The future of European roaming:
More competition or more regulation?

A report for
Telekom Austria Group

October 2011

David Black
David Lewin

About Plum

Plum Consulting offer strategy, policy and regulatory advice in the telecoms, media and online sectors; and on radio spectrum as a key sector input. We draw on economics, our knowledge of the sector and our clients understanding and perspective to shape and respond to convergence.

Plum Consulting, 26-27 Southampton Street, Covent Garden, London, WC2E 7RS
T: +44(20) 7047 1919, **www.plumconsulting.co.uk**

Table of Contents

Executive Summary

S1 Introduction

The European Commission proposes to:

- Impose declining price caps at both the retail and wholesale levels on EU roaming for voice, SMS and data until 2014
- Impose obligations on EU mobile operators to enable roaming services which are structurally separate from national services from July 2014, so that end-users can purchase roaming services from a separate supplier
- Impose obligations on EU mobile operators to provide for wholesale access by resellers and MVNOs at regulated wholesale price, so that MVNOs and resellers can compete more effectively in the European roaming market
- Retain wholesale price caps at 2014 levels until 2022 and remove the 2014 retail price caps in 2016.

This document provides an economic assessment of these proposals.

S2 Problems in the voice roaming market

Clear identification of barriers to competition in the roaming market is a first step in the design of effective remedies. Our analysis focuses on voice and data services[1].

Conventional analysis leads to the conclusion that both the retail and wholesale voice roaming markets are uncompetitive and require regulation. We believe that this conclusion is flawed, that the problems requiring regulation lie in the retail market, and that there is no need for wholesale price regulation, providing the retail market is competitive. Our arguments are as follows:

- Modern traffic steering techniques give the home operator almost complete control over which visited network carries its traffic
- Operators frequently negotiate wholesale arrangements with a preferred partner in a destination state, agreeing to exchange an equal number of minutes in each direction at the same price. We refer to these as ***balanced*** minutes. In member states where an operator has a net inflow or outflow of calls, the operators will agree on a separate price for ***out-of-balance*** minutes.
- For ***out-of-balance*** minutes an operator will seek competitive offers from mobile operators in the visited country and pay an out-of-balance price for these minutes. This price, less the cost of handling the out-of-balance minutes, generates a wholesale margin for the visited network operator
- Figure S1 plots typical out-of-balance prices over time. It shows that out-of-balance prices are already well below the wholesale cap and will fall to cost by 2012 or 2013 on current trends. In other words the wholesale margin on these minutes is rapidly falling towards zero

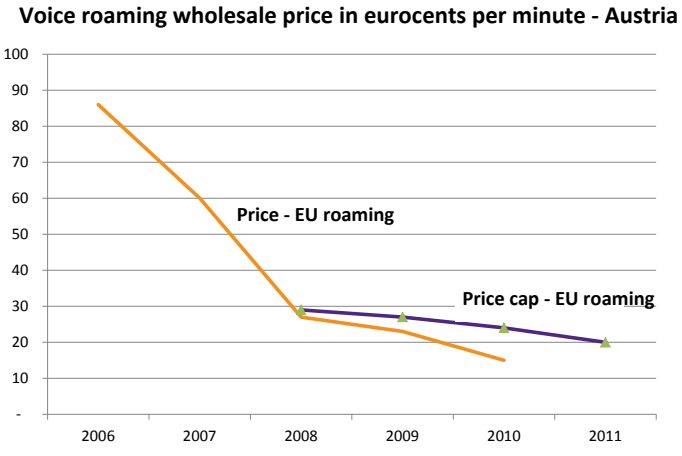
[1] SMS roaming revenues are modest relative to voice revenues and the SMS market works in a similar way to the voice market

- The nominal wholesale price of the ***balanced*** minutes is irrelevant to the overall margin of an operator. In the absence of wholesale price regulation each partner can set this price as high as the retail price (resulting in a zero retail margin) or as low as the cost of supply of wholesale minutes (resulting in a zero wholesale margin) without changing the overall margin (retail plus wholesale) generated by either partner.
- The conventional analysis is to calculate the wholesale margin based on the wholesale prices declared by the operators in their accounts[2]. This leads to the conclusion that the wholesale margin is substantial, and that the wholesale market is uncompetitive and requires regulation
- But this wholesale regulation is not required if the retail market is competitive. In these circumstances the wholesale price received by an operator is irrelevant since it is perfectly offset by the wholesale payment to the operator's partner. Retail prices fall towards the wholesale cost of handling a call[3] and the nominal wholesale price does not constrain this reduction in retail prices. In other words a competitive retail market makes wholesale price regulation redundant

We conclude that there is no need for wholesale price regulation, provided the retail market is competitive. For balanced minutes, the nominal wholesale price is irrelevant, while for out-of-balance minutes the empirical data shows that wholesale prices are falling rapidly towards cost.

Why is the retail market not competitive? There is strong evidence that the problems in the retail market result from retail roaming being a relatively small part of a typical consumer's mobile bundle. As a result, there are weak incentives for mobile operators to offer competitively priced voice roaming services.

Figure S1: The wholesale price paid for out-of-balance minutes



Source: Plum analysis of data supplied by Telekom Austria

S3 Data roaming

Customers have a much wider range of options to choose from for data roaming services than for voice roaming. Because they do not need to receive inbound calls when roaming with a laptop, netbook or tablet, they do not need retain their mobile phone number to access these services.

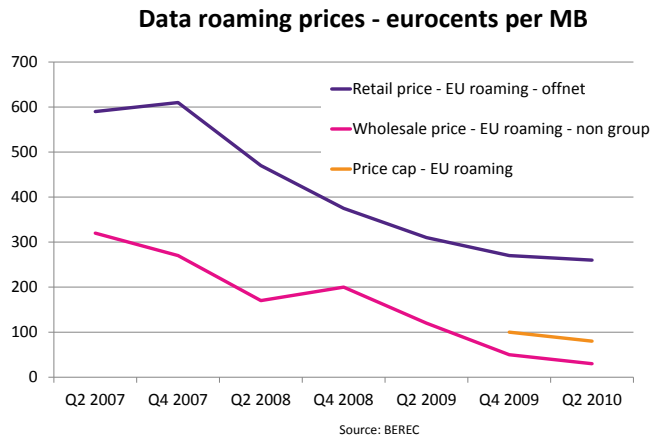
[2] Which operators set at or near the price cap in order to maximise their accounting revenues

[3] Plus a margin for roaming specific and retail costs

Consequently, they can choose between prepaid data offers in the visited country, use of Wi-Fi access points, global data roaming services, or use of multiple identity SIM cards, in preference to roaming with their home mobile service provider.

This position is reflected in the data roaming prices. Figure S2 shows that both retail and wholesale prices for data services have been falling. In particular the wholesale price cap, introduced in 2009, has had no impact. Instead competition appears to have driven prices well below the regulated price.

Figure S2: Data roaming prices



The decline in retail prices slowed in 2009 and early 2010. However, more recently, retail data roaming prices have been significantly reduced. There are now retail price offers at well under 100 eurocents per Megabyte in almost all countries and prices are falling at between 60% and 80% per year. This suggests that competition in the retail market may now be sufficient to result in the lower prices from the competitive wholesale market being passed through to retail prices.

S4 Options for future roaming regulation

We have evaluated four main options for the future regulation of European roaming services. The EU might:

- Continue, as a long term solution, to set caps on the prices which mobile operators can charge for EU roaming. We refer to this option as the ***price cap*** option
- Promote competition by obliging mobile operators to provide wholesale roaming to MVNOs and resellers at regulated prices. We refer to this option as the ***resale*** option.
- Promote competition by enabling customers to purchase international roaming services separately from a roaming operator rather than bundled with their national service operator. This requires an obligation on mobile operators to sell their roaming services separately from their domestic services. There are two main technical options for doing this, which have different characteristics:

– ***Single IMSI[4] separation***, in which technical control of the roaming service remains with the national operator

– ***Dual IMSI separation***, which requires customers to use a new SIM card and which transfers technical control of the roaming service to the roaming operator.

Our assessment of the four options against six key criteria is set out in Table S1 below.

Table S1: Options for future roaming regulation assessed

Criterion	Price cap	Resale	Single IMSI separation	Dual IMSI separation
Effective competition	No	Limited for retail Permanent wholesale price regulation required	Yes for retail Permanent wholesale price regulation required	Yes
Roaming prices approach domestic prices	No	Uncertain	Yes but not by 2015	Yes but not by 2015
Promote EU single market	No	Limited	Yes	Yes
Implementation costs	Very modest	Modest	€400-700 million[5]	€400-700 million
Risks	Price caps below costs in some member states	Wholesale price caps below costs in some member states	Wholesale price caps below costs in some member states Delays and cost over runs	Delays and cost over runs Poor end user experience
Promote service innovation	No	Some	Some	Yes

On the basis of this assessment we conclude that:

- ***Price caps*** have been effective in the past. But they now create growing risks of unintended and harmful consequences as price caps approach the costs of supply. More importantly, caps do not resolve the central issue – the absence of competitive pressure in retail roaming markets.
- The ***resale*** option will undoubtedly increase retail competition. The strength of this effect is uncertain but is likely to be limited on its own
- Either of the ***separation*** options should substantially increase competition in the retail roaming markets and deal with the retail roaming price problems
- ***Single IMSI separation*** offers a better end-user experience in the short term, fewer implementation risks and lower implementation costs

[4] International Mobile Subscriber Identity

[5] This one off cost compares with annual EU roaming revenues of €4800 million

- ***Dual IMSI separation*** offers a permanent structural solution with no need for the long term wholesale price regulation required by single IMSI separation. It also offers greater scope for innovation
- It makes little sense to require both single and dual IMSI solutions. Such a combination would both add significant implementation costs and delay implementation for no obvious benefit. But we can see no reason why the resale option should not coexist with one of the separation options, so as to increase competition further.

