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**IMPACT ASSESSMENT OF POLICY OPTIONS IN RELATION TO THE
COMMISSION'S REVIEW OF THE FUNCTIONING OF REGULATION (EC) No
544/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 18
JUNE 2009 ON ROAMING ON PUBLIC MOBILE TELEPHONE NETWORKS
WITHIN THE COMMUNITY**

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IMPACT ASSESSMENT

1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Background

In June 2007, a first Regulation on roaming on public mobile telephone networks within the Community (the Roaming Regulation) was adopted to contribute to the smooth functioning of the internal market while achieving a high level of consumer protection, fostering competition and transparency in the market. In July 2009, revised regulation¹ was adopted and this is valid until 30 June 2012. In the meantime the Commission's task was to monitor and report to the European Parliament and Council on the functioning of the Regulation. The Commission must review the functioning of the Regulation by 30 June 2011 at the latest.

This impact assessment (IA) report examines options arising from the Commission's review of the functioning of the Roaming Regulation² pursuant to Article 11 thereof. In particular it examines whether it is necessary to extend regulatory intervention beyond its current expiry date of 30 June 2012 and the options for such intervention. In each case it examines the impact of these options on consumers and the industry.

1.2. Implementation of the Roaming Regulation

The Commission has been monitoring developments in the roaming market carefully and in its Interim Report³ on the functioning of the Regulation, published June 2010, noted that competition was not strong enough. In that report that Commission found that, overall, implementation of the amending Roaming Regulation has gone smoothly and operators have complied with the new provisions. Consumers are benefiting from reductions in the prices for voice and SMS roaming services and from increased transparency. The prices for data roaming have also fallen but consumers are not yet enjoying fully the reductions seen at wholesale level.

1.3. BEREC Analysis and Benchmark Data Reports

The Commission services have continued to work closely with the Body of European regulators for Electronic Communications (BEREC) which has provided highly valuable input to the Commission's ongoing monitoring of the Roaming Regulation as well as to this review of the Regulation. This report draws heavily on the work carried out by BEREC and in particular on:

The six collections of operator roaming data carried out by NRAs including trends in roaming prices and volumes for all roaming services at wholesale and retail levels as far back as the 2nd quarter of 2007 and up to and including the first half of 2010. Furthermore, BEREC has

¹ Regulation (EC) No 544/2009, OJ L 167, 29.6.2009, p.12

² (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC, OJ L 171 of 29 June 2007 p 32-40

³ See COM(2010)356 final (29/06/2010)

published a number of other reports which contribute to specific requirements of the Commission's review of the Regulation⁴.

Article 11 of the Roaming Regulation specifically requires that in its assessment of methods other than price regulation which could be used to create a competitive internal market for roaming, the Commission has regard to an analysis carried out by BEREC. To meet this obligation, in December 2010⁵ BEREC published a full analysis the effects of the Roaming Regulation as well as its views as to possible future regulatory approaches.

1.4. Public consultation

The European Commission launched a wide-ranging public consultation on 8 December 2010 seeking comments on the review of the Roaming Regulation. The response rate was high – around 90 contributions were received in total.

Most responses argued for the need for further regulatory intervention beyond 2012. Responses from industry players were mixed – most acknowledged the inevitability of further regulation while a few argued that competition has developed to a level that does not warrant future regulatory intervention. Most respondents acknowledged that the current Regulation had succeeded in bringing benefits for consumers. On the other hand, very few believed that competition was stronger because of the Regulation. Industry in particular was sceptical of the current model's ability to foster competition.

The Commission had put forward a number of options for future approaches to regulation. Among these were options which would link roaming prices directly to domestic prices. These alternative options of retail price regulation (Roam-Like-at-Home/RLAH or Roam-Like-a-Local/RLAL) were assessed by stakeholders but views were quite divergent. RLAL was the least popular option amongst operators as it would make the task of ensuring adequate transparency of tariffs complicated. Only a few positive replies came regarding the RLAH option, mostly stating that this is a better option than RLAL. The continuation of the existing price cap model was favoured by most stakeholder groups.

The Commission had also suggested a number of possible structural solutions to the roaming problem. Some network operators and national authorities expressed doubts on structural solutions, which were considered to be costly, time consuming and (especially the decoupling option) challenging to implement. In this regard, it was also underlined that, if not limited to roaming specific services, such structural solutions could even distort the national mobile markets which are considered to be competitive. The effectiveness and general workability of the 'spot market' was also questioned, though supported by a few small operators. An access obligation for MVNOs was perceived more neutrally and some responses (from smaller operators) highlighted its potential to promote competition.

Most operators were strongly opposed to retail data roaming regulation while consumers, Member States and others support this approach. If such regulation is to be proposed, MNOs suggested a retail cap which would allow flexibility in this new and emerging market. Other stakeholders (Member States, consumer representatives and some MVNOs) however argued

⁴ http://www.erg.eu.int/documents/berec_docs/index_en.htm#board

⁵ http://www.erg.eu.int/doc/berec/bor_10_58.pdf

that the spread between the retail price and the wholesale cap is too big and shows that competition has not kicked-in. It was widely acknowledged that current technology does not provide for a viable roaming substitute.

1.5. Meetings with interested parties

The Commission services have held numerous meetings with mobile operators over the course of the review of the Roaming Regulation.

1.6. Commission studies

A Study entitled “Study on the Options for addressing Competition Problems in the EU Roaming Market” was completed for the Commission by WIK Management Consultants. Support for this impact assessment provided by Van Dijk Management Consultants.

1.7. Development of an economic model

In addition to the general data gathering exercise undertaken by BEREC referred to above, all NRAs have provided directly to the Commission the operator-specific data which was gathered by them as part of that general monitoring exercise. This comprehensive data has enabled the Commission Services to construct an economic model which provides estimates of the impact of the current Regulation as well as the economic impact of the policy options set out in this report. This model is explained in detail in Annex V.

1.8. Commission Services Inter-service Group

In order to support the preparation and drafting of this impact assessment, a Commission Services inter-service group was established. The following Commission Services were invited to participate: Secretariat General, Legal Service, Enterprise and Industry, Health and Consumer Protection, Internal Market and Services, Competition, Economic and Financial Affairs and Trade. There were two meetings of this group.

1.9. Impact Assessment Board

On 8 April 2011 the Impact Assessment Board (IAB) in its final opinion recommended the several improvements that are all included in this final impact assessment report. Following the IAB examination and suggestions, the following improvements were made to the report: (a) the final impact assessment report now provides a more developed analysis of the EU market for mobile roaming services; (b) the report analyses and quantifies to the extent possible the costs that telecom operators and service providers will have to bear to implement the structural elements of the preferred option; (c) the report provides the improved comparison of options by clarifying the scoring method used and explaining its conclusions; (d) the report presents a more detailed summary the different positions of the stakeholders; (e) the quantitative analysis is further improved.

2. PROBLEM DEFINITION

Roaming charges are still an important impediment to the single market and create an important cost factor for businesses and citizens in Europe. Many Europeans avoid, or curtail, usage of their mobile phones when travelling outside of their home Member State in order to

avoid incurring mobile roaming charges⁶. Every day European businesses and citizens are faced with the reality that this bottleneck to cross-border activity remains. The weak linkage between cost and price for roaming services indicates the lack of competition.

The overall *problem* that is dealt with in this impact assessment study is that:

“Roaming charges that are a result of market forces alone are excessive compared to costs”

More precisely, the central *question* to address is if the objectives of the current Regulation have been achieved by the present provisions, and if and how the Regulation should be adapted after 30 June 2012. Derived from this, the overall aim for this impact assessment can be summarised as follows:

“If regulation is justified, what approach should be applied for regulating roaming services after 30 June 2012”?

2.1. Definition of roaming services

International Roaming⁷ is a service that allows a customer of a Mobile (Virtual) Network Operator (M(V)NO)⁸ in one country, to obtain services (voice, SMS or data) from an MNO in another country. The service provider ensures that consumers remain connected to a mobile network abroad while using the same mobile handset (or possibly laptop in case of data roaming) and the same telephone number. A distinction can be made between wholesale and retail roaming services.

Wholesale roaming services

The term “wholesale roaming services” refers to the provision of roaming services between service providers located in different countries. More precisely, service providers that want to offer roaming services to their customers have to buy them from MNOs located in the visited countries. To this end, commercial agreements between service providers have to be concluded.

The wholesale roaming market is actually divided in two different parts:

- The wholesale inbound roaming market is the market where MNOs can sell and buy roaming services to each other by negotiating commercial agreements. As membership to GSMA is in practice required for service providers to conclude agreements with foreign MNOs, this market solely includes MNOs.

The wholesale resale roaming market is the market where other service providers (MVNOs and resellers) can buy roaming services previously negotiated by their MNOs. Indeed, MVNOs are generally not able to access the wholesale inbound market for negotiating themselves bilaterally with all foreign MNOs. Generally,

⁶ 2010 Eurobarometer report on Roaming: http://ec.europa.eu/information_society/activities/roaming/docs/survey2011_en.pdf

⁷ International roaming is most often referred to as simply ‘Roaming’. Unless otherwise indicated, ‘roaming’ will always refer to ‘international roaming’ in the remainder of this text.

⁸ It is assumed that MNOs as well as (full) MVNOs can conclude an inter-operator wholesale contract for international roaming services.

MVNOs and resellers negotiate agreements for buying roaming services via their domestic MNO but this is not especially required.

Retail roaming services

The retail roaming services are the roaming services sold by all domestic providers (MNOs, MVNOs and resellers) to end-users. On this market, service providers resell to their domestic customers roaming services which they have bought (directly or via a domestic MNO) from a foreign MNO.

2.2. Market Size and segments⁹

The EU market for mobile roaming services can be divided into voice services, SMS and broadband data services. In 2009, the **retail** EU roaming market¹⁰ accounted for 4,777 billion EUR in revenues. This can be divided as follows between the different services: 71% for voice (nearly three quarters of which is relative to calls made, the rest to calls received), 17% for data and around 11% for SMS. For **wholesale** revenues, figures only differ slightly, with respectively 69%, 15% and 16% of wholesale non-group roaming revenues coming from voice, SMS and data services. The total wholesale market size in 2009 amounted to 1,253 billion EUR.

With a total EU mobile market size of about 164 billion EUR¹¹, EU (retail and wholesale) roaming revenues appear to represent around 3,68%¹² of the total EU mobile market. Between 2007 and 2009, revenues for voice roaming fell quite significantly as a result of both lower prices as well as lower volumes of traffic (-3,2%). For SMS roaming, the impact of the Regulation can already be clearly seen as total revenues in 2009 compared to 2008 decreased significantly despite a big increase in volume (+23,1%). Finally, for data services, the increase in volume of 43,6% between 2008 and 2009 combined with the imposed decrease in wholesale prices led to an overall decrease in revenues. At the retail level however – where no price ceilings were imposed for data roaming, the total revenues in 2009 remained at the same level as in 2008.

The structure of the EU roaming market has not substantially changed since the introduction of roaming regulation in 2007 in terms of actors in the market. There are around 100 mobile network licences granted in 27 Member States. Half of these operators are subsidiaries of or have co-operation agreements with the four main market players. Almost 80% of EU citizens subscribe to one of the four main mobile groups (460million subscribers). While mobile operators' strategies (e.g. in terms of negotiations with suppliers or investment decisions) are European, mobile services are produced and marketed at the national level. For example, when purchasing retail roaming services as part of the mobile service bundle, the end-user has a choice between 2 or 6 network operators depending on the Member State. In addition to

⁹ All figures in this section are derived from a detailed data-collection exercise undertaken by the national regulatory authorities and the European Commission. Data were collected from 27 NRAs on an individual per-operator basis, and were then aggregated by means a bottom-up approach. See the annex for a detailed explanation.

¹⁰ I.e. excluding revenues from rest of world traffic

¹¹ See 15th Progress Report on the Single European Electronic Communications Market (15th Implementation Report), figure is for 2008.

¹² The BEREC report “International Mobile Roaming Regulation” of December 2010 indicates a market size for roaming services of 4,2% on average for the EU in 2009.

existing mobile network operators, retail roaming services are provided also by mobile virtual network operators, MVNOs. MVNOs market share varies from one Member States to another. In March 2010 their cumulated market share reached 20% in Germany and Denmark, between 10-19% in the UK, the Netherlands and Finland. In the remaining countries the market share is below 10%.

Technological developments related to roaming, including possible substitution between services within the roaming market as well as detailed description of barriers to competition on the European roaming markets are presented in more details in Annex I.

2.3. Evolution in wholesale and retail roaming charges

When considering the problem that “Roaming charges that are a result of market forces alone are excessive compared to costs”, the evolution of tariffs is a useful starting point for a more thorough analysis. Roaming charges at the wholesale and retail level for the different services offered have steadily decreased over time. This is shown by the following graphs with EU averages for the different services considered:

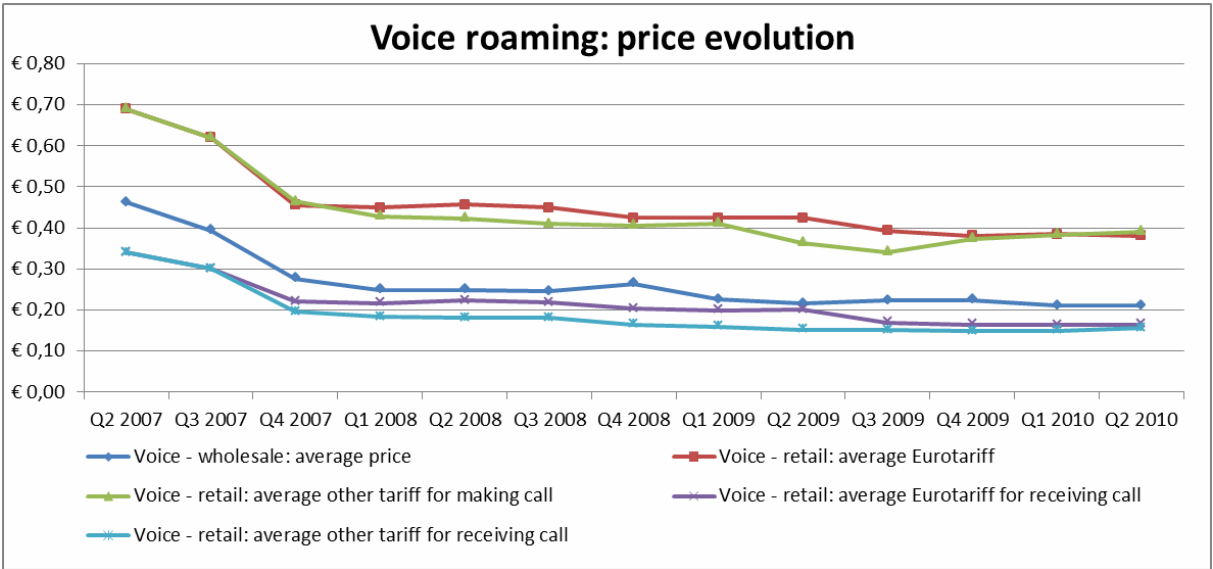


Figure : Evolution of wholesale and retail prices for voice roaming (per min), 2007-2010 (SOURCE: BEREC database on roaming data collection)

