, Brussels.



## **APPENDIX 5: THE TECHNICAL AND CONTRACTUAL BASIS OF ROAMING**

### **What is roaming in technical terms?**

A5.1 Mobile roaming refers to the usage of a wireless phone beyond the area covered by one's network service provider.

A5.2 The term "roaming" is defined by the GSMA as follows:

Roaming is the ability of customers to use their mobile phones or other mobile devices outside the geographical coverage area provided by their normal network operator. When customers travel abroad and use their phones or laptop whilst on a foreign ("visited") network, this is known as international roaming.<sup>97</sup>

Roaming can occur within a country, and between networks using the same system standard (intra-system roaming) as well as those that use different systems (inter-system roaming). For example, intra-system roaming would occur between two WLAN (Wireless Local Area Network) subscribers from different networks, and inter-system roaming would occur if a WLAN subscriber roams onto a GSM network.

A5.3 Table A5.1 below reviews some of the different types of roaming.

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<sup>97</sup> GSMA "Mobile SMS and Data Roaming Explained".

**Table A5.1: Types of Roaming**

<b>Roaming type</b>	<b>Description</b>
Regional roaming	Between regions within national coverage of one operator; rarely offered except in nations with wide geographic landmass areas (like the USA and mainland China)
National roaming	Between mobile operators within the same country; often takes place in order to support new entrants
International roaming	Between service providers across borders; most easily accomplished using GSM standard
Inter-standards roaming	Between mobile networks of different technologies; currently an ongoing effort in the industry
Mobile signature roaming	Between a wireless access point and end-user even where no commercial relationship exists; accomplished using a digital signature
Trombone roaming	Between devices having different home networks that are in the same local area; so-called because of the shape of the redundant data transfer that must take place

**What makes roaming possible?**

- A5.4 When a user changes networks in order to roam, his or her original network is referred to as the “home” network, while the one travelled to is called the “visited” network. A subscriber is granted entry in the Home Location Register (HLR) when making calls from within the home network. In order to visit another network where the subscriber does not have entry, the visited network will require certain data to be imported from the home network to authenticate the subscriber and confirm use of its services. Together these procedures are known as “authentication”.
- A5.5 Authentication can be completed using a range of security procedures but the most common are username/password-based, SIM-based, and certificate-based. Once authentication is completed, the visited network will then authorise service for the visiting subscriber in order to enable the managed services available (i.e. rate plan, user groups, etc.). This procedure is called “authorization”. Once the subscriber can be authenticated and authorized by the visited network, he or she may then acquire an entry in a user database of the visited network (Visited Location Register (VLR)) and be able to access network services, including voice, SMS and data. Importantly, the assignment of subscriber data also enables billing to be properly set up.

- A5.6 Before authentication, authorization and billing can occur the requisite legal framework must first be in place between network operators: this is set up by means of roaming agreements. In addition to laying the legal groundwork for roaming between networks, roaming agreements enable technological interconnections to be established and also typically stipulate minimal safety standards. While roaming agreements have historically been bilateral, both technologically and financially, structural changes currently taking place on the global level in conventions for telecoms operator business models mean that such agreements are increasingly occurring between groupings, or “clusters” of operators.<sup>98</sup> The GSMA publishes standardised outlines for forms of roaming agreements among its member operators.<sup>99</sup>
- A5.7 Typically the networks to which roaming consumers are directed are the preferred networks with whom the home operator has entered into agreement. This action is known as “traffic steering”, and allows operators to negotiate pre-arranged discounts on the wholesale level. Traffic steering is not the only way to route roaming traffic: one alternative technological development has been “gateways”. A gateway network acts as an entrance to an alternative network, for example one based on Internet Protocol (IP). In the context of roaming, gateway operators might offer parallel network interconnection to that of the preferred network, enabling calls to be more cheaply routed through their own infrastructure. The use of gateways is currently illegal in many Member States.<sup>100</sup>
- A5.8 The following diagram summarises the contractual arrangements needed to allow roaming:

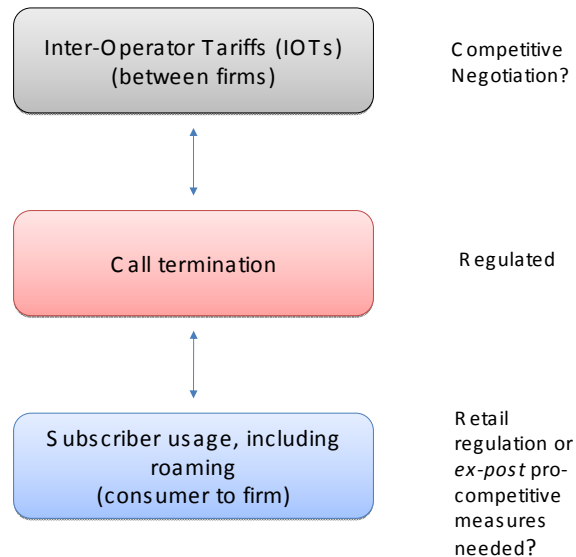
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<sup>98</sup> Kumar et al (2007) “Competition in international mobile roaming: alternative clusters” Communications & Strategies Vol 3rd Quarter, No 67, pp151-172.

<sup>99</sup> GSM roaming was first made possible by a Memorandum of Understanding signed in 1987.

<sup>100</sup> European Commission (2006) “Impact Assessment of policy options in relation to a Commission proposal for a regulation of the European Parliament and of the Council on roaming on public mobile networks within the Community: COM (2006) 382 final, SEC (2006) 926” Commission Staff working paper, Brussels.

**Chart A5.1: Levels of Contractual Agreements involved in Roaming**



*Source: Europe Economics*

A5.9 This chart illustrates that the roaming customer has contract only with his mobile company; that company has contracts with an international transit services company and with a foreign mobile company.

**How does roaming work?**

A5.10 While the exact technical process differs from network to network, three steps generally occur in order to activate roaming.

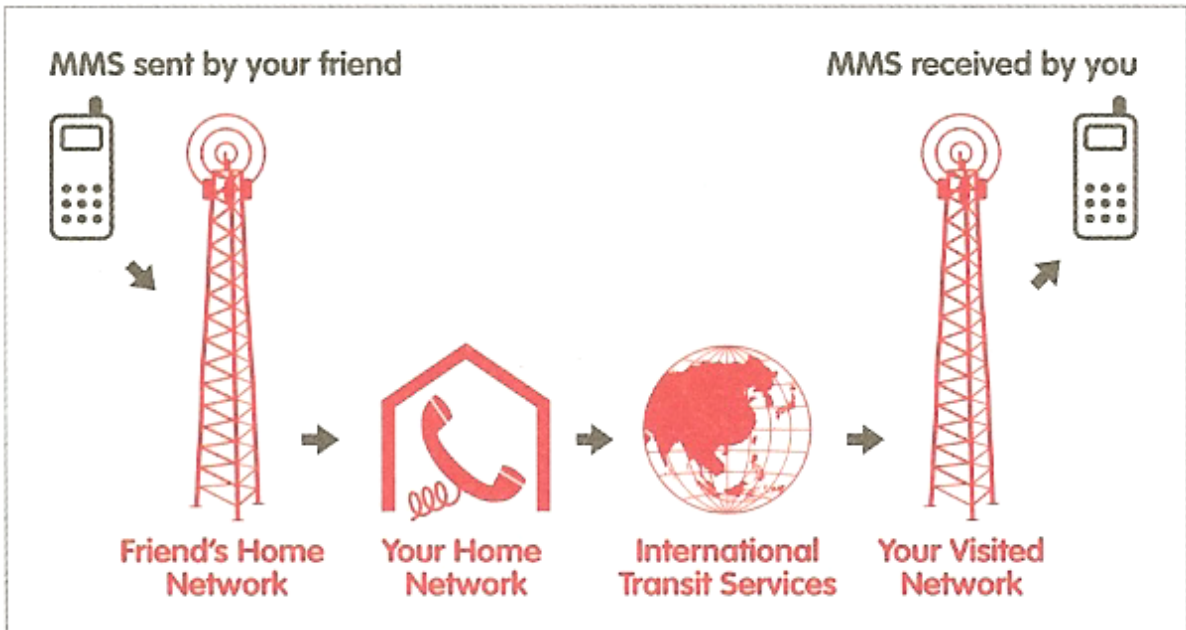
A5.11 When a roaming mobile device is introduced into the visited network, the visited network identifies it as a foreign subscriber and proceeds to identify the home network. This process can only succeed in the presence of a roaming agreement between the two networks.

A5.12 Using an International Mobile Subscriber Identity (IMSI) number, the visited network contacts the home network and requests service information for the device including the status of subscriber roaming rights.

A5.13 Conditional upon the success of step (b), the visited network opens a temporary subscriber record for the device. The home network simultaneously updates its information to temporarily re-assign a location to the device so that new information will be correctly re-routed.

- A5.14 When a call is made to a mobile while it is roaming, the caller's local public telephone network routes the call to the mobile subscriber's home provider, which in turn routes it to the visited network. Then, the visited network must assign the visiting mobile an internal temporary phone number, which, once defined, can receive the incoming call. The visited network will then terminate the call "on-net" and forward it to the subscriber's mobile.
- A5.15 All subscriber usage in the visited network — e.g. visited location, calling party, called party, time of call, length of call, etc. — is captured and stored in a file known as the TAP (Transferred Account Procedure). The TAP is rated according to the tariffs of the visited operator and transferred back to the home network. The home operator will pass these wholesale charges on in the subscriber's bill, adding tax and mark-ups. Alternatively if the subscriber has selected roaming as part of a rate plan or basket, the TAP records will be stored, or possibly referred to as part of wholesale Inter-Operator tariff discussions.
- A5.16 The following charts illustrate transmission of data during basic roaming scenarios.

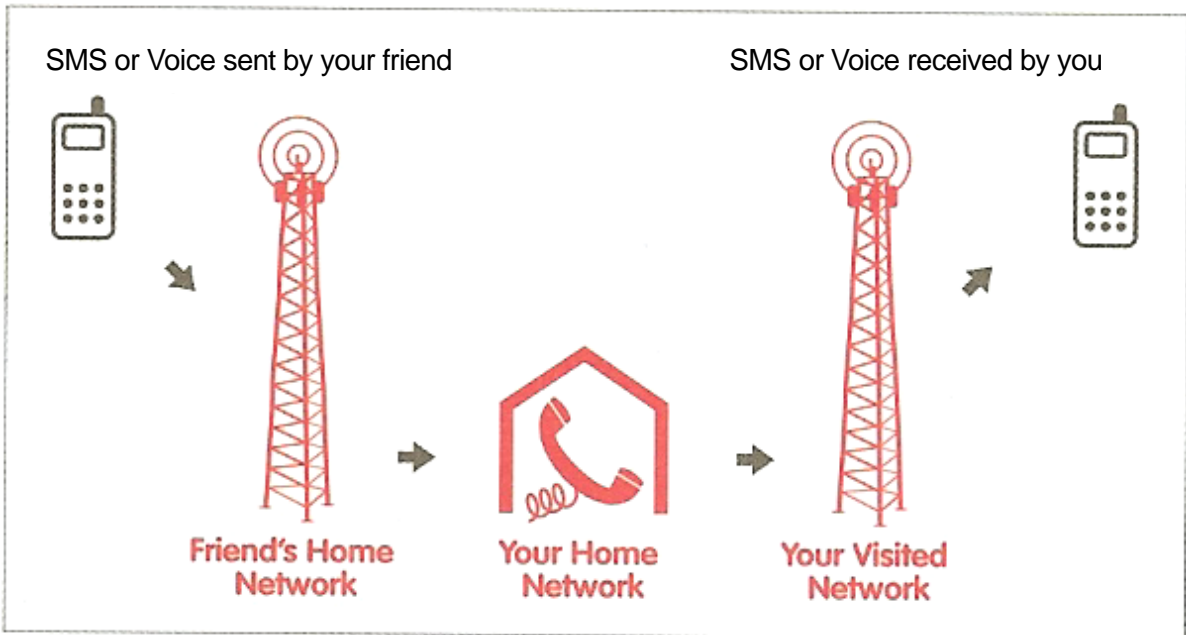
**Chart A5.2: MMS Roaming Process**



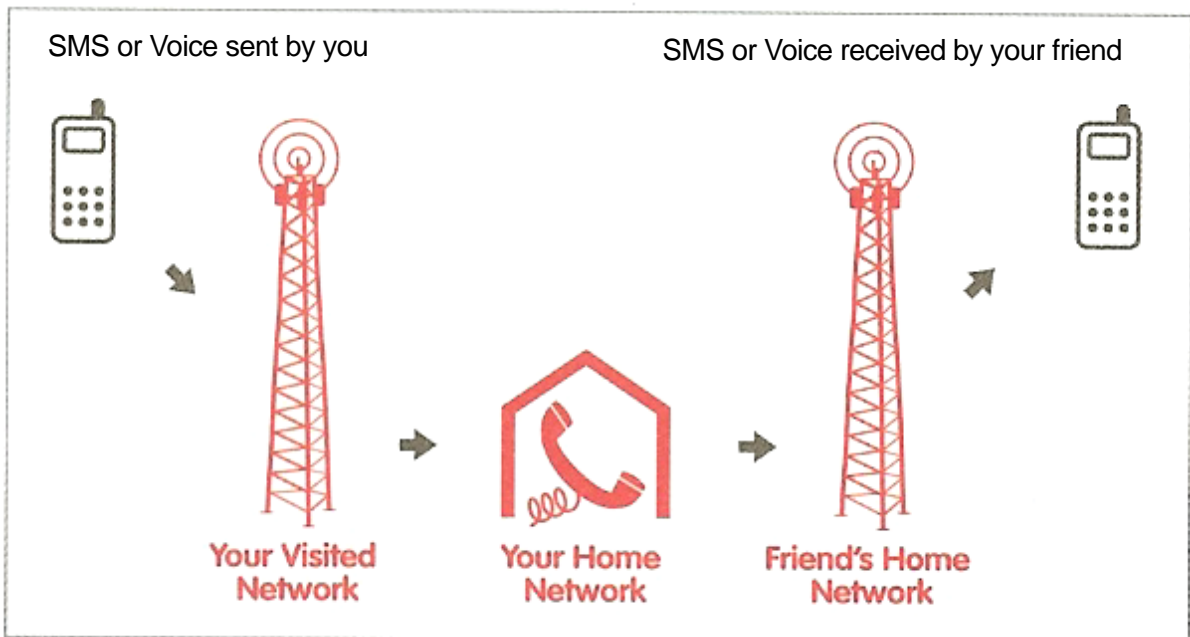
**Chart A5.3: Data Roaming Process**



**Chart A5.4: Process of Receiving an SMS or Voice while Roaming**



**Chart A5.5: Process of Sending an SMS or Voice while Roaming**



*Source for the four charts above: GSMA*

A5.17 The call or data package sent by a customer's contact on their home network travels to the roaming customer by means of:

- The originator's home network; then it is handed over to
- the receiver's home network in her home country; it then enters
- a trunk network, which can be fixed, mobile/satellite, radio-based, etc., although in many cases it is fixed; the trunk network hands the call or data to
- the roaming (visited country's) network, which "finds" the receiver and delivers the call or data package to her phone or other mobile device.

A5.18 The SMS (text) will follow a similar route, by travelling all the steps mentioned above, although – given its nature of an extremely small piece of data – the "trunk" stage might be more easily by-passed by the mobile operators if they agree to communicate directly, for instance by means of their own fixed installations or a radio or satellite device.

A5.19 The Internet accessed by the customer (receiver of services) when roaming will entail data downloading, and any transfer of data would therefore take place, during a downloading session, according to the same scheme depicted for calls or data packages (such as MMS and e-mail). However, in order to transfer Web data packages, both the home and the visited networks will have to communicate with each other at very high speeds, meaning that satisfactory Internet surfing (which might become expensive because of the amount of data been exchanged) normally necessitates 3G connectivity (UMTS) at both ends of the communication session. In other words, both the home and visited networks must be detected as "3G" networks by the receiver's (surfer's) mobile device. The receiving/sending device (Internet entails both downloading and uploading) would normally be a smart phone, a Blackberry or similar hand-held device, or sometimes -- more practically -- a 3G-enabled laptop computer (with internal or external data card).

### **How do data services fit in?**

A5.20 As the market for mobile and wireless devices continues to race forward, so have the possibilities for roaming expanded. Since a major market breakthrough in 1992, GSM has evolved into the *de facto* world standard for mobile communication.<sup>101</sup> But even if technologically it is capable of messaging (SMS) and using data services, GSM is now seen as a relatively low speed service, primarily developed to support voice services.<sup>102</sup>

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<sup>101</sup> Vrolijk, Erik & Bouwman, Raymond (2008) "Study 'roaming data services'" Hague: Connect2Roam.

<sup>102</sup> The average maximum data rate for GSM is 9.6 Kbps.



- A5.21 Clearly the telecommunications market has progressed at an extremely quickly rate over a very few years, especially with respect to data service technology. While a detailed analysis of the technological evolution of data services is outside the scope of this study, we note that Universal Mobile Telecommunications (UMTS) and its radio access method<sup>103</sup> became known as the “Third generation”, or 3G, of mobile communication (where GSM is 2G). Even though the development and licensing of the UMTS spectrum led to major improvements in data service capabilities, many subsequently heightened expectations were not immediately realised. It was not until the advent of High Speed Data Access (HSDA) that the turning point for the telecommunications industry in launching mobile data on a commercially accessible and economic scale was crossed.<sup>104</sup>
- A5.22 One or more 3G networks are operational in each of the Member States (as of June 2008). Member States with the highest penetration levels are Luxembourg (34 per cent), Ireland (30 per cent), Portugal (28 per cent) and Italy (26 per cent). Approximately 103.5 million EU citizens are 3G subscribers, 50 per cent of the total global number. Approximately 3.5 million EU citizens, or 14 per cent of global subscribers, use HSPA. But although the GSM industry has worked fiercely to roll out 3G technologies, it increasingly has to contend with threats from alternative systems such as Wi-Fi, Wi-MAX, CDMA2000 and EV-DO.
- A5.23 Importantly, innovations in data services have also had significant spillover effects on voice telephony technology, especially gateway networks such as Voice over Internet Protocol (VoIP).

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<sup>103</sup> Wideband Code Division Multiple Access, or W-CDMA.

<sup>104</sup> Vrolijk, Erik & Bouwman, Raymond (2008) “Study ‘roaming data services’” Hague: Connect2Roam.

## APPENDIX 6: EU MOBILE ROAMING PRICE DATA

### Explanatory notes and comments on the following price charts

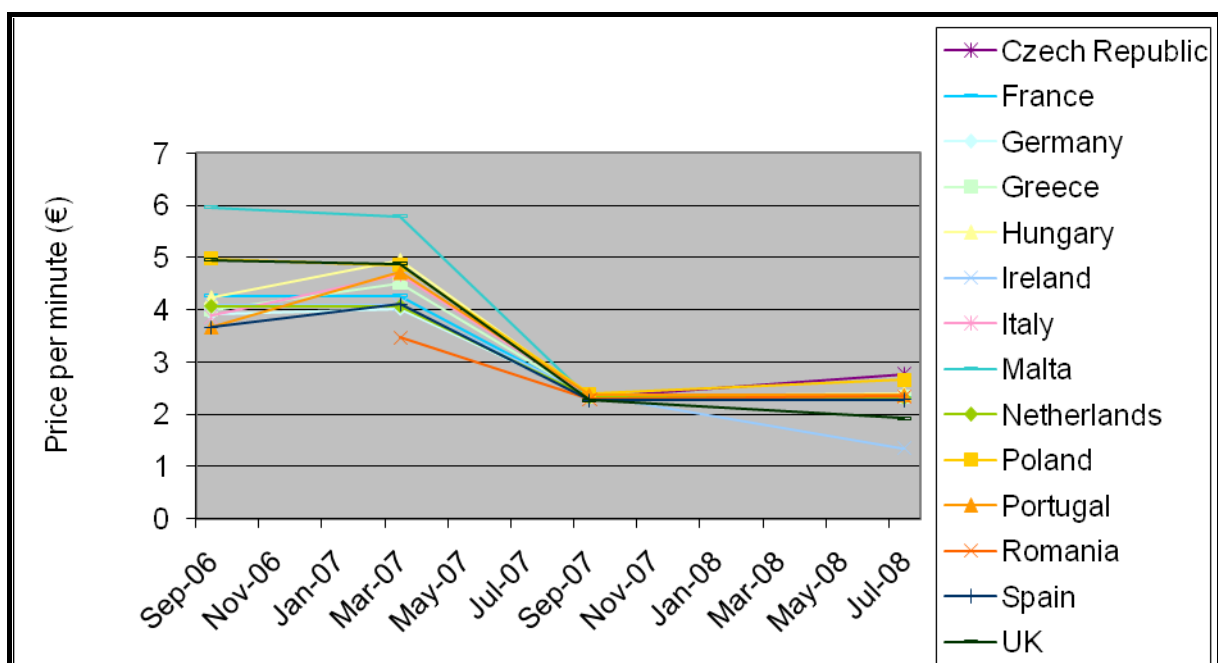
- A6.1 This collection of charts summarises data collected by the European Commission with regard to roaming prices across EU Member States. The data were collected at six-monthly intervals from September 2006 to July 2008 and are available at [http://ec.europa.eu/information\\_society/activities/roaming/index\\_en.htm](http://ec.europa.eu/information_society/activities/roaming/index_en.htm).
- A6.2 The Commission made available prices for users from different subscriber home countries when roaming in a sample of 6-7 visited countries. The selection of visited countries for which prices were supplied differs by home country. In each visited country, a tariff was given for each possible network onto which a customer might roam. The prices given were not the price per minute, but rather the price of a four-minute phone call during peak daytime hours (Note: peak day-time and weekend hours might vary depending on both the host and visited country).
- A6.3 Five operators were chosen to represent customers' potential home operators within the Union: Vodafone, Orange/France Telecom, T-Mobile (Deutsche Telekom), O2/Telefónica, and 3 (Hutchison Whampoa, 3G). These operators were selected as being among the largest mobile operators in Europe, and thus giving the most diverse sample of tariffs. Because of this selection, Bulgaria, Cyprus, Estonia, Finland, Latvia, Lithuania, Luxembourg, and Slovenia were not represented as home countries, because the above operators have no direct presence here (although they might be present in those countries via commercial branding agreements and non-majority joint ventures).
- A6.4 Once the tariffs were collected, an arithmetic average value of roaming prices was taken for each home country in each time period (four time periods in total). It is important to note that the averages are not weighted for the relative volume of calls between each country, as this information is not released by the operators. However, it still gives a representative picture of the relative tariffs for customers in each home country.
- A6.5 On each chart, the actual prices are compared to the Euro-tariff price level, marked as a bold constant line. The Euro-tariff took effect in September 2007 and was set at €0.49 per minute for outgoing roaming calls and €0.24 per minute for incoming roaming calls. The Euro-tariff price for a four-minute phone call would be €1.96 for an outgoing call and €0.96 for an incoming call. It is important to note, however, that the Euro-tariff prices do not include VAT, while the actual prices supplied by the European Commission do include VAT. To account for this inconsistency, VAT has been added to the Euro-tariff in the charts below. For example, in chart A6.6 detailing the price of outgoing roaming calls by home subscriber Austria, the Euro-tariff has been increased to €1.152 to account for the Austrian VAT rate of 20 per cent.
- A6.6 In charts A6.8, A6.18, A6.21, A6.32, A6.42 and A6.45, describing outgoing and incoming roaming calls from citizens of the Czech Republic, Poland and Slovakia, the price levels after September 2007 appear to be above the Euro-tariff. However this slight increase can be attributed to depreciation in the Euro against these countries' currencies after the Euro-tariff was put in place.

- A6.7 The charts imply that before the implementation of the Roaming Regulation in September 2007, roaming prices differed wildly between customers in different Member States. For example, in September 2006, subscribers of France Telecom Poland paid an average of €5.96 for a four minute outgoing roaming call, while subscribers of Telefonica Ireland paid as little as €3.15. Following the Roaming Regulation, outgoing calls in each state were in line with each other, usually between €2-€2.50.
- A6.8 Furthermore, the data allow us to visualise the movement in average tariffs both before and after the implementation of the Roaming Regulation. Between March 2007 and September 2007, there were universally massive drops in tariffs for both incoming and outgoing calls. However, once the Euro-tariff level was implemented, between September 2007 and July 2008, there were very few significant price movements. There is some evidence of price competition in Italy, Ireland, Spain and the United Kingdom for outgoing and incoming roaming calls (charts A6.14, A6.15, A6.22, A6.24, A6.30, A6.38, A6.39, A6.46 and A6.48) but in most cases prices stayed virtually unchanged. This is contrary to the expectation that operators would systematically compete at prices below the Euro-tariff level.
- A6.9 In comparing operators' progress in lowering outgoing tariffs, it is clear that the new-coming "3" brand (owned by Hutchison Whampoa Hong Kong and specialising in 3G/UMTS services) has been the most progressive, normally breaking ranks from the other operators. With VAT included, prices in the operator's six markets at the September 2007 Regulation implementation were as low as €1.48 and no higher than €2.35 (fig A6.5). No other operator reached a price at this point lower than €2.08. Furthermore, prices in all of the 3 brands are either at or below their competitors' rates.
- A6.10 This progress by 3 is again evident when considering tariffs for incoming calls, as again the brand displays falling prices even after the introduction of the Euro-tariff (A6.29). Among the other four operators sampled, the patterns were broadly similar. A wide distribution in prices before the anticipation of the legislation was followed by a drop ending up with tariffs being nearly constant and aligned to each other across the board, usually within a narrow band of 2-3 Eurocents.
- A6.11 Regardless of network, mobile customers of each home country sampled saw very similar price movements between September 2006 and July 2008. Most operators showed only minor movements between September 2006 and March 2007, a large tariff decrease up to September 2007, and again relative stability. There were some notable exceptions, for example, the O2 brand (owned by Telefónica) in Germany deviated from its competitors by giving customers a far lower tariff in March 2007 (chart A6.4), while customers of the Czech Republic saw a steady decrease in prices even before the anticipation of the Roaming Regulation (chart A6.8).