S5 Possible amendments to the new roaming regulation

The European Commission's proposals envisage separation of roaming from domestic mobile services alongside resale. As such they address the central problem of lack of competition in the retail roaming markets. However there are a number of elements in the current draft which raise concerns, and potentially undermine the development of competitive retail roaming markets in Europe. These concerns focus on:

- ***Assumptions about the wholesale roaming market***. The Commission has based its proposals on the assumption that wholesale roaming markets are not competitive and require regulation. We conclude that such regulation is not required in the voice market if the retail market can be made competitive using a structural remedy[6]. We also conclude that the wholesale data roaming market is already competitive
- ***The level of the wholesale price cap in 2014***. The cost of wholesale roaming varies considerably across EU member states and it is important to set the wholesale price cap for roaming at the upper end of the cost range. Otherwise prices are below cost in some member states and this leads to substantial loss of economic welfare. BEREC estimates this upper range cost at 10 eurocents per minute for 2012 to 2015 in its report of December 2010. But this estimate does not allow fully for roaming specific costs. TAG estimates these costs might add a premium of 2 to 3 eurocents per minute. On this basis we believe that the appropriate cost of wholesale roaming to use in setting the price is unlikely to be below 10 eurocents per minute.
- ***The level of the retail price cap in 2014.*** The retail price cap needs to be set with two objectives in mind - to protect consumers from high prices ***and*** to allow sufficient margin to incentivise competitive entry into the pan European retail roaming market. A retail price cap set at 24 eurocents per minute could limit, or even eliminate, entry by specialist roaming service providers outside their home market using structurally separated solutions. If the wholesale price cap for an active voice call in 2014 is raised from 6 to 10 eurocents per minute then it is desirable to raise the retail price cap from 24 to 28 eurocents per minute to maintain the margin. This then provides equivalent commercial incentives for mobile operators and MVNOs to offer structurally separated solutions. There is a case for a higher retail price cap. The analysis in our report suggests that it is worthwhile for mobile operators and MVNOs to enter the roaming market with structurally separated products when there is an 18 eurocent per minute margin between the retail price of an active voice call and the wholesale cost of supply in the visited country. But this analysis assumes that the target end-users will switch to the entrant for a 6 eurocent per minute discount on the prevailing retail price. Market research in three EU member states commissioned by TAG finds that a 10 eurocent per minute discount is required for a large enough number of consumers to

[6] Which does not rely on wholesale price regulation

switch providers to make separation commercially attractive. If this is the case then a larger margin than 18 eurocent per minute may be required for profitable entry.

- **Retail data roaming regulation**. Recent sharp falls in data roaming prices suggest that a reappraisal of competition is required in the retail data roaming market.
- **Cost recovery by the host network**. If the Commission decides to support the resale option then it will be important to allow host networks to recover the costs which they incur in serving the resellers[7], rather than simply charging them the wholesale roaming access rates. The current draft of the Regulation does not appear to allow for recovery of such additional wholesale costs.
- **The timing of the review of the new roaming regulation**. The current draft of the new roaming regulation proposes a review of its impacts in 2015. In our view this is too early. Market players will not have had sufficient time to implement the provisions of the regulation so as to substantially reduce retail roaming prices by this date. We suggest a review in 2017 along with suitable safeguard price caps in the meantime, perhaps set at 2014 levels.

[7] Resellers do not invest in the equipment which enables them to authenticate roaming customers or hold billing information in near retail time. Instead they rely on their host operator to provide them with such services.

1 Introduction

1.1 The purpose of the study

This document provides an economic assessment of options for the regulation of European mobile roaming service. Commissioned by the Telekom Austria Group (TAG), it is designed to inform the debate on proposals by the European Commission to regulate roaming services in the period July 2012 to June 2022.

1.2 The history of roaming regulation in the EU

Europe's mobile operators have provided roaming services, which enable subscribers to use their mobile phones anywhere in the EU and internationally, and not just in their national home markets, since the mid-1990s. Following the introduction of inter-operator tariffs (IOTs) among mobile operators in the late 1990s, however, the retail prices charged for these services rose to levels many times those charged for national retail services. In 1999, for example, EU mobile operators charged between 130 and 300 eurocents per minute for active[8] voice roaming calls[9]. Prices fell over the next seven years to an average of 70 eurocents per minute by early 2007[10], but in the meantime policy makers decided to intervene to lower retail prices.

In 2007, the Regulation of the European Parliament and of the Council on roaming on public mobile communications networks within the Union, the so-called 'Roaming (I) Regulation,' was adopted. This focused on controlling voice roaming prices. The Regulation introduced a cap on both retail charges made to roaming customers for active and passive calls, and on wholesale charges made to the home network operator of the roamer by the operator of the visited network carrying the roaming call. These caps applied to roaming within the EU only. Roaming outside the EU remained unregulated.

Then in 2009, a second roaming regulation, the so-called 'Roaming II Regulation,' was adopted. This tightened the price caps for voice roaming and introduced new caps on roaming charges for SMS[11] and for wholesale, but not retail, data services. Figure 1-1 summarises the caps set through the two Regulations.

[8] We use the term ***active*** to refer to calls ***made by*** a roaming customer and ***passive*** to refer to calls ***made to*** a roaming customer

[9] *International mobile roaming: competition economics and regulation*, Ewan Sutherland, 2010

[10] *Benchmark data report for January to June 2010*, BEREC, October 2010

[11] Retail and Wholesale charges

Figure 1-1: Price caps in roaming Regulations 1 and 2

12 months from	Voice (€ cents per minute)			Data wholesale (€ cents per MB)	SMS (€ cents per message)	
	Retail active	Retail passive	Wholesale		Retail active	Wholesale
7/07	49	24	30	None	None	None
7/08	46	22	28	None	None	None
7/09	43	19	26	100	11	4
7/10	39	15	22	80	11	4
7/11	35	11	18	50	11	4

Source: Regulations (EC) 717/2007 and 544/2009

1.3 The future of roaming regulation in the EU

The Roaming II Regulation expires in June 2012, and the European Commission has consulted on what should replace it, i.e. an expected 'Roaming III Regulation.' In a public consultation in December 2010,[12] the Commission identified two sets of options for regulating the EU roaming markets from July 2012:

- A series of options which involves continued price regulation, along the lines of Figure 1-1
- A series of options designed to promote competition either by structural remedies or by introducing wholesale access for MVNOs and reseller.

Based on responses to this consultation, and a report by BEREC[13] in December 2010, the Commission then developed a draft of the Roaming III Regulation to run from July 2012 to June 2022. This draft Regulation proposes:

- To impose reducing price caps at both the retail and wholesale levels on EU roaming for voice, SMS and data until 2014
- Obligations on EU mobile operators to structurally separate roaming services from national services from July 2014, so that end-users can purchase roaming services from a separate supplier
- Retention of wholesale price caps at 2014 levels until 2022 and removal of the 2014 retail price caps in 2016
- Provide wholesale access to regulated prices to MVNOs and resellers.

Figure 1-2 summarises the price caps proposed by the European Commission.

[12] *Review of the functioning of regulation (EC)544/2009*, European Commission, December 2010

[13] *International Mobile Roaming Report, BEREC*, December 2010

Figure 1-2: Proposed price caps to 2014 – eurocents per minute

Service	Price	7/11	7/12	7/13	7/14	After 7/15
Voice/min	Wholesale	18	14	10	6	6 to 2022
	Retail active	35	32	28	24	24 to 2016
	Retail passive	11	11	10	10	10 to 2016
SMS/msx	Wholesale	4	3	3	2	2 to 2022
	Retail active	11	10	10	10	10 to 2016
	Retail passive	0	0	0	0	Na
Data/MB	Wholesale	50	30	20	10	10 to 2022
	Retail	Na	90	70	50	50 to 2016

Source: Proposal to the European Parliament to recast Regulations (EC) 717/2007 and 544/2009

The European Parliament will now debate and possibly adopt these proposals, as will the Council. To contribute to that debate we provide in this report an economic assessment of the merits of the Commission's proposals and other options from a public interest perspective.

2 Current problems with the EU market

2.1 Introduction

Why does competition not function in the EU roaming markets when it works in the national mobile markets of member states?[14] We need to answer this question before we can evaluate future options for effective regulation of the roaming market.

To simplify our analysis we focus on voice and data services. We ignore SMS roaming given that:

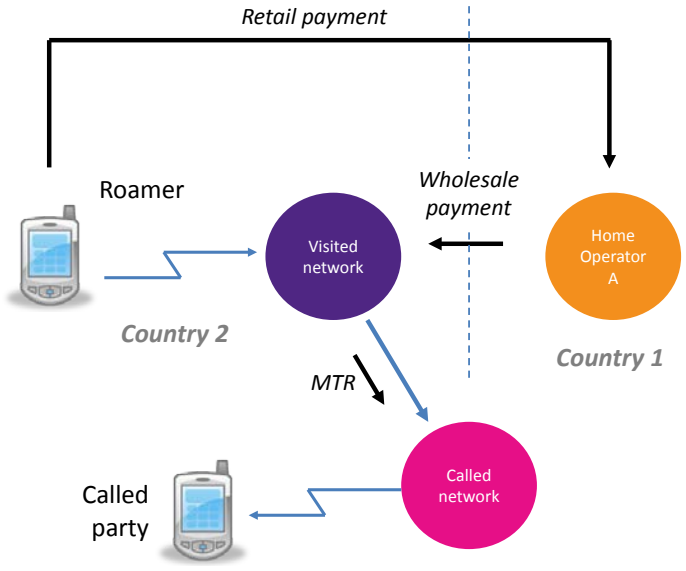
- SMS roaming generates only 12% of roaming revenues[15] and this proportion is declining as data roaming revenues grow
- The mechanisms which determine SMS roaming prices are similar to those which determine voice roaming prices.

2.2 Voice roaming – active calls

The dynamics of the voice roaming market

Figure 2-1 shows the charging mechanism for active voice roaming.