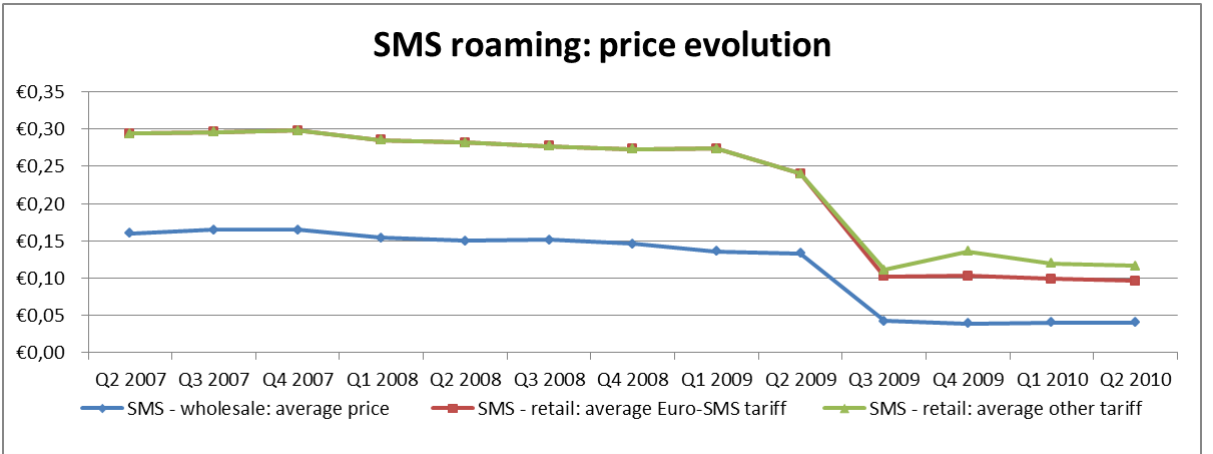


Figure 1: Evolution of wholesale and retail prices for SMS roaming (per SMS), 2007-2010 (SOURCE: BEREC database on roaming data collection)

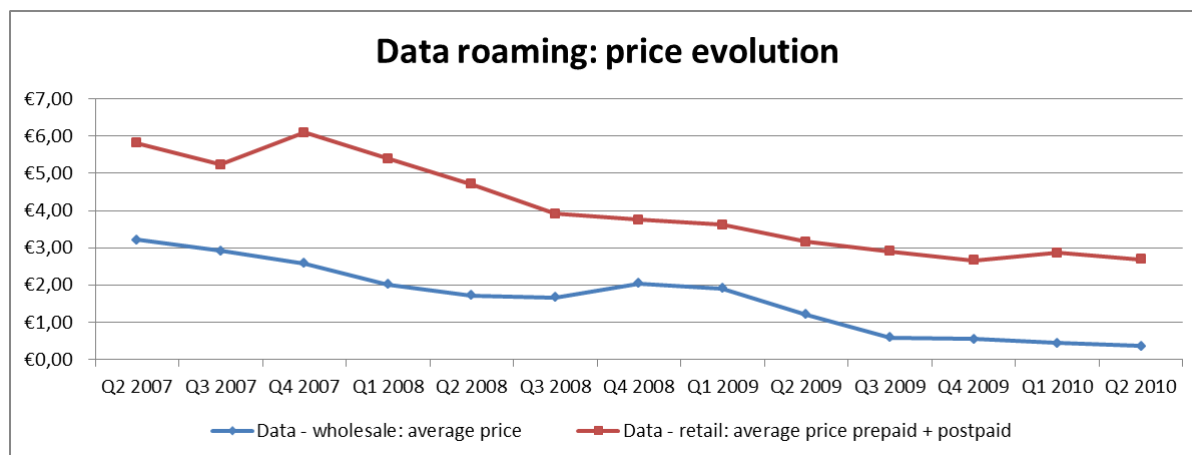


Figure 2: Evolution of wholesale and retail prices for data roaming (per MB), 2007-2010 (SOURCE: BEREC database on roaming data collection)¹³

From the above, it thus appears at first sight that wholesale and retail prices have steadily declined, and that declines in wholesale and retail prices have occurred simultaneously and in a rather coordinated way. As will be discussed in the next paragraph, this however is largely due to the regulations at both wholesale and retail level that are in place since 2007.

Moreover, upon closer inspection it becomes clear that although the absolute margin between wholesale and retail prices has remained constant or has slightly declined, in relative terms the difference between wholesale and retail prices has even increased in recent years, thus enlarging the relative operator margin (e.g. for voice, the difference between wholesale and retail prices has risen from 49% in Q2 2007 to 81% in Q2 2010). Finally, for retail data services, the only service currently not subject to price regulation, declines in wholesale prices do not appear to have been structurally passed through to the retail level: between Q2 2009 and Q2 2010 (so in the first year of application of wholesale data roaming price caps), wholesale prices have decreased by about 70%, whereas retail prices decreased more marginally with about 15%. This evolution is in stark contrast with previous conclusions¹⁴ that “the analysis of the evolution in wholesale and retail prices between 2007 and 2008 suggested that there is a higher likelihood of pass-through of wholesale price reductions to end-users [for data] than is the case for voice or SMS roaming services”.

2.4. Comparison of roaming prices with price ceilings in the Roaming Regulation

In a price-regulated environment, more important than the absolute evolution of the prices is how these compare to the price caps that were defined in the Roaming Regulation. The most

¹³ Since Q1 2010, the BEREC database makes a distinction between retail tariffs applicable to prepaid versus post-paid customers. Therefore, a weighted tariff has been determined, based on respective volumes of roaming data services used by prepaid and post-paid customers. More precisely, on average for Q1 and Q2 2010; 13% of roaming data volumes was transmitted by prepaid user and 87% by post-paid subscribers.

¹⁴ See SEC(2008) 2489 – page 25.

recent benchmark data that exists on the roaming tariffs applied in the different Member States stems from the BEREC international roaming benchmark data collection for the period January – June 2010. Since the current price caps for retail and wholesale voice and SMS roaming services and for wholesale data roaming services only came into force on 1 July 2010, the following graphs set out the most recent BEREC results for average EU tariffs applied against the price caps applicable in the previous step of the glide path, i.e. from July 2009 to June 2010.

As the above graph shows, average EU tariffs in general are very close to the price caps defined by the 2009 Regulation. Differences for regulated wholesale tariffs range from respectively 63,60¹⁵% and 18,85% lower for data and voice service to tariff at the same level as the price caps for SMS roaming.

2.5. Comparison of roaming prices with underlying costs

For **voice roaming**, an estimation of the underlying costs per min was made at the Member State level, with very conservative estimations based on two times the current mobile terminating rate (MTR), 2cEUR for the international transit and 2cEUR for the roaming specific costs¹⁶. It can be concluded that current retail roaming prices are on average 118% higher than the outcome of our estimated underlying costs. The differences vary from +20% for Ireland (which could be partly explained by the second most high MTR in the EU 27) and +515% for Cyprus (which in turn has by far the lowest MTR)

Another more recent approach developed by BEREC¹⁷ makes a further distinction between technical costs, sales and marketing costs and common costs. While remaining conservative (e.g. for the terminating part of the routing, it is still assumed that all calls are terminated at more expensive mobile networks), the methodology for estimating underlying costs also takes a more forward looking approach by estimating costs for the period 2012-2015 (e.g. taking into account the expected further decrease of terminating rates to the LRIC level, at least for the terminating leg¹⁸). The results of the new methodology suggest an average wholesale costs of 5,42 cEUR/min and between 5,69-8,13 cEUR/min when including retail costs.

Similarly for **data and SMS** the underlying costs are extremely low compared to the current caps.¹⁹ A similar approach as developed for voice roaming services has led to following results: the average wholesale costs per SMS is 0.81 cEUR (between 1,41 and 2,01 cEUR when retail costs are included) whilst wholesale costs for data per MR are estimated at 8,08 cEUR (between 8,49-12,12 cEUR when including retail costs).

¹⁵ This is compared to the cap of 1 EUR/MB on 1 July 2010; this will however further go down to 0,5 EU/MB on 1 July 2011.

¹⁶ This is consistent with the approach taken in the Impact Assessment for the amended Regulation – SEC (2008) 2489.

¹⁷ See “International Mobile Roaming Regulation” – BEREC Report – December 2010

¹⁸ For the originating leg, a Fully Distributed Costing (FDC) approach is used in order to also cover the cost of coverage (i.e. ‘the access cost’).

¹⁹ A comparison at the country level, based on publicly available data, was not possible for SMS and data services.

2.6. Comparison of roaming prices with domestic prices

It can be concluded that roaming prices for voice services are on average 200% higher than the domestic Average Revenue Per Minute (APPM). For SMS, no readily available information on average retail prices per SMS at the Member State level could be found.

These elements clearly confirm a previous statement by the ERG²⁰ (i.e. before the introduction of Regulation 544/2009) that the difference between domestic and roaming prices appears to be no better for SMS than for voice and that those differences are unlikely to be justified on the basis of roaming-specific costs. The introduction of the price ceiling already largely reduced the roaming cost for SMS, but these remain very much above the underlying costs.

Finally, for data services, a first comparison was made based on data collected on mobile broadband offers and internal research by Van Dijk Management Consultants related to Q1 2009²¹. It was observed that many domestic offers already contain a number of Gigabyte (GB) (most often 1, 3, 5 or 10GB) in the monthly subscription fee. Additional volume can be bought at an additional cost per GB. After the elimination of some extreme values, and assuming a total monthly consumption of respectively 1, 5 and 10GB, an EU average domestic price for mobile data could be derived. Depending thus on the total consumption, an average cost of 12; 15,6 and 17,5cEUR per MB²² was obtained.

The BEREC report on International Mobile Roaming Regulation also provides benchmarking information on domestic mobile data services. The results obtained indicate a European domestic average of 4,8cEUR per MB.

Based on these elements, it can be concluded that the gap between the prices for domestic and (non-regulated) retail data roaming services²³) remains enormous (> 95%) and is thus very far from reaching the DAE Key performance target of differences between roaming and domestic tariff approaching zero by 2015.

2.7. What are the underlying causes of the problem?

The impact of the 2007 and 2009 roaming regulation on competition has been limited. The BEREC data suggests that there have been no major developments which change this position i.e. prices are still clustered close to the maximum level of the caps, except in the case of wholesale data. The structural issues which were identified as causing mobile retail and wholesale roaming markets to be not effectively competitive are still evident. These include lack of (or substantial imperfections in) retail roaming substitutes and relatively inelastic demand for roaming services for a significant part of the customer base: only few subscribers

²⁰ Submission to Public Consultation for the Impact Assessment SEC(2008) 2489

²¹ Collection of data made during the same data collection period as for the DG INFSO Broadband Internet Access Cost (BIAC) Study in April 2009.

²² The higher cost per MB in case of a consumption of 10GB compared to a lower consumption is caused by the higher cost for additional GB that are added to the cost of those tariff plans that do not include 10 GB in the fixed subscription fee.

²³ The overall average for on-net and off-net at Q2 2010 was 1,30 EUR/MB, whereas the overall average for off-net traffic was 2,604 EUR/MB

chose their operator based on the roaming charges offered. In the wholesale roaming market, the majority of deals are reciprocal, so that purchasers buy and sell wholesale roaming from the same counterparty while negotiating agreements for residual traffic with most (if not all) other operators to ensure good network coverage for their roaming customers. For relatively small volumes of residual traffic, there is not much incentive to compete vigorously on price, especially for larger operators.

To illustrate the reasons for these problems in more detail, the following section will focus on the specificities of the roaming market and the market failures that are at its heart. A distinction will naturally be made between the wholesale and retail market.

Wholesale market

Since the widespread use and efficiency of traffic steering, the wholesale roaming price offered to an operator is principally driven by the amount of traffic that this operator is able to offer to send back to the country with which it is negotiating²⁴. Bilateral negotiations between operators are greatly affected by the amount of traffic that the other operator will in return steer onto the other operator's network, this way increasing the operator's revenues. Therefore, negotiations principally evolve around agreeing to 'balance traffic', and then to apply a marginal rate (wholesale roaming price) to the remainder of the traffic²⁵. It was confirmed by market players that the volume of traffic an operator has to offer in return, at least plays a role in the price it can obtain for its roaming customers²⁶.

Another argument recently raised, more specifically in the "Study on the Options for addressing Competition Problems in the EU Roaming Market", commissioned by the Commission as a preparatory study for the present Impact Assessment, is that the data available on applicable roaming tariffs shows a somewhat twisted view of reality. It is argued that bilateral negotiations between operators solely focus on the rate to be applied to unmatched minutes (thus in excess of the balanced traffic), whereas the matched minutes are simply exchanged at the wholesale cap. Whereas the negotiated price for unbalanced traffic can thus in some instances be as much as 40% less than the regulated cap, this is not as such shown in the statistics, since the relatively small amount of unbalanced minutes is mixed in with the high volume of balanced traffic. Whereas this theory presents good news for the wholesale market in itself, i.e. this would mean that there is more price competition in the wholesale market than has been assumed until now based on the available data, it could also be concluded that in this case the difference between the retail prices actually paid and the retail prices that should be applicable based on the underlying costs, is even greater than had been presumed, thus suggesting that the problem on the retail roaming market is even greater.

Another problem in the wholesale inbound market often raised by full MVNOs is the fact they are in practice excluded from this market. Looking closer, the underlying problem relates to

²⁴ EUI Working Paper RSCAS 2010/62 - Robert Schuman Centre for Advanced Studies – Florence School of Regulation – A Structural Solution to Roaming in Europe, by Tony Shortall

²⁵ For the sake of clarity it should be mentioned that the wholesale cap as regulated by the Roaming Regulation applies to all traffic and sets thus the upper boundary both for balanced and unbalanced traffic.

²⁶ See "Study on the Options for addressing Competition Problems in the EU Roaming Market", by WIK Consult for DG INFSO

the fact that bilateral negotiations for roaming services are most often based on STIRA agreements (i.e. standard documents regularly amended giving a general framework to conclude agreements with foreign MNOs), which can currently only be used by GSMA members. MVNOs, however, cannot have the required GSMA membership. Although in theory, other types of contracts could be concluded, since STIRA agreements are not obligatory, in practice these introduce a higher degree of uncertainty resulting thus in much higher transaction costs²⁷. Furthermore, it appears that MVNOs could obtain GSMA membership by paying high fees and after fulfilling some technical requirements²⁸. Theoretically again, full MVNOs could thus be able to negotiate roaming agreements with foreign MNOs. However, in practice, since technical conditions for GSMA membership are difficult to fulfill and since agreements out of the STIRA framework are more costly, MVNOs are excluded from the wholesale inbound market. To improve this situation, the GSMA has however mentioned that they are currently preparing to allow MVNOs use standard commercial documents such as STIRA.