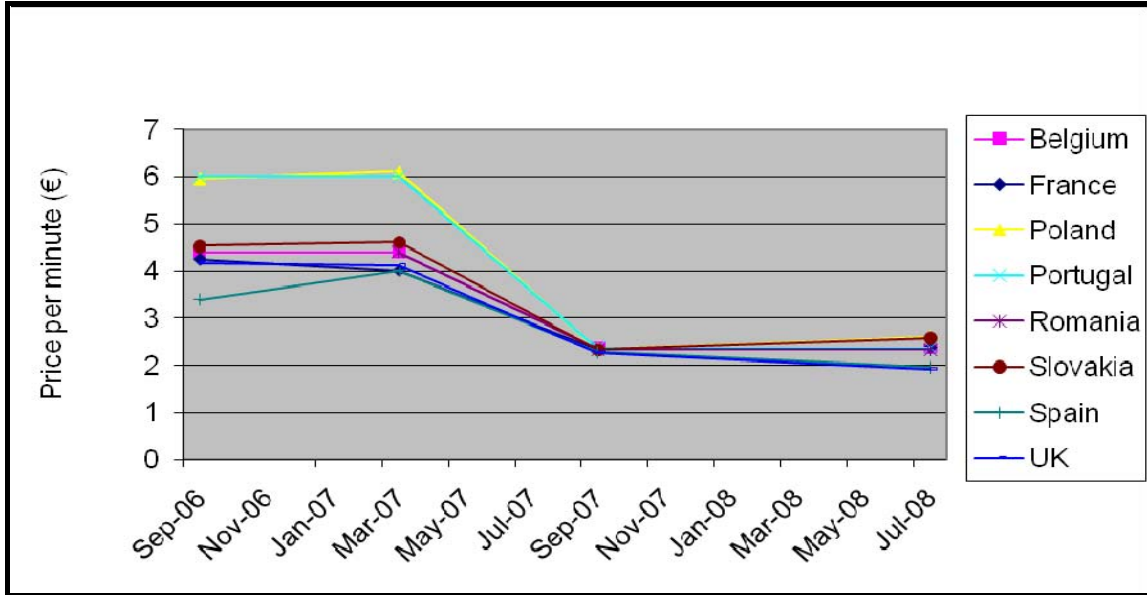
A6.12 Again, the pattern is largely identical when considering tariffs for incoming calls between different Member States, although there are a few anomalies. For example, the Orange brand in France (France Telecom) pre-empted its rivals by dropping near to the Euro-tariff level as soon as March 2007 (chart A6.26), well before most competing operators did. Once the tariff was compulsory, however, the operator lined up once again with its competition, rather than further competing below the capped tariff. It appears that Orange behaved somewhat similarly in Spain, although by the implementation of the Roaming Regulation, Orange's prices matched other operators' prices both in France and Spain (chart A6.34 and chart A6.46).

### Price of outgoing roaming calls by home operator

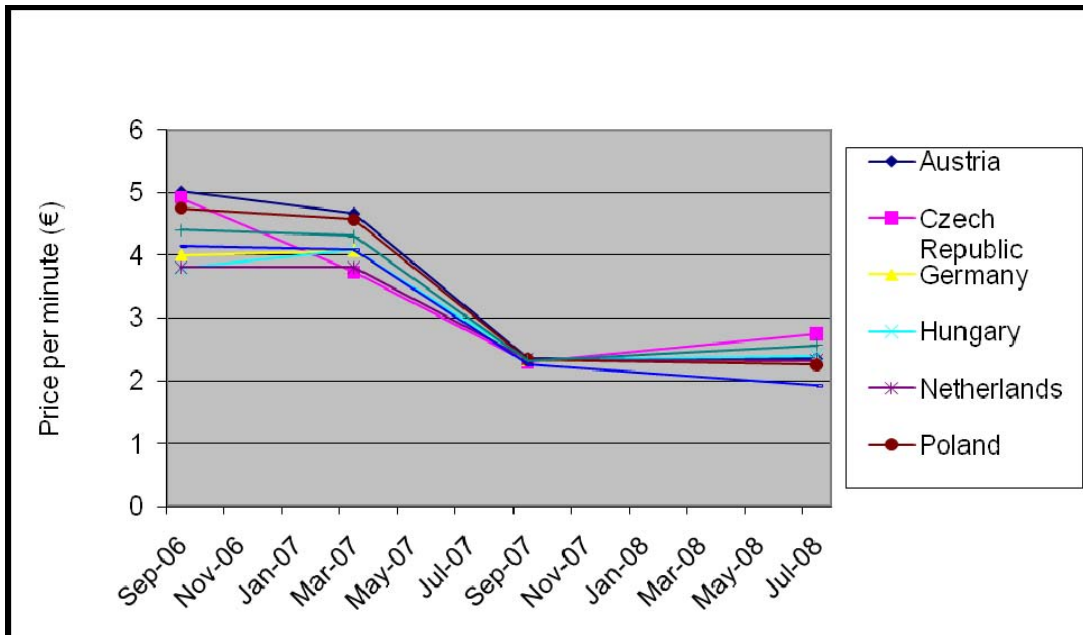
**Chart A6.1: Vodafone outgoing roaming prices within the EU**



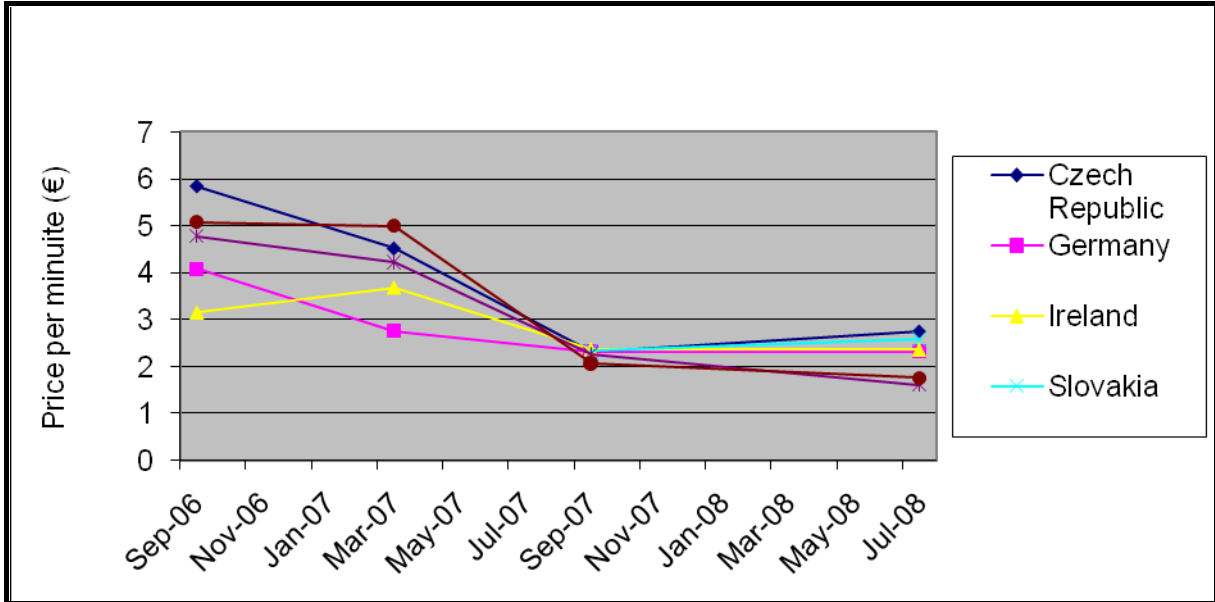
**Chart A6.2: France Telecom outgoing roaming prices within the EU**



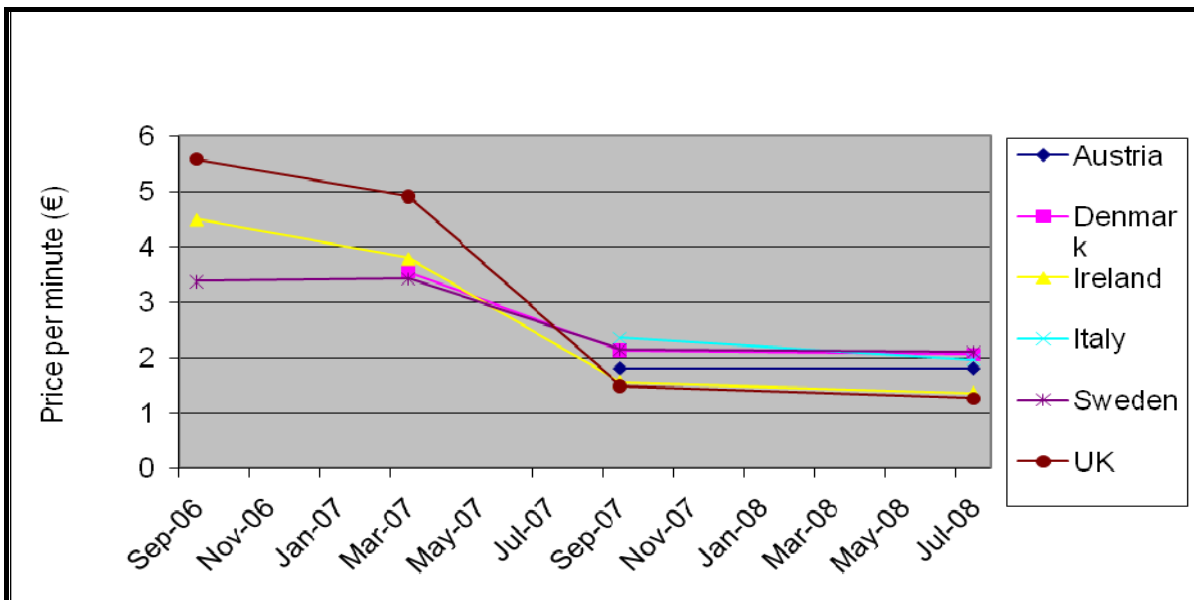
**Chart A6.3: T-Mobile outgoing roaming prices within the EU**



**Chart A6.4: Telefónica outgoing roaming prices within the EU**



**Chart A6.5: Hutchison Whampoa outgoing roaming prices within the EU**



Price of outgoing roaming calls by home subscriber country

Chart A6.6: Price of outgoing roaming calls in Austria

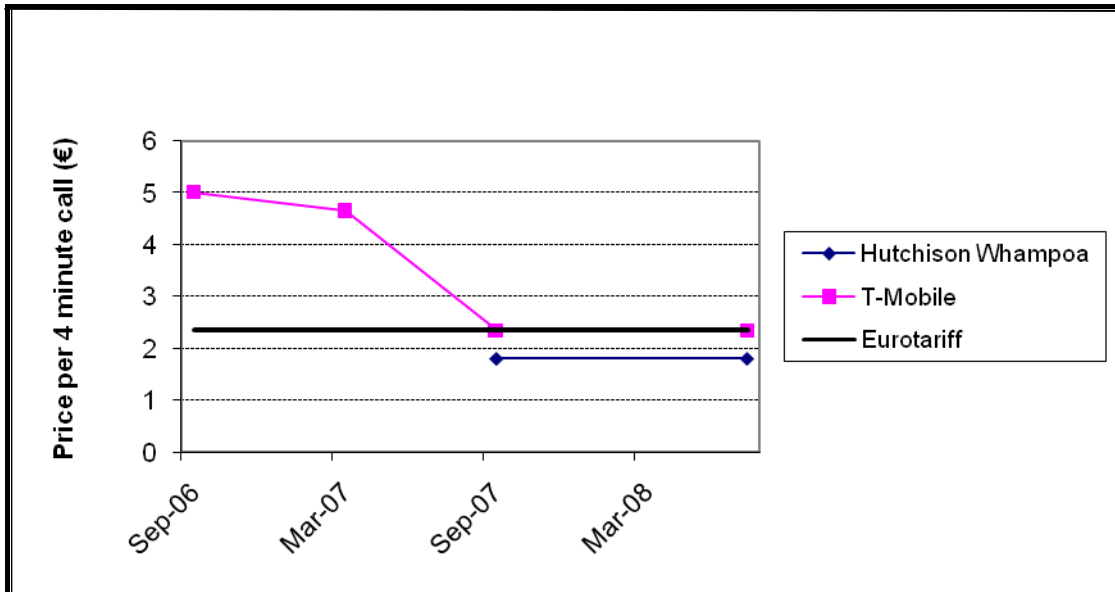
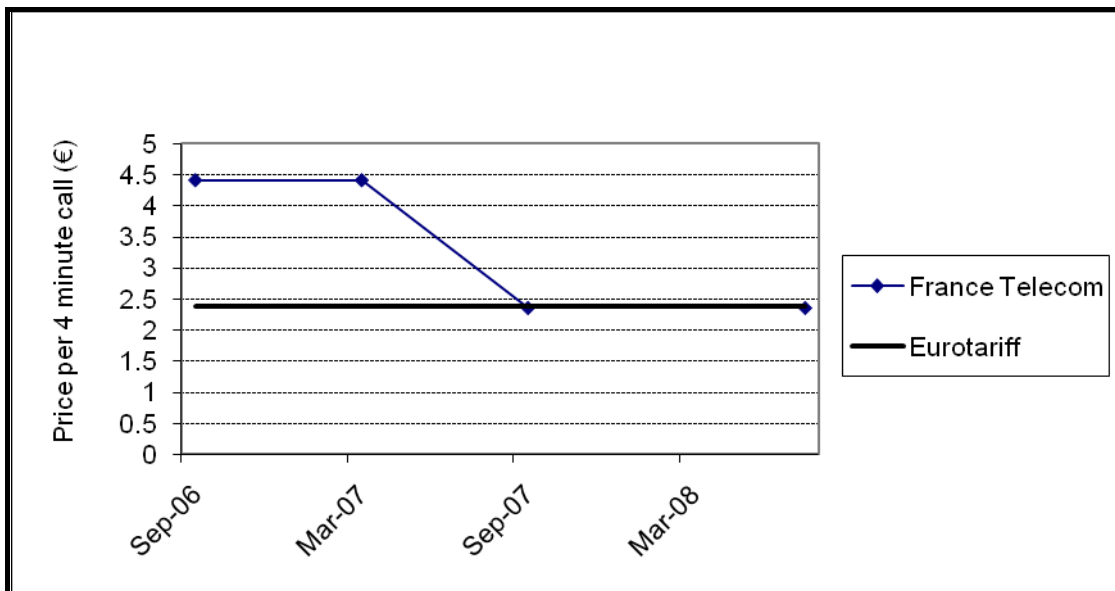
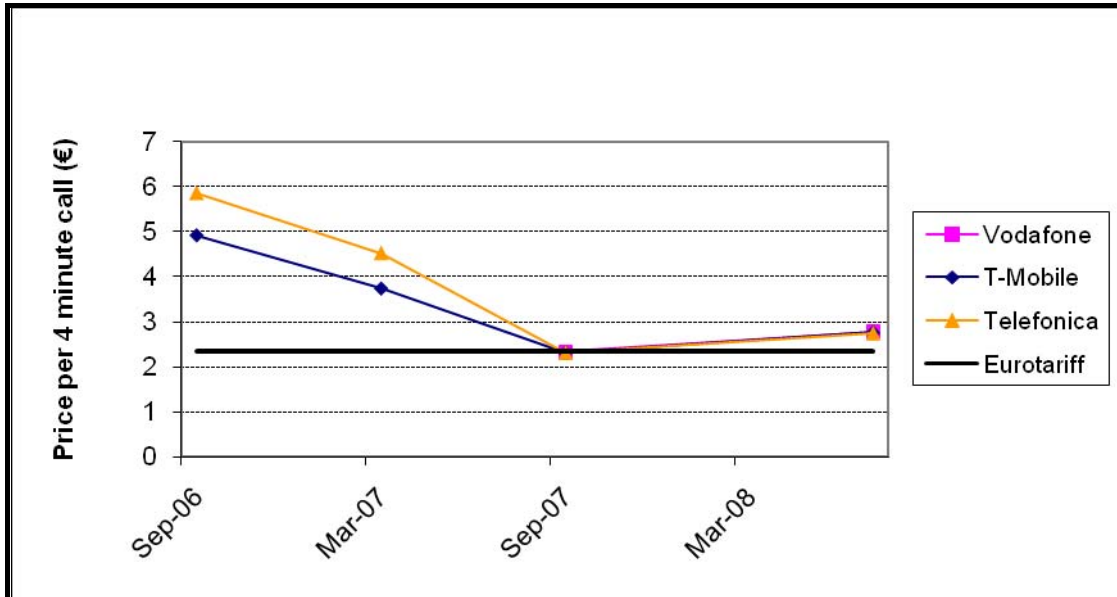


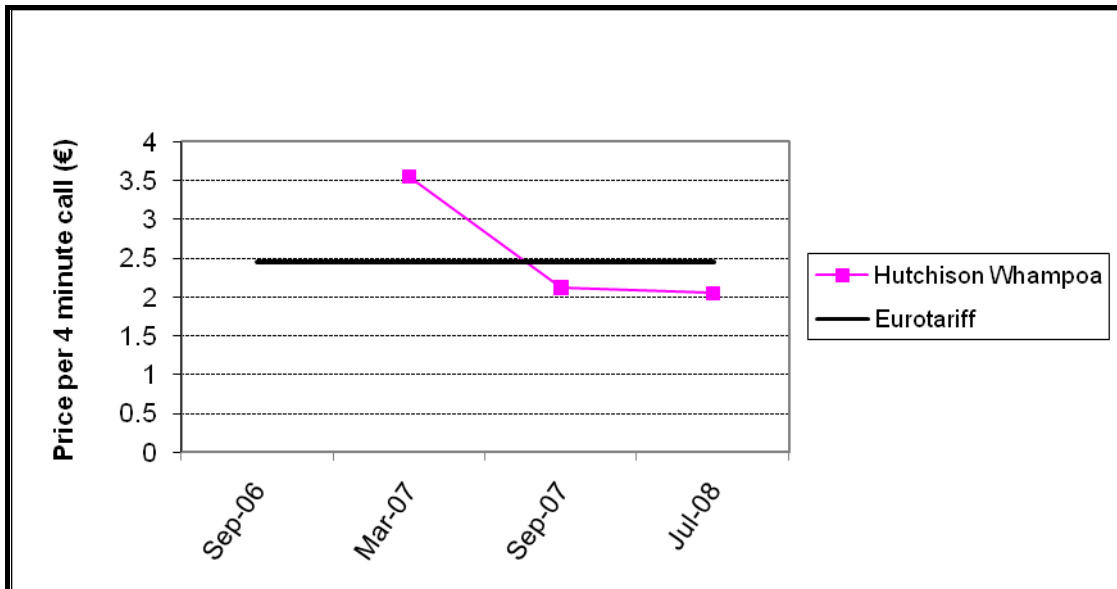
Chart A6.7: Price of outgoing roaming calls in Belgium



**Chart A6.8: Price of outgoing roaming calls in Czech Republic**

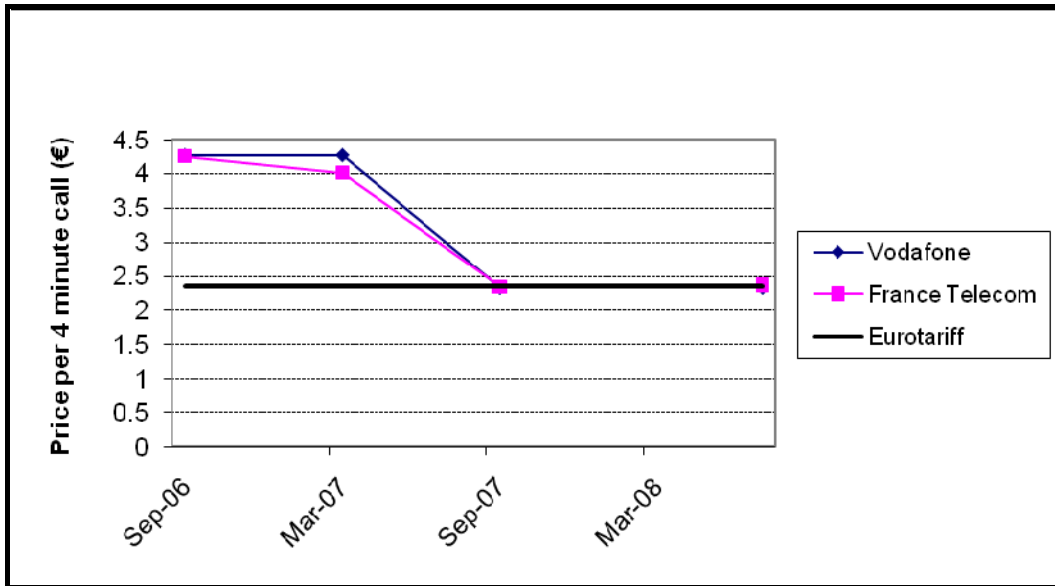


**Chart A6.9: Price of outgoing roaming calls in Denmark**

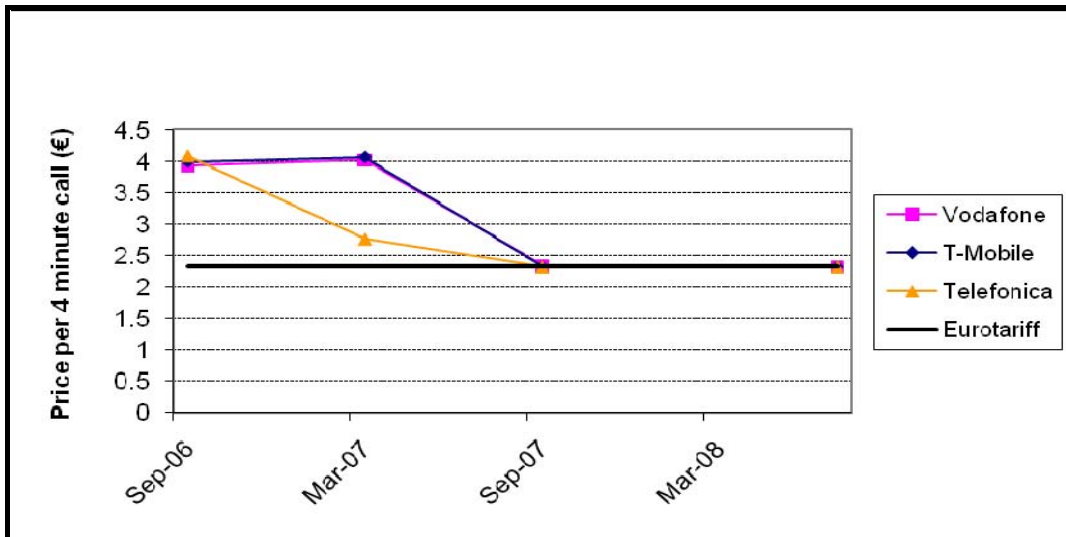




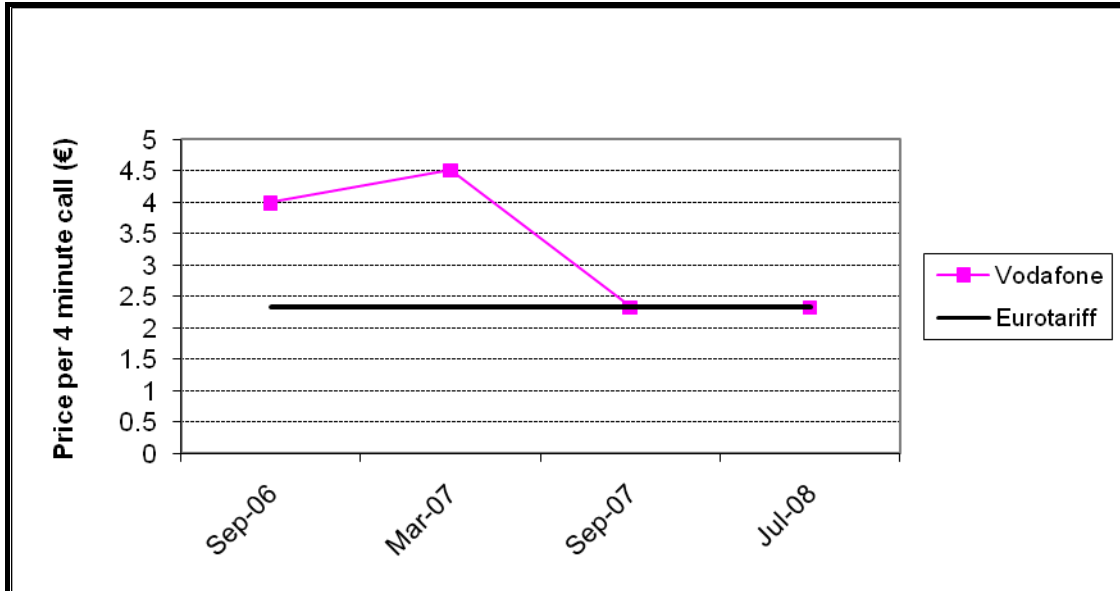
**Chart A6.10: Price of outgoing roaming calls in France**