Figure 2-1: Charging for active voice calls



MTR = mobile termination rate

[14] We note that the remedies imposed by EU national regulatory authorities (NRAs) in the mobile markets are all consistent with the assumption that retail mobile markets are competitive

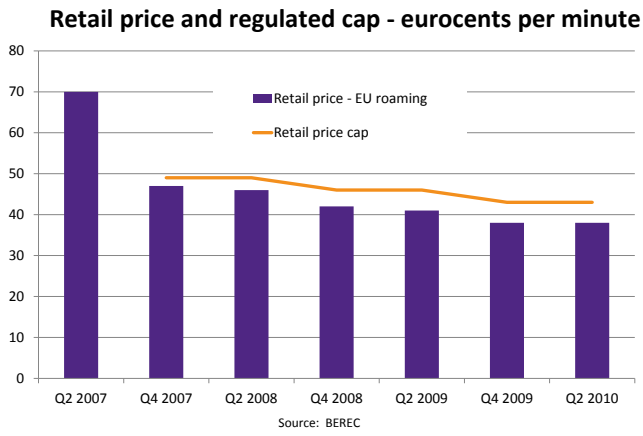
[15] Commission staff working paper to provide an impact assessment of Roaming III Regulation , 2011

In practice, Operator A in Country 1 tries to balance wholesale minutes through an agreement with a preferred partner in Country 2. If Operator A has an excess of minutes to deliver, it seeks the lowest wholesale price for this excess from each of the operators in Country 2[16]. This is the out-of-balance price. Similarly, if both local mobile operators are part of a larger pan-European or international group, the cost to the group is not the price used for the exchange of calls, but the cost handling on the roaming traffic on behalf of the group. It is also worth noting that the price paid for balanced traffic is irrelevant to the profits of Operator A. For every minute of wholesale roaming charge it pays, it receives an identical roaming payment. The net payment for balanced traffic is zero. In practice, Operator A and its preferred partner usually charge for balanced traffic at the regulated wholesale price, so as to maximise their total revenues consistent with roaming regulations, as this may have benefits in the presentation of the financial results of the operator.

Retail prices for active voice calls

Figure 2-2 shows how the retail price for active calls has fallen since 2007.

Figure 2-2: Retail price for active voice calls – EU average



We can see that:

- The introduction of roaming regulation in 2007 significantly reduced prices
- Retail prices have remained at or just below the price cap ever since.

Wholesale prices for active voice calls

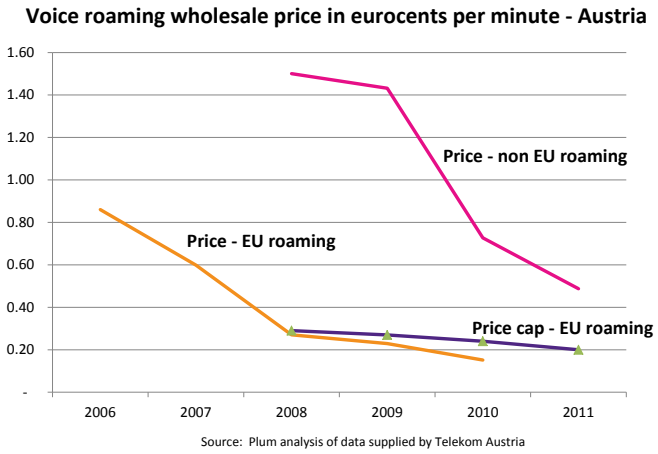
Figure 2.3 shows how wholesale prices for roaming calls have fallen over time. Given that the price of balanced minutes is irrelevant to roaming profits, we consider out-of-balance wholesale prices in our analysis. EU wide information is not available on out-of-balance prices. So we have used instead the wholesale out-of-balance prices paid by Telekom Austria. Note that these prices reflect the average

[16] Operator A may also reach roaming agreements with other operators in Country 2 so as to maximise the coverage available to its customers when they roam there. The volume of traffic carried using such agreements is very small and we ignore it in our analysis

price paid by Telekom Austria for out-of-balance minutes in international roaming markets and are not specific to Austria or reflective of competition within the Austrian market.

We have also included in our graph the average price paid by Telekom Austria in key countries outside EU. These countries have been selected on the basis of popular non-EU destinations. This excludes low volume destinations, which are likely to have higher prices but by definition are less important to most consumers.

Figure 2-3: Out-of-balance wholesale voice prices paid in Austria



Source: Plum analysis of data supplied by Telekom Austria

We can see that:

- The initial roaming regulation had a significant impact on the EU wholesale price when it was introduced in 2007
- The ***out-of-balance*** wholesale price in the EU is falling faster than the wholesale price cap – in contrast, BEREC data show that the average wholesale price has kept just below the wholesale cap
- In the ***unregulated*** non-EU market, wholesale prices have fallen even faster than in the EU, albeit from a much higher level
- By 2012 or 2013, both EU and non-EU wholesale prices will be driven down to competitive levels on current trends.

Figure 2-3 suggests that competition, rather than regulation, is acting to drive down wholesale roaming prices for active voice calls. This prompts us to ask what this mechanism might be and why wholesale roaming prices were so high in 2006. One probable explanation is as follows:

- In the early 2000s, the volume of wholesale minutes handled by a visited network was determined by the market share and coverage of that network, rather than by the wholesale price offered. There was virtually no link between the wholesale price and the volume of wholesale minutes handled
- In these circumstances, it made sense for mobile operators to charge high prices for wholesale services. This then generated revenues with which to cross subsidise the price of national services, where the operator was competing strongly for customers

- Traffic steering techniques were introduced over the last decade and gradually became more effective. This has now led to a strong link between the price a visited network charges to the retail network and the volume of out-of-balance roaming traffic it receives. This has led to a competitive market in the supply of wholesale services and a steep reduction in wholesale prices.

Margins for active voice calls

The conventional approach to analysing roaming margins for active voice calls is as follows:

- The retail margin on an active voice roaming minute is the retail price less the cost of supply
- The retail price is typically €0.35[17] per minute and the cost of supply is the wholesale price paid to the visited network – typically €0.22 per minute. So the retail margin is €0.13 per minute
- The cost to the visited network of handling a call minute is typically €0.10. So there is a substantial wholesale margin of €0.12 per minute
- Both the retail and wholesale margins are excessive and price regulation is required in both the retail and wholesale markets.

We argue that this approach is flawed. Our argument is as follows:

- Modern traffic steering techniques give the home operator almost complete control over which visited network carries its traffic
- Operators frequently negotiate wholesale arrangements with a preferred partner in a destination state, agreeing to exchange an equal number of minutes in each direction at the same price. We refer to these as ***balanced*** minutes. In member states where an operator has a net inflow or outflow of calls, the operators will agree on a separate price for ***out-of-balance*** minutes.
- For ***out-of-balance*** minutes an operator will seek competitive offers from mobile operators in the visited country and pay an out-of-balance price for these minutes. This price, less the cost of handling the out-of-balance minutes, generates a wholesale margin for the visited network operator
- Figure 2-3 plots typical out-of-balance prices over time. It shows that out-of-balance prices in the EU are already well below the wholesale cap and will fall to cost by 2012 or 2013 on current trends. In other words the wholesale margin on these minutes is rapidly falling towards zero
- The nominal wholesale price of the ***balanced*** minutes is irrelevant to the overall margin of an operator. In the absence of wholesale price regulation each partner can set this price as high as the retail price (resulting in a zero retail margin) or as low as the cost of supply of wholesale minutes (resulting in a zero wholesale margin) without changing the overall margin (retail plus wholesale) generated by either partner.
- The conventional analysis is to calculate the wholesale margin based on the wholesale prices declared by the operators in their accounts[18]. This leads to the conclusion that the wholesale margin is substantial, and that the wholesale market is uncompetitive and requires regulation
- But this wholesale regulation is not required if the retail market is competitive. In these circumstances the wholesale price received by an operator is irrelevant since it is perfectly offset

[17] For illustrative purposes we have used specific prices rather than formulae in our analysis

[18] Which operators set at or near the price cap in order to maximise their accounting revenues

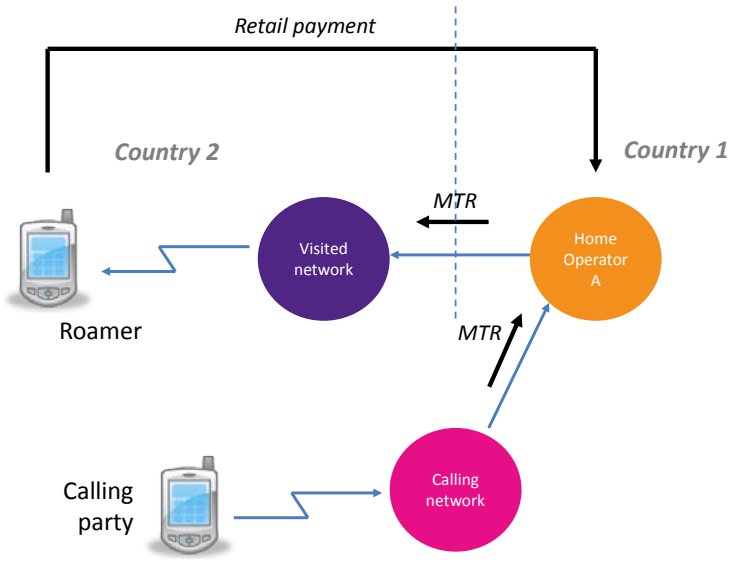
by the wholesale payment to the operator's partner. Retail prices fall towards the wholesale cost of handling a call[19] and the nominal wholesale price does not constrain this reduction in retail prices. In other words a competitive retail market makes wholesale price regulation redundant

We conclude that there is no need for wholesale price regulation, provided the retail market is competitive. For balanced minutes, the nominal wholesale price is irrelevant, while the empirical data for out-of-balance minutes shows that wholesale prices are falling rapidly towards cost.

2.3 Voice roaming – passive calls

Figure 2-4 shows the charging arrangements for passive voice roaming charges. The retail operator both pays and receives a regulated mobile termination rate. At the same time its own network costs, in acting as a transit operator between the calling and visited networks, are small. In some countries the operator might make money on the difference between the incoming and outgoing mobile termination rates[20]; in others it might lose money. If the MTRs of the home network are lower (higher) than the MTRs of the visited network, the home network incurs a net loss (profit). But averaged across the EU, its costs are small.

Figure 2-4: Charging arrangement – passive roaming calls



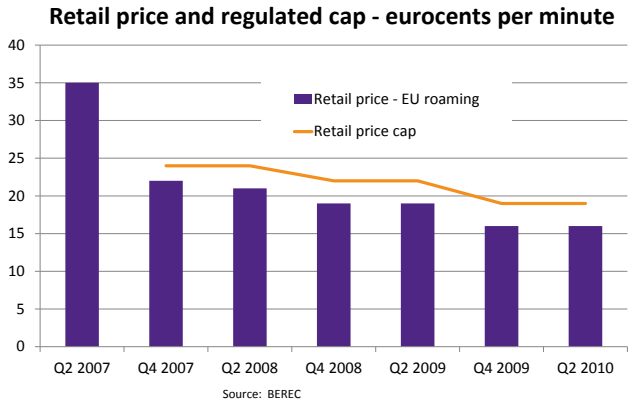
MTR = mobile termination rate

Figure 2-5 shows recent trends in passive calls prices. Retail prices for passive voice calls fell following the introduction of regulation, consistent with price regulation reducing prices. Since 2007, passive call prices have been consistently below the price cap.