The exclusion of MVNOs from the wholesale inbound market as explained in the previous section has several consequences on the wholesale resale market. The most obvious is the fact that, as MVNOs cannot directly negotiate with foreign MNO's, they must buy roaming services from a domestic MNO, most of the time their host MNO. As no price cap has been imposed on the wholesale resale market, and since domestic MNOs are at the same time suppliers for the MVNOs (on the wholesale market) as well as competitors for the MVNOs (on the retail market), MVNOs often encounter margin squeeze problems. Such a strategy seems easy to understand since domestic MNOs - by imposing prices for the MVNOs that are close to the retail price cap - are maximizing their own revenue from resale of roaming services and reducing at the same time the margin that MVNOs can make by reselling roaming services to end users on the retail market.

The wholesale roaming market presents many characteristics of a natural oligopoly market, which is practically a synonym to low competitive pressures. This is aggravated by the fact that there exist few alternatives at the wholesale level for operators wanting to provide a service to their clients when abroad. Substitutes that have developed rather recently are internalization and localization. Internalization is the process whereby operators form roaming alliances, roaming partner agreements, roaming hubs etc. to minimize the costs of roaming. This phenomenon has of course only become effective since the more widespread use of traffic steering. Localization refers to the emergence of global MVNOs, which have access to networks in different countries on local terms and conditions based on domestic wholesale agreements or MVNO regulations. On the retail level, they provide local numbers to their subscribers for each of the different countries within their area of presence. Whereas these developments might create some competitive pressure on wholesale roaming prices, they are not expected to become full roaming substitutes. Localization for instance has the disadvantage that consumers need to have more than one mobile number, which is considered to be rather inconvenient. Internalization from its end is not aimed at by all operators, i.e. it is typically less interesting to operators with a positive roaming traffic balance (those who receive more roaming minutes than their domestic clients cause abroad).

²⁷ See. BEREC Report – International Mobile Roaming Regulation – December 2010, P.48

²⁸ See. BEREC Report – International Mobile Roaming Regulation – December 2010, P.71

The In its Interim Report, which was published on 29 June 2010, the Commission noted that while consumers are benefiting from lower roaming charges, and that broadly speaking compliance has been good, competition in this market is not yet strong enough. The latest BEREC data, covering the first two quarters of 2010, suggests that there have been no major developments which change this position i.e. prices are still clustered close to the maximum level of the caps, except (possibly) in the case of wholesale data. Retail data prices (which are not regulated) are also falling, but remain significantly higher than the average wholesale rates in most countries. The average wholesale price also fell more in both relative and absolute terms than the average retail price resulting in higher margins for operators and suggesting a lack of competition.

Retail market

Like in the wholesale market, the Roaming regulation has not brought about competition in the retail roaming market. In its Interim Report, the Commission noted that while consumers are benefiting from lower roaming charges, competition in this market is not yet strong enough.

As discussed above, there are little or no substitutes to roaming at the retail level. This lack of pressure from substitutes is a first reason as to why the market appears not to be functioning well. Another cause of concern in the roaming retail market is the limited demand elasticity among mobile users. This demand elasticity can take two forms, the first one being the price responsiveness at the time of selection of an operator/ a subscription, the second one being the price responsiveness at the time of roaming, i.e. when the customer is abroad and is contemplating using the roaming service.

When selecting a specific tariff plan for a subscription with a specific operator, the roaming prices attached to this offer have little influence on the decision of the consumer. This is because it is only one component of a complete mobile services bundle, which moreover often represents only a minor fraction of a consumer's total spend on mobile communications. The low elasticity is thus linked to a lack of interest from the consumer who has to buy a bundle of services (where roaming represents only one of the different services concerned). This could change if roaming could be purchased as a stand alone service. There is also a lack of transparency, since comparison of the roaming tariffs of different operators is a time-consuming task, especially since tariffs can differ from one country to the other and because roaming tariffs are just one of the items included in a long price list of bundled services. Again, this could change if roaming was offered as a stand alone service, easily allowing for comparison between alternative roaming offers.

Recent data suggests that usage elasticity, i.e. elasticity linked to use of the roaming service when abroad, is also rather low. The preparatory study for the present Impact Assessment estimated the elasticity for voice and SMS to be in the range of -0,2 tot -0,3, whereas the elasticity for data roaming possibly would be higher, but is difficult to assess since usage might also be growing because of an increase in the use of smart phones.

A full description of the barriers to competition in the roaming market is provided in Annex 1.

2.8. Who is affected by the problem (specific actors, sectors ...)?

The stakeholders affected by the problem of roaming charges can be divided in three main categories:

- Network operators and service providers;
- Customers (both businesses and consumers);
- Public authorities (especially NRAs)

Regarding network operators and service providers, the figure below provides an overview of how each of the different categories of providers participate to the typical value chain of a mobile service provider:

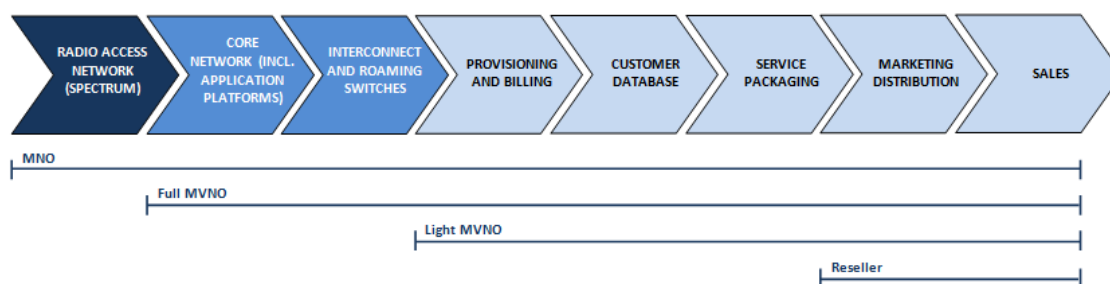


Figure 3: Value chain of different categories of mobile service providers

A detailed assessment of *how* and *to what extent* all of these stakeholders would indeed be impacted under each of the policy options is further elaborated in Annex 1.

2.9. Why is public intervention necessary, why at the European level?

Need for public intervention

High retail prices on the international roaming market have been a source of concern for many years. If the problem mostly concerned voice calls at the beginning, it progressively extended to SMS messages and exchange of data. The excessive tariffs applied for using a mobile phone abroad can have a very damaging effect on consumer welfare.

Despite past EU interventions²⁹ to reduce roaming charges for European customers, they are still high and much higher than those charged at the domestic level (e.g. up to > 25 times for data services). Moreover, these prices do not reflect the underlying cost for providing roaming services as margins up to over 95% can be observed. In her recent speech in September 2010, Vice President Neelie Kroes, emphasised this point and mentioned that examples of excessive

²⁹ See Directive 2002/21/EC, Regulation 717/2007 and Regulation 544/2009.

charging for mobile downloading abroad “bear little relation to the true cost of supplying the service”³⁰.

The European Commission Communication of June 2010 notes that “for voice and SMS, the extent to which operators offer prices below the levels of the regulated caps is considered as a key indicator of the level of competition in the market”³¹. Regarding data roaming, the same Communication noted that even if tariffs are decreasing at wholesale as well as retail level since the introduction of the wholesale cap, the margins made by mobile operators are still very high at retail level. The benefits of the reduced wholesale prices have not yet been reflected on the retail market.

The lack of competitive pressure in the international roaming market is one of the biggest issues. This occurs both at wholesale and retail level. The quasi-oligopolistic structure of the mobile network industry³² and the existence of very few substitutes do not encourage competition on the international roaming market and do not force mobile operators to provide services at the lowest possible price.

At the retail level, the lack of competitive pressure is also perceptible. The European Regulators Group noted in 2008 that regulation solely at the wholesale level does not guarantee that lower wholesale tariffs would result in lower retail prices³³.

Why intervention at the EU level?

The cross-border nature of the international roaming market has already pushed the ERG in December 2005³⁴ to mention that the NRAs cannot individually manage the issue of very high retail prices.

One of the most important arguments was the fact that it is impossible for a NRA which has to protect the welfare of national consumers to control the actions of mobile operators of visited countries, located by definition in other Member States.

The NRAs are also supposed to promote the interests of their national consumers and they have no incentive to force their own national providers to reduce their wholesale tariff since the beneficiaries of this measure would be foreigners and since nothing guarantees that national providers could benefit from similar reductions in other Member States.

Since individual Member States have no incentive to regulate in a way that takes into account the possible effect of its regulation on the other Member States, a centralized intervention at

³⁰ Neelie Kroes European Commission Vice-President for the Digital Agenda Telecoms markets – Working together for change Brussels, 23 September 2010. Speech/10/472.

³¹ See COM(2010)356 final (29/06/2010)

³² The market is characterised by a limited number of players and an obvious lack of transparency.

³³ See IRG/ERG Response to the Commission’s public Consultation on Review of the functioning of Regulation 717/2007 and of its possible extension to SMS and data roaming services, 28 July 2008, also confirmed in the BEREC Report – International Mobile Roaming Regulation – December 2010.

³⁴ See ERG letter to the Directorate general of the Commission’s DG information society, Fabio Colasanti, December 2005.

the European level is preferable as this would better take into account the general interest of all European Member States. A European approach would also avoid that individual Member States take divergent approaches for dealing with the problem of high prices, which would create obstacles to the Internal Market since European services providers and consumers would be treated differently according to home country they belong to and the country in which they are offering or consuming roaming services.

Moreover, the excessive retail prices for roaming services paid by the European consumers when traveling in another Member State, as well as the difference between roaming tariffs and domestic prices for using mobile phones are considered to be an obstacle to the completion of the Digital Single Market. The establishment of a single market for telecommunications is today a priority for the European Commission. According to Vice President Kroes, “*a true digital market is a market where effective competition ensures that citizens, customers and businesses do not experience substantially different services or costs when they pass a border. A true Single Market is one where the price differences between voice, SMS and data relate only to the actual cost of providing these different services*”³⁵.

Based on all elements presented above, the harmonization of national regulations in order to ensure and to *improve the functioning of the Internal Market* is therefore a key argument in favour of an intervention at the EU-level

Another argument is the *protection of the European consumer* which has always been an important principle at the European level. Written into the treaties³⁶, it is a general and underlying objective of all policies in the European Union.

Can EU act, and if so, how? the principles of subsidiarity and proportionality

On the basis of the article 114 of the Treaty on the functioning of the European Union³⁷, the European legislator has already adopted 2 successive temporary Regulations in 2007 and 2009 contributing through the harmonization of the national legislation in the establishment of an internal market. Although the legal basis for these Regulations was contested by some mobile operators, the European Court of Justice (ECJ) recently confirmed the validity of the application of Art 95 TEC³⁸ as a legal basis for the 2007 Regulation³⁹. According to the ECJ, “*the object of Regulation No 717/2007 is indeed to improve the conditions for the functioning of the internal market and that it could be adopted on the basis of Article 95 EC*”⁴⁰.

³⁵ See Neelie Kroes European Commission Vice-President for the Digital Agenda Telecoms markets – Working together for change Brussels, 23 September 2010. Speech/10/472.

³⁶ See title XV of the Treaty on the functioning of the European Union.

³⁷ Previous Art.95 TEC

³⁸ See New Art. 114 Treaty on the functioning of the European Union

³⁹ See Case C-58/08: Judgment of the Court (Grand Chamber) of 8 June 2010 (Reference for a preliminary ruling from the High Court of Justice of England and Wales, Queens’s Bench Division (Administrative Court) (United Kingdom)) — The Queen on the application of Vodafone Ltd, Telefónica O2 Europe plc, T-Mobile International AG, Orange Personal Communications Services Ltd v Secretary of State for Business, Enterprise and Regulatory Reform (Regulation (EC) No 717/2007

⁴⁰ See Case C-58/08: Judgment of the Court (Grand Chamber) of 8 June 2010, §48.

As shown in the previous section, the cross-border nature of the international roaming market forced the NRAs to recognize that actions at the national level would not be sufficient to deal with the problem of excessive prices on the market and that divergent actions among Member States would be ineffective and harm the establishment and the functioning of the internal market.

The European Court of justice also concluded that the principle of proportionality is respected in the case of Regulation 717/2007. The Court found that the particular characteristics of the roaming market allowed the legislator to believe that reduced tariffs at the wholesale level will not necessary result in reduced prices at the retail level. The ECJ then emphasized the objective of consumer protection and on the temporary nature of the Regulation⁴¹.

The setting of prices caps by the European legislator aims to correct in the short term the dysfunctions observed on the international roaming market by lowering retail prices and thus avoiding consumers paying excessive roaming charges when travelling in another Member State. Given the above mentioned characteristics of the international roaming market, regulation at the wholesale level as well as at the retail level is justified. Caps solely at wholesale level do not automatically guarantee that consumers will benefit from the reduced wholesale prices. Ceiling prices at the retail level only could squeeze small providers' margin, favouring thereby only large mobile operators.

It is also important to mention that the temporary basis of current roaming regulation is a crucial argument to assess the proportionality of the European action. This underlines the European legislator's efforts to create the conditions for competition to develop on the international roaming market so that, in the future, competitive pressure will be sufficient to guarantee low retail prices with a less constraining regulation or even without any regulation. The proportionality of regulatory options including elements which aim at addressing the structural problems in the EU roaming market should be assessed against the objective of achieving competitive market. For example, implementation costs of structural solution(s) enhancing competitive dynamics should be weighted against the costs of continued price regulation in the absence of competitive pressure.

2.10. Conclusion on the roaming market and its development

Based on the evidence presented above, the following conclusions can be drawn on the European roaming market and its development:

- The roaming market is significant in terms of size (4,777 billion EUR in 2009);
- Roaming price levels have declined steadily in the last few years, but this is mainly due to the regulation of wholesale and retail prices (cf. conclusion below on the difference with price ceilings);

⁴¹ See Case C-58/08: Judgment of the Court (Grand Chamber) of 8 June 2010, §69.