**Chart A6.11: Price of outgoing roaming calls in Germany**



**Chart A6.12: Price of outgoing roaming calls in Greece**



**Chart A6.13: Price of outgoing roaming calls in Hungary**

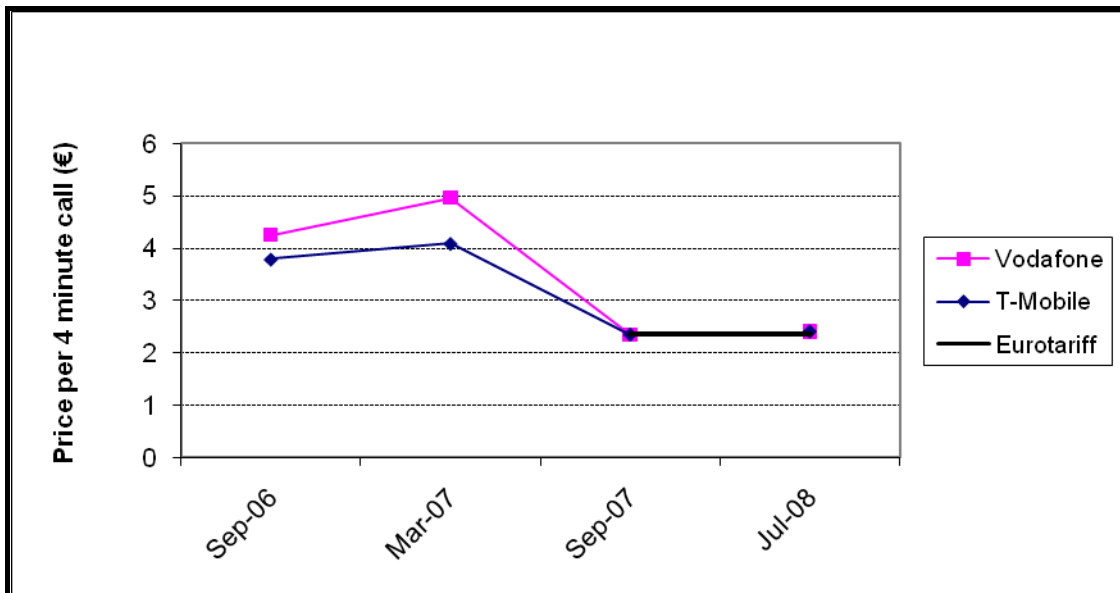


Chart A6.14: Price of outgoing roaming calls in Ireland

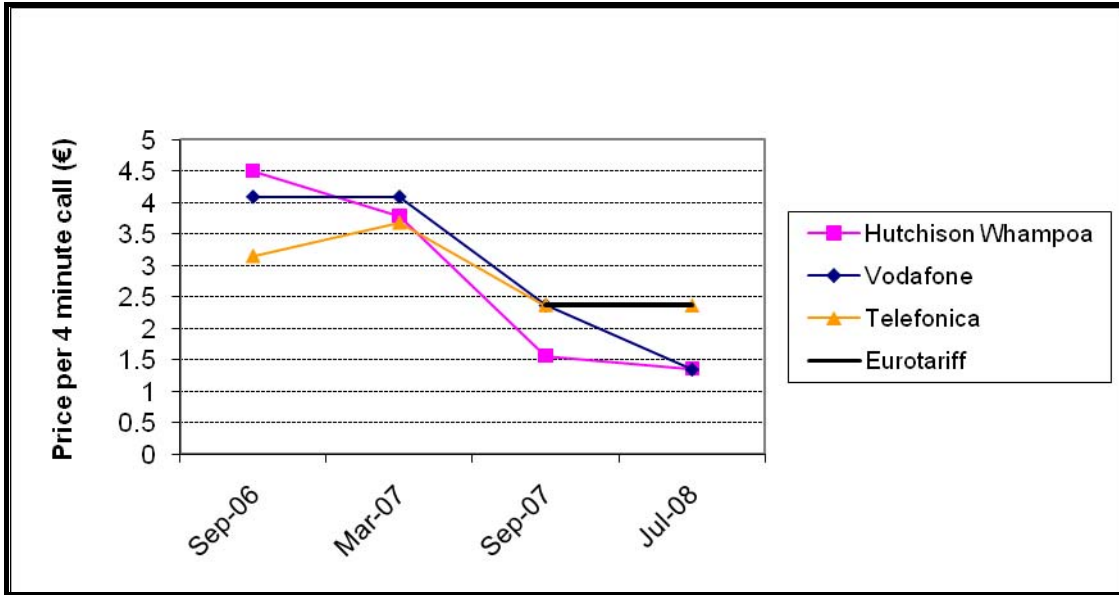


Chart A6.15: Price of outgoing roaming calls in Italy

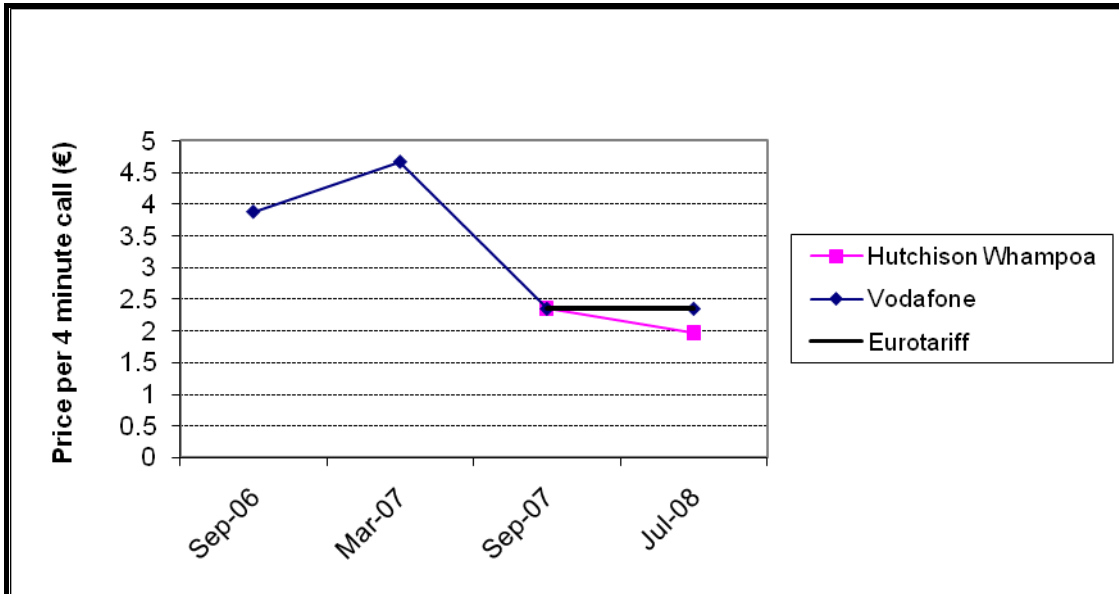


Chart A6.16: Price of outgoing roaming calls in Malta

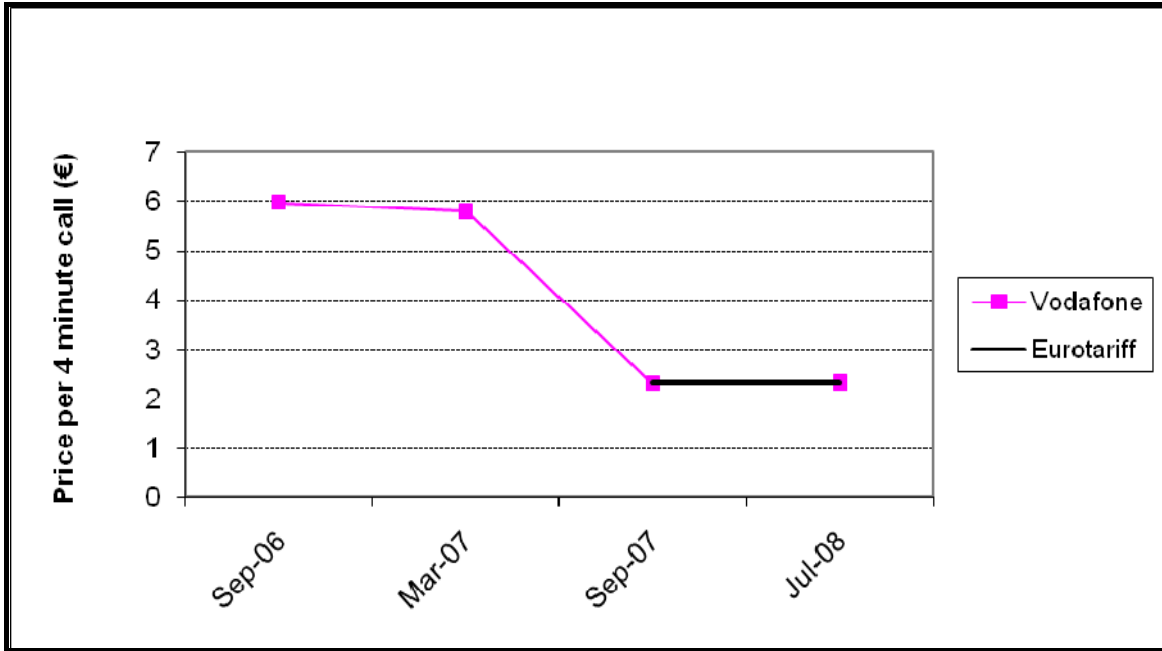
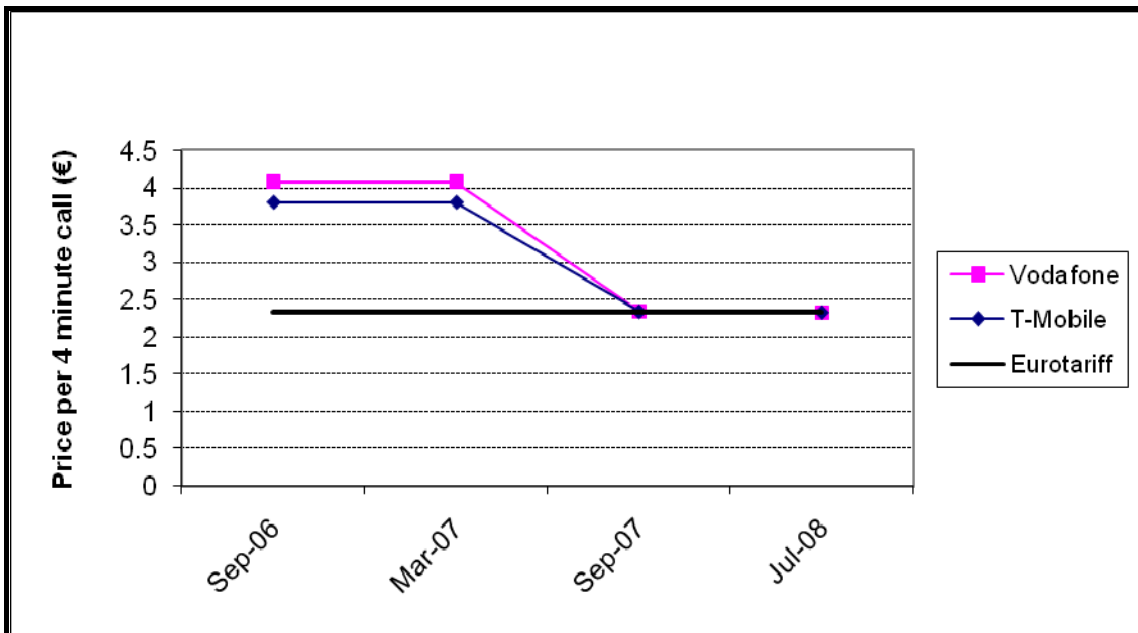
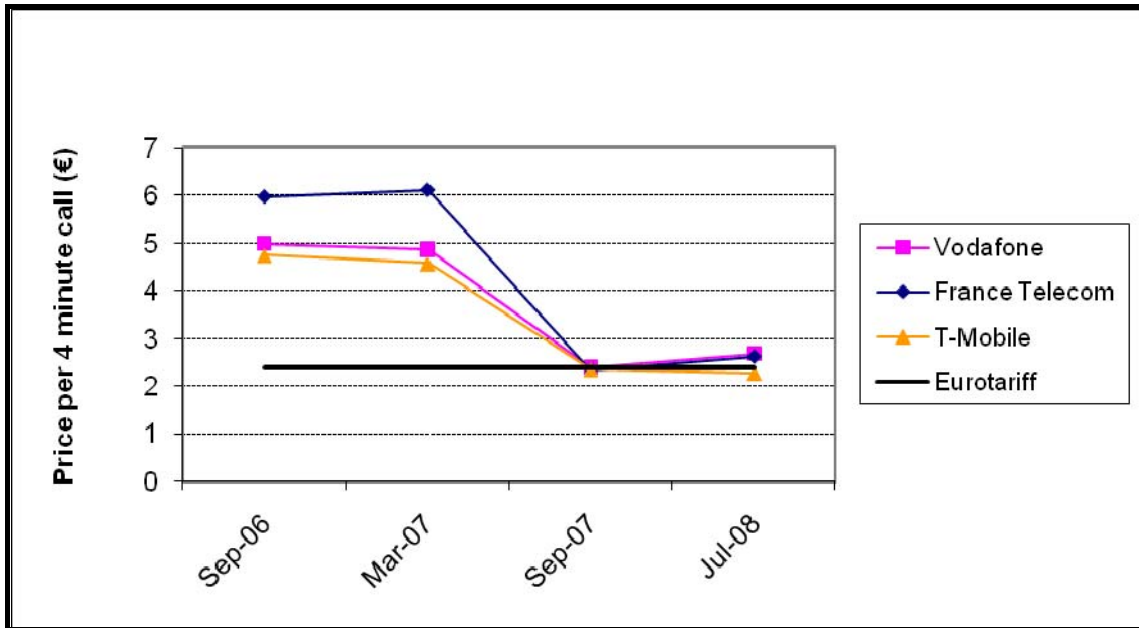


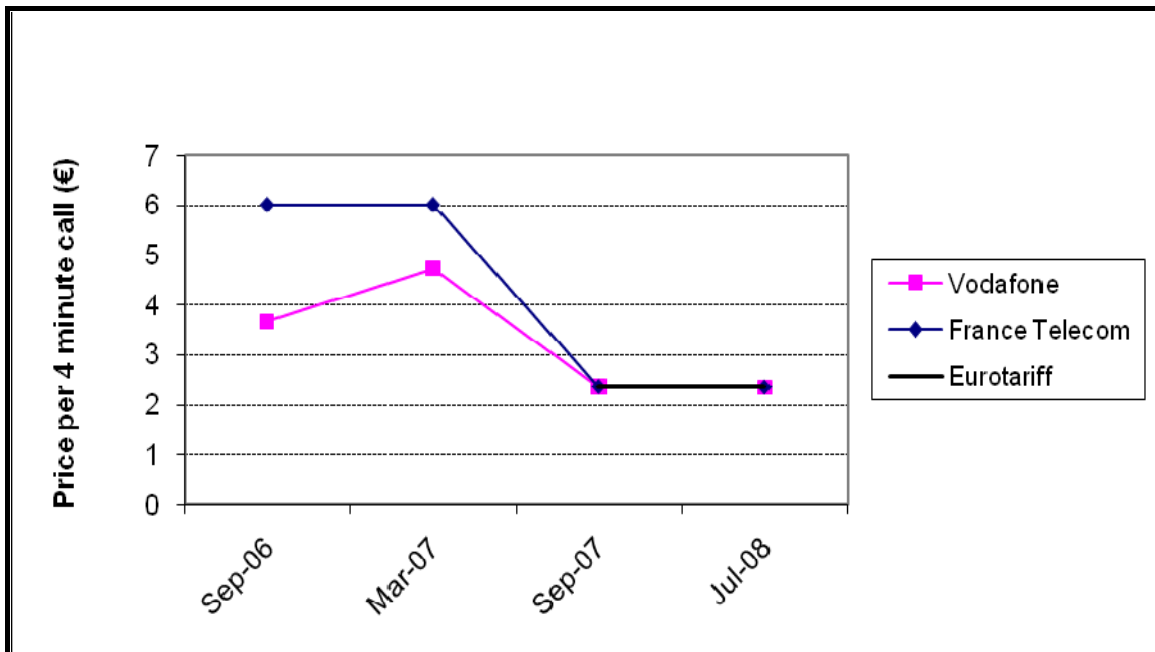
Chart A6.17: Price of outgoing roaming calls in Netherlands



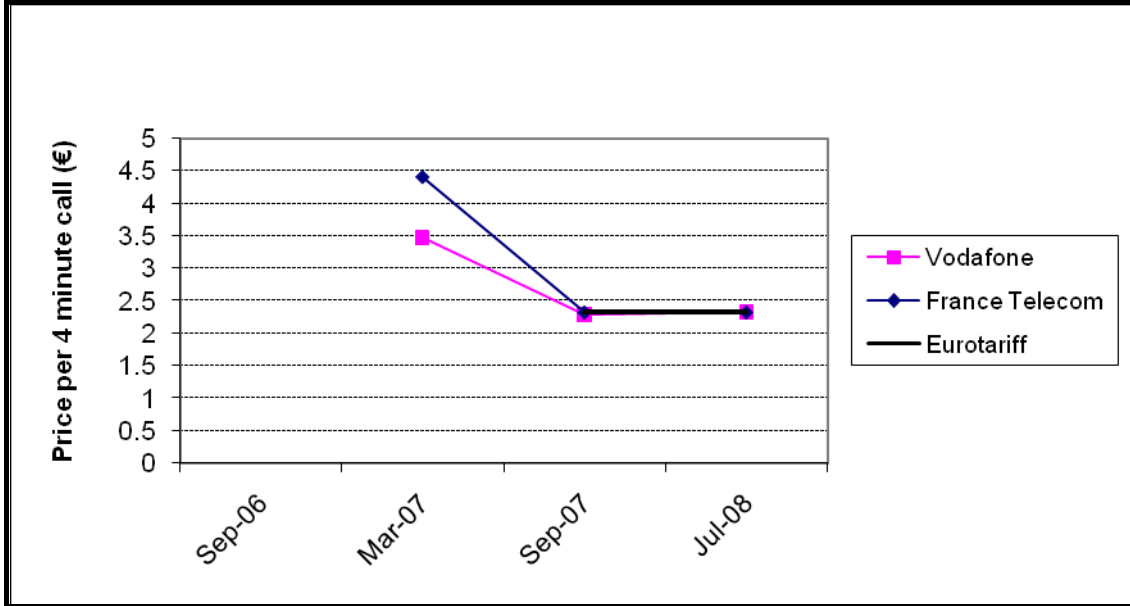
**Chart A6.18: Price of outgoing roaming calls in Poland**



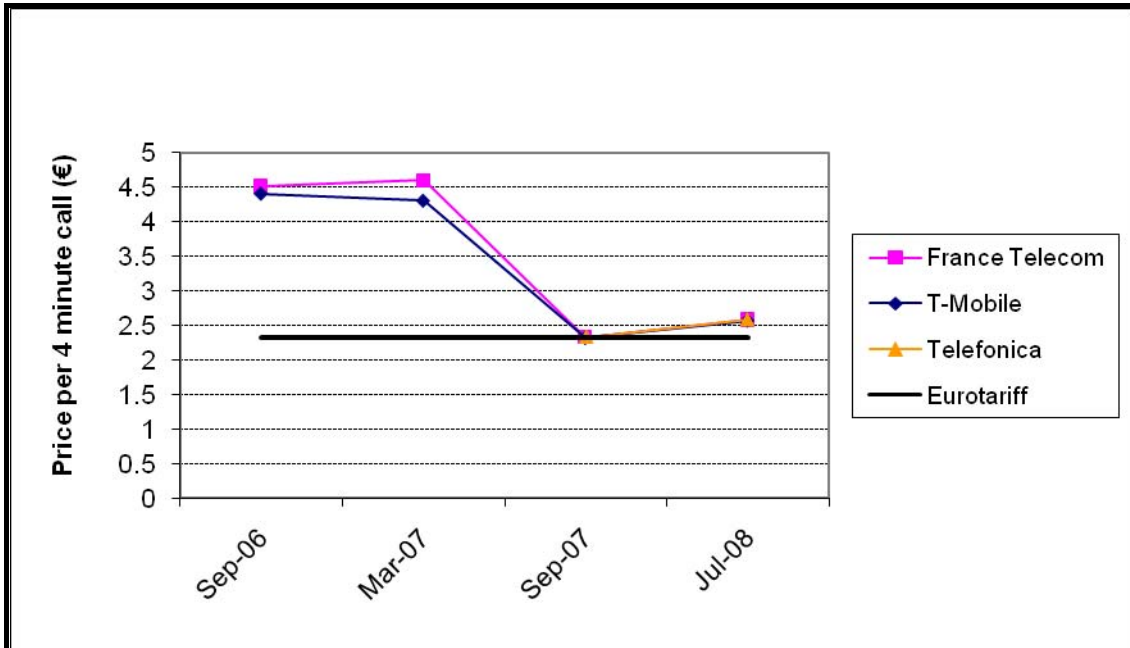
**Chart A6.19: Price of outgoing roaming calls in Portugal**



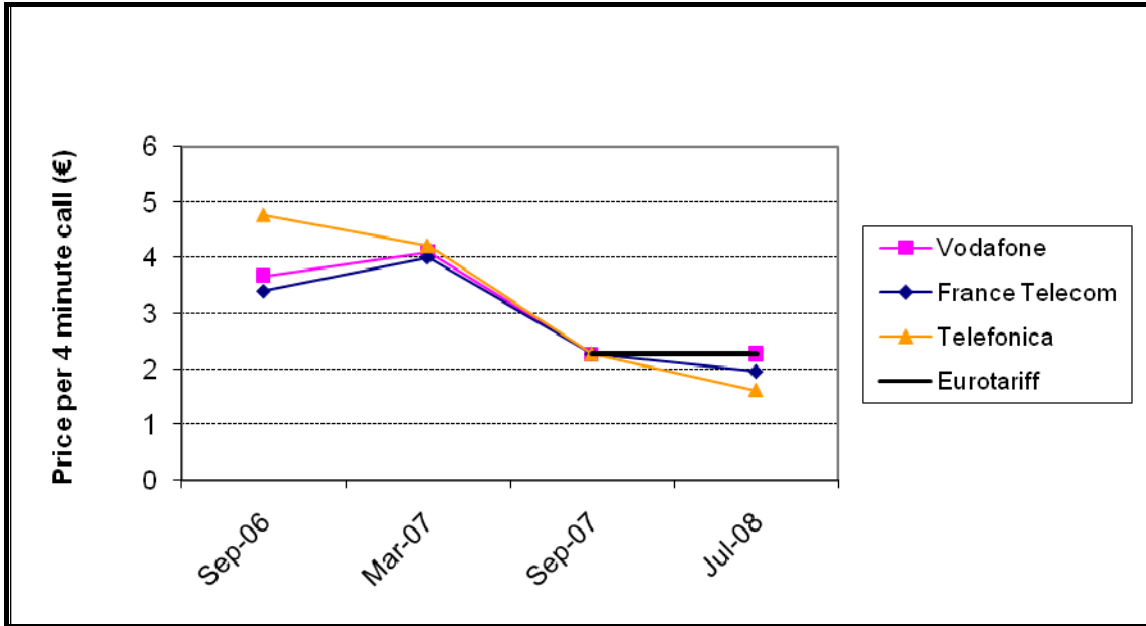
**Chart A6.20: Price of outgoing roaming calls in Romania**



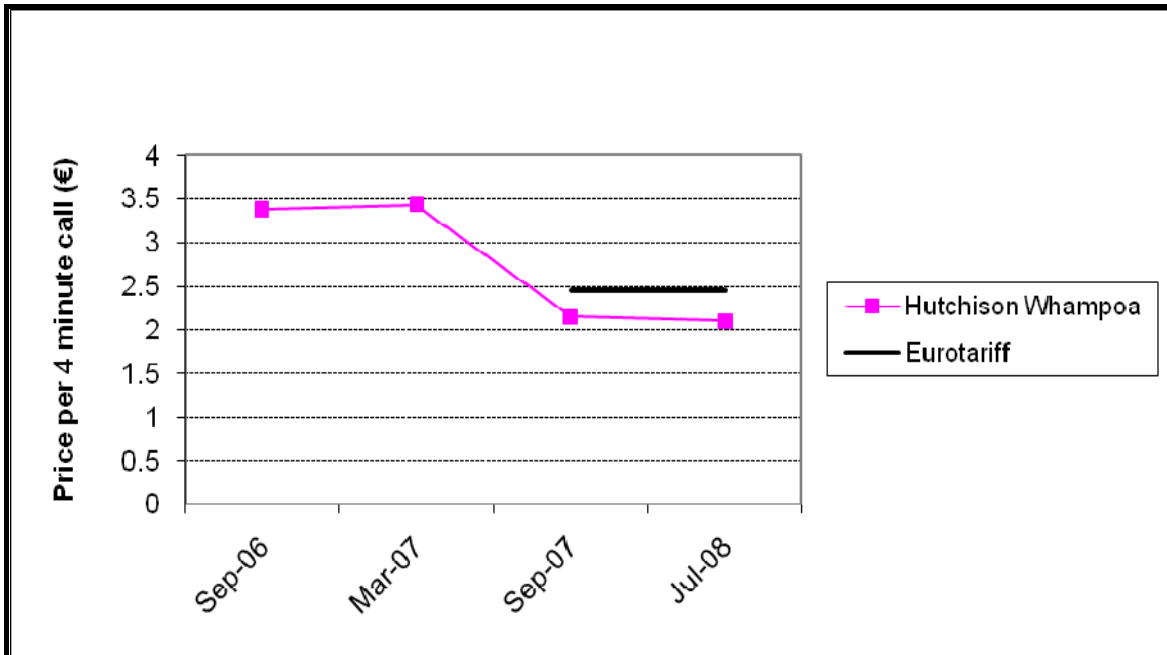
**Chart A6.21: Price of outgoing roaming calls in Slovakia**



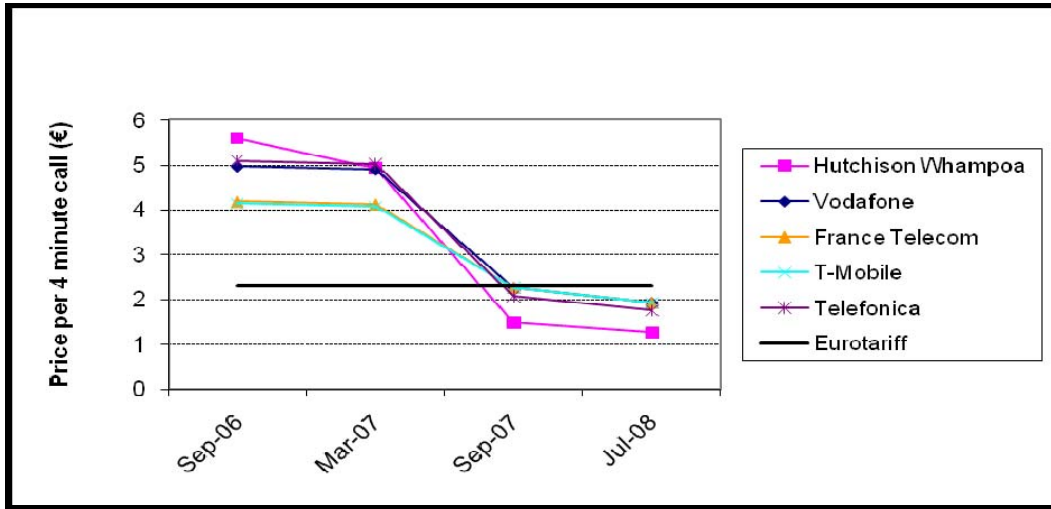
**Chart A6.22: Price of outgoing roaming calls in Spain**