[19] Plus a margin for roaming specific and retail costs

[20] The difference between national and international mobile termination rates is small and, following the lead of BEREC, we ignore this difference in our analysis

Figure 2-5: Retail prices for passive voice calls

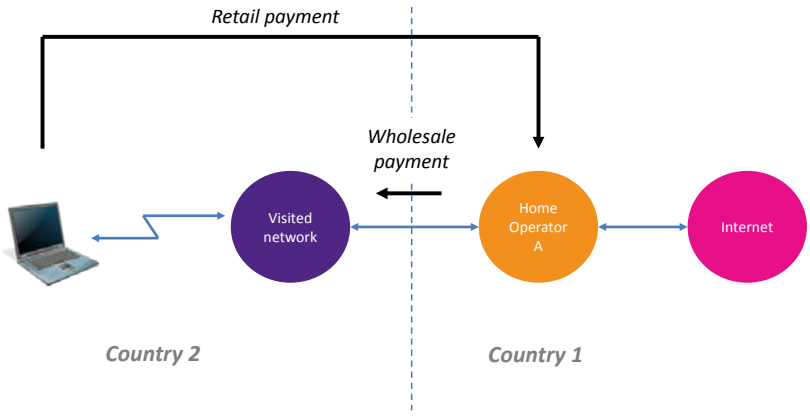


2.4 Data roaming

The dynamics of data roaming

Figure 2-6 shows the routing and charging mechanisms used for data roaming. In contrast to voice roaming, data sessions are routed via the home network of Operator A for connection to the Internet.

Figure 2-6: Charging for roaming data



The bulk of data traffic is currently generated by laptops and netbooks, where sessions are always initiated from the device. As such, there is no need to provide functionality for inbound calls or sessions. This means that the device can use a USB dongle with a separate SIM card from that used by the subscriber's voice terminal. This makes the supply of roaming dongle data independent of the network operator providing voice services. (In effect this service is already separated).[21] In these

[21] In its proposals for future roaming regulation, the European Commission notes (in Recital 57) that "*in some cases the wholesale data roaming prices applicable to non-preferred networks are six times higher than those applied to preferred network*". It is our understanding that preferred data networks are those networks offering the best deal on data roaming prices. These networks may or may not be the same as the preferred networks for active voice calls. Moreover the high prices observed by the European Commission reflect the prices charged under agreements entered into to maximise roaming

circumstances the retail price floor for dongle data is the wholesale prices charged and the margin analysis is straightforward.

Data roaming with smartphones is more difficult to analyse. For the moment, the volume of smartphone data roaming traffic is relatively small when compared with that generated from 3G dongles and data cards. This position is likely to change as the proportion of smartphones rises[22]. Smartphones must use the same SIM card as voice while roaming, if they are to receive inbound calls (or to make calls or send and receive SMSs). So, while the dongle data roaming market is largely independent of the voice roaming market, the smartphone data market is closely linked to it. As a result any competition problems in the voice roaming market may affect the smartphone roaming data market as well. This may change over time, as data become more important and consumers adopt voice-over-Internet Protocol (VoIP) services which are not dependent on a phone number.

The available data does not make a clear distinction between dongle and smartphone data roaming. For the moment it is reasonable to assume that they reflect the situation in the dongle market. But it is important to note the growing importance of the smartphone data market when assessing future regulatory remedies.

The evolution of data roaming prices

Figure 2-7 shows how the average retail and wholesale prices from mobile data roaming in the EU have fallen over the last three years.

We can see that:

- Retail prices halved between Q2 2007 and Q2 2009 but the prices fell more slowly and were at just under 300 eurocents per MB up to June 2010
- Wholesale prices have fallen much more steeply and continue to fall towards cost
- The wholesale price cap, introduced under Roaming Regulation 2 in 2009, appears to have had little impact. Wholesale prices are well below the cap and continue to fall.

coverage for subscribers. The volume of traffic carried on these networks is very low, and the high prices observed are not relevant to our analysis.

[22] Based on data supplied by ComScore, smart phones could represent 75 to 80% of mobile phones in the EU by 2015

Figure 2-7: Prices for mobile data roaming – EU average

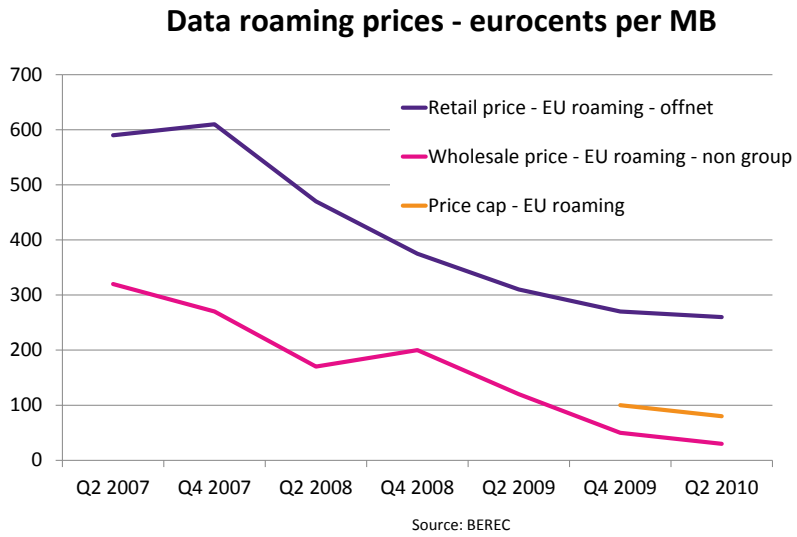
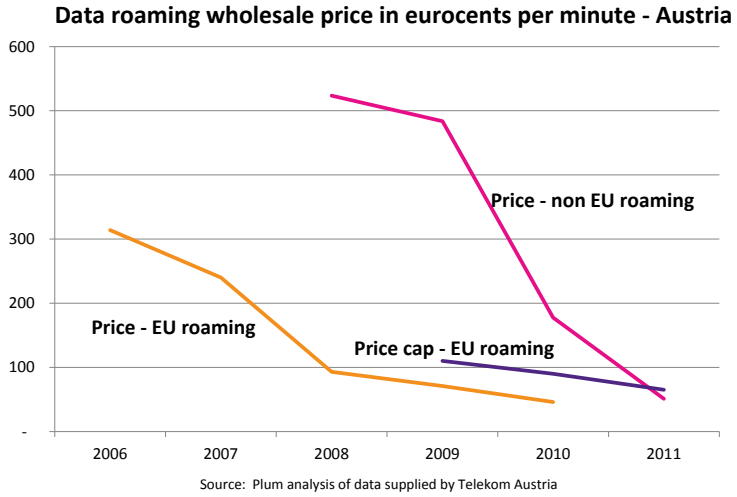


Figure 2-8 is provides additional information on wholesale price trends in Austrian data. This plots both EU roaming prices and roaming prices in selected non-EU countries. As with call price comparisons, the countries which have been selected are popular non-EU destinations. The findings are consistent with those of Figure 2-7. But we also note that unregulated wholesale prices for non-EU countries are falling rapidly and are now below the EU price cap for many key roaming destinations outside the EU.

Figure 2-8: Wholesale prices for mobile data roaming – Austria



There is now some evidence that retail prices for data roaming are beginning to fall quite rapidly since Quarter 2 of 2010 - the last data point in Figure 2-7. We have seen a number of recent offers which suggests that retail data roaming prices for at least some EU roamers had fallen well below 100 eurocents per MB by April 2011. Figure 2-9 tabulates some of these new offerings.

Figure 2-9: Recent retail offerings for data roaming in the EU

Mobile operator	Offer	Price in eurocents per MB if data allowance:	
		Fully used	25% used
Vodafone	25 MB for £2 per day	9	36
Telia Sonera	20MB for SEK 29 for roaming in Scandinavia and the Baltic states	16	64
Telekom Austria	42 to 59 eurocents per MB to roam in 50 countries	42 to 59	42 to 59
Telecom Italia	10MB for €5 to roam in Europe	50	200
T-Mobile	€1.95 per day for up to 10 MB	20	80

Source: GSMA

In addition an August 2011 survey[23] of 101 European mobile operators found that:

- For 10MB usage baskets, the EU/EEA post-paid prices now range from €0.28 per MB based on best price for an operator in each country to €0.59 per MB for the average of operators' best tariffs in each country. The equivalent prepaid prices are €0.41 to €1.35 per MB.
- Almost all prices had fallen since the previous survey in June 2011. Post-paid tariffs per MB has fallen by up to 34% and prepay tariffs had fallen by up to 19%.

These prices compare with a BEREC estimate of 130.3 per MB in June 2010, based on average of pre and post-paid and on-net and off-net prices.[24]

2.5 Conclusions

Figure 2-10 summarises the findings of this section. The overall message is relatively simple. In general, the wholesale roaming markets - whether for voice or data or for roaming in EU or non-EU destinations - appear to be competitive while the retail roaming voice markets are not. Competition is emerging in the retail data market.

[23] GSMA, August 2011

[24] BEREC, December 2010, BoR (10) 58.

Figure 2-10: Problems in the EU roaming markets

Market	Is the market competitive?	
	Wholesale	Retail
Active voice	Yes[25]	No
Passive voice	Price is effectively regulated through national price controls on MTRs	No
Dongle data	Yes	Emerging competition
Smartphone data	Yes	Some evidence, but more limited given linkage to voice roaming market

Figure 2-10 prompts us to ask why the retail voice roaming market is not competitive. Surveys by EU NRAs into how end-users choose their mobile service providers suggest that the price of roaming services is of little importance when compared with the price of national mobile services for the overwhelming majority of customers. In Ireland, for example, the Commission for Communications Regulation (ComReg) found that only 7% of respondents in a major survey spontaneously mentioned the price of using mobile phones in other countries as important[26]. In a third party survey in the UK the proportion was even lower at 1%, a figure identical with a previous survey by Ofcom in 2006.