- For retail data roaming services, only services currently not subject to price regulation, declines in wholesale prices (-70%⁴²) do not appear to have been structurally passed through to the retail level (-15%⁴³).
- The margin between wholesale and retail prices in absolute terms has remained constant or has slightly declined. This means however that the margin in relative terms has risen significantly;
- Average EU tariffs remain in general very close to the price caps defined by the 2009 Regulation; the only exception are wholesale data roaming tariffs which were in Q2 2010 63,6% below the cap of 1 EUR/MB (which is however further declining to 0,5 EUR/MB on 1 July 2011). Competitive market forces are thus not reducing the roaming prices much further;
- There are large variations between the minimum and maximum national prices when compared to the EU average per services. These variations are particularly strong for the non-regulated retail data roaming service (from -90,33% to +279,26% compared to EU averages). These variations are further hindering factors for the accomplishment of the single market.
- The comparison of the roaming prices with the underlying costs indicates very large differences both at the retail and at the wholesale level (from $\pm 50\%$ margin up until $>90\%$). This confirms that there is today no meaningful relation between the roaming tariffs and the underlying costs and that there are significant margins for improvement when bringing the prices down to cost based levels;
- Based on the comparison of the roaming prices with the domestic prices (retail), it was concluded that roaming prices are typically a multiple of the price at the domestic level. Voice roaming calls were on average 3 to 4 times more expensive than domestic outgoing calls; for SMS and data, the ratio is respectively 2,5 and 25 to 35 times higher;
- Transparency measures taken so far have been positively welcomed by consumers and have improved their awareness of roaming prices and their ability to control their invoices. It could however not be observed if or how these have actually impacted the take-up of roaming services by consumers;
- A number of suggestions were made by market players for modifying the scope of the transparency measures (e.g. including VAS services, excluding pre-paid data customers from the bill control measures as well as MMS) as well as regarding the implementation of the measures (e.g. suitability for new devices such as e-readers, application of average exchange rate outside the euro zone);
- The volume of roaming voice traffic has remained rather stable over the last few years. SMS roaming has increased more significantly in volumes during the last four quarters for which information is available (+23,1%) than for the four quarters preceding that period (+4,3%). This could possibly indicate more significant substitution of voice by SMS, e.g. arising from the current economic crisis. Finally,

⁴² Between Q2 2009 and Q2 2010

⁴³ Between Q2 2009 and Q2 2010

data roaming is still growing fast, although at a slower pace during the last four quarters (+43,6%) compared to the preceding four quarters (+102,46%). Again, part of this could possibly be explained by the current economic climate;

- A number of – at least partial – substitutes are available for roaming services, allowing consumers to reduce their costs. None of these alternatives are however sufficiently easy to use in order to convince consumers to use them as real substitutes. As such, the existing partial substitutes – that are rather to be considered as a *complement* to roaming services - do not put competitive pressure on the roaming market;
- Within the roaming market, SMS was indicated as the main substitute used for reducing the cost of roaming;

Technological developments in terms of devices (e.g. dual-SIM phones or smartphones) may in the future allow some (although limited) competitive pressure. However, this is not expected in the short or medium term. Development of new all IP networks (especially LTE) supporting higher capacity and possibly leading to further development and more intensive use of data may in the longer term eliminate voice and SMS roaming problems (as voice and sms would become part of the data traffic), but would not as such solve data roaming problems. In conclusion, in the absence of pro-competitive structural measures, the market alone is not expected to deliver much lower roaming prices in the upcoming years.

3. DEFINITION OF THE POLICY OBJECTIVES

Based on this framework of objectives, different policy options can be analysed in order to address how the problem of *roaming charges that are too high as a result of market forces* could be dealt with and thus to evaluate *whether the current roaming regulation should be adapted and if so, how this should be done in order to create a Digital Single Market*.

3.1. General objectives

For defining the general objectives of the policy initiative sought for, it is useful to take a broader view of the general long term EU policies and objectives in which the policy initiative would be situated. More specifically, the EU 2020 Strategy which was launched by the Commission on 3rd March 2010⁴⁴, aims that Europe would *'be turned into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion'*.

One of the building blocks of this new strategy is the new Digital Agenda for Europe (DAE)⁴⁵ which defines a number of the 'Key Performance Targets' for attaining the Digital Single Market. In relation to international roaming services, the target is that *'the difference between roaming and national tariffs would approach to zero by 2015'*⁴⁶. This target will be achieved

⁴⁴ See Communication from the Commission: Europe 2020 – A strategy for smart, sustainable and inclusive growth, COM (2010) 2020 of 3rd March 2010.

⁴⁵ See http://ec.europa.eu/information_society/digital-agenda/index_en.htm.

⁴⁶ See Annex 2 of the Digital Agenda for Europe

if **competition** in mobile markets gives consumers the **rapid and easy choice** of a roaming service at, or close to, a relevant competitive domestic price level.

Given these aims of the EU 2020 and the DAE and referring to Chapter 2 on why public and EU intervention are required, the issue that is dealt with in this IA is *to improve the conditions of the functioning and ensure further promotion of the development of the Digital Single Market with regard to Community wide roaming services.*

Referring to the Framework Directive⁴⁷, achieving a true Digital Single Market requires an intervention that meets three general policy objectives:

- The first general objective relates to ensuring the development of a single coherent regulatory framework, *contributing to the development of the internal market* (cf. also Article 8.3 of the Framework Directive).
- The second general objective relates to stimulating and strengthening sustainable *competition* in the Digital Single Market (cf. also Article 8.2 of the Framework Directive).
- Finally, the third general objective is to *promote the interest of citizens* and to ensure a high level of consumer protection for EU consumers (cf. Article 8.4 of the Framework Directive).

3.2. Specific objectives

For each of the three general objectives above, a number of specific objectives can further be derived. Specific objectives for *ensuring the development of a single coherent regulatory framework*, contributing to the development of the internal market:

- Objective 1: Prevent distortions between Member States i.e. in terms of regulatory divergences so that conditions for competition on are equal across the ;
- Objective 2: Ensure an optimal level of governance in terms of avoiding isolated measures at the Member States level.

Specific objectives for *stimulating and strengthening sustainable competition in the Digital Single Market*:

- Objective 3: Ensure that competitive market developments are stimulated and that technological developments are not hindered;
- Objective 4: Strengthen the competitiveness of European industry by ensuring that businesses have access to competitive roaming prices.

Specific objectives for *promoting the interest of consumers and ensuring a high level of consumer protection for all EU consumers*:

- Objective 5: Ensure user choice and transparency;

⁴⁷ See Directive 2002/21/EC; amended by Directive 2009/140/EU

- Objective 6: Ensure that prices are at a levels reflecting underlying costs (as they would result from competitive market forces);
- Objective 7: Ensure that consumers can easily benefit from prices reflecting underlying costs;

3.3. Operational objectives

For each of the specific objectives presented above, a number of operational objectives or “measures” can be identified.

Specific objective	Operational measures
<p>Objective 1:</p> <p><i>Prevent distortions between Member States</i></p>	<ul style="list-style-type: none"> • Ensure regulatory coherence between member states; • Allow for consistent implementation of the chosen regulatory approach in all Member States; • Ensure that comparable competitive market conditions for roaming apply in all Member States.
<p>Objective 2:</p> <p><i>Ensure an optimal level of governance</i></p>	<ul style="list-style-type: none"> • Ensure that the heterogeneity of Member States (e.g. countries with positive compared to negative roaming traffic balances) is given sufficient attention in order to correctly evaluate the distribution of impacts on all MS.
<p>Objective 3:</p> <p><i>Ensure that competitive market developments are stimulated and that technological developments are not hindered</i></p>	<ul style="list-style-type: none"> • Ensure that smaller network operators and MVNOs can benefit from competitive wholesale markets and compete effectively at the retail market (avoid that markets become too concentrated); • Ensure that challenges regarding the technical feasibility of imposed measures do not lead to operators exiting the market; • Allow MVNOs to use own IMSI codes; • Allow operators (e.g. full MVNOs) currently excluded from the STIRA framework to use the available standard templates for roaming agreements; • Allow for the recuperation of innovation costs (limited in the case of roaming services); • Ensure that regulatory intervention does not weaken the global position of European mobile operators; • Ensure that there is no risk of price squeeze (especially for the smaller operators);

Specific objective	Operational measures
	<ul style="list-style-type: none"> • Ensure that the market for wholesale roaming is open to different type of providers (e.g. MNO as well as MVNO) and that no discrimination takes place for the conclusion of wholesale contracts; • Ensure that wholesale roaming prices are transparent (e.g. how do wholesale resale roaming prices for MVNOs relate to wholesale inbound roaming prices for MNOs, how are roaming prices to be applied in case of VAS,...); • Provide operators the possibility to further develop services in parallel with the imposed service provisions; • Ensure that MVNOs have sufficient room in their wholesale resale agreement in order to differentiate the retail roaming products. • Allow market entry of specialized roaming operators, offering stand alone roaming services across Europe
<p>Objective 4:</p> <p><i>Strengthen competitiveness of European industry</i></p>	<ul style="list-style-type: none"> • Ensure levels of roaming prices that are competitive at the global level; • Allow business users to negotiate special roaming terms so that these can benefit from competitive roaming charges.
<p>Objective 5:</p> <p><i>Ensure user choice and transparency</i></p>	<ul style="list-style-type: none"> • Ensure that the user can control / monitor its international roaming expenditure; • Ensure user choice regarding bill control measures (e.g. what limit); • Ensure user choice in terms of its (unbundled) provider of roaming services; • Ensure easy access to information on the applicable tariffs; • Ensure easy access to information on possible options or choices available to the end-user (e.g. regarding bill control measures); • Ensure availability of information on roaming tariffs in the appropriate language.

Specific objective	Operational measures
<p>Objective 6:</p> <p><i>Ensure that prices are at a levels reflecting underlying costs (as they would result from competitive market forces)</i></p>	<ul style="list-style-type: none"> • Ensure that price/structural mechanisms are put in place to avoid unreasonable margins, leading to excessive prices, can be obtained by operators; • Ensure that levels of roaming tariffs are better aligned with tariffs for domestic mobile services (i.e. ensure that differences are close to what is justified based on the underlying costs); • Ensure that the price reductions at the wholesale level are transferred to the retail level.
<p>Objective 7:</p> <p><i>Ensure that all categories of consumers can benefit from prices reflecting underlying costs</i></p>	<ul style="list-style-type: none"> • Ensure that the decrease of roaming prices for one category of roaming consumers is not at the detriment of another category of consumers; • Ensure that compliance with regulation can be monitored.

4. ALTERNATIVE POLICY OPTIONS

This section examines a range of options for addressing the problems highlighted in previous sections. Apart from complete removal of regulation (also considered below) the options broadly fall into two categories i.e. options involving continued price regulation or options involving structural approaches aimed at tackling the root causes of the problem but possibly also including safeguard price regulation. For the purposes of this impact assessment these options will be grouped as follows:

1. **No regulation** after June 2012
2. **Maintaining the current approach** of applying both wholesale and retail price cap regulation, including the extension of the retail price caps to data roaming services (in b and c below). Three variations are considered:
 - (a) *Continuation à l'identique* with the same price caps (baseline scenario);
 - (b) *Extension of the current methodology* with adjusted annual price caps plus retail data roaming price caps;
 - (c) *Roam-Like-Home/Roam like a Local* with fixed mark-up.
3. **Structural solution** - introduction of a combination of 2 or 3 new elements at the wholesale and retail levels:
 - (d) *decoupling (home and visited)*;

- (e) granting access to mobile virtual network operators (MVNOs);
- (f) the above combined with safeguard price caps.
- (g) Spot market

4.1. Option 1: No regulation

“Option 1: No regulation” means the expiry in June 2012 of the current roaming Regulation 544/2009 without replacing it by any other form of regulation.

Maximum price caps would no longer be applicable at the wholesale level, or at the retail level. Operators would be free to apply any roaming charges they want on both the wholesale and the retail market.

Operators would also no longer be obliged to apply any transparency measures in order to allow customers to better control their roaming expenses. Charging on a *per second basis* would also become optional at the wholesale and at the retail level as would the maximum 30 seconds of initial charging period.

Most responses to the public consultation on roaming argued for a need of a further regulatory intervention beyond 2012, this is particularly true for consumer organisations and national authorities. Industry response was mixed – most acknowledged at least the inevitability of further regulation and some argued that competition has developed to a level that does not warrant future regulatory intervention.

4.2. Option 2: Maintaining the current approach

Option 2(a): Continuation à l'identique – same price ceilings

This assumes the same price caps and the same regulatory approach as in Regulation 544/2009 would be maintained and that the regulation would not be extended to new areas.

The regulatory approach in Regulation 544/2009 consists of a combination of both wholesale and retail price caps (for voice services and SMS), wholesale price caps (for data services) and transparency measures allowing consumers to better control their expenditure for international mobile roaming. Furthermore, obligations regarding the unitization of billing were introduced. For this impact assessment, this first scenario will be considered as the baseline scenario. Although the estimation of economic impacts of various scenarios vis-à-vis the baseline scenario is carried out for the period 2012-2014, in the overall assessment it is assumed that under the baseline scenario the same price caps would apply for the period of ten years, i.e. the proposed duration of the revised Regulation.

Most respondents to public consultation acknowledged that the current regulation succeeded to bring benefits for consumers. Much fewer, however, believed that competition was stronger because of the current regulation. Industry response in particular was sceptical of current model's ability to foster competition. Few industry stakeholders argued for wholesale price caps regulation only and elimination of retail price cap regulation.

Option 2(b): Extension of the current methodology with adjusted price ceilings plus cap on data roaming

For the second scenario, further annual adjustments will be determined following a methodology that is consistent with the one that was previously developed for the Regulation 544/2009⁴⁸. Furthermore a price ceiling for retail data roaming is added.

The methodology for determining the glide path is *based on the analysis of the structure and level of forward looking underlying production costs* (where relevant incl. retail costs) and the assumption that the regulated price caps should reflect these costs. A detailed analysis of the underlying costs of roaming services is presented in the BEREC report on the Roaming Regulation.

Format of the price caps

For voice services, the price-caps are derived based on the difference between the current level of the caps and the estimated underlying costs and are determined in a linear way, as was done for the current Regulation, i.e. in terms of a reduction by an equal fixed annual amount (i.e. 3 cEUR) per year. For SMS roaming, one single price ceiling for the whole regulated period was determined as - unlike for voice services - it was difficult to predict a significant downward trend for underlying SMS roaming costs at the time when the current regulation was developed. This has however changed now and consequently a glide path is included for SMS. Finally, for data service, a non-linear price cap was set for the wholesale services. This will now be replaced by price caps with a glide path, both at the wholesale and retail level.

The approach presented above leads to the following price caps for each of the roaming services:

Voice services

Based on the estimated average cost for wholesale roaming it was first of all concluded that a continued reduction by 4cEUR per year over a three year period would lead to approximately the cost estimated by BEREC (i.e. 5,42cEUR). This reduction corresponds to a compound annual reduction of $\pm 30\%$.

For determining the retail roaming price caps, account was taken of the fact that the price ceilings in the 544/2009 Regulations aimed at increasing the margin available to operators to 100% (compared to the level of 65,3% in 2008). However since significant competition has failed to materialize over the course of the current Regulation it is considered that for this scenario a margin of 100% is unnecessarily high. It is therefore proposed for the adjusted annual price ceilings under this option, that a margin of 70% should be applied, at least for the retail *calls made*.

⁴⁸ See SEC(2008) 2489

By consequence, the price ceiling per minute of retail calls made ('Retail outgoing') was determined based on the adjusted price ceiling for roaming calls, including a mark-up of 70%.

For the retail calls received ('Retail incoming') no corresponding regulated wholesale ceilings are available. However, the BEREC report has provided inputs on the underlying wholesale costs for receiving a roaming call (i.e. 5,3cEUR). It could be observed that the current regulated cap for a retail incoming call is indeed approximately 100% higher than the corresponding wholesale cost. Therefore, in order to allow for a glide path for these services as well, it was decided to bring the retail mark-up down to 50%⁴⁹. This implies that assumption was taken that mobile operators are mainly focusing their retail efforts at stimulating increased consumption by their own customers, which is reflected in the allocation of a lower retail cost for *call received* compared to *calls made*.

<i>in EUR/min (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail outgoing	0,24	0,17	0,10
Retail incoming	0,10	0,09	0,08
Wholesale	0,14	0,10	0,06

Table 1: Adjusted annual price caps for voice roaming services

SMS services

The forward looking underlying costs estimated by BEREC for the wholesale costs correspond on average with the outcome of the pure NITA approach⁵⁰ of June 2008 (i.e. 0,8cEUR). Minimum and maximum costs correspond respectively to 0,06cEUR and 2,67cEUR. Based on these elements, it was decided to bring the wholesale price cap for SMS down to 2cEUR.