**Chart A6.23: Price of outgoing roaming calls in Sweden**

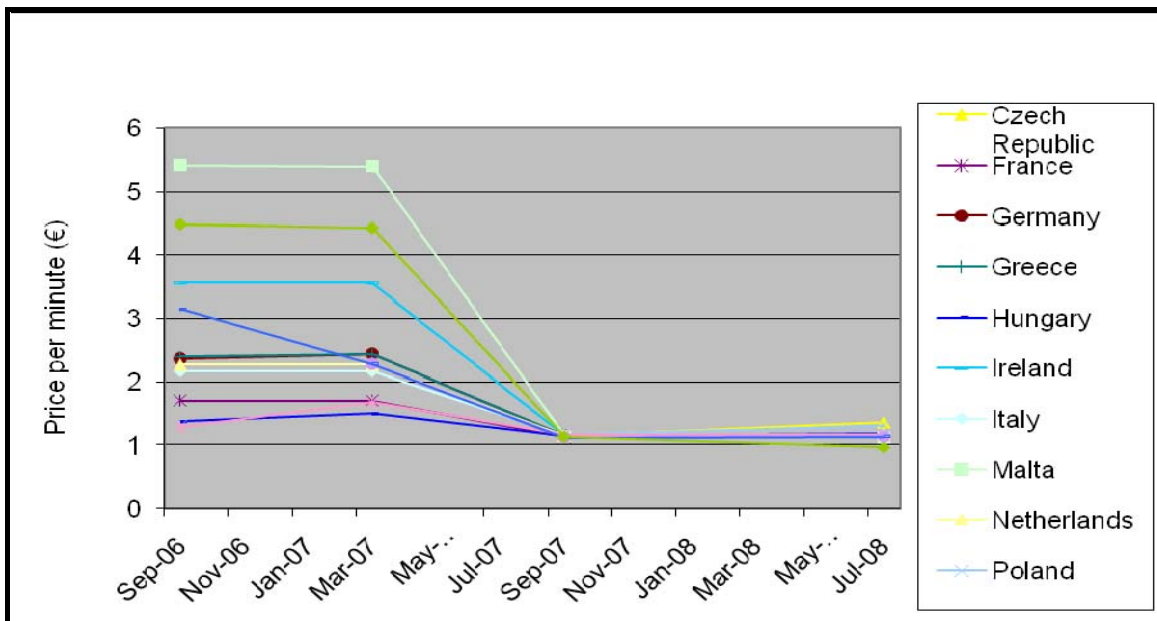


**Chart A6.24: Price of outgoing roaming calls in the United Kingdom**



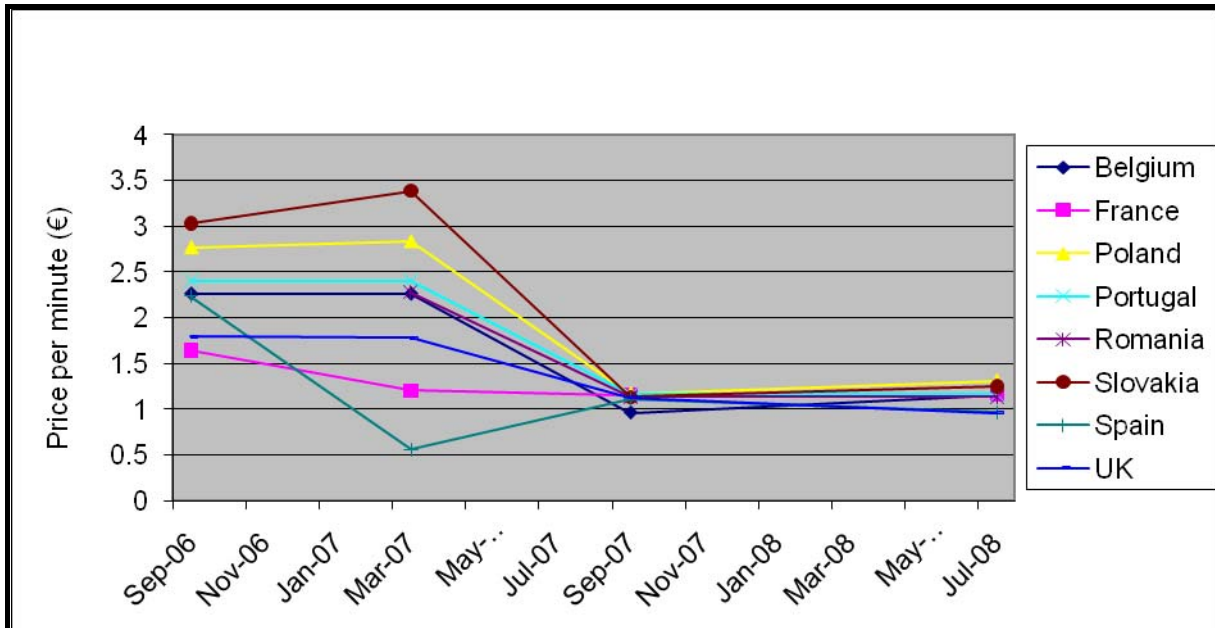
**Price of incoming roaming calls by home operator**

**Chart A6.25: Vodafone incoming roaming prices within the EU**

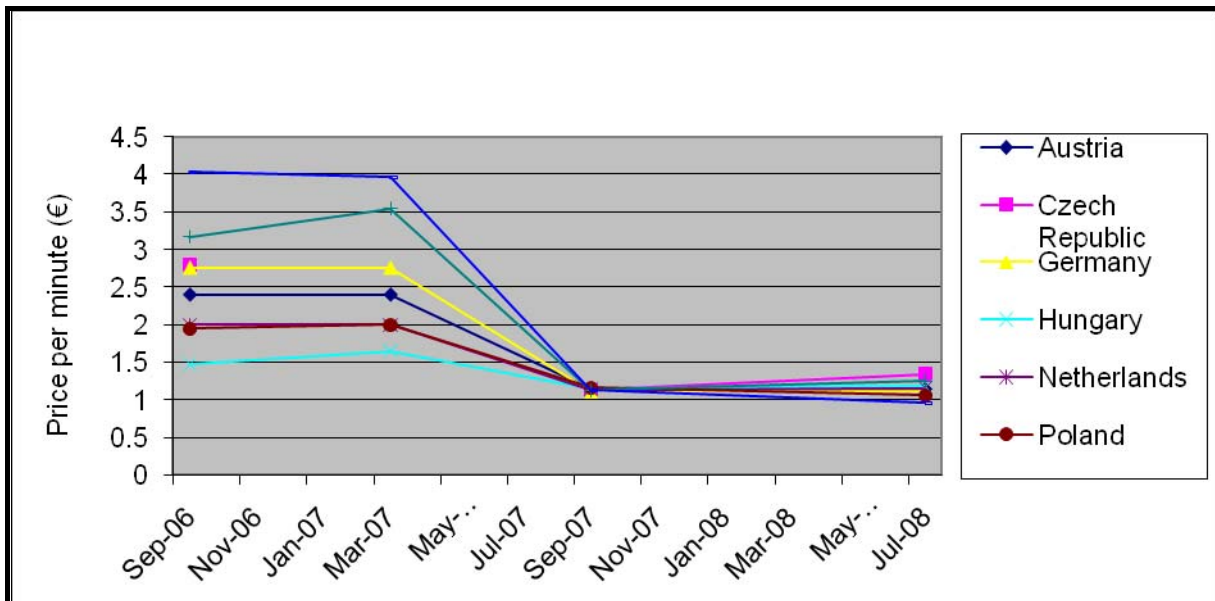




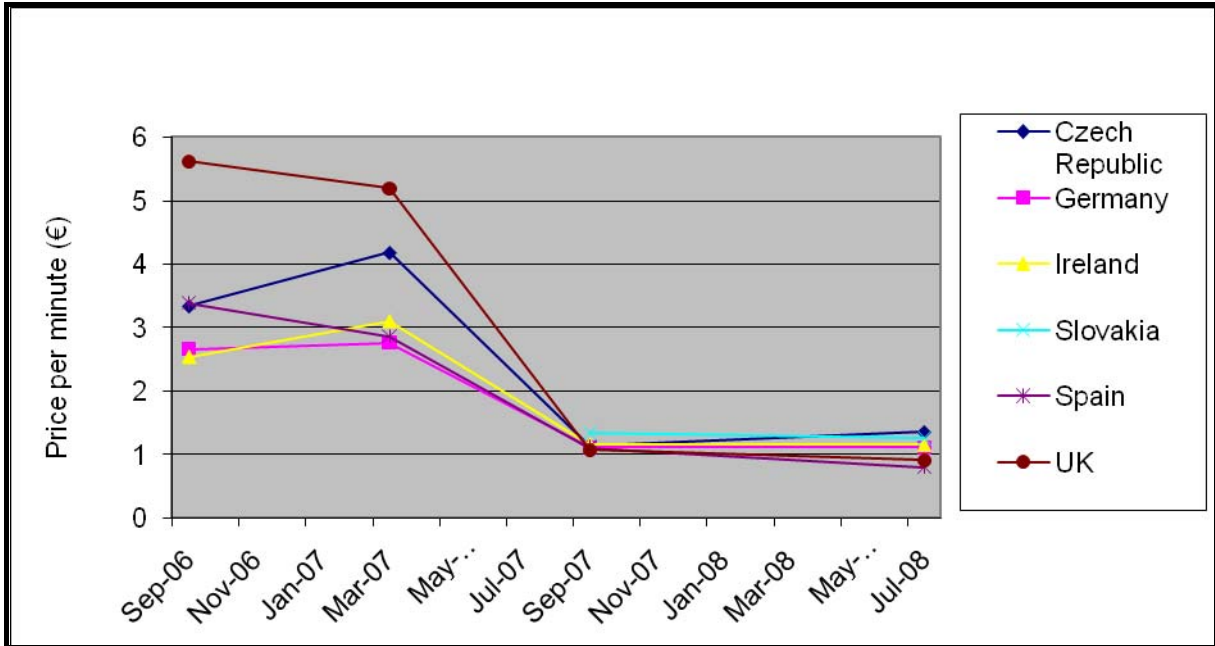
**Chart A6.26: France Telecom incoming roaming prices within the EU**



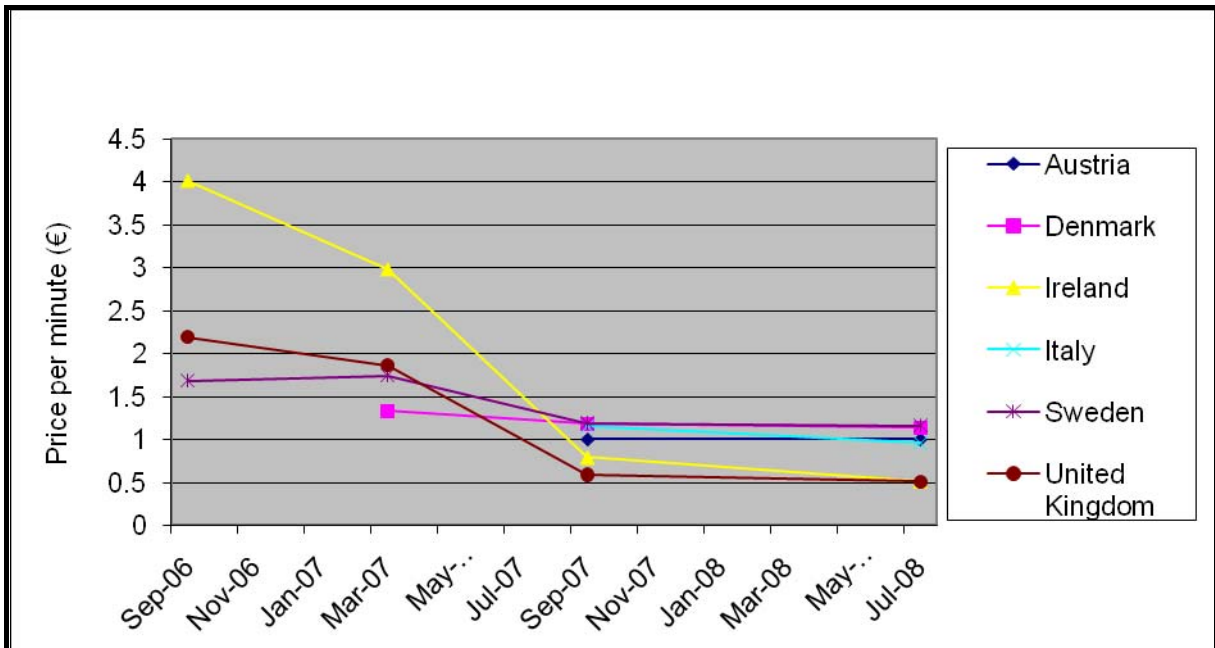
**Chart A6.27: T-Mobile incoming roaming prices within the EU**



**Chart A6.28: Telefonica incoming roaming prices within the EU**



**Chart A6.29: Hutchison Whampoa incoming roaming prices within the EU**



Price of incoming roaming calls by home subscriber country

Chart A6.30: Price of incoming roaming calls in Austria

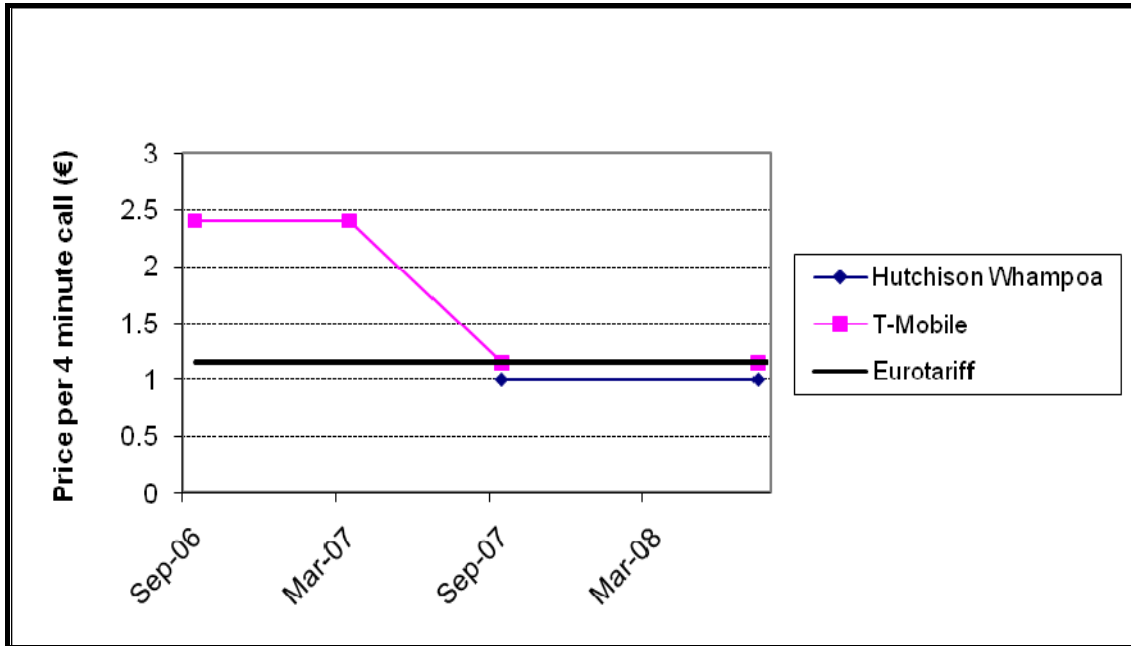
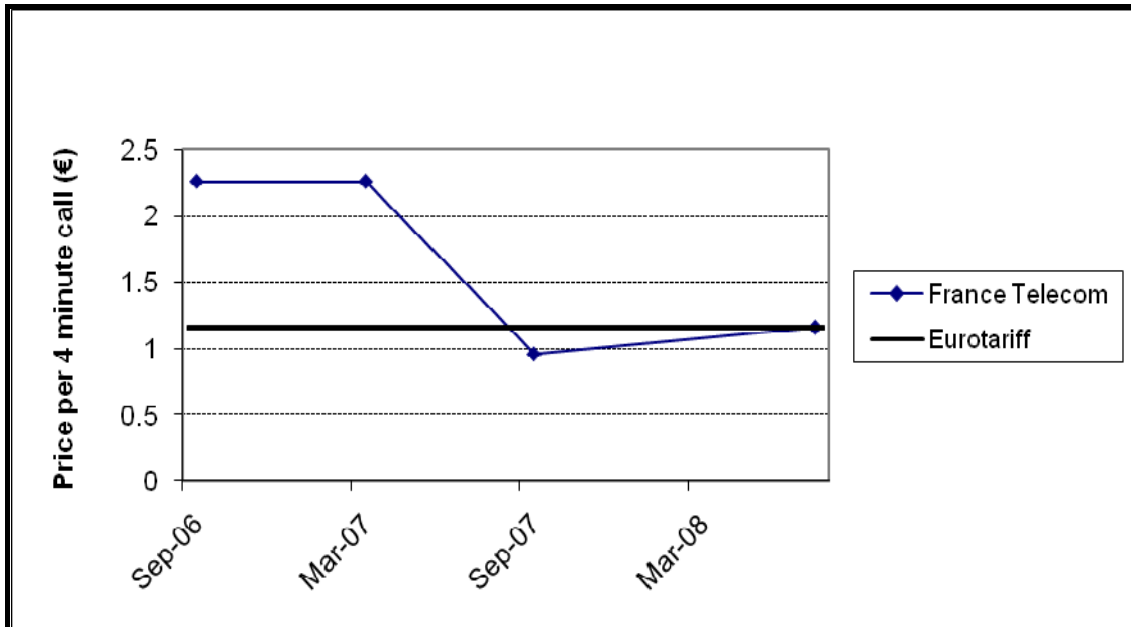
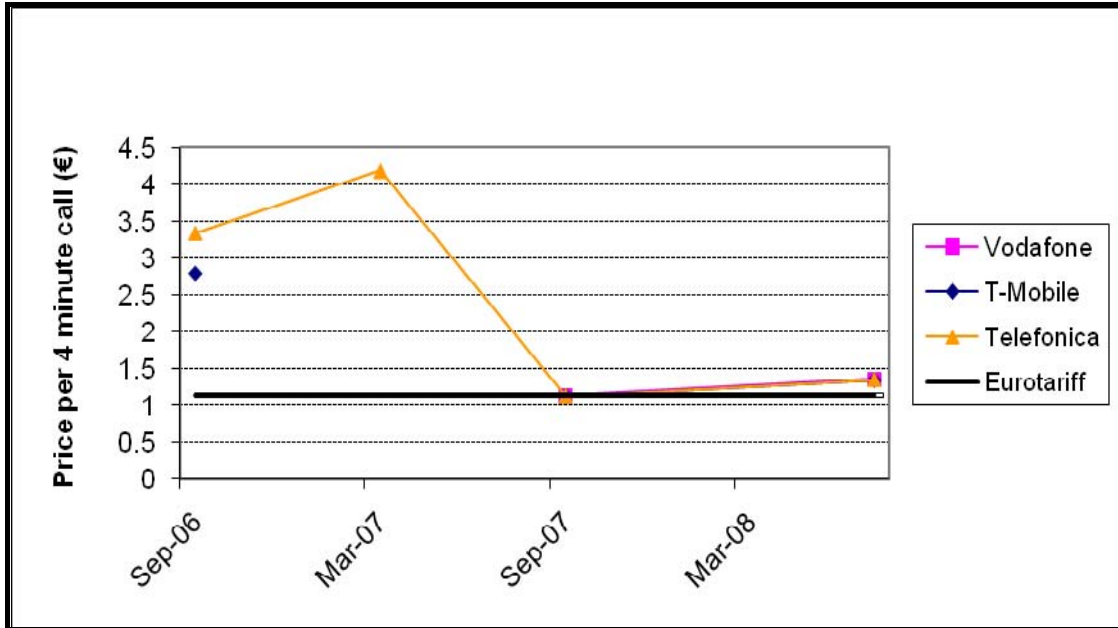


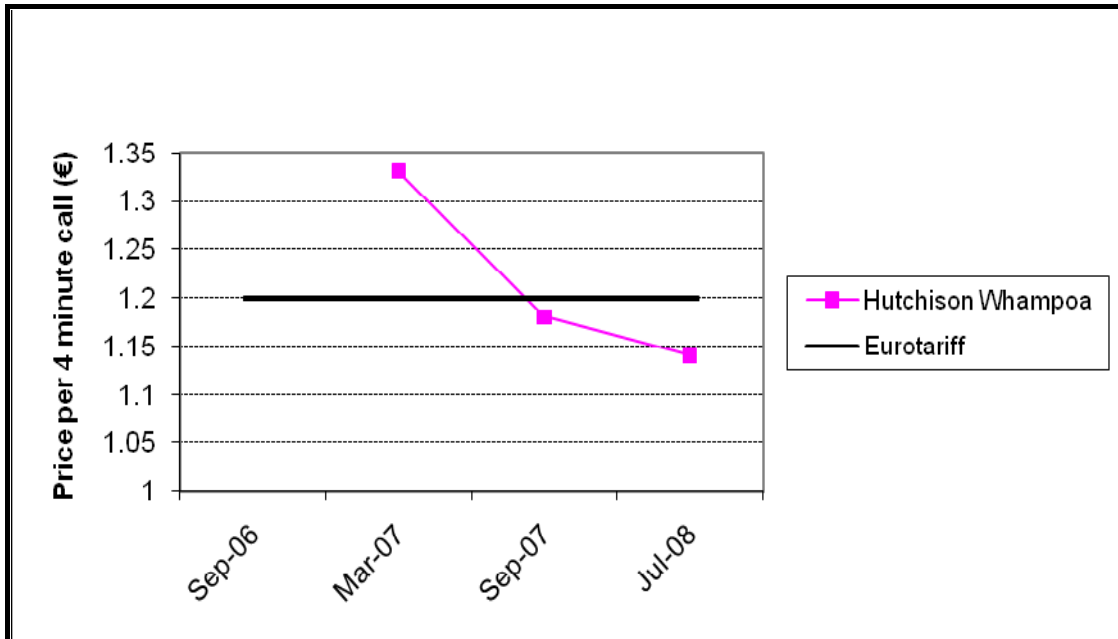
Chart A6.31: Price of incoming roaming calls in Belgium



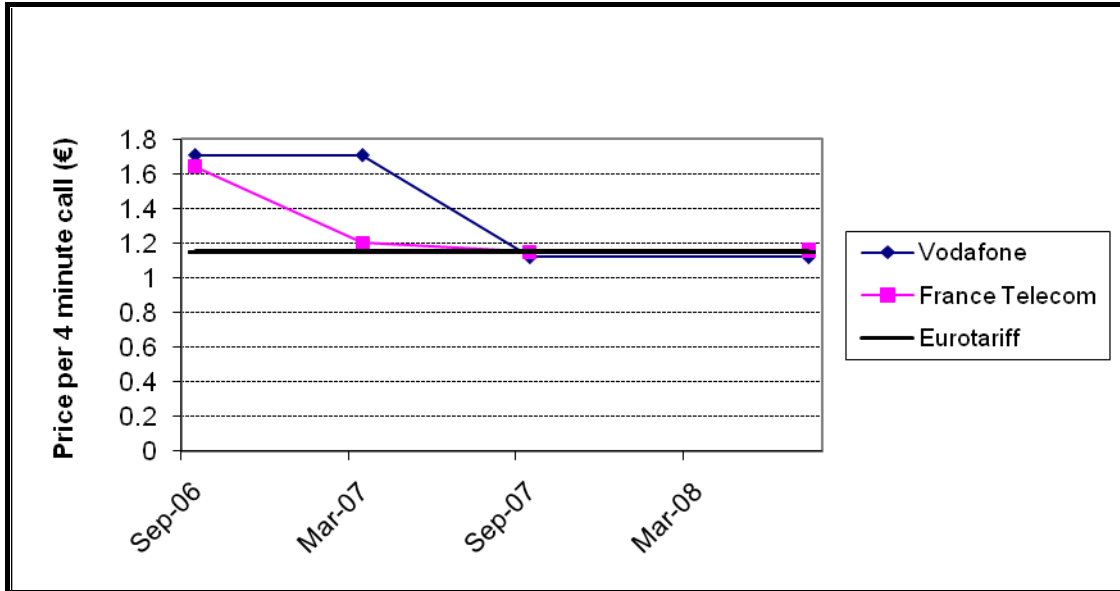
**Chart A6.32: Price of incoming roaming calls in the Czech Republic**