Yet a significant number of EU citizens spend substantial sums of money on roaming. Based on data supplied by Telekom Austria, we estimate that around 20% of customers spend over €100 per annum each on roaming[27] and account for over 80% of roaming spend.

One obvious way to introduce competition into the retail roaming market would be to require mobile operators to sell their roaming services separately from their national services. Higher spending roaming customers would find such a structurally separated service attractive. At the same time, we might expect that mobile operators would compete strongly for the revenues they generate. We explore the merits and costs of this structural separation of roaming in the chapters which follow.

[25] Given that the wholesale price for out-of-balance minutes is falling rapidly to cost and that the wholesale price for balanced minutes is irrelevant to roaming profits and will fall to costs once there is retail competition

[26] *International Mobile Roaming Report, BEREC*, December 2010

[27] While 60% of subscribers do not roam at all

3 Evaluation of options

3.1 Introduction

In this section we discuss the three main options for the future regulation of European roaming services. The EU might:

- Continue, as a long term solution, to set caps on the prices which mobile operators can charge for EU roaming. We refer to this option as the ***price cap option***
- Promote competition by obliging mobile operators to provide wholesale roaming to MVNOs and resellers at regulated (wholesale roaming access) prices. We refer to this option as the ***resale option***. We assume resellers can buy roaming at these regulated prices from their host operator and full MVNOs can buy roaming services from foreign operators at wholesale roaming access prices.
- Promote competition by enabling customers to purchase international roaming services separately from a roaming provider rather than in a bundled from their national operator. This requires an obligation on mobile operators to sell their roaming services separately from their domestic services if customers request this. There are two main technical options for such separation which have different characteristics:
  - ***Single IMSI separation***. Under this option a mobile operator or full MVNO from anywhere in the EU can purchase wholesale roaming access from operators in each EU member state and then offer separate roaming service to their customers. Technical control of the roaming service remains with the national operator. But roaming customers are authenticated and billed by the roaming operator
  - ***Dual IMSI separation***. Under this option a mobile operator or full MVNO sells roaming services to customers anywhere in the EU and then supplies them with a dual IMSI SIM for use in their mobile device. The customer selects the roaming IMSI rather than the national IMSI when roaming and technical control of roaming calls then moves to the roaming operator. The roaming operator pays the visited network operator directly for roaming services at negotiated rather than regulated rates.

Figure 3-1: The evaluation criteria

Criterion	Criterion: Does the option…	Description
1	…lead to a roaming market which is effectively competitive?	Assesses the impact of each option on competition in the retail market for international roaming
2	…meet Digital Agenda goals of roaming prices which approach those observed in domestic markets?	Assesses how well each option contributes to the Digital Agenda goals of retail prices for international roaming which approach those in domestic markets by 2015
3	…promote the single European market through development of pan-European roaming providers?	Takes account of the contribution of each option to the development of the single market.
4	…generate reasonable Implementation costs and timescales?	Considers the time required and costs of implementation for each option
5	…lead to unacceptably high risks?	Identifies the potential risks of each option
6	…promote innovation in the roaming market?	Considers the extent to which each option promotes innovation in the roaming market.

3.2 Criterion 1: impact on competition

The price cap option

A price cap attempts to mimic the outcome of a competitive market by restricting prices to a level consistent with a competitive market. However, a price cap does not promote the competitive process or encourage entry into the market. Imposing price caps reflects an expectation that competition is not effective and will not become effective in the foreseeable future. Price caps might effectively mimic the prices of a competitive market, but they are recognised as offering second best outcomes when compared with a competitive market. This is because a regulator is likely to have imperfect and limited information on the underlying costs of supply and a limited ability to provide appropriate incentives to innovate and reduce costs. The regulator may also be biased or captured in the regulatory process.

The resale option

The resale option would enable competition at the retail level, potentially driving retail prices down towards regulated wholesale rates. The costs of implementation are modest and we can expect uptake by MVNOs and resellers from 2012 on – initially to offer cheaper roaming as part of a bundle and then, from 2014 on, to offer separate roaming services. But competition under this option may be limited given that:

- Resellers may decide not to pass on the lower wholesale rates to their customers
- Host operators may raise the domestic wholesale prices charged to resellers - with consequential additional costs to domestic customers who do not roam

- Resellers may be focused on selling to customers who generate limited, or no, roaming traffic.

We conclude that the resale option is likely to increase competition in the retail market roaming market quickly but to a limited extent. In addition this option requires permanent price regulation at the wholesale level.

Single IMSI separation

Single IMSI separation should promote the development of effective competition in the international roaming market at the retail level. Research by regulators, which is described in Section 2.5, shows that consumers give little weight to the price of roaming in making mobile purchasing decisions. This is due to a range of factors, such as:

- The relative unimportance of roaming when compared with national mobile services
- Difficulties for consumers in comparing the price of roaming between different packages.

The relative unimportance of roaming in consumer purchase decisions means that operators tend to compete on other aspects of the mobile bundle. A few, smaller, operators have tried to build market share through competitively priced international roaming offers for voice[28], and there is growing competition in the retail data roaming markets[29]. But in general there is relatively little competition between mobile operators to supply the international roaming component of the retail mobile bundle. By enabling consumers to purchase international roaming separately from other services, mobile operators would face stronger competitive pressures in the provision of roaming.

This analysis suggests that single IMSI separation should lead to strong long-term competition in the international roaming markets. But is it commercially viable for operators to offer separation? We consider this question in Annex A and conclude that:

- Structurally separated services are likely to be highly attractive to end-users who spend more than €60 per annum on EU roaming or €100 per annum on roaming in total
- These end-users generate 82% of roaming revenues
- The structurally separate roaming market is likely to be profitable enough for mobile operators to enter, after allowing for some reductions in retail roaming prices over the next three years
- There is a danger that mobile operators will not enter the structurally separated market if retail prices are regulated so that the potential margins available to operators are too slim to justify the investment risk and costs associated with entry.

Single IMSI separation should promote vigorous competition in the retail market, as there are over 100 mobile operators across Europe plus a number of full MVNOs:

- We would expect all operators to immediately compete with the other mobile operators in their home country to provide separate roaming service. The cost of doing so is close to zero and the potential rewards substantial
- We would also expect significant entry by mobile operators into other EU markets. While some operators are part of wider groups and not all operators would necessarily enter the market in all

[28] *Meteor abolishes roaming charges within Europe,* The Irish Times. 6 May 2011

[29] As discussed in Chapter 2

countries, we would expect that competitive pressures would be similar to those in national markets, which typically have three to five competing operators.

We conclude that single IMSI separation should lead to strong competition in the retail roaming markets. But we note that this option depends on permanent regulation of wholesale prices, even though the wholesale market is competitive. The basic design of single IMSI separation relies on the fact that a national mobile operator is required to supply wholesale services to rivals at regulated prices so that they can offer competing roaming services to its customers.

Dual IMSI separation

The analysis for dual IMSI separation is similar at the retail level to that for single IMSI separation. The key difference lies at the wholesale level. Dual IMSI separation does not rely on wholesale price regulation, instead a roaming operator negotiates wholesale prices directly with visited network operators. Given that traffic steering techniques have made the wholesale market competitive, this means that dual IMSI separation eliminates the need for price regulation at the wholesale level as well as at the retail level.

Overall conclusions

Our analysis indicates that:

- Continuing price caps would not lead to competition in the roaming market
- The resale option should help increase competition in the retail market, but the effect is likely to be limited
- Single IMSI separation should lead to strong competition in the retail market but require permanent wholesale price regulation
- Dual IMSI separation should lead to strong competition at both the retail and wholesale levels.

3.3 Criterion 2: achieving the Digital Agenda goal

The European Commission's Digital Agenda for Europe proposes the following goal for international roaming:

> *"Single market for telecoms services: the difference between roaming and national tariffs should approach zero by 2015."*

Achieving this goal without distorting markets depends on the costs of roaming calls and national calls being broadly equal. This is unlikely for two reasons:

- Roaming services may have different cost characteristics from national calls. For example, operators in some member states are required to supply substantial capacity in coastal and mountain resorts for limited periods of time to meet demand from foreign holiday makers. The provider of the wholesale roaming service will need to invest to network capacity to meet roaming demand and only be able to recover costs during part of the year. It would be reasonable to expect that the incremental cost of wholesale roaming capacity in this case would be significantly higher than for national calls.

- There are a number of additional costs for providing roaming services, which are not included in the cost of a national call. These are set out in Figure 3-2 below.

Figure 3-2: Additional costs of roaming services

Cost category	Additional cost
Network costs	Additional signalling cost for each roaming customer on network
	Additional transit and international transport costs
Other technical costs	Steering Platform Cost (steering via Signalling)
	SIM Steering expenses such as Over the Air programming (preferred roaming partners on SIM cards)
	IT platform to follow roaming traffic trends
	Visited Location Register (VLR) needed for roaming service provision
	International Roaming Expert Group (IREG) – roaming testing
	Transferred Account Data Interchange Group (TADIG) to test and check billability of calls
	GPRS Roaming Exchange (GRX) expenses for roaming data
	Development costs for new services
	Fraud prevention
Commercial costs	Personnel to manage wholesale roaming
	Tools for management of roaming such as QoS tools
	Legal and administration costs of roaming including negotiation and pricing
	Fraud costs
Financial administration costs	Clearing house for billing records
	Bank fees
	Internal financial administration and cost control

We would expect these costs to be reflected in wholesale roaming charges and this may mean that it is not possible to equalise roaming and national tariffs.

Setting to one side the cost differences between national calls and roaming, we now consider the extent which the four options of Section 3.1 help achieve the Digital Agenda goal.