Keeping in mind that it could be too drastic to bring the wholesale roaming cap down from 4cEUR⁵¹ to 2cEUR at once, it could be envisaged to *introduce a glide path* for the SMS price ceilings, as was previously done for voice roaming.

Furthermore, the difference between the wholesale and retail costs for SMS roaming consists of the internal network cost for terminating the SMS on the own network or an average SMS terminating paid if the SMS is sent to another network, as well as a compensation for retail costs (incl. reasonable return). These additional retail cost elements were previously estimated at 7cEUR⁵². The new forward looking costing exercise of BEREC now indicates a much

⁴⁹ This is still the upper limit of the range of retail mark-ups that were considered by BEREC in the report 'International Mobile Roaming Regulation' – December 2010

⁵⁰ See SEC(2008)2489 – page 59

⁵¹ I.e. corresponding to 2 times 2cEUR in order to account for an allowance for the unrecovered cost of SMS terminating.

⁵² Approximately twice the cost of terminating 25% of the SMSs on the own network (valued at a cost of 0,5cEUR) and 75% of the costs on another network (valued at 4,4cEUR); resulting in a weighted

lower cost of 0,53cEUR (for prospective cost-based terminating charge) and a retail mark-up between 5% and 50%.

It needs however to be kept in mind that the retail roaming charges should allow the operator to pay for the (domestic) termination of the SMS. The charges for this service are not regulated and amounted to 4,4cEUR on average in 2008. Bringing the component relating to domestic termination down to the prospective cost level of 0,53cEUR could therefore be too drastic, so an intermediate valuation for this service could be more appropriate. Again, given the significant gap between the current roaming price ceilings and the underlying costs, it is suggested that a glide path would be introduced.

The calculations described above, lead to the following price ceilings over the period of regulation:

<i>in EUR/SMS sent (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail	0,05	0,05	0,03
Wholesale	0.03	0.03	0.02

Table 2: Adjusted annual price caps for SMS roaming services

Data services

BEREC indicates an average wholesale cost of 8cEUR/MB, whereas the maximum cost presented equals 15cEUR/MB. Given the remark that cost for mobile data could be overestimated, it was considered that a glide path towards the level of the average wholesale costs is a not too aggressive approach. More precisely, the estimated average wholesale cost for data roaming can be reached by a fixed annual decrease of 10 to 20cEUR/MB⁵³. Based on the BEREC estimate for average cost per MB a target wholesale cap of 10c in 2014 is not unreasonable. This leads to the following adjusted annual price ceiling over the period of regulation:

<i>in EUR/MB of data transmitted (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Wholesale	0,30	0,20	0,10

Table 3: Adjusted annual price caps for data roaming services (wholesale)

Method for applying the retail price caps for data

average costs of 3,4cEUR times two in order to include an allowance for the unrecovered cost of termination (cf. SEC(2008) 2489 – page 61).

⁵³ As of 1 July 2011, in accordance with the current Regulation, the wholesale cap is set at the level of 0,50cEUR which means a reduction of 20 cEUR on 1 July 2012.

Based on the BEREC data it is clear that the gap between the average retail prices that were observed in 2010⁵⁴ and the estimated underlying costs is very significant. Given that past experience has shown that operators do not tend to pass decreases of wholesale prices on to the consumers (but generally retain higher retail margins), in the absence of pro-competitive structural changes, it would be reasonable to limit the retail margins to 70%, as for retail calls made and SMS.

Given the considerations above with regard to safeguard retail caps and allowing a 70% mark-up at retail level produces the following glide path for retail and wholesale prices:

<i>in EUR/MB of data transmitted (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail	0,51	0,34	0,17
Wholesale	0.30	0.20	0.10

Table 4: Annual safeguard price caps for data roaming services (retail)

In summary the following price caps can be proposed for Option 2b

Voice

<i>in EUR/min (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail outgoing	0,24	0,17	0,10
Retail incoming	0,10	0,09	0,08
Wholesale	0,14	0,10	0,06

SMS

<i>in EUR/SMS sent (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail	0,05	0,05	0,03
Wholesale	0,03	0,03	0,02

Data

<i>in EUR/MB of data transmitted (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Retail	0,51	0,34	0,17

⁵⁴ The overall average for on-net and off-net at Q2 2010 was 1,30 EUR/MB, whereas the overall average for off-net traffic was 2,604 EUR/MB

Wholesale	0,30	0,20	0,10
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This option was particularly welcomed by the consumer organisations and to some extent by the national authorities. Industry response was negative towards continued downward retail price regulation and especially negative with regard to retail regulation of data services, which in most industry stakeholders view would negatively influence any competitive dynamics exhibited by data roaming market.

Option 2c – Roam like at home/Roam like a local

This approach links the roaming price paid by the individual customer to the domestic price for national calls by that same customer. We consider here the variant “RLAH+X” (that is, the roaming price is an amount greater than the corresponding domestic price). In principle, the roaming premium covers two things. First, it allows recovery of the genuine (albeit small) additional costs of provision of roaming. Second, it aims to deal with issues that arise from price differences across Europe. The option only delivers tariffs “like at home” if the value of X is indeed sufficiently small. This requires two preconditions:

- (a) Wholesale prices very close to cost-oriented levels; and
- (b) Broad similarity in domestic tariffs across Europe.

If the conditions permit "X" to be set at a sufficiently low level, i.e. including low wholesale roaming prices, providers might take the commercial decision to offer “Single Europe” tariffs where the price of a call, for example, was the same wherever the customer was situated, i.e. in their home country or another EU Member State.

In roam like a local, the roaming price is linked to the price paid for national domestic calls in the visited country (as opposed to the roamer's home country). Again, this could be seen as a method of reaching the DAE target.

This method also requires adoption of a mark-up to avoid at least some of the problems mentioned above. The size of the mark-up can be “tuned” so that roaming prices approach domestic prices to a lesser or greater extent, according to the policy objective.

This method has some of the characteristics of “Roam like at home” but also some significant differences. On the positive side, the linkage of roaming prices to domestic prices in the visited country significantly reduces the scope for margin squeeze. On the other hand, the measure is less consumer-friendly. The consumer would pay a different price in each visited country (unlike at present). Most would have little idea in advance what they will be paying (unless they take the trouble to search for the information). For those who disregard the welcome SMS messages, they will have little idea of the charge until they receive their bill. The method would also necessitate a significant statistical exercise, probably annually, to establish and calculate a benchmark rate for each visited country, increasing significantly the regulatory burden for industry and regulators as regards implementation and compliance.

Responses to public consultation on the alternative approaches for price regulation (Roam-Like-at-Home/RLAH or Roam-Like-a-Local/RLAL) were quite divergent. Regulators,

national authorities and consumer organizations argued to continue with the current price regulation approach. In those instances where industry stakeholders expressed interest in the alternative price regulation models, there was no consensus regarding which of the alternatives, RLAH or RLAL, model would be better.

4.3. Option 3a: Decoupling of roaming services

Option 3a relates to the introduction of an additional structural measure at the retail level. This option is also often referred to as “decoupling” or “(pre-)selection” of the roaming operator. Under this option, roaming services would no longer always be offered as part of a bundle with domestic mobile services. Instead, customers would be able to easily choose and purchase roaming services from an operator other than the provider of the domestic services.

Selection of the most appropriate scenario

Based on the assessment of advantages and disadvantages as presented in the Table below, it was concluded that unbundling in the *domestic* market is the most promising approach and the other two approaches are excluded from further analysis. The selected scenario would thus allow consumers to *opt-out* of the default roaming services offered by their provider of domestic roaming services and pre-select an alternative home operator for roaming services only. Each time the customer roams, the retail roaming service would automatically switch to this alternative provider.

As the unbundling option consists of a measure that is meant to improve the awareness of customers of the level roaming prices, considering that this should lead to competitive pressure bringing the prices closer to cost levels, this assessment is mainly made from the viewpoint of the consumers:

Unbundling in the domestic market (home country)	Unbundling in the visited country	Choose your operator at the border
<i>Advantages</i>		
<p>Consumers are familiar with the other mobile operators offering services in their country;</p> <p>Information on roaming offers is available in the language of the consumers;</p> <p>An opt-out approach could avoid that all consumers are obliged to modify their mobile contract, even if they never use roaming services.</p>	<p>Competitive pressure could in some circumstances be more important as the operators in the visited countries have a direct possibility for attracting new customers (the choice of roaming operator could become comparable to e.g. the choice of a car rental company).</p>	<p>The relation with the own operator supplying domestic retail services would be maintained;</p> <p>Consumers would not be obliged to do research on foreign providers and subscribe to their offer before travelling abroad since information about available providers and tariffs would be sent by SMS at each border.</p>

<p>Advertising campaigns to make the consumers aware about the opportunity of selecting another provider for roaming and regarding the different available tariff plans could be more effective.</p> <p>Consumer would have the same roaming services provider for all European countries.</p>		
Disadvantages		
<p>If not accompanied by mandated wholesale access at cost oriented prices, this option risks not being effective.</p> <p>Not all consumers would switch towards alternative more advantageous offers. However, the consumers who would not switch towards alternative more advantageous offers should normally benefit from the reduction of prices to be expected due to the competitive pressure created by such offers.</p>	<p>Consumers are not familiar with the other mobile operators offering services in the visited country;</p> <p>Information on roaming offers is possibly not available in the language of the visiting consumers;</p> <p>This scenario is per definition “opt-in” so imposes a large administrative burden, also for users with very limited roaming traffic volumes.</p> <p>Consumer would have to select a different provider in each visited European Member State.</p>	<p>It could very soon become very cumbersome if a roaming operator needs to be chosen every time you cross a border (even if the home provider is assisting by providing an overview of the tariffs available at different operators;</p> <p>Information received by SMS giving an overview of the different available providers’ tariffs could possibly be too short to make a considered choice. Problems of transparency could appear.</p>

Table 5: Comparison of possible scenarios for the unbundling option

Despite that most respondents to the roaming public consultation agreed that a structural solution should always be preferred instead of price regulation, most of the respondents from all stakeholder groups were not certain or convinced about feasibility, costs and complexity of the decoupling/unbundling option. Only few stakeholders were of the opinion that unbundling solution would deliver the best result.

4.4. Option 3b: Additional wholesale Access Measures

Option 3b relates to the introduction of an additional structural measure at the wholesale level. Depending on the scenario selected, these measures can relate to the access to specific *levels*

of wholesale charges or to the access to specific services itself. Moreover, these services can be restricted to roaming services or correspond to all mobile services.

Selection of the most appropriate scenario

The table below compares possible approaches for defining an additional measure for wholesale access:

Same wholesale caps apply to MNOs and MVNOs	Limited wholesale access for MVNOs for roaming	Full wholesale access for MVNOs for all mobile services
<i>Advantages</i>		
Enabling MVNOs to gain access to regulated wholesale prices could stimulate greater competition for retail roaming services	Enabling MVNOs to gain access to roaming services could stimulate greater competition for retail roaming services	<p>This option could stimulate greater competition for all mobile services by allowing that any MNO or MVNO would be entitled to enter any other EU national market on the basis of guaranteed wholesale access (at regulated prices);</p> <p>As the presence of the same M(V)NO in different EU member states could replace the need for wholesale roaming agreements, this could stimulate the emergence of a true pan-European mobile market.</p>
<i>Disadvantages</i>		
		If not limited to the roaming services, this options could strongly distort the development of competition in the domestic markets, going far beyond what is necessary to solve roaming specific problems

Table 6: Comparison of possible approaches for defining additional wholesale measures

Decoupling (Option 3a) is not likely to be effective without also adding an access obligation which will facilitate market entry. Therefore Option 3(a) should be combined with Option 3(b). It was concluded that the best approach consists of a combination of the first and second approach. This implies that MVNOs would have the choice between continuing buying roaming services from their domestic MNOs (while having the guarantee that the rate applied are consistent with the regulated price-caps at the wholesale level) and directly negotiating roaming agreements with MNOs in other member states (allowing MVNOs to benefit from the same conditions as MNOs at the inbound market).

Furthermore, while the combination of these options is likely to produce positive competitive effects in the roaming market, safeguard retail price regulation is desirable to ensure that the existing consumer benefits are preserved during a transitional period of implementation of such structural solutions. Such safeguard caps should be set at sufficiently high levels which do not distort the potential competitive benefits of structural solutions and could be removed completely once the structural approaches have had an opportunity to deliver concrete gains for all consumers.

In their responses to the roaming public consultation, smaller operators and several non-operator industry stakeholders supported additional measures for wholesale access for roaming.

4.5. Option 3c – Safeguard price caps accompanying the decoupling and wholesale access measures

The above (Options 3a and 3b) combined with safeguard price caps. The unbundling measure combined with MVNO access is assumed to introduce competitive pressure in the retail market. Stringent retail price caps would therefore not be needed to get competitive prices for the consumers. However, it would be appropriate to keep retail caps, set at a sufficiently high level to leave room for competition in order to ensure a safety-net for consumers until the unbundling measure has had an opportunity to become fully operational and effective. It is expected that the retail safeguard caps would remain in place for a period of years into the course of the next Roaming Regulation.

The retail safeguard caps would follow a glidepath until the structural solution is in place (two years after the commencement of the next Regulation i.e. by June 2014) after which the safeguard caps would remain flat for up to a further two years. These caps could be removed completely thereafter. The other features of the structural solution i.e. the wholesale caps (kept at the level of 1 July 2015) and the regulatory obligations to facilitate the consumer's ability to choose an alternative provider for roaming services only, would need to remain in place for a longer period, in order to ensure regulatory stability and predictability for operators, and in particular for new entrants in the decoupled roaming market. However, it is possible that the wholesale caps could also be removed following a subsequent two-yearly review (e.g. six years after the commencement of the next Regulation). In this respect, it is important to note that the wholesale market for data roaming services exhibits more dynamism than the corresponding wholesale markets for voice and data.

Price caps at the wholesale level

Since the unbundling option consists of adding a structural measure *at the retail level*, it would not imply any change at the wholesale level. There is no reason to believe that providing MVNOs with similar conditions as MNOs would as such lead to lower wholesale charges. By consequence, the same wholesale price caps will be applied as under Option 2b. These are summarized for all services in the table below:

	<i>in EUR (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Voice (per minute)		0,14	0,10	0,06
SMS (per SMS)		0,03	0,03	0,02
Data (per MB)		0,30	0,20	0,10

Table 7: Wholesale price caps for the unbundling option

Safeguard price caps at the retail level

At the retail level, a specific set of safeguard price caps have been defined. Indeed, while the proper functioning of the unbundling measure combined with MVNO access is assumed to introduce competitive pressure in the retail market, it would be appropriate to foresee a safety-net for consumers while awaiting the unbundling measure to become fully operational and effective. More precisely, the assumption was taken that, compared to the baseline scenario only 50% of the additional decrease for bringing down the caps at cost based levels (including retail margin) would be taken into account. It is then up to the market to deliver further price decreases.