**Chart A6.33: Price of incoming roaming calls in Denmark**



**Chart A6.34: Price of incoming roaming calls in France**



**Chart A6.35: Price of incoming roaming calls in Germany**

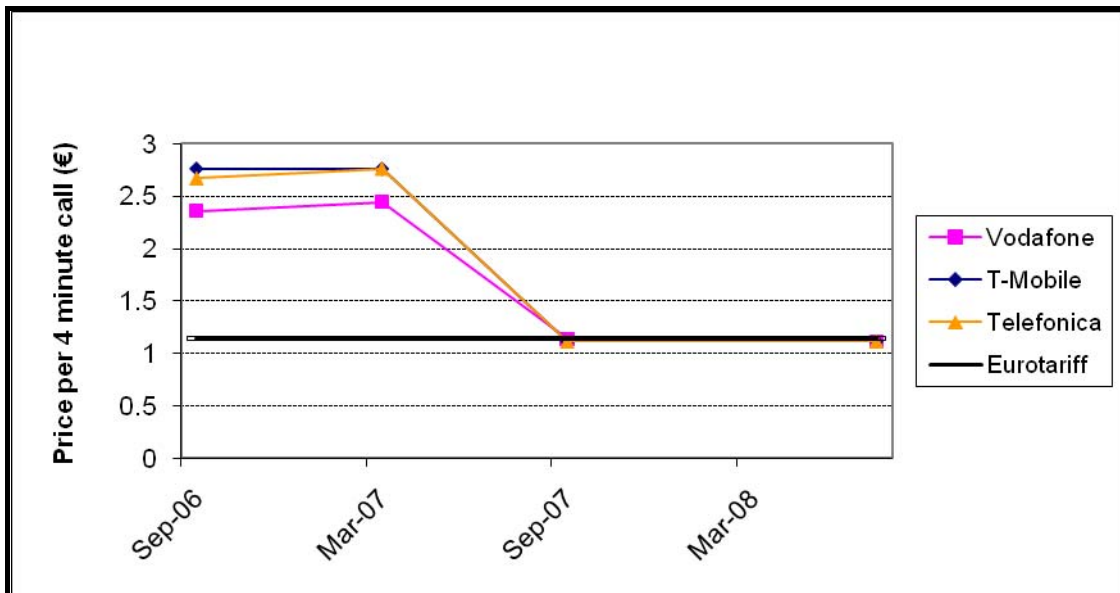


Chart A6.36: Price of incoming roaming calls in Greece

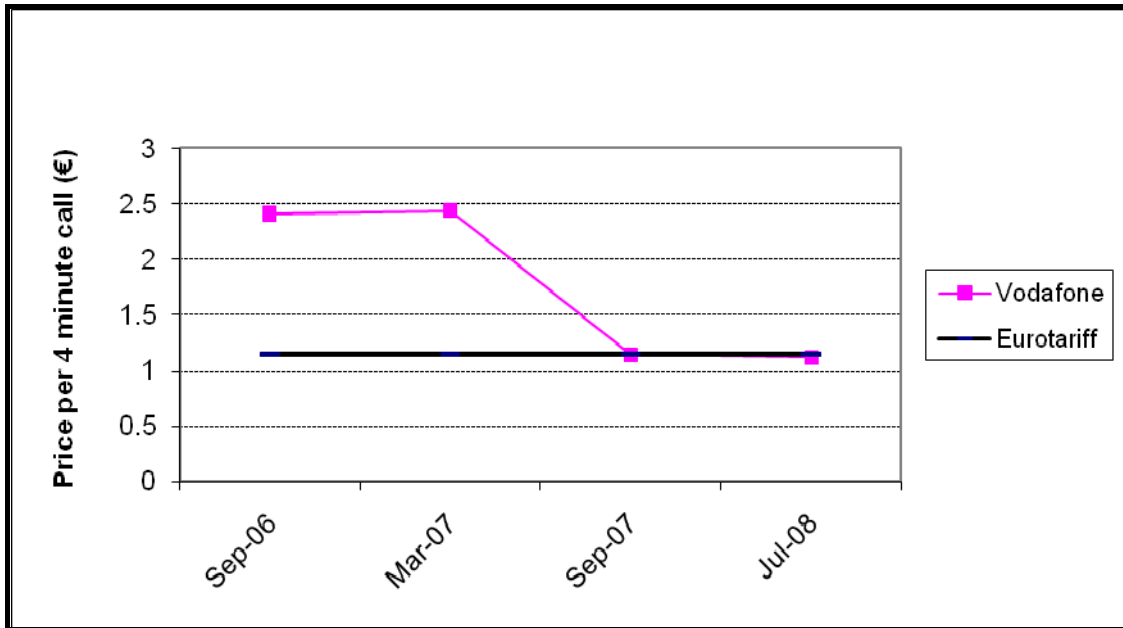
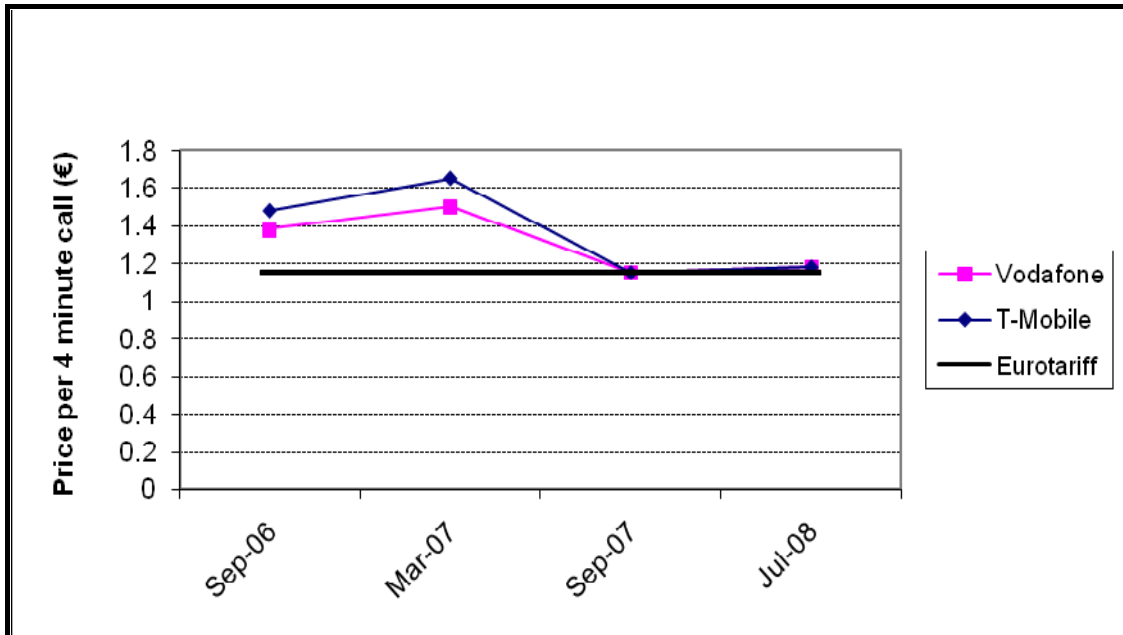
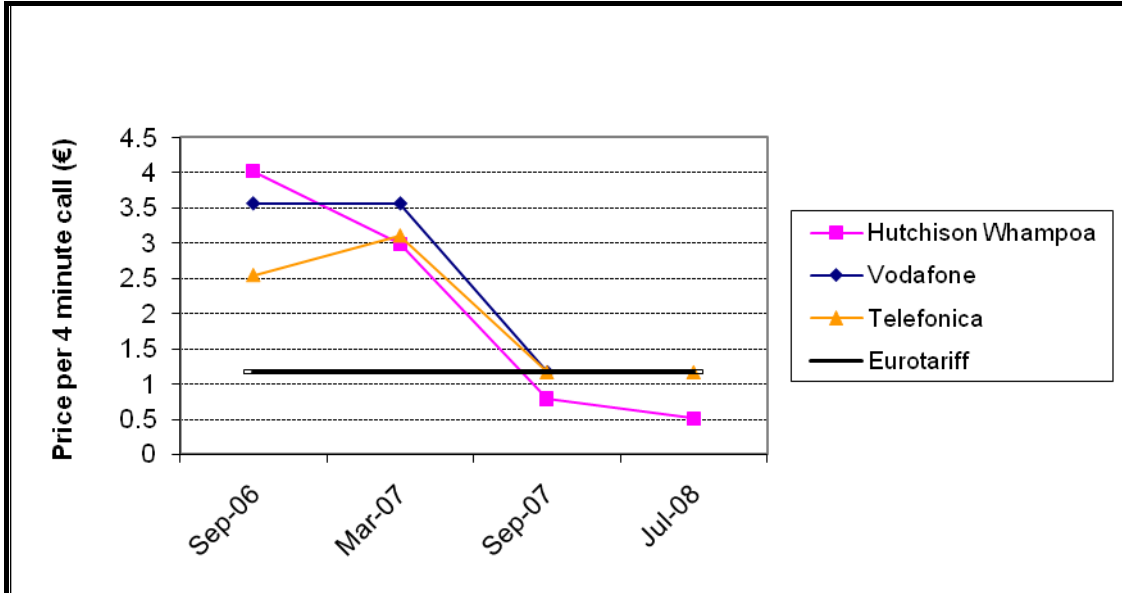


Chart A6.37: Price of incoming roaming calls in Hungary



**Chart A6.38: Price of incoming roaming calls in Ireland**



**Chart A6.39: Price of incoming roaming calls in Italy**

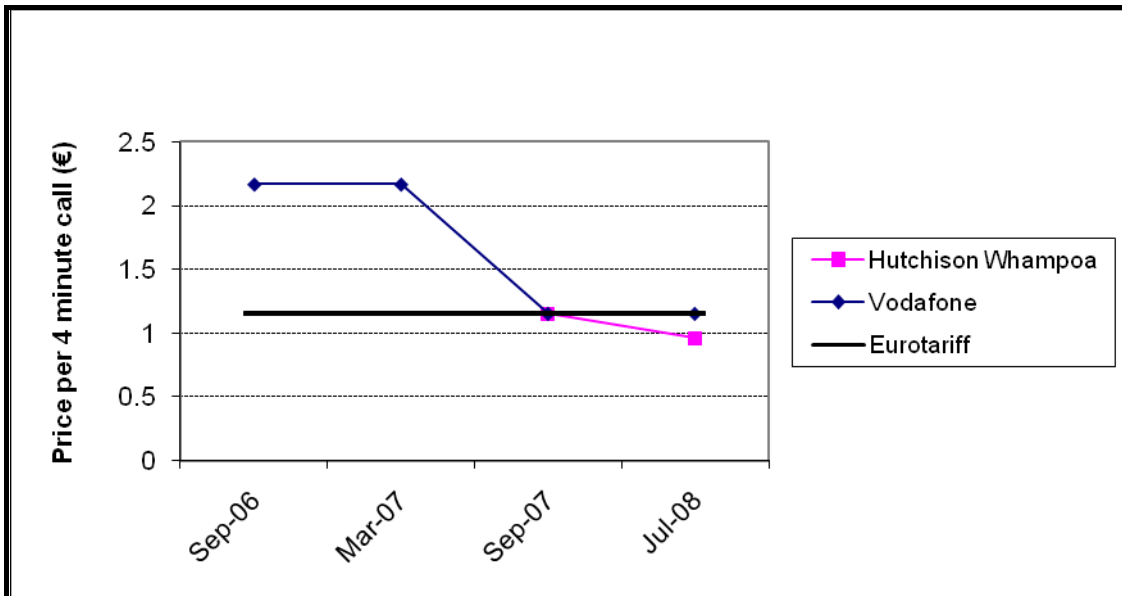


Chart A6.40: Price of incoming roaming calls in Malta

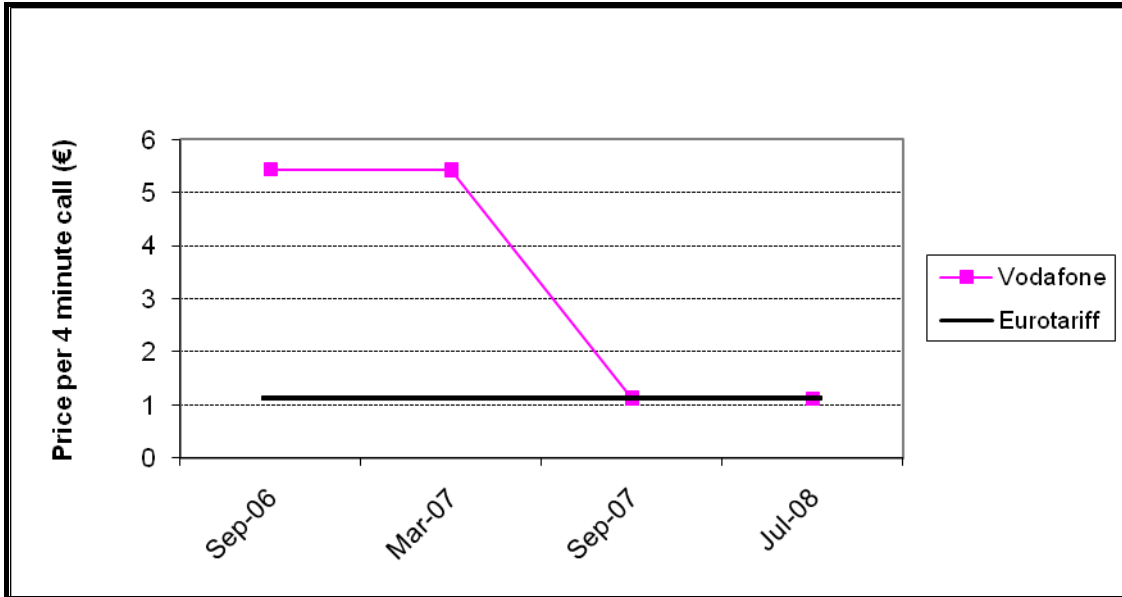
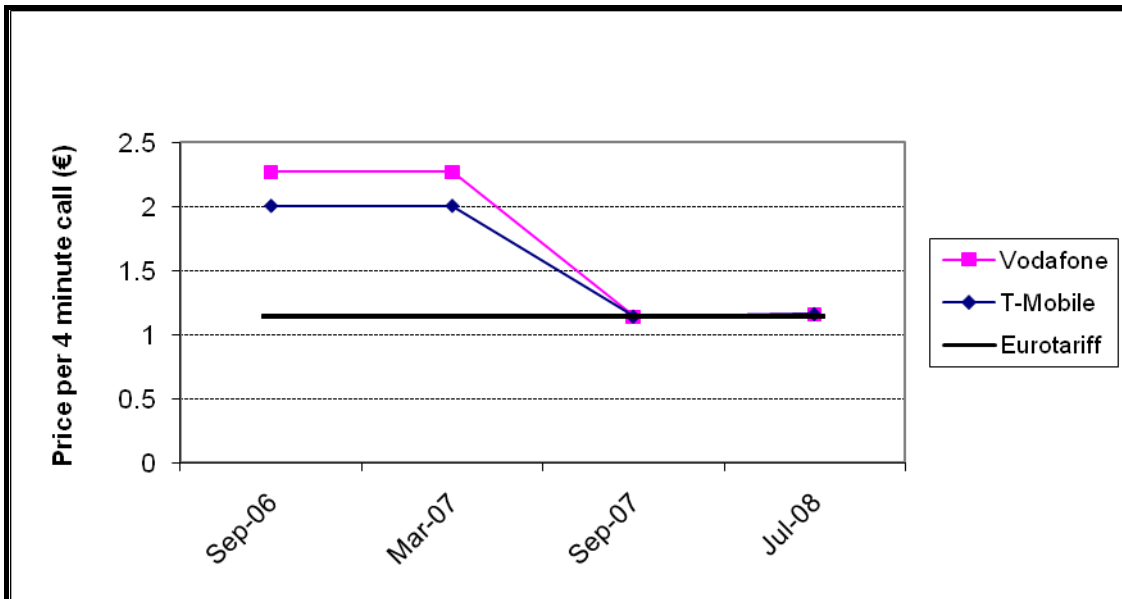
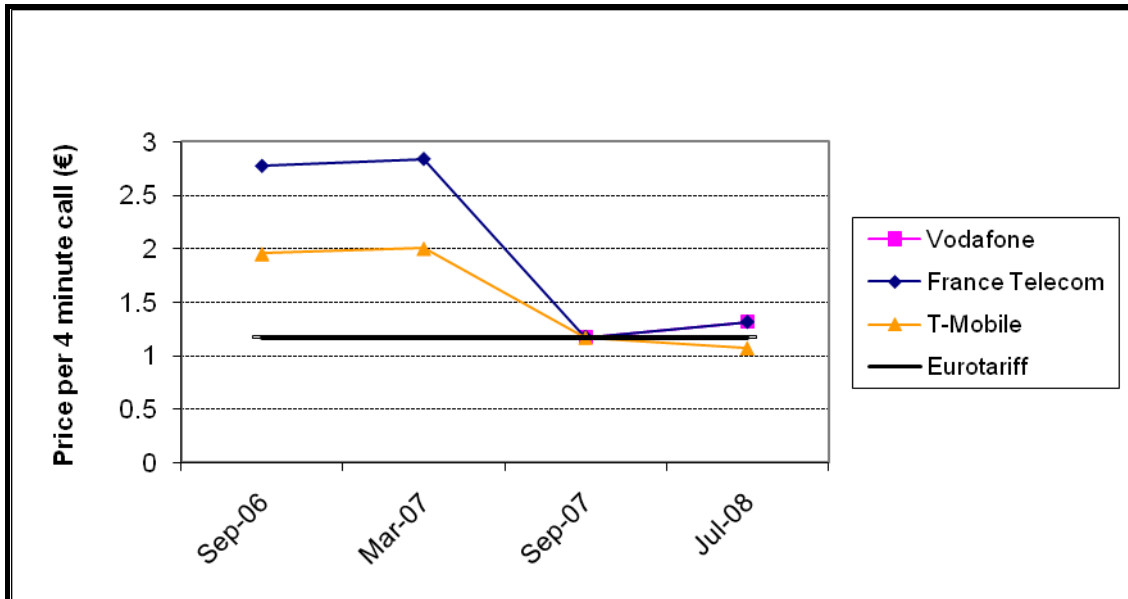


Chart A6.41: Price of incoming roaming calls in the Netherlands

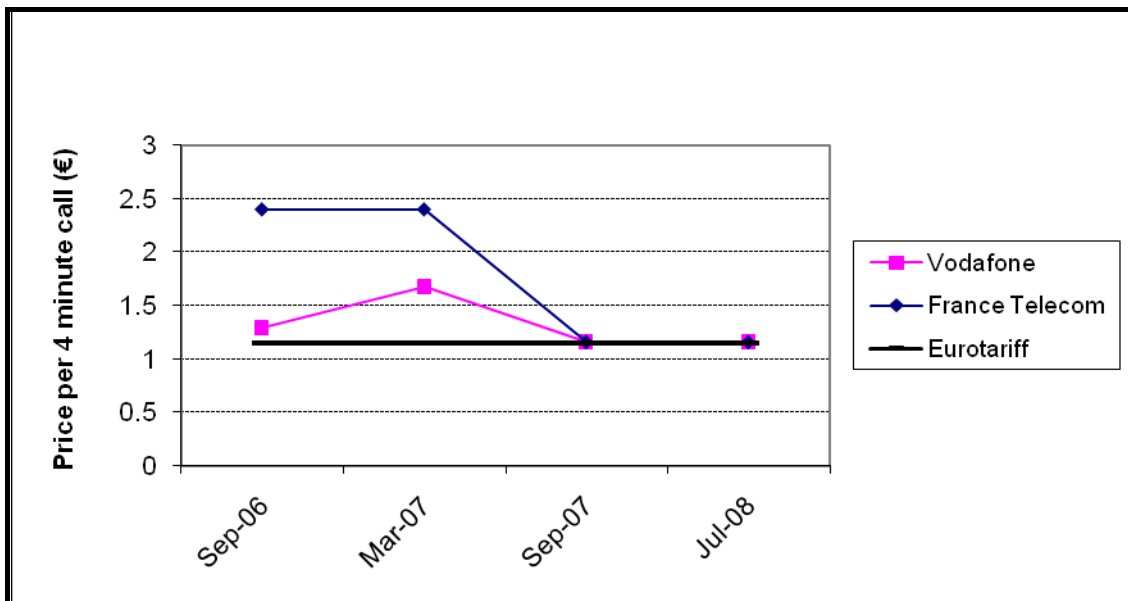




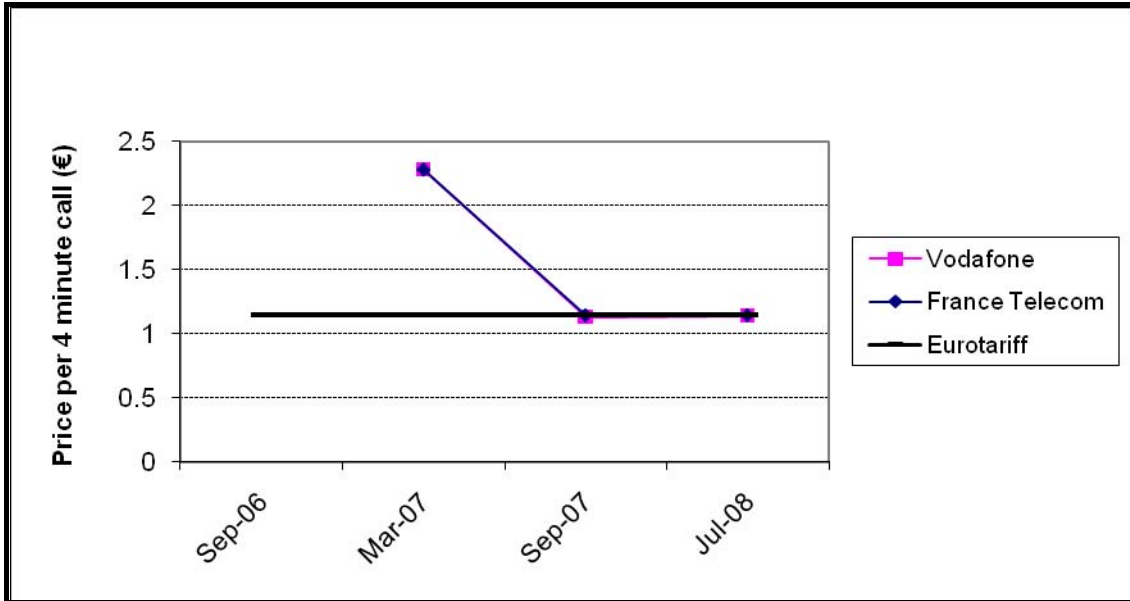
**Chart A6.42: Price of incoming roaming calls in Poland**



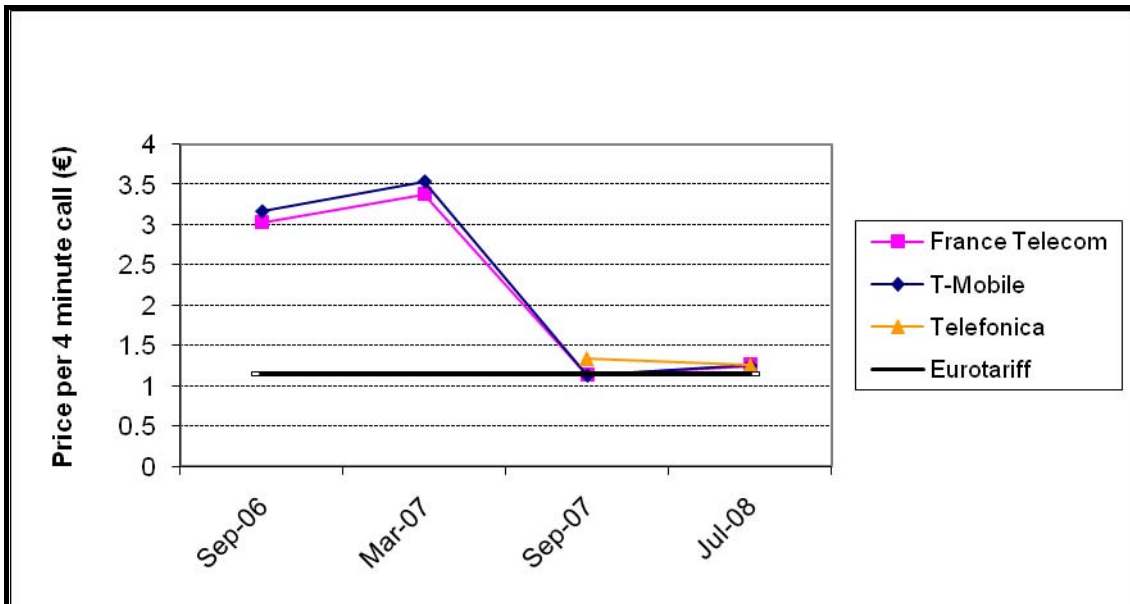
**Chart A6.43: Price of incoming roaming calls in Portugal**



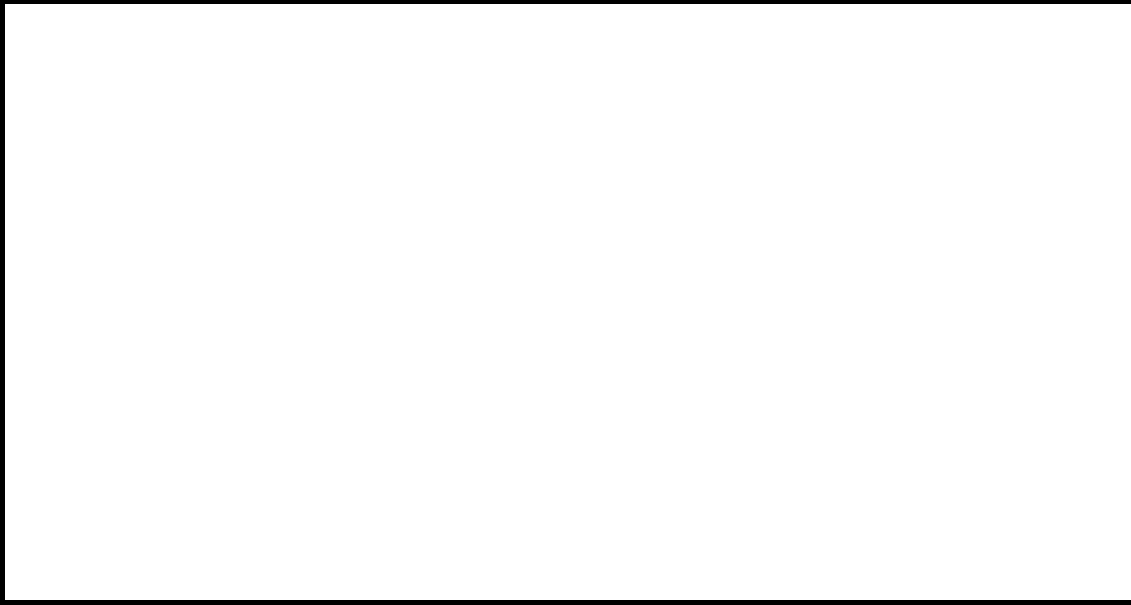
**Chart A6.44: Price of incoming roaming calls in Romania**



**Chart A6.45: Price of incoming roaming calls in Slovakia**



**Chart A6.46: Price of incoming roaming calls in Spain**



**Chart A6.47: Price of incoming roaming calls in Sweden**

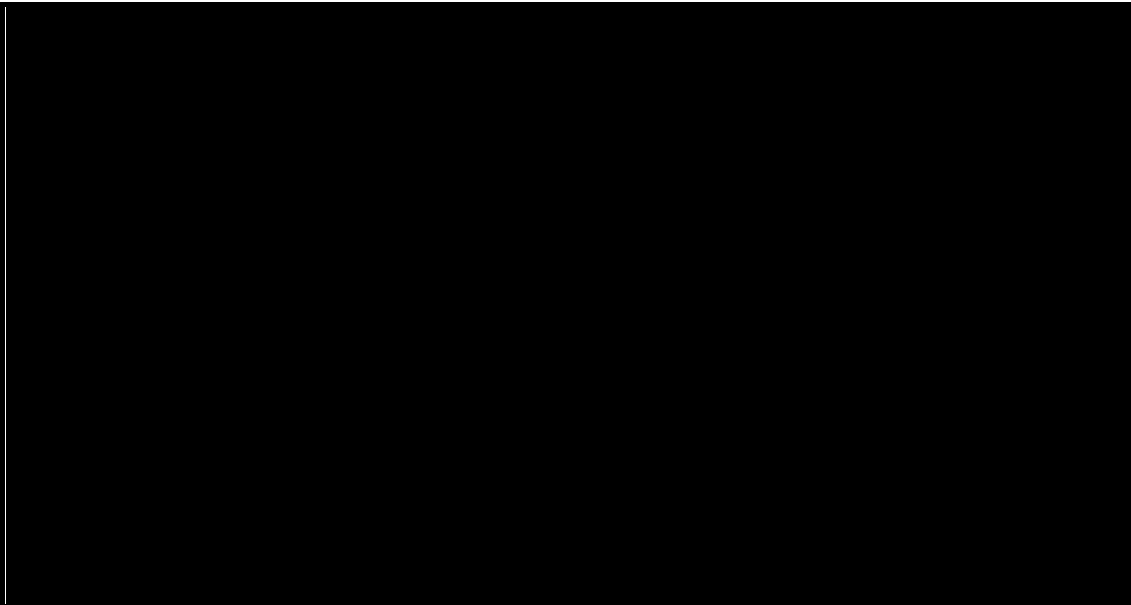
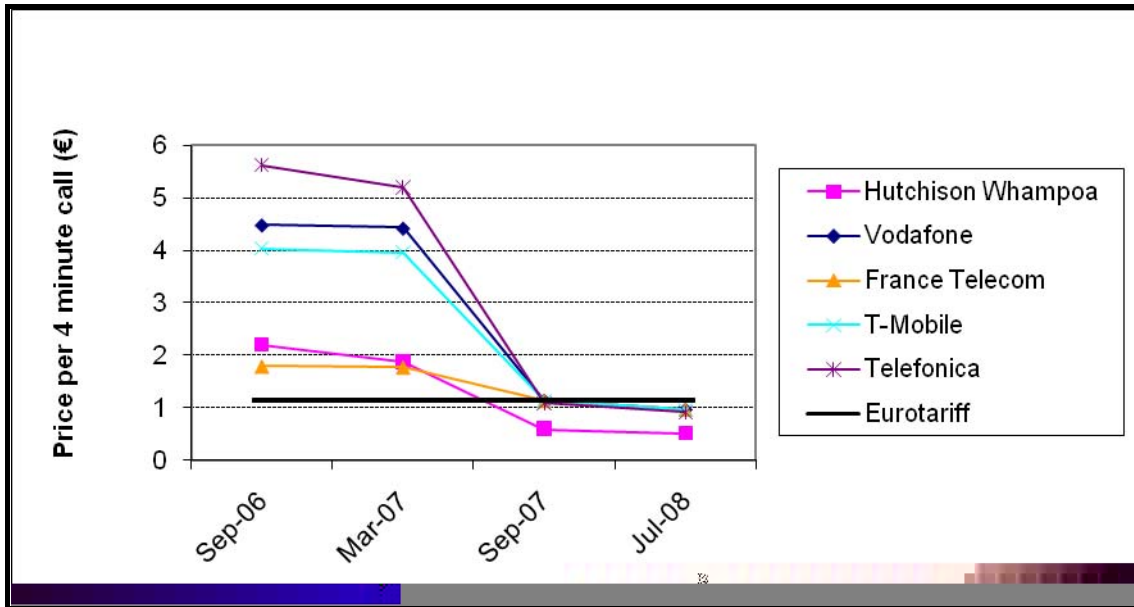


Chart A6.48: Price of incoming roaming calls in the United Kingdom



## APPENDIX 7: LITERATURE REVIEW

A7.1 This Appendix summarises some points from what we have felt are the most relevant documents to the study of the Roaming Regulation, including official reports as well as academic articles. Each of these documents has contributed to informing the critical assessment and conclusions laid out in the main report.