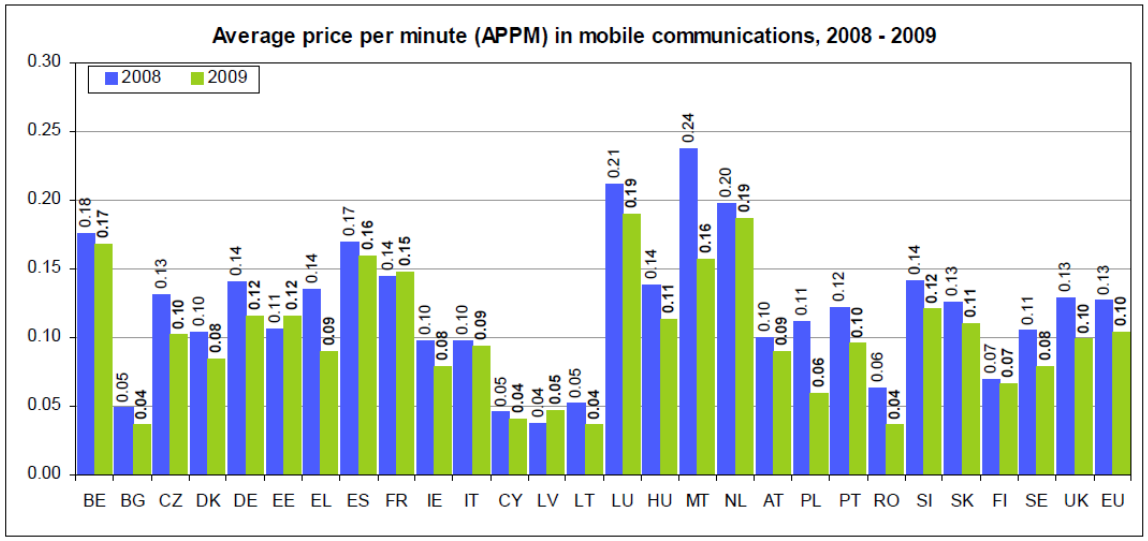
Price caps and the Digital Agenda goal

It is difficult to use EU-wide retail price caps to bring international roaming prices to the levels observed in individual national mobile markets, due to the dispersion in prices at a national level.

National prices for mobile services across the EU show a wide dispersion. This partly reflects differences ***between*** member states. Figure 3-3 shows that the highest priced member states (Netherlands and Luxembourg) levies charges which are around five times higher than those in the

lowest priced member state (Belgium and others) based on prices measured by the European Commission. [30] It also reflects the variation in prices ***within*** member states - with different price packages for different customer segments. In virtually all member states on-net contract calls are free while prepay prices can be as high as 25 eurocents per minute (in Austria), 40 eurocents per minute (in the UK) or 50 cents per minute (in France).

Figure 3-3: Average price per minute of mobile communications, 2008 - 2009



Source: EC, 2011

To reflect this variation in national retail mobile prices, regulators might set the regulated price cap for retail roaming services at the top end of the range of national mobile prices. But, given the current lack of competition in the retail roaming market active voice calls, this would probably lead to a situation in which international retail roaming prices were all set well above average national mobile prices. For example we note, based on BEREC analysis[31], that mobile operators have so far set the bulk of EU roaming prices close to the retail price caps[32].

Alternatively regulators might set the retail price to reflect the average national mobile price. But this would lead to a narrow range of international roaming prices when compared to the price ranges observed in competitive national markets for telecommunications. Roaming providers would be restricted to prices which are little higher than the average national mobile price. This would distort market mechanisms by reducing what, in competitive markets, is welfare enhancing price and product differentiation. As a result there would be substantial economic welfare losses.

[30] Looking at other measures of national mobile prices produces similar relative price differentials between member states.

[31] *Benchmark data report for January to June 2010*, BEREC, October 2010

[32] Even the prices to large corporations are set in this way in most cases, with the discount coming off the organisation's total bill rather than off the roaming prices it is charged

Resale and the Digital Agenda goal

The resale option starts to make an impact on retail roaming prices in 2012, two years before the structural separation options. But, for the reasons set out in Section 3.2, its effects on roaming prices are uncertain and likely to be limited. So the Digital Agenda goal is unlikely to be met.

Single IMSI separation and the Digital Agenda goal

Single IMSI separation offers better prospects of reaching the Digital Agenda goals than resale. It is likely to generate stronger competition than resale, while giving the roaming operator more freedom to price differentiate than with the price cap option. But it is unlikely to have any real impact on retail roaming prices before 2015.

Dual IMSI separation

Dual IMSI separation offers even better prospects of reaching the Digital Agenda goals than single IMSI separation. Under this option, retail roaming prices are based on negotiated, rather than regulated, wholesale prices and these negotiated prices are likely to be lower in many member states than the regulated wholesale prices used with single IMSI separation. We argue as follows:

- Wholesale roaming costs vary by a factor of four or more across the 27 EU member states. For example BEREC records a five-fold variation in wholesale costs in its report of December 2010, while cost oriented mobile termination rates in the EU varied from 1.84 eurocents per minute in Cyprus to over 8 eurocents per minute in Luxembourg and Ireland in October 2010
- Setting the wholesale cap at the average wholesale cost across the EU means the wholesale cap is below cost in some member states. This could lead operators in these states to degrade wholesale roaming services or to refuse to offer them
- To avoid such dangers the wholesale cap needs to be set at the upper end of this cost range. But this means that the cap is well above cost in other member states.

Overall conclusions

Our overall conclusions are as follows:

- The Digital Agenda goal can be met by 2015 using ***price caps***, but only at the expense of substantial market distortions and economic losses. To avoid such economic losses the retail price caps would need to be set at levels well above average national prices. This weakens the ability of price cap regulation to achieve the Digital Agenda goals
- The resale option offers the prospect of immediate but uncertain and limited progress towards the Digital Agenda goals
- Single IMSI separation leads to good progress towards the Digital Agenda goals in the long-term
- Of the four options dual IMSI separation gets closest to the Digital Agenda goals in the long-term.

3.4 Criterion 3: promoting the single market

A key objective of the European telecommunications framework is to promote the single market[33]. Two of the four options offer the prospect of progress towards this objective by promoting the development of pan-European service providers.

At the moment the European mobile market is primarily structured on a national basis. While a number of operators own part or all of service providers in a range of countries, competition in each market is dependent on the operators and service providers in each state. This reflects the fact that offering national mobile services requires the roll out of a network or the negotiation of an MVNO agreement in each country.

The two ***structural separation*** options would enable operators to compete on a pan-European basis, and hence contribute to the completion of the single market. An operator would, almost certainly, offer a stand-alone roaming product to the customers of its rivals in its home market. But there are also strong incentives for it to offer such services outside its home market, given that the potential opportunity for ***new*** revenues would be larger than in its home market. This is particularly true for operators in small member states. But, even for operators in larger countries, the EU market as a whole is a much larger than any single member state. Given that mobile services are at close to saturation levels in many member states, the separated roaming market should offer an attractive growth opportunity.

The ***resale*** option provides some prospect for the development of pan-European service providers, similar to the current role of niche pan-European MVNOs.

Price cap regulation does not provide an opportunity for the development of pan-European service providers. The provision of international roaming is limited to national operators and price caps do not promote the development of a single market in this way.

We conclude that:

- The two structural separation options would promote the single market
- The price cap and resale options would not.

3.5 Criterion 4: implementation costs and timescales

The price cap option

The direct implementation costs of ***price cap*** regulation are likely to be modest, and we do not consider them further. At the same time the timescale for introducing price cap regulation are not a problem. There are no major barriers to the introduction of a third set of price caps from July 2012.[34]

[33] http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=3701

[34] We understand that there may be issues with imposing price cap regulation as a long term remedy.

The resale option

The resale option, like the price cap option, generates only modest implementation costs. It should be possible to implement it by mid-2012.

Single IMSI separation

There are significant implementation costs which European mobile operators and MVNOs would incur to enable either of the structural separation options. These are distinct from the entry cost of marketing, customer acquisition and, in the case of dual IMSI separation, distribution of new SIMs. For single IMSI separation these costs include:

- Standardisation work
- Modifications to HLRs
- Modifications to customer management, billing and fraud systems.

Based on a review of recent work by AT Kearney and analysis of cost data supplied by TAG we estimate that:

- These one-off costs are in the range €400 million to €700 million. This compares with current EU roaming revenues of €4800 million each year
- It should be relatively easy to implement these changes by the proposed date for the introduction of structural separation of July 2014.

Dual IMSI separation

It will take longer to implement dual IMSI separation than single IMSI separation. There is, for example, significantly more standardisation work to be done before dual IMSI separation can be implemented. We estimate that:

- The cost of implementing this option is between €400 million and €700 million
- It should be possible to implement dual IMSI separation by July 2014 but, given the additional standardisation work required, there is a possibility that implementation might be delayed beyond this date.

Overall conclusions

The costs and time involved in implementing the ***price cap*** and ***resale*** options are modest.

It should be possible to implement ***single IMSI separation*** in good time for July 2014 at a cost of €400 million to €700 million

It should be possible to implement ***dual IMSI separation*** before July 2014 at a similar cost. But there is a risk of cost and time over-runs for the implementation.

3.6 Criterion 5: the risks of each option

Risks with price caps

The key risks associated with setting price caps are set out in the table below.

Figure 3-4: Risks and risk migration for price caps

Potential risk	Proposed mitigation
Wholesale price caps set below cost	Take account of member states with the highest cost MTRs and highest cost of wholesale roaming in setting the price caps
Prices for national services distorted	As above
Limited price and product differentiation in roaming services	Set price caps at top of expected ranges of competitive roaming prices
Arbitrage	Design of price regulation

First, price cap regulation could lead to wholesale prices being set below cost in some member states. As discussed in Section 3.3, this is likely to happen if an EU wide retail price cap is set to achieve the Digital Agenda goals of retail roaming prices approaching national mobile prices by 2015. In consequence some operators may not provide wholesale roaming services or may degrade their quality. At the retail level this would mean that good quality roaming was not available across all member states.

A second potential risk is that, faced with unprofitable wholesale roaming services, operators may seek to raise national prices mobile services to preserve their profitability. This is sometimes referred to as the waterbed effect.

Both of these problems can be mitigated by taking account of variations in wholesale costs across member states and setting price caps to reflect costs at the top of this range. But this mitigation then makes it difficult for price caps to achieve the Digital Agenda goal.

A third risk, also discussed in Section 3.3, is that tight retail price caps constrain the opportunity for price and product differentiation in international roaming packages. Mitigating this risk might involve setting retail price caps towards the top end of the expected range of competitive roaming prices.