This leads to the following set of safeguard retail price caps:

<i>in EUR (excl. VAT)</i>	1 July 2012	1 July 2013	1 July 2014
Voice-calls made (per minute)	0,32	0,28	0,24
Voice-calls received (per minute)	0,11	0,10	0,10
SMS (per SMS)	0,10	0,10	0,10
Data (per MB)	0,90	0,70	0,50

Table 8: Retail safeguard price caps for the unbundling option

Transparency measures and unitization of billing

The same measures regarding transparency and the unitization of billing would continue to apply as under the current Regulation 544/2009.

4.6. Option 3d: Spot market

The spot market refers to a trading mechanism which would be able to remove the current barrier related to the fact that the volume of roaming traffic that an operator can offer in return, largely determines the wholesale prices in the wholesale inbound market. If this spot market works well, it would lead thus to cost oriented wholesale prices for all roaming traffic and all operators instead of the much higher outcome of the current negotiations, leading to much higher wholesale charges which are solely actually paid for the unbalanced traffic.

Moreover, since MVNOs would also be allowed to access this market, the spot market could also (and to the extent that MVNOs would actually directly go to the spot market) remove those barriers that are specific to the resale market. Those barriers relate mainly to the strong dependency of MVNOs on the home MNOs, the fact that supply in the resale market does not allow for differentiation and the high risk of price squeeze for MVNOs.

More precisely, the spot market would *separate the offer to supply* a given number of roaming minutes in a given visited country *from the offer to purchase* a given number of roaming minutes. Bilateral traffic exchanges would be disallowed. Total volumes of demand and supply would be broken down in standard size “bonds” in order to allow for easy and neutral trading.

The implementation of this option would require the obligation that all wholesale inbound roaming traffic would need to be purchased by means of open trading (e.g. via an electronic platform).

Overall a neutral reaction from the stakeholders in reply to public consultation respondents to the public consultation. Some industry stakeholders questioned applicability of spot market

principles for roaming, which as such is not a commodity. Several smaller operators expressed interest in spot market for roaming.

5. ASSESSMENT OF THE POLICY OPTIONS

5.1. Qualitative assessment

The following paragraphs present the qualitative assessment of the impact of each of the seven policy options. Next to a more general description of the expected consequences of the implementation of each option, a detailed analysis is made of the type, magnitude and likelihood of impacts corresponding to each policy option. These are presented for each option individually in Annex II. The table in which the assessment of all impacts of all options is compared is presented at the end of this section.

5.2. Identification of the relevant impacts

The impact of each policy option will be assessed in relation to each of the seven specific objectives. These specific objectives have been derived from the general objectives. These in turn are drawn from the Framework Directive for electronic communications which is generally considered to be contributing greatly to the functioning of electronic communication services and, in that way, to the overall development of the EU economy. Since the specific objectives are directly linked to the general objectives from which they are derived, the assessment of the impacts at the specific objective level will provide for the most detailed possible approach. Moreover, given the relation between the specific and general objectives, it is redundant to assess impacts of policy options in relation to the general objectives.

This can be illustrated by the following example: the assessment of the extent to which a policy option (directly) contributes to the specific objective 5 regarding ensuring user choice and transparency also indicates how it will (indirectly) contribute to the promotion of the interests of consumers and ensuring a high level of consumer protection for EU consumers (cf. General objective 3).

The relationship between the list of impacts and the specific and general objectives is further illustrated below:

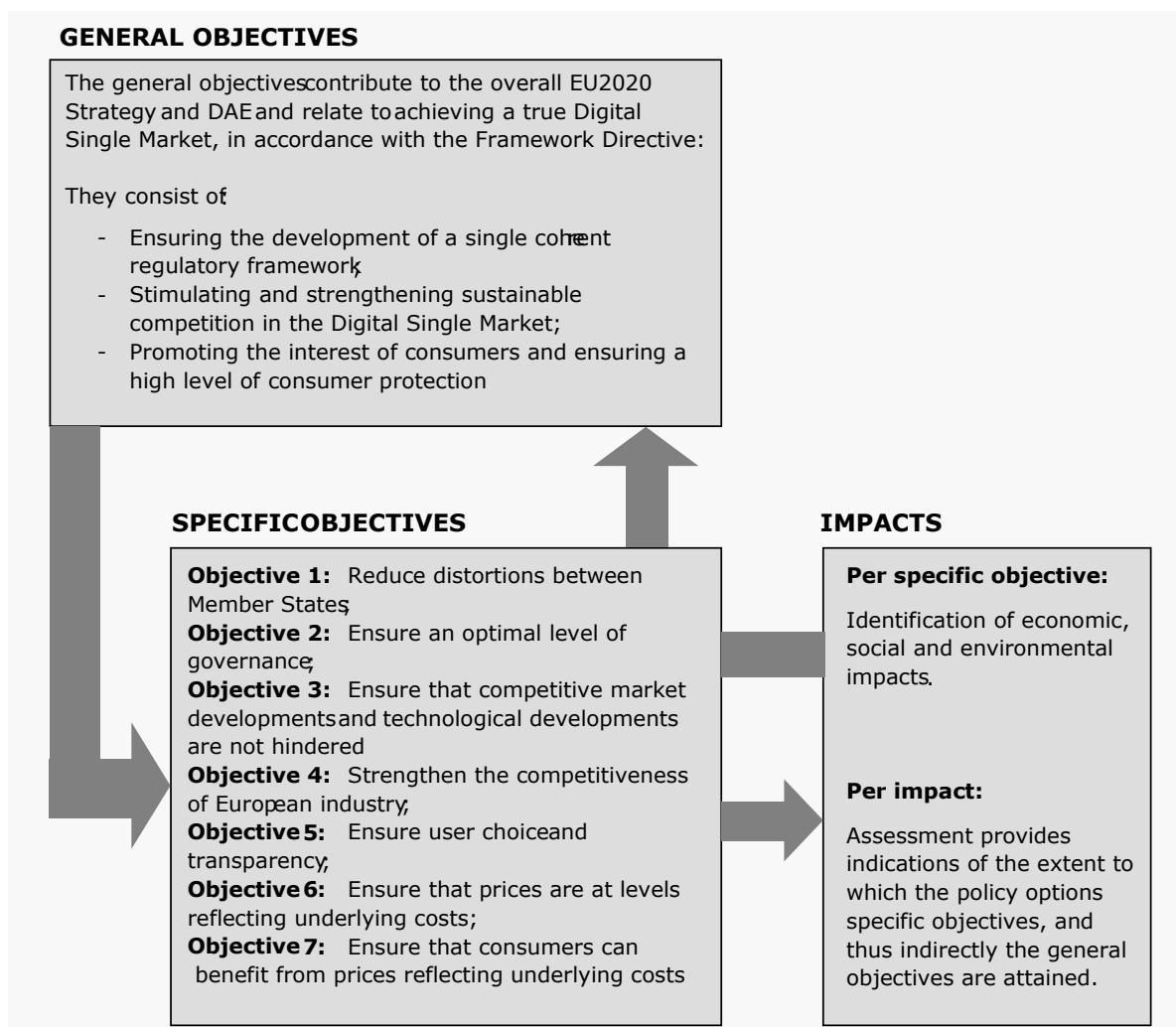


Figure 4: Illustration of how the impacts directly relate to the specific and indirectly relate to the general objectives

It should be noted that the ‘Baseline Scenario’ against which the impacts of all options will be assessed, consists of a situation in which the current state of affairs is maintained, thus corresponding to “Option 2a: Continuation “à l’identique” (with July 2011 Caps)”.

The assessment of all of the impacts under each of the options is done by analysing the magnitude of the expected impact, as well as the likelihood that the impact will actually occur as a result of the proposed policy option.

5.3. Qualitative assessment of Option 1: No Regulation

In the case of expiry of the current roaming Regulation, the current lack of competition at the wholesale as well as at the retail level indicates that prices will not decrease. They are much more likely to increase due to a reduced number of operators able to actually compete on the retail market. Indeed, market failures exposed in the table presenting barriers to competition on the wholesale and on the retail markets (Annex I) clearly express concerns about the current lack of competition in the roaming market.

Removing the wholesale regulation would most probably lead to worse wholesale deals for small MNOs since terms of commercial agreements are linked with the volume of services that the MNOs can offer in return to the foreign MNO. Small MNOs would have no other choice (unless they join a group or alliance of mobile operators) than either increasing their retail price to compensate their increasing wholesale charges or suffering margin squeeze if retail prices are maintained.

MVNOs would still suffer from margin squeeze, and this situation could even become worse in the case of MVNOs buying roaming services from small MNOs which could themselves suffer from margin squeeze.

In any case, removing regulation would result in a smaller number of providers fully able to compete on the retail market without margin squeeze. Big MNOs could still compete at the current retail prices but will have no incentive to decrease retail roaming prices since competitive pressure would be reduced. It is even more likely that big MNOs will increase retail prices in order to benefit from higher profits.

In summary and referring to the objectives identified in Chapter 3, it can be concluded that under Option 1, there would be no development of a single coherent regulatory framework (cf. General Objective 1). Furthermore, sustainable competition in the Digital Single Market, in which *all mobile operators* would participate, would not be stimulated and strengthened (cf. General Objective 2)..

Finally, consumers will not benefit from truly competitive offers and will no longer be protected as is the case under the current regulation. This would lead to reduced user choice and transparency (cf. Specific objective 5), prices that remain high above the underlying costs (cf. Specific Objective 6) and a significant risk that some categories of consumers would suffer from material increases of roaming charges (cf. Specific Objective 7).

5.4. Qualitative assessment of Option 2a: Continuation à l’identique – current price caps

The baseline scenario implies that the problem of high roaming charges as would continue to be dealt with in the same way as dealt with by Regulation 544/2009. It is clear that the baseline scenario would mainly focus on preventing excessive retail tariffs while ensuring transparency of roaming charges and preventing ‘bill shock’ for data roaming services (cf. General objective 3 regarding promoting the interest of consumers and ensuring a high level of consumer protection for all EU consumers).

Furthermore, the intervention at EU level has led to more uniform rates being applied across Europe. Moreover, it was ensured that no measures at the country level can be taken that would introduce negative cross-country externalities (cf. General objective 1).

Finally, the current regulatory approach does not deal in a structured way with a number of barriers at both the wholesale (inbound and resale) market and retail market. By consequence, there is e.g. almost no transfer of reductions in wholesale charges, leading to retail tariffs below the maximum caps and there remain significant differences between wholesale rates available to MNOs and to MVNOs (cf. General Objective 2).

The effects of this option would be temporary, as it would not tackle the underlying problem of the lack of competition in the roaming market. Therefore, a new regulatory intervention would be required after the period concerned, creating a significant regulatory uncertainty for the operators.

5.5. Qualitative assessment of Option 2b: Extension of the current methodology with adjusted annual price caps incl retail data

The main difference between this scenario with adjusted annual price caps, compared to the baseline scenario, is better roaming prices for all users. The main advantage of this approach is that it would lead to the achievement of the DAE target (general objective) as the retail caps established for 1 July 2015 (for voice, data and SMS) are approaching domestic level prices. This would also lead to a further strengthening of the competitiveness of European Industry (cf. Specific Objective 4), but would especially ensure that prices would be closer to levels reflecting underlying costs (cf. Specific Objective 6). Since retail prices would be set at a lower level than under the baseline scenario, there could finally be a slightly higher risk that the new technological developments would develop less since there is less room for the recuperation of initial investments (cf. Specific objective 3).

There would be an improvement in the development of the single market since minimal uniform safeguard caps would be imposed on all Member States (cf. Specific Objective 1). Furthermore, imposing retail price caps for data could distort competitive market developments (cf. Specific objective 3).

Furthermore, defining price caps for data could have a limited but positive effect on the choice between roaming tariff plans available to consumers (cf. Specific objective 5) and on reducing the difference between roaming and domestic charges while somewhat increasing the transfer of price reductions at the wholesale level to the retail level (cf. Specific Objective 6).

The effects of this option would be temporary, as it would not tackle the underlying problem of the lack of competition in the roaming market. Therefore, a new regulatory intervention would be required after the period concerned, creating a significant regulatory uncertainty for the operators.

5.6. Qualitative assessment of Option 2c: Roam like at Home

Roam like at home is more consumer-friendly than roam like a local (cf. Specific objective 5) since the customer's experience of bill shock in using services abroad is minimised. Subject to the size of the mark-up, consumers would face charges for roaming services closer to domestic levels. The “roaming price” would no longer be a material consumer issue. A “welcome SMS” could be retained to ensure tariff transparency, especially where the customer has a bundled or “unlimited” domestic tariff, given that a small payment (roaming supplement) would apply when abroad. While doing very little to promote competition (cf. Specific objective 3) in the provision of roaming services, the method ensures that the benefits of domestic retail competition are automatically passed through to roaming users (cf. Specific objective 7).

BEREC estimates that, for 2012, the value of the mark-up might well need to be around 10c per minute for outgoing voice calls in order to avoid margin squeezes. While this would lead to lower prices than are typical at present for some consumer segments, overall the option would lose all its advantages compared to Eurotariff price caps (assuming European average prices are the same in each case), as regards bringing roaming prices closer to domestic levels. (cf. Specific objective 6).

5.7. Qualitative assessment of Option 3a: Unbundling option

From the demand perspective, it is expected that the unbundling option could have a positive impact on the competitiveness of European Industry (cf. Specific Objective 4) as the decoupling of the roaming services would further increase the bargaining power of this high usage segment. Furthermore, all users could benefit from increased choice regarding the applicable tariff plan (cf. Specific Objective 5) since each customer would have access to all tariff plans of all national operators. Unbundling would bring about a consistent regulatory approach and therefore would help to avoid distortions between Member States.

Since the unbundling option focuses on the retail market, Option 3a is not expected to improve the market conditions at the wholesale level (cf. Specific Objective 3) unless combined with Option 3b. There is a slight positive effect of lower wholesale caps compared to the baseline scenario and the unbundling is expected to lead to the development of additional retail services, but enabling this requires however tackling a number of technical challenges on the compliance and administrative cost related to this option.

Depending on the interest of consumers to have a different provider of their roaming services and the willingness of domestic operators to compete against each other (e.g. in a specific market niche), the unbundling option could make operators reduce their retail charges in order to retain existing clients or to attract new clients. As such, Option 3a would thus reduce the difference between the roaming charges and the domestic charges and underlying costs (cf. Specific Objective 6). Despite the significant inelasticity of demand for bundled retail voice and SMS roaming service observed today, the competitive offer of such services separately

from other parts of the mobile bundle may allow the consumers to easily compare prices and, in case of significant differences, switch to alternative roaming suppliers. Moreover, the data used for this impact assessment suggests that the demand for data roaming services is more elastic. Taken this into account together with the forecasted increase in data traffic, unbundling has potential to enhance retail competition significantly in the medium term.

Moreover, it should be considered that also consumers who do not switch towards alternative more advantageous roaming offers should normally benefit from the reduction of prices to be expected due to the competitive pressure created by such offers. In this respect, it is again important to note that the market for data roaming services exhibits more dynamism than the corresponding markets for voice and SMS. Given that data traffic is expected to increase strongly in the future it is expected that this will also have a bearing on the markets for voice and SMS (at least for the strongly growing number of smart-phone users). However it will take some time to implement this solution which suggests that the continuation of safeguard retail price caps may be necessary for a period of time. As indicated, decoupling alone may not create the conditions for new entry to the roaming market. It may therefore need to be accompanied by access obligations (see Option 3b below) which facilitate the entry of dynamic new players.