### European Commission Impact Assessment (2008)

A7.2 European Commission (2008) “Commission staff working paper accompanying the proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services: impact assessment: COM(2008) 580, SEC(2008) 2490” Commission Staff Working Paper: Brussels.

A7.3 The 2008 Impact Assessment looks into the market for roaming in the EU, specifically in the context of the 2007 Roaming Regulation. It discusses various developments since the Regulation was adopted, other studies and work done in the area (namely by the ERG), and introduces an economic model. The model, which is not strikingly different from that used in 2006 (see “European Commission Impact Assessment [2006]”), is used to weigh the costs, benefits, and changes in welfare given by different degrees of continued regulation.

A7.4 For the procedure of assessing the impacts, the regulatory options are modelled using a static competitive equilibrium social welfare model. In other words, a natural equilibrium in the market for roaming services is calculated and the extent to which each policy option causes the model to deviate from equilibrium is used to calculate changes to consumer surplus, producer surplus, and thus social welfare. The quantitative analysis focuses on two sets of charts, or “glide paths” for each option: ERG proposals and the Commission proposals. Finally, each calculation is done assuming three elasticity scenarios, which is meant to take account of the uncertainty and differing estimates surrounding the elasticity for roaming services.

A7.5 Before presenting analysis, the Impact Assessment takes care to define and review the specific problem in the markets of voice, SMS, and data roaming, as well as a problem with voice billing unitisation to which it is responding. Policy options are presented for each of the market segments, and while there are some differences, each includes:<sup>105</sup>

- No policy change;
- Transparency;
- Wholesale level regulation;
- Retail level regulation; and
- Wholesale and retail level regulation.

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<sup>105</sup> Billing unitisation policy options differ from the policy options presented for voice, SMS and data roaming and are not covered by the above list.

A7.6 The analysis concludes that the current Regulation should be extended in duration both in time and scope because “the underlying causes of the problem of insufficient competitive pressure in the mobile roaming market still remain valid”. Specifically, it calls for:

- Wholesale and retail regulation for voice (with a wider gap between the wholesale and retail ceilings);
- Wholesale and retail regulation for SMS with a retail price ceiling at €0.11;
- Modified per second billing unitisation; and
- Wholesale safeguard cap plus transparency measures for data roaming services.

A7.7 The Impact Assessment conclusions were informed by ERG Benchmark reports (see “International Roaming: ERG Benchmark Data Reports”), a wide-ranging public consultation to review the 2007 Roaming Regulation, stakeholder interviews, an independent study on roaming data services, and implementation results from operators. Finally, the Impact Assessment was presented to the Impact Assessment Board of the European Commission for evaluation.

A7.8 In the outset of the Impact Analysis, some feedback of the IAB is reproduced. It states,

The conclusion that competition is inadequate needs more explanation and the use of competition policy measures should be analysed...In particular the report should explain the rationale for analysing roaming as a market in its own right, as opposed to viewing the purchase of a mobile phone package as the relevant market.

The Commission writes that these comments have since been taken on board and integrated into the analysis.

## European Commission Impact Assessment (2006)

- A7.9 European Commission (2006) “Impact Assessment of policy options in relation to a Commission proposal for a regulation of the European Parliament and of the Council on roaming on public mobile networks within the Community: COM (2006) 382 final, SEC (2006) 926” Commission Staff working paper, Brussels.
- A7.10 The European Commission Impact Assessment of policy options for regulating roaming within the EU is instrumental in providing a window into the thinking that went into the Roaming Regulation, and therefore also aids in understanding further options for regulation.
- A7.11 The report is divided more or less into sections on context, the issue at hand, and impacts of each policy option. According to the document, “The core [market] problem is that prices for EU-wide roaming at both wholesale and retail levels stand in no meaningful relationship to the underlying costs of providing the service.”<sup>106</sup> It goes on to say that this problem is compounded by lack of transparency into the wholesale market, the difficulty for NRAs to regulate the market for mobile roaming, and its cross-border nature.<sup>107</sup>
- A7.12 The problem is explored in depth, and possible implications of the technological and economic context of the current market are also examined. The options laid out by the report are:
- Option 1 — No policy change;
  - Option 2 — Self regulation;
  - Option 3 — Co-regulation;
  - Option 4 — Soft law;
  - Option 5 — Targeted regulation;
    - Option 5.1 — Wholesale regulation only;
    - Option 5.2 — Retail regulation only;
    - Option 5.3 — Wholesale and retail regulation;
      - “Home Pricing Principle”
      - “Visited Country approach”
      - “European Home Market Approach”

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<sup>106</sup> According to the Impact Assessment, the EU market for roaming is valued at around €8.5 billion in 2006, or 5.7 per cent of total industry revenue.

<sup>107</sup> See page 17.

- A7.13 Co-regulation is characterised by joint efforts on the part of operators and regulators. It can involve any combination of policy tools given that the “overall objectives, the deadlines and mechanisms for implementation, the methods of monitoring the application of the legislation and any sanctions are set out”. The Targeted regulation policy options are intended to be utilised if Co-regulation does not sufficiently achieve the objectives set out. Soft Law would look to a benchmarking exercise based on best practice prices to identify recommended international roaming services, and integrate them into non-binding Community legislation. The Visited country approach would have consumers charged the actual domestic rate for making a call within the visited country, and an international rate equivalent to what a subscriber in that country would normally pay to make an international call (the other two Targeted regulation options are defined below).
- A7.14 The Impact Assessment uses a static model to calculate the welfare effects of each policy option in competitive equilibrium. The model consists of demand-side set of functions which are analysed with comparative statics, and of cost-side modelling. It uses three scenarios to gauge demand elasticity of roaming. As a secondary goal the model is used to calculate possible spillover or redistributive effects. In addition to the model, the Commission undertook a two-round consultation of major mobile operators, smaller operators, ministries, NRAs, and consumer and user associations.
- A7.15 The Impact Assessment finds that the European home market approach is the policy option offering the greatest consumer benefit, while having the most minimal implementation difficulties. This approach is a slight variation of another Targeted wholesale and retail regulation option, the “Home Pricing Principle”, which pegs retail roaming prices to the roaming customer’s home prices for comparable domestic services.<sup>108</sup> In order to circumvent this possibly leading to distortion in the wholesale market, parallel measures would be required on the wholesale level, either in the form of cost-orientation obligations or a capping mechanism. The justification given for impact had on industry by the Home Pricing Principle is that for most operators there is a small difference between the price of international calls and international roaming calls.
- A7.16 The European home market approach tweaks the Home pricing principle and applies (maximum) EU-wide roaming rates, to be set by reference to benchmarks based on multiples of the average EU mobile termination rates (MTRs). The rationale for opting for this approach is provided by its ability to overcome certain implementation difficulties identified with the Home Pricing Principle, and, by setting stricter price caps providing greater consumer benefits (and in turn detriment to industry).

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<sup>108</sup> To illustrate,

Under this ‘home pricing’ approach, a Belgian customer, for example, roaming in Spain and making a local call (i.e. a call to a Spanish number) would be charged a rate not exceeding the rate (as charged by his or her home network) for a local call in Belgium. The same customer roaming in Spain and making a call home to Belgium (i.e. a call to a Belgian number) would be charged a rate not exceeding the rate (as charged by his or her home network) for an international call to Spain from Belgium (page 31).



**Table A7.1: Suggested Roaming Charges under European Home Market Approach**

	Wholesale maximum charge (€ per minute)	Retail maximum Euro-tariff (€ per minute)	
	All calls	Calls made	Calls received
IOT for calls made within visited country	2 x MTR = 25.28	32.9	1.3 x MTR = 16.4
IOT for calls made back to home/another EU country	3 x MTR = 37.92	49.3	1.3 x MTR = 16.4

Source: European Commission, 2006

A7.17 The suggested charges are displayed in Table A7.1. One can compare this table with the actual charges stipulated by the Roaming Regulation, in Table A7.2.

**Table A7.2: Charges Set by Roaming Regulation**

	Wholesale maximum average charge (€ per minute)	Retail maximum average Euro-tariff (€ per minute)	
	All calls	Calls made	Calls received
29 June 2007	0.30	0.49	0.24
30 August 2008	0.28	0.46	0.22
30 August 2009	0.26	0.43	0.19

*N.B.: Wholesale charges are inclusive of origination, transit and termination costs; retail charges exclude VAT.*

Source: OJEU 29/06/07

Broader effects of each policy option are explored and addressed in the report. The report makes scant mention of SMS and data charges, except to say that it is unlikely VOIP technology will make any difference to market competition in the short term; and even if it were to, operators would still be able to charge for data. However, it was emphasised that NRAs should monitor retail roaming for charges including for voice, SMS and MMS and report back to the Commission.

## The Economics of Mobile Telephone Regulation

- A7.18 Haucap, Justus (2003) “The economics of mobile telephone regulation” Institute for Economic Policy working paper, University of the Federal Armed Forces Hamburg.
- A7.19 Haucap’s paper raises several relevant issues about the telecoms market, regulation and delves into some of the nuances of the mobile markets and markets for roaming. While the main conclusion of the article is to demonstrate that *ex post* telecoms regulation is a “breach of the implicit regulatory contract by the State” and tantamount to a “government ‘hold-up’”, more serious lessons can be extracted from the body of the article. For example, if rules and regulations exist in the market which hinder market entry or induce uncertainty this will decrease incentives for new entrants and slow investment and innovation (especially when evaluated by means of a dynamic model).
- A7.20 Haucap bases his analysis on the premise that the telecoms market is different from most other markets because it involves significant sunk costs as well as endemic common costs. Therefore, one cannot assess the market from a regulatory point of view and assume that prices will be reflective of marginal costs in a competitive market without accepting that there will always be a mark-up to recoup the initial investments required. Instead, a good understanding of the Ramsey pricing structure is required to see that efficient cost structures entail charging a price above marginal cost which is inversely proportional to elasticity of demand.
- A7.21 Haucap demonstrates that the empirical literature has not arrived at any clear conclusions about the competitive number of operators in the telecoms market. He cites barriers to entry and switching costs as the main arbiters of competition but then points out that this is made complicated in the European telecoms markets because it has been difficult to prove that the availability of frequency spectrum is a limiting factor on the number of entrants. He notes that the advent of mobile number portability (MNP) has lowered switching costs for consumers between networks and therefore enabled operators to price more aggressively.
- A7.22 MTRs are seminal for understanding competition between operators. Unfortunately, there is no shortcut to discerning what competitive conditions different MTR rates might reveal. For example, one might assume that high MTRs in a market with a few major players indicate weak levels of competition — but closer analysis has shown that collusive termination fees can be an equilibrium only if all networks are symmetric (i.e. same size) and compete in non-linear prices (e.g. two-part tariffs or price structures that discriminate between on-peak and off-peak calls). As being able to satisfy both conditions at once is improbable, high MTRs do not necessarily mean that competition is weak; and in some situations can even indicate the opposite.
- A7.23 However, one potentially useful result was cited in a 1999 paper by Wright which states that the socially optimal termination fee should be between 200 and 400 per cent of marginal cost. Haucap continues to say that the Ramsey pricing rule mandates that MTRs be “significantly” greater than marginal costs because they are relatively inelastic. He also argues that high termination fees indirectly intensify competition for new subscribers between networks who want more customers to receive calls from rival networks. However, the issue of regulating MTRs is obfuscated by the problem that cost structures are generally somewhat of a mystery to the consumer.

- A7.24 The roaming analysis presents an interesting issue for the European question because Haucap distinguishes between national and international roaming situations. He cites the 2002 Salsas and Koboldt result that coordination of roaming prices between networks in other countries can lead to more transparency, higher quality and lower prices merely because the firms typically do not compete with each other and as such have strong incentives to enter into agreements. On the other hand, with national roaming and mobile virtual network operators (MVNOs), the interested parties are also competitors. Valletti (2003) argues that a monopolist has little incentive to allow for roaming and as such voluntary *national* roaming agreements between duopolists should be considered as a sign of collusion. But this result will vary accordingly with the number of players and amounts of market power.
- A7.25 Such a distinction in competitive conditions due to the existence of international borders raises important questions about the case for Europe. If network operators have greater incentives to enter into roaming agreements with operators from separate markets, then the distinction between markets and borders must come to the forefront as a factor of negotiation. Needless to say the tension would play a role in consolidation talks, and in forming roaming agreements. To take this idea one step further, if roaming prices remain capped — and international roaming agreements between operators are no longer viable, then suppressed competition which would normally be manifest in roaming prices may find outlet vis-à-vis more aggressively competitive national and international markets for mobile telephony.

### **On Data Roaming**

- A7.26 Vrolijk, Erik & Bouwman, Raymond (2008) “Study ‘roaming data services’” Hague: Connect2Roam.
- A7.27 Vrolijk and Bouwman’s in-depth examination of data roaming was conducted at the request of the Commission to serve as input for their requisite review of the developments in wholesale and retail charges for the provision to customers of roaming voice and data communication services under the Roaming Regulation. The report, although it explores an increasingly relevant and substantial part of the market, focuses on data services and therefore does not cover SMS or MMS uniquely. However, by encompassing all data, SMS and MMS are included implicitly even if there is no discussion of them in isolation.
- A7.28 The report, although heavily technical, brings to light many important features of the market, often in the context of comparisons with the market for mobile roaming for voice. It explores the markets for retail and wholesale mobile data roaming services, and then examines the costing process. The two dominant pricing concepts in the retail market are known as the “managed” and the “unmanaged” models. The unmanaged model is akin to what is offered by fixed line broadband providers, where internet access is provided and differentiated on transmission speed rather than services offered. The managed model offers prearranged services to the customer in basic infrastructure, service specific infrastructure, software, quality of service, devices, and pricing plans. Examples of these services include Blackberry, MMS, Messaging, Mobile TV, Machine-to-machine services, etc. It is noteworthy that the spread in the per MB rates for different services is apparently much greater than the variation occurring in price per minute for voice in the corresponding market segments.

A7.29 Today most mobile data operators pursue relatively aggressive price approaches. The report highlight some market characteristics to explain this:

- Mobile data are an emerging market. Customers need to get familiar with the possibilities and benefits of mobile data;
- Operators in some cases are faced with excess capacity on the data networks;
- HSPA [High Speed Data Access] technology creates the possibility to compete with fixed ADSL networks;
- Costs for data networks have a ‘shared’ nature. For instance, there is no data volume interconnect charging for mobile data services. For voice, the interconnect charges create a bottom line (base) for the retail charges. For mobile data such a threshold does not exist

A7.30 The report argues that there is too much uncertainty to know whether some of the current pricing structures are sustainable from the cost perspective into the long run. This is largely because current retail offers do not necessarily reflect historic and/or future cost levels for networks. For example, the situation may emerge (and has before) when operators will have to invest in expanding capacity.

A7.31 A cost component model is outlined by the study. Overall there for data roaming there is a very limited number of additional components when compared to existing voice roaming service. The authors stress also that retail data prices are formed by many components, of which cost is only one: there are the factors to take into account of packaging, segmentation, transparency, service-based pricing, and market situation. The major and primary sunk-cost needed for data roaming is the GRX service.<sup>109</sup> Therefore it is more difficult for smaller operators to charge competitively for data roaming than it is for major ones, especially in the high data volume scenario after depreciation of one-time implementation costs.

A7.32 Finally the report draws some conclusions with regards to the regulatory challenges of roaming data services. First, because prices differ per services offered, regulation at a per-MB price can have a possibly unwanted impact on the business models used by operators — but it can also impact voice roaming regulation. Yet price regulation, as implied above, may not deal with all market issues in a situation when customers are not fully aware of the market structure. Moreover, because current retail data prices at the domestic level do not necessarily reflect future cost levels, these rates may not be the appropriate benchmark when considering regulation. Finally, the underlying data wholesale rates have often limited operators from bringing the most attractive offers to the market for services, even if generated in high volume.

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<sup>109</sup> GRX service is a peering exchange between different mobile networks, which provides secure and private exchanges between a home and roaming network that are connected to several GRXs. GRX implementations exist worldwide and are commercially available to mobile roaming operators.

## The Regulation of International Mobile Roaming

- A7.33 Sutherland, Ewan (2008) “The Regulation of international mobile roaming” *Info*, Vol X, No 1, pp.13-24.
- A7.34 Sutherland’s paper deals almost exclusively with the European market in the context of the 2007 Roaming Regulation. The paper surveys the regulatory developments over the last decade in the European Union and arrives at rather unfavourable conclusions about their efficiency and effectiveness. It then discusses the regulation of mobile roaming in other regions of the world.
- A7.35 In pairing the 2007 Regulation with the 2002 Framework Directive into a single context, which created the possibility for NRAs to impose *ex ante* obligations on operators deemed to have SMP, Sutherland highlights the flaws of the process to arrive at the former. He supposes that if DG Competition truly had customers’ interests in mind, it would have allowed expansive operators to consolidate further and offer pan-European tariffs. However in appealing to the protection of smaller operators from being squeezed out of the market Sutherland views the DG choice to ignore the goal of a single market as a way of placating Member States who wanted to protect national operators. On the other hand, he lauds the Directive for its “well-established approach of identifying markets for analysis, designating dominant operators and the imposition of remedies to address specific problems” — qualities not attributed to the current Regulation.
- A7.36 After thirteen Member States concluded regulatory analysis of the market for international roaming,<sup>110</sup> no regulator imposed SMP on any operator. More fundamentally, neither was any regulator able to identify a root cause of the pricing problem. Sutherland explains that two reasons for this “regulatory failure” are:
- A7.37 Insufficient data were used for the analysis. Most data were short-term snapshots whereas the market in question is extremely dynamic and perpetually evolving.
- A7.38 The framework for the analysis was national, but should have been trans-national. The market definition for international roaming as such did not sufficiently take into account exchanges of traffic and revenues.
- A7.39 Nonetheless and perhaps resulting from the “insistence” of Commissioners, a roaming Regulation was proposed and implemented in 2006. As Sutherland lamented, it stood outside of the 2002 framework, but the problem cannot be effectively addressed before it is formulated in the context of competition law economics.
- A7.40 Another significant change that took place between the proposal and the Regulation involved the decoupling of prices with MTRs, as this linkage was seen to be excessively complicated.

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<sup>110</sup> These were Austria, Czech Republic, Denmark, Estonia, Finland, Greece, Ireland, Italy, Norway, Poland, Slovenia, Spain and Sweden.

- A7.41 Sutherland notes that while ARCEP and the EC have previously defined the wholesale termination of SMS as a market, there is no agreed definition for Multimedia Messaging Service (MMS) and it is arguably not even a distinct market. The regulation of data roaming is problematic due to the take-up of wholesale data roaming services by unlicensed service providers, and high potential for supply-side substitutability in the retail market. But Sutherland sees the low levels of roaming data penetration as a sure sign that “something is badly wrong with the market”.
- A7.42 A small selection of country case studies is examined, albeit in the context that most have been “looking to the European Union for a solution to the roaming problem, given its superior resources and its trans-national responsibilities”. The Arab Regulators Network, for example, implemented a website in 2007 with pricing information; however, when this was not sufficiently effective it asked the Council of ICT Ministers of the Arab league to take active measures to reduce prices, again, following the EU example. Beyond that, developments elsewhere have pushed prices even lower, either to local rates — or, as in African countries, free.

**GSM Association Response to the Public Consultation for the Review of the Functioning of the Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its Possible Extension to SMS and Data Roaming Services**

- A7.43 GSMA (2008) “GSM Association response to the public consultation for the Review of the functioning of the Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and data roaming services” London.
- A7.44 The GSM Association (GSMA) argues against the Roaming Regulation and any extension of its scope or duration. The GSMA is the global trade association representing over 750 GSM mobile phone operators across 218 countries and territories worldwide. It has headquarters in Atlanta and London.
- A7.45 The reasons given in the Response for protesting the Regulation are not particularly extensive, but many points appear to be solid and carefully argued. Above all they argue that the Roaming Regulation was and continues to be unjustified because competition in both the EU mobile market and its roaming “sub-market” for roaming is strong. According to the report, before the Regulation was enacted, domestic mobile service prices in the EU dropped at 13 per cent per annum while roaming prices declined by 20 per cent in the year to July 2007.
- A7.46 The GSMA further argues that the legal basis for the Regulation is surrounded by “significant doubt” due to claims and a lodged complaint that the Commission failed to conduct a proper consultation process and impact assessment prior to implementing legislation. The Commission was mistaken to regulate the mobile roaming market in isolation, as it is a sub-market of the mobile market and asymmetric changes will distort other areas in the market. The GSMA maintains that regardless of this all operators have complied with the Regulation, and furthermore that competition and innovation continue independently of the new “Euro-tariff”, and would do so in its absence. Unfortunately increased usage of roaming due to the Regulation has not offset the negative impact of price cuts to the industry, as the Commission predicted would occur.

- A7.47 The GSMA is especially critical of the Euro-tariff. In the first place, about 40 per cent of roaming traffic (calls made and received) in the first quarter of 2008 has been on a roaming-specific (i.e. non-Euro-tariff) plan. This implies, it is argued, that frequent roaming customers are capable of selecting the most attractive tariffs and that most EU citizens do not roam because they do not go abroad; not, as the Commission might assert, because of fears of high prices. This conclusion of course is somewhat fallacious, as it is possible that the self-selecting 40 per cent of the EU mobile customer population does not reflect its entirety. GSMA additionally argues moreover that the intense publicity surrounding the Regulation has spawned a general reluctance among consumers to enter competitively priced non-Euro-tariff plans, which may actually be more beneficial. Finally, the rigid structure imposed on prices by the Euro-tariff requirements has made further pricing innovation significantly more difficult.
- A7.48 The Regulation should not be extended in duration or scope, and must be repealed. Any economic justification for the Regulation such as the high legacy tariffs cited by the Commission in 2006 have been removed, and there is no rational incentive, given the attention it would draw from consumers, press and regulators, for any operator to reintroduce them. On the other hand, operators have not seen enough increases in traffic or volume to offset the revenue losses incurred: revenues are forecast to decline and a report attached as an appendix warns of imminent drops in investment.<sup>111</sup>
- A7.49 It is inappropriate to introduce new regulation into either the market for data or SMS roaming. The market for data roaming services is nascent and as such still in a perpetual state of self-revision and innovation which influences operators' promotional strategies. Moreover, the migration from 2G to 3G networks introduces a level of technical complexity for data roaming not had by voice, and bilateral agreements take longer to arrive at and to implement. Price reductions are already significant in both wholesale and retail levels, and traffic, although still low overall, increased by 75 per cent in the year to April 2008. SMS roaming services are popular and demand continues to grow (although it is slowing, which may indicate market saturation). In addition, like voice roaming services, SMS are provided as part of a basket offered to consumers and cannot be regulated in isolation.
- A7.50 Finally, GSMA argues that even if the Commission does not accept that there is no market failure for roaming services, regulation is still premature. After all the Roaming Regulation is not yet a year old, and operators spent most of 2007 preoccupied with ensuring compliance. An immediate assessment will prevent from the observation of the impact had by the Regulation during summer, the busiest European roaming period.

### **Obligations that can be Imposed on Operators with Significant Market Power under the New Regulatory Framework for Electronic Communications**

- A7.51 Valletti, Tommaso (2004) "Obligations that can be imposed on operators with Significant Market Power under the new regulatory framework for electronic communications" *Journal of Network Industries*, Vol 5, No 1, pp51-81.

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<sup>111</sup> A.T. Kearney and Professor Newbery, David (2008) "Demystifying the European mobile industry" London.

- A7.52 Valletti's paper is organised into three areas: wholesale markets of access and call origination on the public mobile networks; wholesale voice call termination on individual public mobile networks; and wholesale international roaming on public mobile networks. For the purposes of this study we look most closely at the latter topic, although the second part offers some insights which are relevant to the roaming issue. Each area first reviews the market failures most likely to occur within the industry, the optimal (*ex ante*) regulatory approach, and provides possible remedies.
- A7.53 The author points out two noteworthy peculiarities in the wholesale market for roaming, although one is less relevant four years later. First, the 1996 Standard Terms for International Roaming Agreement (STIRA) coordinated by the GSMA carries a non-discrimination clause: according to this provision, each operator must apply the same terms and conditions in its international roaming agreements to all other operators.<sup>112</sup> The second unique problem for the market results from a combination of poorly informed consumers and a technological constraint through weak capacity for traffic steering on the ability of roaming customers to switch to the cheapest available network in the visited country. Together, these conditions mean respectively that on the one hand operators have little incentive to offer attractive wholesale rates to certain visiting networks and that consumers have little incentive to seek out the best tariffs when roaming. Valletti notes that as a result of this interaction the market will be "quite frozen, where no one has a real interest in changing the current pricing structure". One should bear in mind that traffic steering technology will have improved since 2004.
- A7.54 But there are further reasons to be concerned about the competition in mobile roaming markets. Some market characteristics may facilitate joint dominance such as the potential for all visited networks in a given country to assume the role of a collective entity, and the use of GSMA as a vehicle to acquire multi-market contacts and tacitly compare IOTs. Regulators too may have distorted incentives because the welfare impacts of roaming agreements include multiple countries, but NRAs are concerned primarily with the surplus of domestic consumers or the profits of national network providers.
- A7.55 The "first best" situation is therefore one where retail prices are set at incremental cost, which is the socially optimal equilibrium when charges are not marked up due to SMP. If the market is mature enough that subscribers have inelastic demand, then fixed costs may be recovered by raising subscription charges and not calling charges. If the market is not mature, then the mark up would reflect a number of elasticities in both countries. Incidentally this mark up might be offset by a receiving party pays (RPP) policy.<sup>113</sup>
- A7.56 The following are given as possible remedies to the failures discussed:
- a) Abolition of the no discriminatory clause;
  - b) Technological requirements for operators to adopt steering mechanisms;
  - c) Exclusivity deals between networks;

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<sup>112</sup> STIRA standardised pricing principles across GSMA members in order to facilitate the setting of IOTs.