Finally, there is the risk that tight price caps create an opportunity for arbitrage of national call prices by international roaming prices. This could occur if it were cheaper for a consumer in one member state to purchase a mobile service in another member state and pay regulated roaming charges, rather than buy a mobile service in their home state. We believe that the risk of such an outcome is low, given the charge for a roaming customer to receive calls. This price is not faced by domestic service customers and should be sufficient to make roaming unattractive relative to domestic mobile services.

Risks with resale

The key risks with the resale option and the potential mitigations are set out in the table below.

Figure 3-5: Risks and risk migration for resale option

Potential risk	Proposed mitigation
Wholesale price caps set below cost	Take account of member states with the highest cost MTRs and highest cost of wholesale roaming in setting the price caps
Retail competition ineffective and wholesale price reduction retained by MVNOs and resellers	Robust evaluation of option and consultation with industry and safeguard price caps.

Like the price cap option, there is also a risk that the wholesale price cap is set too low, and does not take account of the cost of roaming in high cost states. The impact of a low wholesale price cap would be similar, with distortion of incentives to provide service and risks of degraded service.

There is a further risk that competition based on resale is not effective at reducing retail roaming prices. In this case, the wholesale price reduction from regulation would pass from operators to MVNOs and resellers, but not be passed on to consumers. A more promising possibility is that specialist MVNOs would use wholesale roaming access to offer roaming services on a pan-European basis.

Risks with single IMSI separation

The key risks associated with single IMSI separation and ways to mitigate these risks are summarised in Figure 3-6. We discuss each of them in more detail below.

First there is the problem of wholesale price caps which are below cost in some member states. Mitigation is the same as for the resale option.

Secondly, there is a risk that technical or operational issues could delay the introduction of roaming, and hence the time at which competitive pressures starts to drive down retail roaming prices. This might be mitigated, if the Commission were to do one or both of the following:

- Impose a safeguard cap which continued to apply after the expected time of implementation of structural separation. This would mean that consumer interests remained protected in the event of any unforeseen delays. We note that the Commission's current proposals go beyond a safeguard cap, with the regulated price cap continuing to fall in 2014.
- Undertake intensive consultation with the mobile sector.

Figure 3-6: Risks and risk mitigation for structural separation

Potential risk	Proposed mitigation
Wholesale price caps set below cost	Take account of member states with the highest cost MTRs and highest cost of wholesale roaming in setting the price caps
Delays to introduction of roaming	Provide for safeguard caps to protect consumer
Higher costs than expected from introduction of roaming	Industry consultation on proposals
Low take up of structurally separated roaming services	Provide reasonable gap between safeguard cap and expected competitive price level

A third risk is that the cost of introducing structural separation may be higher than anticipated. This might be mitigated through the consultation process where operators and other stakeholders will be able to consider the cost estimates and inform the Commission of any difference in views.

The final risk is poor consumer take up of structurally separated roaming, either due to limited entry into the retail market for separated roaming services or to lack of consumer demand. This risk is most likely to arise if the Commission adopts tight price cap regulation alongside structural separation, rather than simply imposing safeguard price caps. Tight price caps would reduce:

- The potential returns from retail structural separation to operators which may deter entry
- The potential gains to consumers from taking a structurally separated service which may deter take up.

The Commission can address this risk by ensuring that price caps are set at safeguard levels rather than as the primary means for delivering benefits to consumers.

Risks with dual IMSI separation

The risks and mitigations for dual IMSI separation are similar to those for single IMSI separation. But there is an additional risk – poor end-user experience when roaming. In the short term potential operational difficulties with structurally separated roaming might include

- The need to switch off handsets when crossing borders between member states so as to be able to select the roaming provider
- Some handsets having difficulty in providing outgoing SMS services via a structurally separated provider
- Some handsets requiring manual intervention to restart data services once a customer has returned home.

This risk is best managed by operators as they have strong incentives to develop an effective commercial proposition for retail roaming customers. It is also likely that the development of industry standards to support roaming will facilitate the development of an effective structurally separated product. We understand that some technical standards, developed by 3GPP, will help to support implementation of structural separation. The adoption of structural separation by the EU would also

provide operators and equipment suppliers with strong incentives to develop appropriate technical standards.

Overall conclusions

There are risks with all four options.

- With price caps the risks centre round the potential market distortions and economic losses which might result from applying an EU wide price cap which tries to achieve the Digital Agenda goal across 27 member states where roaming costs vary widely. These problems were less significant in previous roaming regulations, when roaming prices were set at higher levels. They become more severe as average roaming prices come close to average costs.
- The resale option may have little impact on retail prices, even if wholesale prices are regulated at levels below cost in some member states
- Single IMSI separation may suffer cost overruns and delays. There are also risks that the wholesale price cap is set below cost in some member states
- Dual IMSI separation creates even more risk of cost overruns and delays. In addition the end user experience when roaming may be poor, at least in the short to medium term.

3.7 Criterion 6: promoting innovation

Our analysis of the benefits of competition has focused on the potential gains from lower prices for roaming consumers. However, economic theory suggests that dynamic efficiency gains, such as increased innovation, are more significant than static gains from lower prices in the telecommunications sector.[35] The nature of innovation means that it is difficult to be precise about expected outcomes. It could take the form of innovative service packages which stimulate consumer demand such as fixed prices for calls. If service innovation were to increase the size of the roaming market, then the potential benefits would be large.

Price cap regulation seeks to mimic the lower price effects of a competitive market, but it is not able to incentivise the innovation benefits of a competitive market.

The ***resale*** option offers little scope for innovation. The reseller is dependent on its host for the functionality of the services it offers, while the modest margins between its retail prices and the price charged by its host limit the scope for retail price innovation.

Single IMSI separation offers greater scope for innovation. In the case of international roaming, innovation is more likely to occur at the retail level rather than at the network level. Indeed there is some evidence that the current roaming regulation has been relatively ineffective at promoting the take up of roaming services. Despite a significant reduction in roaming prices, the volume of roaming calls has increased by a very modest amount. This might be due to the inherent elasticity of demand for roaming services. But it may also be due to limited marketing of these services, given the relatively weak competitive pressure on operators in the retail roaming market. The stronger competitive pressure generated by the structural separation options may well stimulate innovative service offering which would unlock unserved demand for roaming services.

[35] Jerry Hausman, 1999, "Cellular Telephone, new products and the CPI", *Journal of Business Economics and Statistics*.

Dual IMSI separation, where technical control of roaming services is handed to the roaming operator, offers the greatest scope for innovation. Suppliers have freedom to innovate at both the retail and wholesale levels.

3.8 Overall assessment

Our assessment of the four options against six key criteria is set out in Figure 3-7 below.

Figure 3-7: Options for future roaming regulation assessed

Criterion	Price cap	Resale	Single IMSI separation	Dual IMSI separation
Effective competition	No	Limited for retail Permanent wholesale price regulation required	Yes for retail Permanent wholesale price regulation required	Yes
Roaming prices approach domestic prices	No	Uncertain	Yes but not by 2015	Yes but not by 2015
Promote EU single market	No	Limited	Yes	Yes
Implementation costs	Very modest	Modest	€400-700 million[36]	€400-700 million
Risks	Price caps below costs in some member states	Wholesale price caps below costs in some member states	Wholesale price caps below costs in some member states Delays and cost over runs	Delays and cost over runs Poor end user experience
Promote service innovation	No	Some	Some	Yes

On the basis of this assessment we conclude that:

- ***Price caps*** have been effective in the past. But they now create growing risks of unintended and harmful consequences as price caps approach the costs of supply. More importantly, caps do not resolve the central issue – the absence of competitive pressure in retail roaming markets.
- The ***resale*** option will undoubtedly increase retail competition. The strength of this effect is uncertain but is likely to be limited on its own
- Either of the ***separation*** options should substantially increase competition in the retail roaming markets and deal with the retail roaming price problems. Of the two:
  - ***Single IMSI separation*** offers a better end-user experience in the short term, fewer implementation risks and lower implementation costs

[36] This one off cost compares with annual EU roaming revenues of €4800 million

- ***Dual IMSI separation*** offers a permanent structural solution with no need for the long term wholesale price regulation required by single IMSI separation. It also offers greater scope for innovation.

3.9 Combinations of options

We have assessed the four options of Section 3.1 on a stand-alone basis. But what combination of these options might be in the public interest?

- Price caps are clearly an alternative, rather than a complement to, the other options
- It makes little sense to require both single and dual IMSI separation. Such a combination would add significant implementation costs and delay implementation for no obvious benefit
- We can see no reason why the resale option should not coexist with one of the separation options, so as to increase competition further.

4 Key issues with the new draft Regulation

4.1 Introduction

The Commission's draft of the new roaming regulation enables structurally separated roaming and so addresses a major barrier to effective competition in the retail roaming markets. However, there are a number of elements in the current draft which raise concerns and potentially undermine the development of competitive retail roaming markets in Europe. In this section, we discuss these issues.

4.2 Competition in the wholesale roaming market

As discussed in Section 2, the Commission has based its proposals on the assumption that the wholesale roaming market is not competitive. This is based largely on a misunderstanding of wholesale roaming margins for active voice calls, as discussed in Section 2.2. If, instead, we base our analysis of roaming margins on out-of-balance prices and the dynamics of the wholesale margin for balanced minutes, we reach different conclusions. Specifically:

- Wholesale prices for out-of-balance traffic are well below the Commission's current price caps and falling fast towards costs.
- The wholesale price for balanced traffic is irrelevant to the competition analysis if measures are taken to make the retail market competitive
- Wholesale price regulation is redundant.

We suggest that the Commission review its proposals in the light of this analysis and, in particular, whether continued regulation of wholesale roaming services is required.

4.3 The proposed level of the wholesale price cap

We do not believe that continued regulation of wholesale roaming is required. However, if the Commission does continue to regulate wholesale prices, then it needs to reconsider the level of the price cap for wholesale voice minutes. The Commission proposes to cap this price at 6 eurocents per minute by 2014. We believe this cap may be too low. Our argument is as follows:

- The cost of wholesale roaming varies considerably across EU member states. This is reflected in both the retail prices charged for mobile services in competitive markets and regulated (cost based) MTRs.
- It is important to set the wholesale price cap for roaming at the upper end of the cost range. Otherwise prices are below cost in some member states. This means operators may degrade or even discontinue supply of wholesale roaming services in these states with substantial losses of economic welfare.
- BEREC estimates this upper range cost at 10 eurocents per minute for 2012 to 2015 in its report of December 2010

- But this estimate does not allow fully for roaming specific costs. It only covers the costs of call origination and termination. TAG estimates these costs might add a premium of 2 to 3 eurocents per minute
- Finally, in countries which are holiday destinations, network capacity is provided for holiday period demand and is little used outside the holiday season. This adds a further premium to the unit costs in some member states.