5.8. Qualitative assessment of option 3b: Improved wholesale access measures

A consistent regulatory approach to wholesale access would help to avoid distortions between Member States. Since the improved wholesale market conditions could result in a situation whereby M(V)NOs request access to foreign MNOs in order to be hosted as MNOs, this could lead to the development of pan-European virtual networks by these providers and could enable them to offer the same roaming tariff plans to customers in different countries. The chances of this happening however are increased significantly if this option is combined with Option 3a.

It is expected that Option 3b would have a positive impact on competitive market conditions (cf. Specific Objective 3). The improved access conditions for MVNOs would clearly increase the availability of wholesale roaming services at the same conditions for all operators (at least for the “unbalanced” part of traffic) and reduce the risk of price squeeze via the availability of cost based wholesale services⁵⁵. The changes at the wholesale level would most probably also introduce more competition in the business segment and as such strengthen the competitiveness of European industry (cf. Specific Objective 4). This effect was estimated as less important than under Option 3a since the roaming offers would still remain bundled with domestic mobile services. More precisely, the importance of competitive pressure would depend on the extent to which MVNOs would succeed in increasing their market share in the business sector and the likelihood that businesses would select another provider for all mobile services, triggered by the possibility of obtaining lower roaming rates.

Furthermore, Option 3b is expected to slightly increase user choice and transparency (cf. Specific Objective 5), but to a lesser extent than the unbundling option. On the one hand, there would indeed be a larger number of operators that are actually capable of providing attractive roaming tariff plans. On the other hand, that fact that roaming offers would still be bundled with domestic services could make the tariff options less transparent and require customers to be willing to change the provider for all of their mobile services.

The extent to which the lower prices at the wholesale level, available to all providers (cf. Specific Objective 6), will actually be transferred to the retail level will depend on the likelihood that consumers will indeed be interested in a better deal for roaming services as well as on their attitude towards the barrier of needing to switch to another provider for all mobile services at once. Since MVNOs would have more room for lowering the retail charges compared to Option 3a, a more significant reduction of the difference between the roaming and domestic charges could possibly be realized. Again, the significant inelasticity of demand for retail voice and SMS roaming service observed today is likely to reduce the efficiency of this regulatory option whereas the more elastic demand for data roaming services may indeed make consumers adapt their behavior and consider better roaming charges as a trigger for changing to another roaming provider.

Finally, it is questionable whether *all* customers will actually benefit from more advantageous roaming offers. However, Specific Objective 7 would be satisfied if customers could benefit from such offers. Moreover, it should be considered that consumers who do not switch towards alternative more advantageous roaming offers should normally benefit from the reduction of prices to be expected due to the competitive pressure created by such offers. The risk that some categories of users would have a limited benefit is expected to be higher in the case where there is no unbundling as low usage consumers would be locked into their bundled mobile offers. The chances of boosting competition are increased significantly if this option is combined with retail structural obligations (Option 3a).

⁵⁵ As MVNOs margin is currently very small, it could be expected that the availability of cost based tariff will represent a significant reduction, introducing more competitive pressure in the retail market.

5.9. Qualitative assessment of Option 3c: Decoupling plus MVNO access plus safeguard price caps

Decoupling (option 3a) in combination with enhanced access obligations (option 3b) is likely to have a significant impact on competition in the roaming market (cf. Specific Objectives 3 and 4), although this solution will take time to implement. This structured solution would avoid distortions between Member States by ensuring a consistent regulatory approach thereby contributing to the development of the Single Market. Essentially it is considered that for decoupling to be fully effective it would need to be combined with an access obligation which will facilitate market entry by new or existing players including pan-European roaming service providers. However given that this solution will take time to implement there will be a need to ensure continued consumer protection against excessive roaming charges by maintaining safeguard caps for all services at an appropriate level for a period of time. This combination of obligations should lead to the possibility for a sustainable competitive solution to the roaming without the need for long terms price regulation.

5.10. Qualitative assessment of Option 3d: Spotmarket

Finally, the creation of a spot market for wholesale roaming services would first of all provide no guarantee that more uniform prices across the EU would be obtained or that roaming prices would be aligned to the domestic charges of the different Member States (cf. Specific Objective 1).

Moving towards a system in which roaming service would be traded on a spot market to which all M(V)NO would have access, would clearly increase the availability of these services under the same conditions for all operators, thereby also reducing the risk of price squeezes (cf. Specific objective 3). However, the whole structure of the market would be shaken up since all competitively and commercially grown alliances would be broken down. This structure would be replaced by a new structure which would take a lot of effort and time to put in place, first of all to ensure trading of existing services and technologies today but also it would also need to come up with approved EU wide agreements on how to deal with new services (e.g. specific machine-to-machine services, LTE⁵⁶ based services...) before these can be traded on the spot market. These agreements would possibly imply a delay in commercializing these technologies between EU Member States.

It is not expected that this drastic change in the roaming market structure would be beneficial to the European Industry (cf. Specific objective 4) since it would be uncertain if the advantageous offers by multi-country alliances would still be possible once all of the national partners of these alliances would need to pass via the spot market. The spot market would also definitely make it much more difficult for operators to provide pan-European mobile offers since the underlying wholesale conditions would become too variable.

Furthermore, the impact on user choice and transparency (cf. Specific objective 5) and the extent to which retail prices would better reflect underlying costs (cf. Specific objective 6) is assessed to be moderately positive and comparable to the impact that the improved wholesale access measures could have (cf. Option 3c).

⁵⁶ Long term evolution, the latest standard in the mobile network technology

Finally, establishing a spot market, will not ensure that all categories of users would be able to benefit from price better reflecting the underlying costs (cf. Specific Objective 7) and would not bring competition at retail level.

Summary of the qualitative assessment of all options – per objective

	Option 1 No Regulation	Option 2a	Option 2b	Option 2c Roam like at home/ Local	Option 3a	Option 3b Improved wholesale access conditions	Option 3c 3a + 3b + safeguard caps	Option 3d
Ensuring the development of a single coherent regulatory framework								
Objective 1: Reduce distortions between member states								
Total Objective 1	-8	0	+3	+1	+5	+2	+8	0
Objective 2: Ensure an optimal level of governance								
Total Objective 2	-2	0	0	0	+0	0	0	0
Total	-10	0	+3	+1	+5	+2	+8	0
Stimulating and strengthening sustainable competition in the Digital single market								
Objective 3: Ensure that competitive market conditions are stimulated and that technological developments are not hindered								
Total Objective 3	-14	0	-1	-1	+6	+10	+12	-3
Objective 4: Strengthen the competitiveness of European Industry								
Total Objective 4	-3	0	+4	+6	+3	+3	+5	0
Total	-17	0	+3	+5	+9	+13	+17	-3
Promoting the interest of consumers and ensuring a high level of consumer protection for all EU consumers								
Objective 5: Ensure user choice and transparency								

	Option 1 No Regulation	Option 2a	Option 2b	Option 2c Roam like at home/Local	Option 3a	Option 3b Improved wholesale access conditions	Option 3c 3a + 3b + safeguard caps	Option 3d
Total Objective 5	-8	0	+3	+1	+6	+2	+10	+2
Objective 6: Ensure that prices are at levels reflecting underlying costs (as they would result from competitive market forces)								
Total Objective 6	-10	0	+8	+4	+2	+2	+8	+2
Objective 7: Ensure that all categories of consumers can benefit from prices reflecting underlying costs								
Total Objective 7	-12	0	+3	0	+0	+0	+1	0
Total	-30	0	+14	+5	+8	+5	+19	+4
Overall total	-57	0	+20	+11	+22	+19	+44	1

Table 9: Summary of score per option and per objective⁵⁷

In summary, it can be concluded that Option 1 (no regulation) runs the risk of a return to high roaming charges and consequently scores least best for all of the three general objectives. The more positive assessment of Option 2b compared to the baseline scenario is fully due to the fact that better prices would be secured for customers of all segments (industry as well as consumers) and is further strengthened by the inclusion of caps for retail data services. However this approach does not address the underlying problems and is likely to mean long term price regulation.

The structural approaches outlined in Options 3a and 3b will take significant time to implement but together hold the promise of a sustainable long term solution. The combination of these options, with transitional safeguard price caps (Option 3c), rates very positively against on all objectives. Finally, Option 3d is not expected to have a very positive overall impact.

On the basis of the above assessment it is proposed to carry out quantitative assessment on Option 1, Option 2a, Option 2b and Option 3c.

⁵⁷ Please see Annex II for the detailed assessment and explanation of the scoring mechanism.

5.11. Quantitative assessment

For the quantitative assessment of the policy options, a distinction is made between the economic impact (social welfare), and the *compliance* and *administrative* cost of implementing the specific options. Estimates for the social welfare and these costs are presented in detail in the following sections. In order to facilitate comparison between the options on a quantitative basis, they are compared over a four year period commencing on 1 July 2012. After mid-2015 it is assumed that the effects of competition will have developed. Furthermore it is envisaged that competition will also be effective at the wholesale level meaning that these caps should have no material effect in economic terms.

5.12. Assessment of the economic impact (Social welfare impact)

For the assessment of the economic impact, a detailed economic model has been developed. The aim of this model is the determination in the aggregate and for each country the effect of different regulatory options on roaming quantities⁵⁸ and revenues, consumer and producer surplus, and total social welfare. An underlying roaming market model analyses how roaming wholesale and / or retail prices are expected to evolve due to market forces, e.g. without regulation.

The paragraphs below, firstly, present the results of the economic model estimating the impact, measured as the variation of producer and consumer surplus against the baseline scenario, of each regulatory option. Secondly, this economic impact (social welfare) is assessed against total sector turnover and gross operating surplus⁵⁹ of the electronic communications sector to put the figures into perspective. Finally, the estimated distribution of this economic impact under each of the policy options defined above will be discussed.

5.13. Estimation of the economic impact under each option in the EU 27

An economic model has been developed for estimating the *economic impact (social welfare)* of each regulatory option in the EU 27. This *social welfare* can very briefly be described as the sum of the producer surplus (or industry profits) and the consumer surplus.

The consumer surplus can be defined as “*the amount that consumers are willing to pay for a given good or service minus the amount they are required to pay*”⁶⁰. For a single good, it can be measured by the area of the triangle below the demand curve and above the observed price. In reference to the industry profit, “*the amount paid to the sellers above and beyond the required minimum*”⁶¹ to bring forth production, it can be determined by the area below the observed prices and above the cost function (see below the comparison between two hypothetical scenarios).

⁵⁸ Demand has been calibrated with the country-wise retail and wholesale roaming data available from BEREC.

⁵⁹ Cf. Code 12 170 of Commission Regulation (EC) N° 2007/98 of 17 December 1998 concerning the definitions of characteristics for structural business statistics.

⁶⁰ Fundamentals of Managerial Economics, Mark Hirschey - 2009

⁶¹ Idem

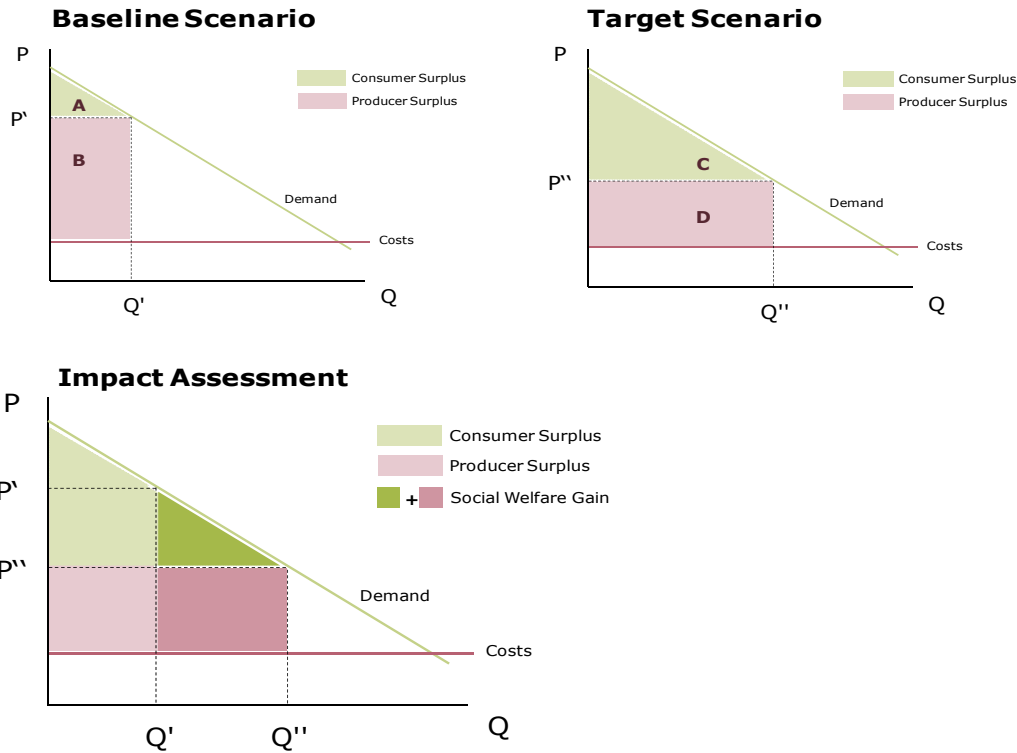


Figure 5: Illustration of how the economic impact (social welfare) has been determined

In this sense, this impact assessment aims at estimating the social welfare gains resulting from the potential implementation of each regulatory option, that is, the sum of the variations of consumer surplus and industry profits. According to the graphs above, the variation of consumer surplus will be derived from (C-A) and the variation of industry profits from (D-B).

The calculation of the social welfare is structured in 6 steps:

- **Step 1.** Determination of the relevant parameters for the Status Quo of the International Roaming market.
- **Step 2.** Estimation of the demand parameters.
- **Step 3.** Determination of the relevant prices by service for each regulatory option.
- **Step 4.** Estimation of the quantities (traffic volume) by service for each regulatory option.
- **Step 5.** Estimation of the revenues and costs by service for each regulatory option over the relevant period.
- **Step 6.** Estimation of the industry profits (or producer surplus), consumer surplus and social welfare for each regulatory option over the relevant period.

5.14. Estimation of the economic impact under shortlisted options⁶²

The estimates of the accumulated economic impact, for the price caps of the shortlisted options (plus Option 1) listed in the Table below, over the relevant period (2012-2014) have the following values at EU level as measured against the baseline scenario (Option 2a):

	Option 1	Option 2.a.	Option 2.b.	Option 3.c.
	No Regulation	Baseline Scenario	Adjusted price caps incl. retail data	Unbundling + Access + safeguard caps
Consumer surplus (m €)	-18.604,64	-----	6.323,50	3.656,73 ⁶³
Total profits (m €)	4.998,48	-----	-4.901,99	-2.373,19 ⁶⁴
Welfare (m €)	-13.606,16	-----	1.421,51	1.283,54

Table 10: Estimated economic impact (accumulated over the relevant period) for each regulatory option

Option 1 has a significant negative impact. Following the results presented above, the option of de-regulating tariffs is inadequate, due to the current lack of competition at both the wholesale and the retail levels. The market equilibrium, driven freely by market forces, would result in a significant increase in prices and a high social welfare loss.