<sup>113</sup> Visiting customers are more likely to keep their phones switched off when charged for calls received; therefore a negative mark up is required to incentivise them to keep their phones on.



- d) Reciprocity requirements between countries;
- e) Transparency;
- f) Imputation tests (e.g. linking prices of roaming and international calls); and
- g) Wholesale charge controls.

A7.57 From the above list (b), (d), (e), and (g) would be the most viable options for the EU case. Abolishing the no discriminatory clause is a drastic measure to take and would require careful and extensive review of the market first. Option (c) is not a possibility as long as the no discrimination clause is in place. Imputation tests remain a possibility, as put forth by the Commission Impact Assessment in various forms, but according to this author there is little economic justification for linking prices when the two demand functions are likely to be so disparate.

A7.58 Technological requirements, option (b), are likely to emerge naturally once economic incentives are put into place for operators to compete. However in the absence of this it is likely to be seen as intrusive and cumbersome. Option (e), Transparency, is a good way to increase price elasticity on the part of consumers, but on its own it is unlikely to suffice. Both remaining options, Reciprocity and Charge controls, require bilateral agreements and would therefore apply well to the context of the European market. Reciprocity is likely to help synchronise regulatory interests between countries.

A7.59 Yet this is not to say that these latter options will be completely beneficial. Reciprocity is unlikely to undo most double mark ups if charges have already been set in bilateral agreements. Furthermore, if one country is a net receiver of foreign calls it is likely to prefer the higher tariffs. Valletti deems charge controls to be intrusive to this particular market, but concludes that in the absence of other solutions, this one may effectively put an end to tacit collusion in the wholesale market.

### **Demand-side Spillovers and Semi-collusion in the Mobile Communications Market**

A7.60 Foros et al. (2002) “Demand-side spillovers and semi-collusion in the mobile communications market” *Journal of Industry, Competition and Trade*, Vol 2, No 3, pp259-278.

A7.61 This paper is most relevant to the question of data roaming. While data roaming is not specified by the paper, the model used is 3G (UMTS). However, the overwhelming majority of mobile phones currently in use are 2G (GSM) and thus the extension of the results of this paper to evaluating the roaming regulation is limited. Moreover, with the exceptions of Germany and the Netherlands, all 2G MNOs in Western Europe are required to provide roaming services to operators that have 3G licenses.<sup>114</sup>

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<sup>114</sup> Atiyas, İ, and Doğan, P. (2007) “When good intentions are not enough: sequential entry and competition in the Turkish mobile industry” *Telecommunications Policy* Vol 31, pp502-503.

A7.62 The model is predicated upon a three-stage game under a duopoly, in the presence of an NRA. In the first stage roaming quality, voluntary or mandatory, is selected by the firms or regulator. In the second stage the firms determine the extent of infrastructure investment either cooperatively or non-cooperatively, and in the third stage they compete in a Cournot price game.<sup>115</sup> There are thus altogether four combinations of game options, and they yield the following results:

- Firms, regulator and consumer are all better off under collusion provided that roaming quality is set sufficiently high;
- Furthermore when quality is chosen in the model it is indeed sufficiently high in all cases, implying that when the regulator selects roaming quality it is aware that it can do no worse than allowing collusion;
- Introducing a third, virtual operator into the game qualitatively shifts all investment incentives, which decrease in roaming quality under both collusive and non-cooperative markets.

A7.63 The most significant application of this capacity investment game would be to the upgrade from 2G to 3G systems. The analysis of consequences is more relevant to 3G systems because while the majority of 2G providers made non-cooperative investments, this pattern has not necessarily been followed by 3G providers. Second, there is more benefit to sharing roaming agreements between 3G networks, which have more dynamic capacity arrangements than the fixed amount typically allotted to 2G providers. This means there is an augmented positive externality generated to other networks when one firm invests in new infrastructure.

### **When Good Intentions are not Enough: Sequential Entry and Competition in the Turkish Mobile Industry**

A7.64 Atiyas, İzak and Doğan, Pınar (2007) “When good intentions are not enough: sequential entry and competition in the Turkish mobile industry” *Telecommunications Policy* Vol 31, pp502-503.

A7.65 İzak and Doğan present a case study on the Turkish mobile industry as an example of regulatory failure. Turkey is currently trying to model its regulatory framework on the European regulation for electronic communications, in preparation for accession. However, a decade after liberalisation, the mobile sector in Turkey remains one of the most concentrated in Europe: in 2003 the dominant operator, Turkcell, had 68.1 per cent market share, the largest of any dominant operator in the OECD countries, with the exception of Mexico. This chart is more glaring in the context of a staunchly pro-competitive regulatory regime.

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<sup>115</sup> The authors justify the selection of a Cournot game by the need to constrain capacity (e.g. quantity) limits, thereby ruling out the possibility of playing Bertrand.

- A7.66 The driving force behind the rigid market, according to the authors of the paper, has been the impact of delaying new entry into the market by seven years. This confirms the significance of first-mover advantages in the telecommunications industry. The advantages stem from tariff mediated network externalities and switching costs, and are amplified the longer the delay lasts before new entry. The authors cited three possible regulatory instruments for introducing competition into the market: national roaming, interconnection regulation and number portability. For different reasons, among them the lacking robustness of the Turkish legal regulatory framework, none of these tactics was successful.
- A7.67 One lesson to emerge from the unsuccessful implementation of roaming policy relates to the importance of foresight: roaming obligations should be imposed during original concession agreements with incumbent operators, and not as an afterthought. Yet a significant difference between the Turkish case and the situation in the EU is that the roaming agreements made in Turkey occur within the country. National roaming is used in Turkey as a viable way for firms to extend geographical coverage in the presence of major incumbent operators. Still, the authors attempt to gain insight into the Turkish scenario by looking to the limited literature available on the market for international mobile roaming.
- A7.68 Among the literature surveyed is a 2003 paper by Valletti that offers a model in which firms simultaneously set coverage, negotiate for roaming, and compete on prices.<sup>116</sup> Valletti finds that in the absence of collusion firms do not have an incentive to roam because it would require more rigorous competition (network coverage is considered here to be a measure of quality). Moreover if firms can collude on price they can then avoid duplication of networks and strategically employ roaming agreements to provide services in non-covered areas. The caveat to Valletti's model is its assumption of simultaneous network development, which does not apply to the Turkish mobile market, or in many of the European Member States. In a model of national with sequential entry the incumbent operators are likely to deny roaming privileges at a reasonable cost to new entrants as these firms have already built their network and reputation, locked-in some customers through tariff mediated network externalities, and face little threat from new entrants. This condition is unlikely to apply to the European case, where competition from neighbouring network providers may exist to strike agreements with new entrants before rival firms do.

### **Competition in International Mobile Roaming: Alternative Clusters**

- A7.69 Kumar et al (2007) "Competition in international mobile roaming: alternative clusters" *Communications & Strategies* Vol 3<sup>rd</sup> Quarter, No 67, pp151-172.

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<sup>116</sup> Valletti, T. (2003) "Is mobile telephony a natural oligopoly?" *Review of Industrial Organisation*, Vol 22, pp47-65.

- A7.70 This paper provides an analysis of the predominant business structures within the market for international mobile roaming, and homes in on one emerging model. While traditionally the model for international mobile roaming has been based on bilateral financing and technology, more and more these bilateral models are giving way to “clusters”, that is, vertical and/or horizontal groupings of three or more operators which utilize a packet-switched hub-and-spoke model rather than the traditional dominant circuit-switched roaming model.<sup>117</sup> Three different types of clusters are discussed in the paper.
- A7.71 The first two cluster types discussed involve mobile operators with traditional business models, a single operator with multi-national presence based on its own subsidiaries (e.g. Vodafone); and a group of operators, usually medium-sized with moderate geographical presence, who form cooperative alliances in order to attain their objectives (e.g. FreeMove alliance). The third type capitalises on the emergence of IP as the *de facto* mobile data transmission protocol to generate a new, alternative type of cluster. It is formed as a result of convergence and is based on the separation of network and service operators. Skype is the given example of this cluster type.
- A7.72 Such clusters involve an independent service operators lacking access to networks of its own that aligns itself with other mobile or unlicensed network operators or aggregators “in order to offer seamless services to its own as well as partners’ subscribers in multiple markets.” Such alliances may be formed vertically such that each player’s role is complementary to (and therefore largely dependent upon) the other’s — or horizontally, so that service operators form alliances between each other resulting in “super-clusters”, or larger clusters consisting of multiple clusters. In order for service operators to enter the market, many key enablers are required, such as access aggregators, charge and billing providers, mobile handset vendors to offer multi-mode handset (Cellular + WLAN/WiMAX) support, and not least, available low cost wide and local area network access at affordable prices.
- A7.73 The emergence of service operators poses a threat to traditional independent mobile roaming operators. The authors emphasise the importance of voice roaming services to revenue: international mobile roaming generates between 15 and 25 per cent of a mobile operator’s revenue. Because of the nascent status of data and content provisioning for roaming services, the great majority of revenues for roaming still comes from voice and SMS services; however, a combination of high retail tariffs and poor transparency has mobilised customers to look for alternative models. According to one study, mobile operators stand to lose up to 6.8 per cent of their revenues by 2008 due to roaming subscriber migration. The greatest impact is thought to be on European mobile operators.

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<sup>117</sup> Packet-switching refers to the technology used for routing data, so-called because information is processed in individual blocks, or packets.

A7.74 The conclusions of the paper point to opening up the traditional market to emerging cluster types. The rise of these operators would create competitive pressures on traditionally dominant mobile operators and lead therefore to considerable reductions in existing tariffs. However, as the business model is still new, the integration of these players relies largely on regulators willing to push for the re-definition of the market for international mobile roaming.

### **International Roaming: ERG Benchmark Data Report for April to September 2007**

A7.75 ERG (2008) “International roaming: ERG benchmark data report for April to September 2007” Brussels.

A7.76 The ERG has implemented a regular survey programme in order to monitor the changes taking place in the international mobile roaming market in the EU in the wake of the Roaming Regulation. Data are to be collected on a six-monthly basis, and presented by quarter. This report, the first such collection, is the only one available as of the time of this report; because it spans the six months leading up to the enactment of the Regulation, the ERG considers this to be benchmarking data for future instalments.

A7.77 Although the Regulation was only fully in effect at the very end of the data collection period, the report nevertheless points to a decline in average wholesale and retail roaming prices. Retail price information is also now widely available to consumers. Overall, there has been a high level of compliance in all EU Member States with the Regulation.

A7.78 The Appendix to the report names all survey respondents. They include over 150 providers of international roaming services — nearly all mobile operators in the EU, and a significant number of MVNOs. The ERG estimates that this sample covers over 95 per cent of EU consumers of international roaming services.<sup>118</sup>

A7.79 According to the charts in the data, the average price per minute of wholesale calls appears to have dropped by €0.07 from Q2 to Q3. The average price for EU/EEA roaming voice calls made declined by €0.07 during the same period. There was a reduction in the average retail price per minute for making a call by almost every provider surveyed. The average price for calls received dropped by €0.04. While the average retail prices for data roaming dropped as well, the prices charged by operators for SMS appeared to remain more or less constant. In general the prices for making and receiving calls to and from the “Rest of the World”, i.e. those not subject to the provisions of the regulations dropped slightly as well.

A7.80 The report explores some further issues relevant to the Roaming Regulation, but few of them pose significant problems. Traffic Steering seems to be successfully used to the advantage of consumers where possible, while inadvertent roaming is a rare occurrence for which operators compensated victims in every recorded instance. One possible area for improvement may be the existing discrepancy between billed roaming minutes and actual roaming minutes, caused by charges being rounded from actual seconds to the nearest amount of full minutes. According to the report the difference at the retail level tends to be about 20 per cent.

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<sup>118</sup> As it had not been possible to use the statutory data-gathering powers set out in the Regulation during the period before the Regulation was implemented, data was collected on a “best efforts” basis.

## **International Roaming: ERG Benchmark Data Report for October 2007 — March 2008**

A7.81 ERG (2008) “International roaming: ERG benchmark data report for October 2007 — March 2008” Brussels.

A7.82 The second ERG Benchmark Data Report was published on 12 August 2008, and it spanned the time period from between October 2007 and March 2008. This completes one year of data collection by ERG on international roaming, with about six months of this period falling after the Regulation went into force. Incidentally, since the publication of the original report, some operators have come forward to point out corrections to data. The second report accepts the revised estimates, and adds,

These updates have been incorporated into the data used in this Report, which may create some inconsistencies with the first Report. In such cases, the data from this Report take precedence.

A7.83 This time nearly all operators provided data, and those that were not able to do so provided best quality estimates and have embarked on necessary upgrades to be able to provide data in the future.

A7.84 The latest data collected are often compared to the findings of the first report; e.g. the analysis covers Q2 2007, Q3 2007 (from first report), Q4 2007, and Q1 2008 (this one). The findings show that on average, retail prices have decreased, but not significantly enough. In about two thirds of Member States they remain at or just below the maximum Euro-tariff. On the other hand, wholesale prices have dropped significantly: between Q2 2007 and Q1 2008, the EU/EEA average wholesale price per minute has decreased by around 46 per cent.

A7.85 SMS prices still appear to have seen little movement at either retail or wholesale levels. The report attributes this partly to the unregulated status of SMS. Data roaming prices however are decreasing, on both the wholesale and retail levels, despite much heterogeneity; yet data tariffs are not currently subject to retail regulation either. The report emphasises, in much of the same spirit as the first ERG Benchmark Data report, that it is still too early to gauge the full impact of the Regulation, primarily because observations for the summer months have not been made to account for seasonal effects.

A7.86 Some further issues are discussed. In general, most of the concerns voiced in the last report have either remained (but not worsened) or been remedied. For example, since the last report, all operators have been able to implement the transparency measures required by the Regulation, meaning those that could not previously have overcome technological complications. Inadvertent roaming still remains a problem, albeit quite minor; and billed minutes for roaming still exceeds actual minutes elapsed.

## **Public Consultation on a Review of the Functioning of Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and Data Roaming Services**

A7.87 DG Information Society and Media (2008) “Public consultation on a review of the functioning of Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and data roaming services” Brussels: European Commission.

A7.88 DG Information Society and Media launched a public consultation in May 2008. The consultation, designed to seek the views and data of interested parties, will provide necessary feedback to the European Parliament for the year end review of the impacts had by the Roaming Regulation. The consultation closed on 2 July. While the primary substance of the Consultation document is comprised of 39 detailed questions to be answered by the stakeholders, there is also solid background and contextual information in which the questions are couched. This provides some further insight into the execution of this project.

A7.89 The Consultation questions are organised roughly into the same categories of the “Description of the Study” section in the Terms of Reference for this study, and can therefore be read correspondingly:

**Extension of the duration of the Regulation:**

A7.90 What effects could be foreseen if the Regulation is not extended beyond 30 June 2010?

- The Consultation cites some conflicting evidence about this. On the one hand the trend seen even before the Regulation entered into full effect has been downward in both retail and wholesale tariffs, which is therefore likely to continue under business as usual.<sup>119</sup> On the other hand, the Consultation points out possible indicators of poor competition in the international mobile roaming market, notably the fact that most operators have set Euro-tariffs at maximum levels allowed by the Regulation and that since the Regulation came into effect no “genuine” substitutes for voice roaming services have been seen to emerge.

A7.91 Should the duration of the Regulation be extended?

- An additional argument to those given above for extending the duration of the Regulation centres around the scant progress made with regards to market transparency. If further developments would occur to improve the access of consumers to cost (including IOTs) and pricing information, and assuming a non-collusive market, it is likely that operators would be forced to compete on pricing below the maximum Euro-tariffs.

A7.92 To which level should the price caps for voice calls ideally decrease or increase in case of an extension of the Regulation beyond 2010?

- This issue is a complex one, and as such requires careful consideration of a multitude of variables before arriving at an answer. From the basic background given in the Consultation, there are a few issues to consider. First, it must be borne in mind that changes in one price basket may lead to reactionary changes in another to compensate for lost revenue (this is known as the “waterbed effect”).

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<sup>119</sup> This trend seems to have baffled even the Commission, as one mention in the Consultation explains this as being a preemptory response to the Regulation implementation while in another section it is questioned whether price caps ought not to be even lower if this trend would be seen to occur in the absence of any Regulation. This demonstrates the inability to use this short period of data from an instable regulatory environment to forecast future market behaviour.

Therefore NRAs would need to not only carefully consider possible repercussions on domestic tariffs, but also the cost of monitoring further price behaviour if the price caps are substantially lowered. For example, more operators may switch to per-minute billing to help offset losses in revenue. The Consultation also cites changes in the natural market behaviour from the time the Regulation was initially proposed, claiming that the reductions projected by NRAs have become “more pronounced” since the Regulation was implemented, which may provide impetus for further lowering the price caps.

#### **Extension of the scope of the Regulation:**

- Should the scope of the Regulation be extended to cover SMS, MMS and other data roaming?
- The Consultation document touches upon current trends in the SMS and data roaming markets. It notes that data roaming services are undergoing significant and ongoing changes in technological capacity and price plans. SMS roaming services, while commonly accepted to be very cheap, still do not exhibit any tangible relationship to costs either on the wholesale or retail levels. Moreover, business customers who are among the most frequent SMS roaming subscribers are not being targeted with cheaper rates.
- The Consultation document gives basic criteria for considering this issue in the context of both services. First, one should take into account evidence in support of or pointing to a lack of competition at the wholesale and retail levels. Secondly, the exact nature of the relationship between prices at the wholesale and retail levels as well as underlying costs should be discerned. Finally, it would be useful to compare differences in roaming charges with those for equivalent domestic services and determine whether this amount can be justified.
- Should the regulation apply on the wholesale and/or the retail level?
- Again, here it is imperative that the relationship between costs, wholesale and retail prices is understood. This necessarily implies a need for heightened levels of transparency on the part of the network operators. It is unlikely that this would be sufficient for determining regulation.

#### **IRG/ERG Response to Commission Consultation “Review of the Functioning of Regulation (EC) No 717/2007 (The “Roaming Regulation”) and of its Possible Extension to SMS and Data Roaming Services” of 7 May 2008**

A7.93 IRG/ERG (2008) “IRG/ERG response to Commission Consultation ‘Review of the functioning of Regulation (EC) No 717/2007 (the “Roaming Regulation”) and of its possible extension to SMS and data roaming services’ of 7 May 2008” Brussels.

A7.94 The IRG/ERG findings, which appear to be detailed, carefully considered and exact. The document provides a brief regulatory background and rationale for the thinking behind the Roaming Regulation.

As the IRG/ERG use the argument for regulation of the voice mobile roaming market as a sort of benchmark for arguments on extending its scope or duration, it is important to grasp what this argument is. Essentially, the IRG/ERG called for Regulation based upon the following reasons:



- In theory there are incentives for mobile network operators to compete for the business of foreign networks; however, in practice these incentives are muted by a limited number of players that nearly always give their business to sister companies.
- There are reasons to believe that benefits gained from regulation on the wholesale level, especially of roaming voice and SMS services, are not passed onto consumers of retail roaming.

A7.95 Independent of its position on the effectiveness of the Regulation, the IRG/ERG is in accordance with the GSMA about the problem that it is too early to fully understand the impacts of the current regulation, simply because not enough time has elapsed (Summer has not yet been observed to control for seasonal effects). The overview thus makes clear its position that the European Commission and Parliament should be sure to take information gleaned from after the 2008 review into consideration when coming to a final decision.

A7.96 While the IRG/ERG accepts that the stipulations of the Regulation are being met, evidence from the latest ERG Benchmark Data Report suggests that the tariffs in general “do not yet vary sufficiently from the Euro-tariff cap to provide evidence of healthy innovation and competition”. The regulators fear that operators may not have significant incentives to further reduce charges. Moreover this is compounded by the increasingly common per-minute billing (instead of per-second) which generates a “hidden charge” from the difference between minutes billed and actual minutes consumed. Still, it is mentioned more than once that permanent price regulation would not be an attractive option for any party, and if necessary alternative regulatory solutions should be investigated.

A7.97 With respect to a possible “waterbed effect”, the IRG/ERG, although they do not have data to prove it, strongly deny the possibility of any causal link between domestic prices and the Roaming Regulation. Domestic prices are the main focus of competition for consumers and are exceptionally unlikely to rise. There is some discussion about an international backlash from companies who lost revenue from the European roaming market, but the latest Data Report found this to be the case only in a minority of countries.

A7.98 For voice roaming, the ERG notes that despite significant positive improvements for consumers, the case for regulation is broadly the same as it was in 2006/7. Despite generously set price caps, at the retail level many operators charge at or near the maximum Euro-tariff caps. Therefore, the same reasoning used to adopt the current Regulation states that it should be continued until after 2010. The IRG/ERG also argues that current transparency provisions should be maintained, and extended to SMS and data roaming.

**Table A7.3: Suggested Charge Caps for Voice in Extended Roaming Regulation**

	Wholesale maximum average charge (€ per minute)	Retail maximum average Euro-tariff (€ per minute)	
	All calls	Calls made	Calls received
2011	0.16 – 0.24	0.38 – 0.46	< 0.38 – 0.46
2012	0.14 – 0.22	0.43 – 0.51	< 0.43 – 0.51
2013	0.12 – 0.20	0.40 – 0.48	< 0.40 – 0.48

Source: IRG/ERG

A7.99 Table A7.4 displays the recommended voice tariffs for an extended Regulation.

A7.100 While SMS roaming prices are seen as being extremely cheap relative to voice roaming, and thereby generate less overall consumer detriment, the IRG/ERG does not accept that the tariffs are justified based on wholesale or underlying costs. Moreover, despite calls from politicians and NRAs for sharp reductions in price, there has been little movement in SMS retail roaming prices. Apparently SMS termination is nearly unregulated in Europe at present. The report advocates regulatory arrangements analogous to those for voice roaming to be applied to the SMS roaming market.

A7.101 The following tariffs are recommended:

**Table A7.4: Suggested Charge Caps for SMS in Extended Roaming Regulation**

	Wholesale maximum average charge (€ per minute)	Retail maximum average Euro-tariff (€ per minute)
	All SMS	SMS sent
2011 -	0.04 – 0.08	0.11 – 0.15

Source: IRG/ERG

A7.102 While the price situation for data roaming is similar to that for SMS, the case for regulation is slightly weaker — although the IRG/ERG refuses to rule out the possibility. Costs for providing data roaming are likely to be significantly less than the typical retail charge (despite a very wide observed spread in tariffs). However, the IRG/ERG has noted some signs of competition in the market, as well as evidence that in most Member States the market has responded to calls from politicians and NRAs to cut data roaming rates. Moreover, the immature state of the market for mobile data services appears to provide some real commercial incentives to cut rates, regardless of regulation. It is also noted that if regulation would be designed for the data roaming market, it would be “extremely difficult” to do so correctly (i.e. without harming the operators) given the constant evolution of product marketing strategies and tariff structures.

## **Economic Study on IP Interworking**

- A7.103 Paul Reynolds, Bridger Mitchell, Paul Paterson, Moya Dodd, Astrid Jung, Peter Waters, Rob Nicholls, Elise Ball (2007) “Economic study on IP interworking: white paper prepared for the GSM Association” London.
- A7.104 The evolution towards Next Generation Networks (NGNs) or All-IP based fixed and mobile networks provides many opportunities, such as launching new innovative services, enhanced Quality of Services (QoS) capabilities (e.g., latency, jitter and security) and improvements in economic efficiency. Regulatory authorities are increasingly interested in the subject of IP Interconnection, as part of their overall review of the impact of the evolution to NGNs. Given this context, the GSM Association invited economic consultancy firm CRA International and law firm Gilbert & Tobin to undertake an extensive economic study on IP Interconnection. Their findings are presented in this report.
- A7.105 The report investigates charging models in IP Interconnection and concludes that there is no “one-size-fits-all” charging model that delivers superior efficiency in all situations. The report also provides several recommendations to regulators or policy-makers to ensure that IP interconnect will support efficient outcomes.
- A7.106 First, the report compares traffic exchange in three kinds of network architectures: traditional telephony networks, today’s IP-based networks and NGNs. Traditional telephony networks establish a single physical path for the duration of a phone call, which may involve several interconnecting networks. All these participating networks are known to the originating and terminating networks and have a commercial agreement to exchange traffic. Therefore, end-to-end traffic management and QoS can be provided. However, current IP-based networks deliver traffic in a best-effort way regardless of the content of the traffic. This means that traffic can be routed along multiple blind paths and can be lost or discarded (i.e., no QoS is ensured) before reaching its destination. NGNs create virtual QoS “paths”, which are sustained across multiple networks for the right duration. Traffic is attached with a quality level and routed on a pre-determined QoS path, in which all participating networks have agreed to exchange the traffic by fulfilling the desired QoS level.
- A7.107 Second, the report studies how IP Interconnect in NGNs can help to achieve economic efficiency. To be efficient, IP interconnect charges must cover the costs of each interconnecting network and support efficient retail pricing. In addition, the underlying wholesale costs must be borne by retail services. Given a large number of services delivered via IP (e.g., Voice over IP and IPTV) and the additional costs of supporting QoS, it is very important to optimise IP interconnection charges in NGNs.
- A7.108 Three charging models are then compared in terms of advantages and disadvantages: Initiating Party Network Pays (IPNP), Receiving Party Network Pays (RPNP) and Bill-and-keep (BAK). IPNP is likely to be optimal in most cases. But in some circumstances, RPNP can maximise efficiency. BAK means each network agrees to terminate calls from the other network at no charge. It is superior only in very limited situations particularly where traffic and costs are balanced. BAK cannot respond to market dynamics because it fixes the interconnect price at zero. The report states that various retail pricing models must be supported by a range of appropriate wholesale pricing models.

Therefore, there is no “one-size-fits-all” IP interconnect charging model that delivers superior efficiency in all situations.