On this basis we believe that the appropriate cost of wholesale roaming to use in setting the price is unlikely to be below 10 eurocents per minute.

4.4 The proposed level of the retail cap

The European Commission proposes a retail cap for active voice calls of 24 eurocents per minute by 2014. Again this cap may be too low. We argue as follows:

- The retail price cap needs to be set with two objectives in mind - to protect consumers from high prices ***and*** to allow sufficient margin to incentivise competitive entry into the retail market
- The analysis in our report suggests that it is worthwhile for mobile operators and MVNOs to enter the roaming market with structurally separated products when there is an 18 eurocent per minute margin between the retail price of an active voice call and the wholesale cost of supply in the visited country.
- A retail price cap which provides a margin of less than 18 eurocents per minute could limit, or even eliminate, entry by specialist roaming service providers using structurally separated solutions.
- If the wholesale price cap for an active voice call in 2014 is raised from 6 to 10 eurocents per minute then it is desirable to raise the retail price cap from 24 to 28 eurocents per minute to maintain the margin. This then provides equivalent commercial incentives for mobile operators and MVNOs to offer structurally separated solutions.

There may even be a case for a higher retail price cap:

- Our analysis assumes that the target end-users will switch to the entrant for a 6 eurocent per minute discount on the prevailing retail price.
- Market research in three EU member states commissioned by TAG finds that a 10 eurocent per minute discount is required for a large enough number of consumers to switch providers so that separation is commercially attractive.
- If this is the case then a larger margin than 18 eurocent per minute may be required for profitable entry.

4.5 A reappraisal of competition in the retail data market

Recent sharp falls in data roaming prices suggest that a reappraisal of competition is required in the retail data roaming market. Since BEREC and the European Commission conducted their analysis of retail data roaming markets we have seen retail data prices fall at a rate of 75% per year.

4.6 Cost recovery by the host network

If the Commission decides to support the resale option then it will be important to allow host networks to recover the costs which they incur in serving the resellers. For example resellers do not invest in the equipment which enables them to authenticate roaming customers or hold billing information in near real time. Instead they rely on their host operator to provide them with such services. The current draft of the Regulation does not appear to allow for recovery of such additional wholesale costs.

4.7 Review date for the new regulation

The Commission is proposing to review the functioning of the roaming regulation in 2015.[37] This is likely to be too early to assess its effectiveness. A 2015 review would not have sufficient data to assess the development of competition based on structural separation. BEREC usually publishes data with some time lag. For example, their December 2010 report uses data from Q2 2009, a lag of 18 months. This means that a report in late 2015 would only report outcomes up to early 2014, much too early to assess the impact of structural separation.

A review in 2015 would increase the uncertainty facing potential entrants into the separated roaming services market and may deter entry and investment. Given this analysis it would be more appropriate to schedule a review for 2017. This should provide sufficient time to assess the development of competition from structural separation in the 2014 to 2016 period.

4.8 The coexistence of options

The new Regulation would allow a number of options to coexist in parallel. For the avoidance of doubt, it would be useful if the European Commission could clarify this matter when it redrafts the new Regulation. In particular it makes little sense to require both single and dual IMSI solutions. Such a combination would both add significant implementation costs and delay implementation for no obvious benefit. But we can see no reason why the resale option should not coexist with one of the separation options, so as to increase competition further.

[37] European Commission, July 2011, Report to the European Parliament on Roaming, page 9.

Annex A The viability of structural separation

A1 Introduction

In this annex we consider the commercial viability of the single IMSI and dual IMSI separation options. We analyse the viability of single IMSI separation. But the analysis applies with only minor modifications to dual IMSI separation.

A2 When is structural separation attractive to roaming customers?

We estimate that structural separation is attractive to customers who spend more than €100 per year on roaming. Our estimate is derived as follows.

For the consumer segment, we assume that:

- Consumers will not spend more than two hours purchasing a structurally separated roaming service
- The consumer value of time is €6 per hour[38]
- Consumers who move to separate purchase of roaming services enjoy roaming prices which are 25% lower than existing market prices
- 60% of roaming spend is on EU roaming.

With these assumptions the one off end user cost of purchasing roaming services separately is less than €12 and the annual saving is €15 (€100 x 25% x 60%). Hence the cost savings to a customer outweigh the joining costs, providing the customer spends more than €100 each year.

The analysis for the business segment is similar. The value of time is significantly higher, but so too is the average number of subscribers per account.

A3 What proportion of roaming spend is accounted for by such customers?

We have divided the international roaming market into business subscribers, contract consumer subscribers, and prepay subscribers by level of spend. We have then estimated, using confidential data supplied by TAG, how customers and customer revenues are distributed by segment. Our estimates are set out in Figure A1. These proportions are based on gross roaming revenues before any corporate discounts.

[38] Based on value of leisure time used in transport project appraisal, National Roads Authority, March 2008, Project Appraisal Guidelines, Appendix 6 – National Parameters Value Sheet, page 5.

Figure A1: Distribution of roaming spend by customer segment

Customer segment	Spend on roaming	% customers	% roaming revenues
Business	>€100	6%	61%
	<€100	9%	5%
	€ 0	16%	0%
Residential contract	>€100	5%	21%
	<€100	23%	11%
	€ 0	13%	0%
Prepay	>€100	0%	0%
	<€100	13%	2%
	€ 0	15%	0%
Total		100%	100%
All	>€100	11%	82%
	<€100	45%	18%
	€ 0	44%	0%
		100%	100%

We can see that:

- Just under half of mobile subscribers never roam
- 20% of the customers who do roam spend more than €100 each year. This group would find it worthwhile to consider switching to a structurally separated for roaming services
- These customers generate 82% of roaming revenues. The majority of these roaming revenues are generated by small businesses and residential contract subscribers. These customers would enjoy substantial benefits and price reductions as a result of structural separation
- A substantial minority of this roaming revenue is generated by subscribers who already enjoy corporate discounts as a result of competition between mobile operators for corporate customers. Structural separation should increase competition in this sub-segment, but not as much as the increase in competition enjoyed by small businesses and residential contract customers
- 80% of roaming customers spend less than €100 per annum. A proportion of these customers may find structural separation attractive, especially if service providers can find convenient and low-cost ways to serve them. They should also enjoy indirect competitive benefits as a result of structural separation. It is likely that, with the introduction of structural separation, national mobile service providers would want to protect their customer base by including a small allowance of "free" roaming minutes in mobile packages on offer to such customers.

A4 When is structural separation commercially viable for mobile operators?

Does it make commercial sense for mobile operators to enter the structurally separate market, both in their own countries and in other EU member states? To answer this question we need to consider whether the profits to be generated from structural separation justify likely customer acquisition and support costs plus the fixed cost of implementation.

To estimate the likely profitability of structural separation we consider the business case for an operator considering entry as a structurally separated provider in Country A - with a population of 20 million – in 2014. We assume that:

- The 2009 average price for roaming voice calls in the EU is 30 eurocents per minute - a blended rate of 41 eurocents per minute for active calls and 18 eurocents per minute for passive calls
- Retail revenues for EU voice roaming were €3439 million in 2009
- The population of Country A is 20 million and that of the EU 480 million

We then estimate that there are 477 million retail roaming voice minutes generated in Country A[39]. We then assume that:

- Prices fall to 24 eurocents per minute for active calls and 10 eurocents per minute for passive calls by 2014, in line with current European Commission proposals for roaming prices
- The volume of roaming minutes grows to 600 million by 2014 as a result of these price reductions
- The wholesale cost is 6 eurocents per minute for active calls and 0 eurocents per minute for passive calls
- By 2014 the gross margin on voice calls is 18 eurocents per minute for active calls and 10 eurocents per minute for passive calls. This produces a blended rate of 14 eurocents per minute

In Country A the gross margin on EU roaming voice calls is then €84 million per year[40]. To calculate the expected gross margin to the entrant operator we assume that:

- The entrant acquires a 10% market share
- SMS and data contribute an additional 20% to gross margins and non-EU roaming contributes a further 20%
- The entrant needs to offer a 6 eurocent per minute discount on active voice calls (or 4 eurocents per minute discount on the blended price[41]) to be attractive to potential customers. This discount reduces the gross margin available to the entrant from 14 to 10 eurocents per minute.

Using these assumptions the gross margin to the entrant is €8.4 million per annum[42]. To estimate the costs which the structurally separated provider faces we then need to know:

- The number of customers represented by a 10% share of the target market
- The acquisition cost per customer for marketing, customer sign-up and SIM card production and distribution
- The fixed costs of implementing structural separation. We estimate this at €400 million to €700 million in total, or €4 million to €7 million per operator[43]. If this cost is spread over four countries €1 million to €2 million must be recovered from customers in Country A.

[39] [€3439 million x 20 million]/[480 million x 30 eurocents per minute]

[40] €0.14 x 600 million minutes

[41] There are more active call minutes than passive call minutes

[42] €84 million x 10% x 1.4 x 10/14

[43] Assuming a total of 100 operators in the EU

We estimate that the target market in Country A consists of 2.2 million customers[44]. If we assume an initial acquisition cost of €50 per customer[45] then the structurally separated provider with a 10% market share faces initial costs of €12 million to €13 million[46]. It is reasonable to expect that:

- Once acquired, customers will stay for two years
- The cost of acquiring customers who switch from one roaming provider to another under the structural separation scheme will be significantly lower than initial acquisition costs.

On this basis the case for market entry looks reasonable. The entrant faces initial costs of €12 million to €13 million for a gross profit of €8.4 million per year.

This result suggests that entry is likely to be profitable, even after allowing for some reductions in retail prices between 2010 and 2014. One potential threat to commercial viability arises from retail price regulation. If retail prices are regulated close to the level of cost, then the structurally separate market is likely to be unattractive and entry by structurally separated providers may not take place.

[44] 20 million x 11% of customers spending more than €100 pa

[45] Based on discussions with TAG.

[46] 2.2 million x10% x €50 + €1 to 2 million