A7.109 Finally, the report suggests what regulators and policy-makers need to do and not to do in NGNs. It highlights that regulatory intervention is risky. Wrong regulations may hinder innovation, damage competition and chill investment. It recommends that regulators should:

- proceed cautiously in recommending or imposing any particular IP interconnect charging model;
- intervene only in the event of demonstrable market failure (and if intervention can be expected to result in benefits which exceed the cost of regulation);
- intervene only to an extent that is necessary to remedy the market failure;
- tailor the solution to the specific market circumstances, rather than applying a standard “fall-back” option;
- issue explicit assessment criteria, based on whether and how efficient market outcomes would be advanced, to analyse which solution is best suited to fulfil the objective of the intervention.

A7.110 The report also suggests that existing regulatory frameworks based on objective assessment of market power are likely to prove suitable to remedy market failure where it has been identified.

## APPENDIX 8: OVERVIEW OF THE INTERNET PROTOCOL EXCHANGE (IPX)

### Background

A8.1 With the advances in mobile and fixed networks, today's networks are evolving to Next Generation Networks (NGNs) or All-IP networks. Mobile Network Operators (MNOs), Fixed Network Operators (FNOs), Internet Service Providers (ISPs) are expected to launch a wide range of new innovative services with enhanced Quality of Service (QoS) capabilities (e.g. bandwidth, delay). Whilst competing, these commercial entities have the common objective of delivering traffic to each other in a profitable and cost effective way. The common protocol to enable interconnection of these networks is the Internet Protocol (IP).

A8.2 Traffic exchange in NGNs is similar to that in traditional telephony networks. Traditional telephony networks establish a single physical path for the duration of a phone call, which may involve several interconnecting networks. All these participating networks are known to the originating and terminating networks and have a commercial agreement to exchange traffic. Therefore, end-to-end traffic management and QoS can be provided. However, current IP-based networks deliver traffic in a best-effort way regardless of the content of the traffic. This means that traffic can be routed along multiple blind paths and can be lost or discarded (i.e., no QoS is ensured) before reaching its destination. In the case of NGNs, NGNs create virtual QoS "paths", which are sustained across multiple networks for the right duration. Traffic is attached with a quality level and routed on a pre-determined QoS path, in which all participating networks have agreed to exchange the traffic by fulfilling the desired QoS level.

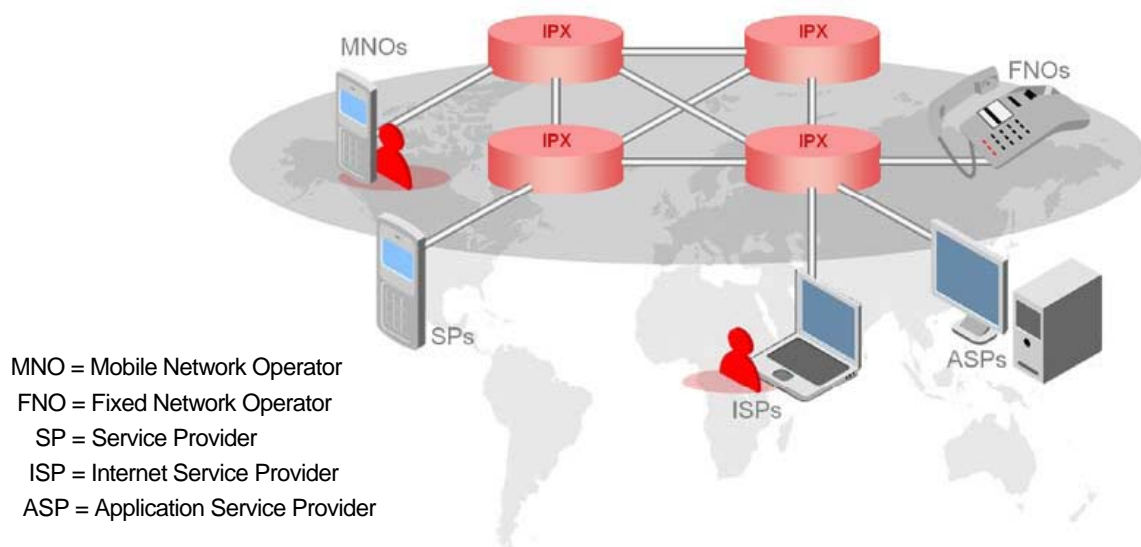
From the above comparison, we can see that there is a chain of interconnecting networks in traditional telephony networks and in NGNs. However, the chain is broken in current IP-based networks. The existence of such a chain ensures that retail and interconnection (i.e., wholesale) pricing is closely linked while in current IP-networks, interconnect pricing is only negotiated bilaterally at handoff, in isolation of retail pricing. When retail and wholesale pricing are linked, all parties in the chain can receive a commercial return, which promotes innovative services and enhanced service quality support.

A8.3 Service providers (e.g., MNOs, FNOs, ISPs) want to maximise their connectedness in NGNs for their users to appreciate the full value of their services. To address this demand, the GSMA has proposed an industry wide interworking environment, IP exchange (IPX), with the goal that all parties can commercially benefit from the environment.

## IPX Overview

A8.4 IPX is designed to exchange IP-based traffic among all kinds of service providers with controlled QoS capabilities in a secure environment. The IPX environment, as illustrated in Chart A8.1, consists of a number of IPX carriers and service providers. The IPX carriers will be mutually interconnected when there is demand from a service provider. This forms an interworking chain, in which all parties maintain technical and commercial agreements.

**Chart A8.1: IPX Environment**



*Source: IPX Brochure: IP exchange - Providing a quality based solution for IP Interconnect, IPX/Overview/v2/11.07, June 2008*

A8.5 The IPX carriers will be provided by a number of international IP carriers, such as Belgacom, France Telecom, Telecom Italia and TeliaSonera. Service providers are able to choose which IPX carrier they would like to use in order to access the IPX network.

A8.6 The GSMA has carried out a series of global workshops in 2007, discussing the practical implications of launching real-world solutions to the deployment of the IPX. In addition, trials were also launched in 2007 to speed up the commercial implementation of the IPX. In July 2008, trials of Voice over IP between mobile networks (supplied by Ericsson and Nokia Siemens) were successfully completed by GSMA. This is a key enabler to ensure the deployment of IPX-based interconnection.

A8.7 Development of the IPX initiative has attracted broad support from the industry. Fixed operators, mobile operators and carriers participating in existing or planned trials include Belgacom ICS, BT, Cable & Wireless, DTAC, Elisa, France Telecom/Orange, iBasis, Mobilkom, Proximus, T-Com, T-Mobile, Telecom Italia, Telecom Italia Sparkle, Telefónica/O2, Telefónica IWS, Telekom Austria, Telenor, Telenor Global Services, TeliaSonera, TeliaSonera International Carrier, Telus, Telecom New Zealand, Telecom New Zealand International, Vipnet, Vodafone and Teleglobe/VSNL.

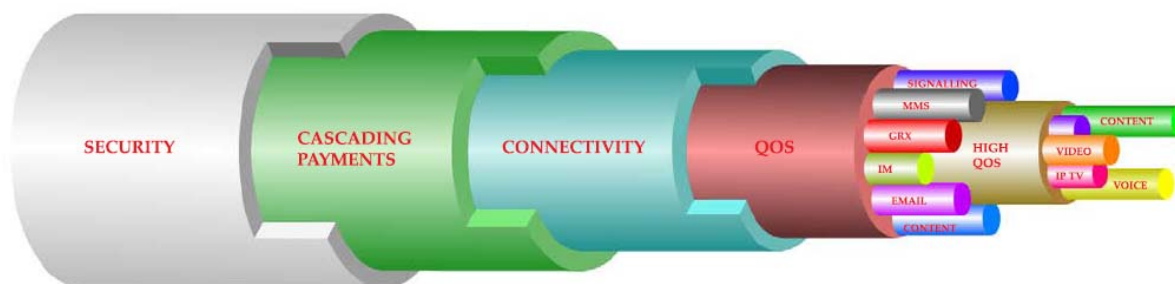
A8.8 Anticipated Fourth Generation (4G) systems will be able to provide a comprehensive All-IP solution for transporting voice, data and multimedia.

The international telecommunications regulatory and standardization bodies are working for commercial deployment of 4G networks roughly in the 2012-2015 time scale. So we can project mature IPX networks by then.

## IPX in Detail

A8.9 Key aspects of IPX are shown in Chart A8.2: Security, Cascading Payments, Connectivity, Quality of Service (QoS) and supported IP Services.

**Chart A8.2: Key Aspects of IPX**



Source: IPX Brochure: IP exchange - Providing a quality based solution for IP Interconnect, IPX/Overview/v2/11.07, June 2008

## Security

A8.10 The IPX is not addressable from the public Internet and hence end users have no visibility of the IPX. This provides privacy and protection to the management and delivery of IP services.

## QoS and Cascading payments

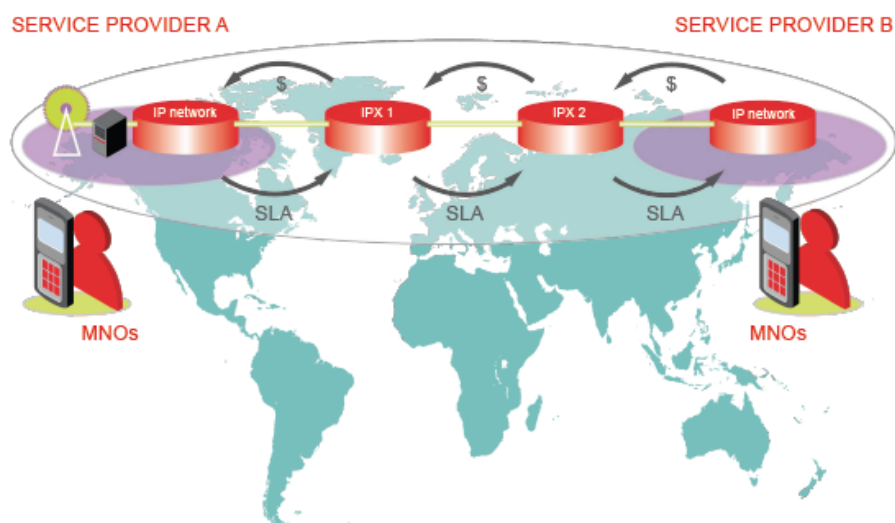
A8.11 Quality of service (QoS) is a key requirement for the IPX environment. Voice and video usually demand high QoS whilst other IP services such as Instant Messaging (IM) can use less demanding QoS. This brings many benefits in terms of efficiency, capacity and investment.

A8.12 In the IPX, a QoS path is established among service providers and IPX carriers for the duration of the transfer of traffic. Parties in a QoS path exchange traffic based on Service Level Agreements (SLAs), which specify various QoS parameters such as latency, jitter and security.

A8.13 Each party is compensated for its efforts in delivering traffic. Several interconnect charging models are optional, such as Initiating Party Network Pays, Receiving Party Network Pays, Bill-and-Keep,<sup>120</sup> data volume based, and duration based charging. The advantage of the cascading payments is that parties who meet their mutual obligations in the QoS chain will receive a fair commercial return. In Chart A8.3, assume Service Provider B roams a voice call to Service Provider A via IPX1 and IPX2. One party pays the next party in the roaming path for utilising network capacity and reserved QoS level.

<sup>120</sup> Bill-and-keep is a pricing scheme for the two-way interconnection of two networks under which the reciprocal call termination charge is zero - that is, each network agrees to terminate calls from the other network at no charge. The underlying assumption here is that on average, during the contractual period traffic flows are roughly equal in both directions.

**Chart A8.3: Service Level Agreement**

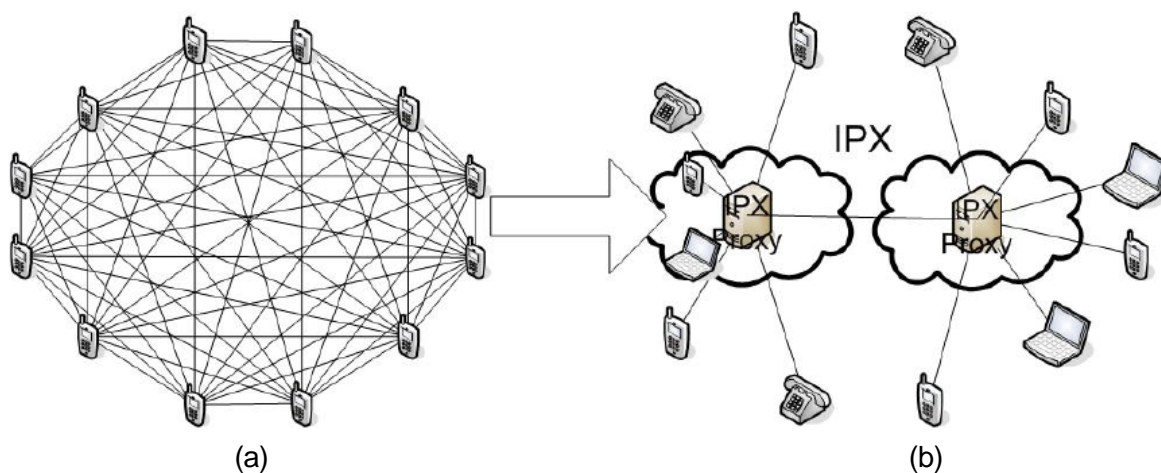


Source: IPX Brochure: IP exchange - Providing a quality based solution for IP Interconnect, IPX/Overview/v2/11.07, June 2008

**Connectivity**

A8.14 IPX provides efficient service connectivity. As the number of service providers grows, the bilateral point-to-point nature of GPRS roaming agreements begins to cause problems, as seen in Chart A8.4(a), presenting operational and financial burden. The IPX introduces a multilateral model to avoid these problems while keeping the bilateral model.

**Chart A8.4: Bilateral Model vs. Multilateral Model**



Source: IPX White Paper, IPX White Paper, vs1.2, March 2007

A8.15 The multilateral model results in a major simplification of commercial agreements: providing access to many service providers using a single agreement and a single connection with an IPX proxy (hubbing function), as illustrated in Chart 4(b).



## IP services

- A8.16 The IPX may be used to interconnect any IP services, such as Voice over IP (VoIP), IP Video Telephony, Instant messaging (IM) and Push-to-talk over Cellular (PoC).<sup>121 122</sup> The IPX itself is not responsible for offering these end-user services; the IPX provides the interconnection between the parties who offer these services.
- A8.17 For example, voice telephony is a real-time service that will be allocated a conversational QoS class. Critically, tight end-to-end latency control must be maintained for voice telephony services and consideration of this is vital in ensuring an effective and successful IPX.

## Regulation

- A8.18 There are two aspects that the IPX is relevant to the Europe Commission's proposals to regulate wholesale roaming charges
- A8.19 First, the wholesale roaming charges would involve more parties, i.e. between two IPX carriers and between an IPX carrier and a mobile network operator, because all these parties will be responsible for roaming traffic with specified quality. Therefore, any further regulation would have to regulate the IPX carriers in addition to mobile network operators.
- A8.20 Second, as summarised in the literature review for Economics Study on IP Interworking, regulators are recommended to:
- proceed cautiously in recommending or imposing any particular IP interconnect charging model (i.e., wholesale charges);
  - intervene only in the event of demonstrable market failure (and if intervention can be expected to result in benefits which exceed the cost of regulation);
  - intervene only to an extent that is necessary to remedy the market failure;
  - tailor the solution to the specific market circumstances, rather than applying a standard "fall-back" option;
  - issue explicit assessment criteria, based on whether and how efficient market outcomes would be advanced, to analyse which solution is best suited to fulfil the objective of the intervention.
- A8.21 Therefore, any regulation on the IPX should be flexible and only regulate the wholesale roaming charges at right time when the IPX interworking market is sufficiently mature.

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<sup>121</sup> Instant messaging (IM) is a type of real-time communication between two or more parties through the medium of typed text. The text is conveyed via computers connected over a network, such as the Internet.

<sup>122</sup> Also known as Press-to-Transmit, PoC is a method of conversing on half-duplex communication lines, including two-way radio, using a momentary button to switch from voice reception mode to transmit mode.

## **Conclusion**

A8.22 The IPX is a solution to ensuring a highly developed, competitive and flexible market for IP service interworking. It establishes a secure and efficient means of interconnection for different networks. It introduces a commercial framework that enables all parties in the interworking chain to receive a commercial return to encourage the delivery of QoS. However, due to its relatively new appearance on the scene, IPX regulation will be complicated, and require policy makers to exercise delicate judgment to about timing and scope of regulation.

## **APPENDIX 9: NARRATIVE OF SOME COMMERCIAL ROAMING PLANS ON OFFER IN THE EU**

A9.1 Below we provide a few examples of special offers and tariffs relevant to roaming customers within the EU. Please note that this sample is intended to give some indication of innovation in the EU market for mobile roaming, but is by no means exhaustive. Most of the major operators below have more offers on sale than those discussed. (Details can easily be found on the respective operators' websites.)

### **Orange**

A9.2 In May 2008, Orange/France Telecom appealed to its customers who travel frequently within the EU by introducing some new plans. "Data pass", aimed at users of data roaming, enables Orange customers to connect to the internet from any country. Depending on the country, he or she will see price reductions of up to 90 per cent off the official tariff.

A9.3 The "preferred country" (pays préféré) plan allows frequent EU travellers to pay €5 per month and realise savings between 18 and 60 per cent off of the official tariff in his or her country of choice.

### **3/Hutchison 3G**

A9.4 The popular "3 Like Home" offer is being extended into the winter months (2008). 3 Like Home enables travellers going between Austria, Australia, Denmark, Hong Kong, Ireland, Italy, the UK or Sweden — countries where 3 shares sister networks — to use their mobiles abroad as they would do at home. Monthly minutes and texts to standard home numbers are used at the exact same rates and charges when abroad.

A9.5 Moreover, if travellers exceed their monthly allowances they are still charged at their standard home rates; i.e., there is no minimum threshold after which prices jump beyond standard domestic rates. Although this offer applies to post-pay contract users, pre-pay customers do qualify for the same benefits if travelling to/from Austria, Hong Kong, Ireland or Italy. Equivalent offers apply to subscribers who reside in sister countries.

### **Telefónica/O2**

A9.6 The roaming initiative "My Europe" was launched in May 2006 by subsidiaries of the Telefónica/O2 Europe group, as well as Movistar in Spain. The package offers roaming customers reduced and flat-rate monthly voice roaming rates across the EU — and across networks — during the summer months. According to Telefónica/O2, the My Europe package amounts to savings of over 60 per cent when compared with previous tariffs.

A9.7 For example, in 2006 O2 mobile customers from Ireland and Germany would have seen roaming rates of €0.59 per minute for calls back home, within the country, and calls received when visiting certain Member States. UK customers would pay €0.35 per minute, and Czech customers (Eurotel network) pay CZK 14.90 per minute.<sup>123</sup>

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<sup>123</sup> O2.com (2006) <http://www.o2.com/about/2143.asp>.

- A9.8 As an initiative under My Europe, Telefónica/O2 Europe announced in October 2006 a 'high roamer' service, aimed at frequent travellers. With this service, O2 UK users for instance pay a flat monthly fee of £5 and can make calls while travelling to Spain for £0.25 per minute, which represents a discount of 70 per cent over standard tariffs. Incoming calls are received at no charge. Under this plan, SMEs are eligible for a £2.50 monthly fee under a 12 month contract.<sup>124</sup>
- A9.9 Spain was the country chosen for launching the initiative because more of O2 UK's customers travel there on business or holiday than to any other Member State. According to its website, O2 will expand the offer to over 35 countries throughout Europe. Yet for Movistar customers on a Spanish SIM card on the High Roamer tariff, customers travelling to 33 destinations can already receive incoming calls at no charge — an initiative called “Spanish My Europe”. The 33 destinations are: Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Guernsey, Holland, Hungary, Ireland, the Isle of Man, Italy, Jersey, Latvia, Lithuania, Luxembourg, Malta, Monaco, Norway, Poland, Portugal, the UK, Sweden, Switzerland, San Marino, Slovakia, Slovenia, Spain, and the Vatican City. This offer is available to contract customers subscribing to My Europe for a monthly fee of €10.

### **T-Mobile**

- A9.10 Currently, T-mobile is targeting frequent business travellers by providing a “WorldClass International Roaming” mechanism for reduced roaming charges, which certain users on pre-pay contract can activate from their phone at no charge. Rates and countries on offer are available through the T-Mobile website. For Austrian T-Mobile subscribers, for example, 100 minutes of outgoing calls cost €29 per month.

### **Vodafone**

- A9.11 The Vodafone “Passport” offer, now on offer in a number of countries, enables Vodafone users to take their mobiles abroad and, for a fixed “connection charge”, speak at domestic rates.
- A9.12 For example, in the UK this non-trivial connection charge is £0.75 and in the Euro area it is typically around €1. Regardless of the visited network, this offer applies to the following visited countries, both in and outside the EU: Albania, Australia, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and Switzerland.
- A9.13 However, this offer only applies to calls under sixty minutes (after which users are charged at £0.20 per minute), and it does not apply to SMS or data charges.

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<sup>124</sup> It is worth noting that some of these tariff plans featuring free received calls when roaming in Europe were brought in not only in response to the Euro-tariff, but also as a countermeasure against the emergence of international independent SIM cards providing similar advantages to tourists and frequent travellers. However, both traditional operators' offers and liberalised independent SIM cards normally charge a flat fee to access the tariff plan/buy or recharge the card. Therefore, prepay customers on traditional tariff plans would normally still be better off under the Euro-tariff unit prices, unless they dramatically increased their foreign usage patterns so as to justify a post-paid tariff plan or the acquisition of an independent or foreign SIM card.

## **Transatel**

- A9.14 This emerging company has built its business model on the demand for cross-border use of mobile phones.
- A9.15 Transatel offers “multi-country” plans which are either generic or customised by the subscriber. For all plans, roaming rates are offered at the 2008 Euro-tariff rates. In addition to its call and text packages, Transatel offers a flurry of innovative services which are tailored for the globalised mobile user. These include local tariffs in several countries, savings on international calls, “Unified Messaging Services”, and multilingual customer service.

## **APPENDIX 10: NITA REPORT**

### **Introduction to NITA**

A10.1 According to its website, Denmark's National IT and Telecoms Agency (NITA) is responsible for the central parts of the Danish Government's IT and Telecoms policy....the National IT and Telecom Agency consists of 11 Divisions, an Executive Secretariat, an Administration Secretariat, a Corporate IT unit, and a Board of Directors.

### **NITA SMS and Data Roaming Report**

A10.2 The June 2008 report entitled "Analysis of prices and costs for mobile data services abroad" responds to the Commission's consideration for extending the Roaming Regulation *in scope* once the current Regulation expired.<sup>125</sup> As such, it does not address voice roaming. While the report uses Danish data, NITA is aware that there are might be cost differences between providers in EU, due to various factors outside the providers' control. However, it is the opinion of NITA that there are no circumstances to indicate that providers in Denmark have significantly lower costs than the other providers in EU. Furthermore NITA's cost estimates tend to over-estimate costs, since the data traffic forecast applied in the LRIAC model is quite conservative.

A10.3 This report suggests the charts below, which are compared with proposed ERG and EC charts for reference. To be clear, the NITA estimates are of the costs involved, including profits, not a proposal for price caps. However, the cost estimates would be an important basis for decisions on the levels of any such price caps.

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<sup>125</sup> NITA (2008) "Analysis of prices and costs for mobile data services abroad" <http://www.itsk.dk>.

**Table A10.1: Comparison of Suggested SMS, MMS and Data Price Caps (€), and NITA Cost Estimates**

2009/2010	ERG	EC	NITA
<b>SMS (per text)</b>			
Wholesale	0.04-0.08	0.04	0.01
Retail	0.11-0.15	0.11	0.04
<b>MMS</b>			
Retail			
Send	–	--	0.28
Receive	–	--	0.12
<b>Data (per MB)</b>			
Wholesale	-	1.00	0.45
Retail	-	-	0.95

*Sources: ERG (2008) and NITA (November 2008)*

A10.4 NITA’s calculations of cost are noticeably lower than those of the ERG, or the price caps proposed by the Commission — with the exception of charges for data roaming (although in subsequent statements NITA has criticised the Commission’s cap of €1.00 as excessive). Hence the estimates have become widely discussed among both NRAs and operators, ERG and the European Commission.

A10.5 The NITA results were calculated using publicly available data, data from NRAs, data from Danish operators, and the NITA’s bespoke LRAIC pricing model. The aim of the report is to approximate the cost levels of providing the roaming services. . In reiteration of views that some operators have expressed to Europe Economics, NITA assumes that the costing of non-roaming MTRs is sufficiently similar to roaming costing to use the same model. The report is carefully laid out and explained; moreover, there are some illustrative diagrams showing how the SMS and data processes map out, and exactly where the various costs can be attributed.<sup>126</sup> While the LRAIC model is not discussed in detail, all assumptions and inputs it uses are made explicit either in the report itself or in footnotes. Furthermore, a separate document has been made available which details the model very carefully.<sup>127</sup>

<sup>126</sup> See Charts 4.1 through 4.9 of the report.

<sup>127</sup> See: Analysys (2008) “NITA’s mobile LRAIC model — final v4 cost model” Cambridge Analysis Consulting Limited.

A10.6 The authority has made it clear that it sees the need for extension of the Regulation in scope, based on the rationales of excessive prices and extreme mark-ups. Incidentally, in all of the bar charts comparing actual versus normative prices, the term “effective market” stands in for “competitive market”. Although the report repeatedly and effectively impresses on the reader that the actual wholesale and retail costs in the market belie the true costs of operation, which may well be the case, there is no economic discussion about whether and why the two should converge. The answer to this underlying issue would depend on whether NITA sees the mobile roaming market as competitive; and, if so, what is the rationale for regulating.

### **Critique of NITA Report**

A10.7 The NITA report has been greeted with some criticism by those opposed to the Regulation. The primary criticisms of the report revolve around the fact that it radically underestimates the allocation of cost to roaming services, that this is a direct result of the regulator not harbouring a sufficient understanding of the technical nuances of the telecommunications industry.

A10.8 The main costs that the report has been criticised for overlooking include: <sup>128</sup>

- interconnect costs between Home operator and the gateway/GRX;
- signalling costs, e.g. to/from the Home Location Register (HLR) and to/from other network elements of the operator;
- interconnect costs to the external IP network;
- inter-operator billing costs including costs for handling roaming charging data records (CDR) and settlement;
- costs associated with Data Clearing House;
- other infrastructure costs (e.g., prepay billing check, retail billing);
- application of content lock;
- ensuring consistent look and feel of the product e.g., not getting the wrong language version of a website;
- those common costs derived from the Internet.
- certain networks have claimed the need to invest in platforms to deal with roaming-related SMS fraud, flooding, and other contingencies. This includes investments in specific fraud costs and staff;
- cost of exchange in day to day business and keeping in step with recent sudden fluctuations in currencies; and
- costs of financial clearing and settlement.

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<sup>128</sup> Please note that these points have been supplied to us by stakeholders and do not necessarily reflect the opinion of Europe Economics.



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