⁶² In analysing the options we assume that the policy measures would be applied homogeneously across countries. Therefore they will be assessed at the EU level, though the differences between countries are in some cases significant.

⁶³ The consumer welfare impacts calculated for this option constitute a conservative minimum and the actual welfare benefits are likely be higher (taking into account the benefits of increased competition which will arise from this option).

⁶⁴ The implementation costs of the structural solutions have not been factored in these figures. It is estimated **by the industry** that the implementation of unbundling would cost around EUR 300 million at the industry level compared with the annual roaming revenue of around EUR 5 billion and with the total annual revenue of around EUR 164 billion. It is important to note that this is one-off cost and is necessary to address the structural problems in the roaming market. Unbundling provides a long term solution and therefore the implementation costs should be spread over a longer time horizon. For instance, if the cost is distributed over the ten year period, which is the proposed duration of the revised Regulation, the (nominal) annual cost for industry would be EUR 30 million. If this cost is incorporated into the producer surplus figures (table 10, p.48), the overall welfare of options 3c will be reduced, but only marginally (approximately from 1.284 m € to 1.193 m €).

On the other hand, options 2b and 3c involve positive and comparable gains of social welfare. These options both foresee that consumers would benefit from lower prices for all roaming services. While option 3c is expected to have also an effect on prices mainly due to the increased competition, both options foresee a retail data price-cap (glide-path towards cost oriented level), in addition to the existing price-cap for the rest of services, namely voice and SMS.

Regarding the differences among these options, it should be mentioned that Option 3c is based on a competition enhancing structural approach, allowing a less strict retail price regulation, leaving space for market forces to determine prices. The consumer welfare calculation above is based only on the safeguard caps foreseen under this option and does not take into account the downward pricing effect arising from competition enhancing structural measures. On the other hand, it should be mentioned that the welfare estimates above do not take into account the implementation costs (see section 5.15) which are estimated by the industry to be around EUR 300 million at the industry level. This represents less than 10% of annual roaming revenues and 0.2% of the total annual revenue. The costs will be one-off but at the same time the unbundling provides a long term solution that would bring benefits over a longer time horizon. The general finding of small elasticities for roaming services, except for retail data, implies that the effects on total welfare are small – and therefore the differences between these options are also small, since reductions in prices only imply that consumers pay less for roughly the same consumption - that is, create a transfer from firms to consumers. However, this may change due to the expected growth of data, as lower data roaming prices are expected to lead to higher data roaming consumption.

However, it can be observed that while achieving similar levels of social welfare gain, these options might be considered as less distortionary since they produce less variation in producer and consumer surplus.

It should also be considered that the positive effects of option 3c would remain over time, while the effects of option 2b would disappear if no new price cap were introduced after the period concerned.

5.15. Assessment of the costs of implementing the roaming regulation options (incl. feasibility)

The table below presents an overview of the cost of implementing the different policy options assessed. These “costs of managing the system” comprise both administrative costs (i.e. related to *‘costs incurred by enterprises, the voluntary sector, public authorities and citizens in meeting legal obligations to provide information on their action or production, either to public authorities or to private parties’*⁶⁵) as well as some substantive compliance costs, e.g. for the implementation of the organization and management of the option.

For the *assessment* of the cost of implementing the roaming regulation, the focus is both on comparing the cost of implementation between options and providing a basis for comparison with the outcome of the economic model.

⁶⁵ See http://ec.europa.eu/governance/impact/docs/key_docs/sec_2005_0791_anx_en.pdf

Option 1 No Regulation	Option 2 Caps of 2012 - Baseline	Option 2b Annually adjusted caps	Option 3c Unbundling + Access + safeguard caps
ADMINISTRATIVE COSTS			
For mobile operators			
No costs	Same cost for reporting as under current Regulation	Same cost for reporting as under current Regulation.	Additional cost for specific system changes and billing arrangements.
For NRAs/BEREC			
No costs	Same cost for monitoring as under current Regulation	Same cost for monitoring as under current Regulation	Additional implementation costs plus extra monitoring will be required in order to measure if these structural options are indeed delivering in terms of bringing down the retail prices below the safeguard caps.
For Consumers			
More effort is required if transparency and bill shock measures no longer apply.	No specific costs	No specific costs	Benefiting from Option 3c implies more research costs and dealing with additional invoices.
COMPLIANCE COSTS			
FOR MOBILE OPERATORS			
No costs	No costs	Need to update wholesale agreements.	Need to update and extend wholesale agreements. A number of technical, security and routing issues to deal with.

Option 1 No Regulation	Option 2 Caps of 2012 - Baseline	Option 2b Annually adjusted caps	Option 3c Unbundling + Access + safeguard caps
FEASIBILITY			
-	The impact assessment for the current regulation confirmed limited additional burden compared to previous market analysis approach.	Complex and time required to implement.	

In terms of administrative costs it is considered that Option 1, 2a and 2b would not result in significant incremental costs since these either involve no regulation (although continued monitoring would be required) or the continuation of the status quo - the costs of compliance and the administrative costs are the same as those already being incurred. Industry has already incurred the costs of compliance (e.g. with data collection and implementation of the cut-off limit for data roaming). Option 3c will take time to implement since there are a large number of technical, security and routing issues to deal with. The practical implementation would involve issues such as implementation of multi IMSI SIM cards with an EU-wide roaming authentication algorithm, special signalling protocol to reroute incoming calls, adapting billing procedures. First there will have to be agreement at EU level on the details of how these regulatory obligations will work. This will involve the Commission, BEREC and industry working together possibly leading to the need for guidelines by the Commission. The involvement of standardization bodies may be required. Secondly there will be an implementation phase whereby operators will make the necessary adjustment to their systems to ensure compliance. On the other hand, once the structural solution is in place the costs of monitoring and compliance are expected to decrease. In contrast Option 2b does not offer a long term solution and is likely to lead to prolonged price regulation.

5.16. Overall cost-benefit assessment of the selected policy options

Based on the detailed qualitative and quantitative assessment outlined in the previous sections, the tables below present a ranking of policy options:

Qualitative assessment

	Option 1 No Regulation	Option 2a Caps of 2012	Option 2b Annually adjusted caps	Option 3c 3a + 3b + safeguard caps
Ensuring the development of a single coherent regulatory framework				
Total	-10	0	+3	+8
Stimulating and strengthening sustainable competition in the Digital single market				
Total	-17	0	+3	+17
Promoting the interest of consumers and ensuring a high level of consumer protection for all EU consumers				
Total	-30	0	+14	+19
Overall total	-57	0	+20	+44
Ranking	4	3	2	1

Quantitative assessment – social welfare model

	Option 1 No Regulation	Option 2a Caps of 2012	Option 2b Annually adjusted caps	Option 3c 3a + 3b + safeguard caps
Consumer surplus				
Total (m EUR)	-18.604,64	-	6.323,50	3.656,73
Total Profits				
Total (m EUR)	4.998,48	-	-4.901,99	-2.373,19
Welfare				
Total (m EUR)	-13,606,16	-	1.421,51	1.283,54

	Option 1 No Regulation	Option 2a Caps of 2012	Option 2b Annually adjusted caps	Option 3c 3a + 3b + safeguard caps
Consumer surplus				
Ranking	3	-	2	1

Though the differences among options 2b and 3c are relatively small, the first place in the ranking from an economic impact point of view is therefore given to the option that is the least distortionary. Also as mentioned in previous chapters, the consumer welfare calculation for option 3c is based only on the safeguard caps foreseen under this option and does not take into account the downward pricing effect arising from competition enhancing structural measures.

Quantitative assessment – Cost of implementation

	Option 1 No Regulation	Option 2a Caps of 2012	Option 2b Annually adjusted caps	Option 3c 3a + 3b + safeguard caps
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Administrative costs	1	2	2	3
Compliance costs	1	2	3	4
Feasibility	1	2	2	3
Ranking	1	2	3	4

6. CONCLUSION

When measured on a qualitative and quantitative basis Option 2b and 3c both demonstrate positive social welfare. Option 2b (price capping) performs marginally better from a consumer protection point of view, as it foresees a direct incisive intervention at retail level, ensuring by regulation that - irrespective of market conditions - all consumers would at any moment pay lower prices. On the other hand Options 3c offers the possibility of enhanced competition for roaming services, which is expected to lower prices for consumers, while keeping safeguard price caps for a certain period. By increasing competition through structural measures this option would lead to long-lasting effects and a more stable regulatory

framework over a longer period of time. Option 2b would not introduce pro-competitive structural changes and would probably need to be followed by new regulated retail prices after 2015. It is therefore proposed to adopt a revised Roaming Regulation on the basis of Option 3c for a period of 10 years with reports on its functioning by the Commission every 2 years.

7. EVALUATION AND MONITORING

Extension of the mobile roaming regulation will continue to be monitored very closely both by the individual NRAs, BEREC and the Commission. Already under the current roaming regulation, NRAs were required to collect data not only on retail and wholesale voice tariffs but also on SMS charges and data roaming charges. This data collection exercise went smoothly and did not create any significant additional administrative burden compared to the situation before the regulatory intervention. This was due to the fact that NRAs had already in place the necessary basic tools to gather and analyse information since market data on roaming was already assembled under Article 5 of the Framework Directive. Data collected by the NRAs and the Commission and presented collectively by the BEREC provided a very useful and timely input for evaluation of the effectiveness of the current regulation and for assessment of the policy options for its possible extension.

The Commission services therefore consider that data collection of similar scope and frequency should continue to be carried out also during the time span of the proposed extension. NRAs will be asked to collect data on retail and wholesale voice, SMS and data roaming services every six months. They will also regularly report to the Commission on the progress of implementation of the extended Roaming Regulation in individual Member States. The Commission can supplement the national regulators' data collection by its own ad hoc studies or surveys on main market and technical developments, charging systems, contract conditions, business vs. residential customers' tariffs, etc. in order to get a more complete picture of the actual impact of the extended regulation once it is implemented. At the same time, the Commission will continue to monitor the entire mobile market as such, as part of its regular monitoring of the implementation of the regulatory framework for electronic communications. This monitoring exercise as well as various studies on specific issues in electronic communications markets commissioned regularly by the Commission will provide a sufficiently broad overview of the context in which the Roaming Regulation operates and will also inform other Commission services in the next review exercise.

In relation to enforcement and compliance it is envisaged that, as in the case of the current Regulation, NRAs will continue to be charged with the tasks of monitoring and supervising compliance and may intervene on their own initiative to ensure compliance in accordance with the terms of the amended Regulation.

With respect to evaluation of the extended Roaming Regulation, it is foreseen that the Commission would review, taking into the account the opinion of BEREC, and report to Council and Parliament in 2015. Thereafter the Commission will carry out regular reports every 2 years before the Regulation expires in 2022.

ANNEX I

1. TECHNOLOGICAL DEVELOPMENTS RELATED TO ROAMING

Regarding technological developments related to roaming, the next sections mainly focus on the comparison of possible substitutes that could provide for less expensive solutions for consumers when using voice, SMS or data mobile services abroad. The extent to which these are actually also perceived as a substitute by consumers, will furthermore impact the probability that these substitutes have a competitive pressure on the roaming prices. A second part briefly points out what the possible substitution is between services within the roaming market. After that, the most recent evolutions in possibilities regarding traffic steering are presented and finally, an overview is given of how the roaming market could be affected by recent innovations.

1.1. Alternatives to roaming services

The possible alternatives have been explicitly limited to *mobile* alternatives to roaming as, according to a 2010 OECD's report on international mobile roaming services "*The preference of consumers for roaming services suggests that the possibility of using the mobile phone as they do at home is very much appreciated*"⁶⁶. Some studies⁶⁷ had also already shown that solutions such as public phones, hotel telephones, call shops are not regarded by end-users as good substitutes to international roaming. The main reasons are again the lack of mobility, as well as the fact that the end-user cannot receive incoming calls on his usual number (for voice and SMS) and the high cost of the alternative service. Note that given the increased demand for data services and the possible technological developments in this area (compared to voice and SMS which are regarded as "mature markets"⁶⁸), alternatives requiring a laptop have also been considered.

In order to assess and to compare possible alternatives to roaming, the 5 following criteria have been considered:

1. Mobility: refers to the possibility of *being able to move* while using voice, SMS or data services and not being constrained to go to specific places for using them;
2. Availability: refers to the availability of the alternative itself as well as of the technical coverage voice, SMS and data services;
3. Accessibility: relates to the *possibility of being reached* at any time and at any location on the same phone number;
4. Affordability: concerns the investment (one-off cost) and the cost of using (recurring cost depending on the volume of services) for using the alternative services;

⁶⁶ "*International mobile roaming services: Analysis and policy recommendations*", OECD, March 2010, P.31

⁶⁷ Examples OECD 2009 and 2010

⁶⁸ See e.g. "International Mobile Roaming Regulation" – BEREC Report – December 2010 (pag 45) and graphs in the previous section presenting the respective evolution in volume of voice, SMS and data retail roaming traffic.

5. Ease of use: refers to the steps required /possible difficulties before being able to use the service as well as the ease of the actual use of the alternative service.

The following table presents the comparison of different possible alternatives to roaming, based on their assessment according to the five above-mentioned criteria. The notation is used for assessing to what extent each of the criteria is respected:

+++	Very good
++	Good
+	Rather good
-	Rather bad
- -	Bad
- - -	Very bad

	Mobility	Availability	Accessibility	Affordability	Ease of use
Local SIM card					
<i>Without dual SIM card handset</i>	+++ The consumer can use the local SIM card throughout the territory covered by the local chosen provider's network.	- The user needs to switch from one SIM card to another when he wants to make a local call or he/she needs to buy a second (unblocked) handset for the local SIM card. Some traditional handsets (mainly those subsidized by MNO) are blocked for other SIM card.	-- If the user has only one handset, he is not reachable at his home number when he switches to the local SIM card.	+ The consumers can benefit from local tariffs for their outgoing local calls. For the incoming calls however, they are most likely to be called on their home number which leads to the payment of roaming charges.	-- The user needs to deal with an additional phone number which has limited validity duration. The consumer incurs research efforts to find a services provider in the visited country.

<p><i>With dual SIM card handset active at the same time</i></p>		<p>+</p> <p>Dual SIM handsets are never subsidized by MNO because they have no incentive to cannibalize their roaming revenue; consumers are therefore discouraged from acquiring them.</p> <p>Once the handset is acquired, the user benefits from high availability of voice, SMS and data services.</p>	<p>+++</p> <p>A dual SIM handset allows the customer to keep keeping the home and the local numbers active at the same time. The user can be reached at his home number and can make calls with the local SIM card without any manipulation.</p>	<p>--</p> <p>Idem as above, but the user needs to buy dual handset phone.</p> <p>In Europe the market for dual SIM handset is not yet much developed, even less for 3G handsets. The cost of the handset will be much higher than for a traditional handset.</p>	
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	Mobility	Availability	Accessibility	Affordability	Ease of use
VoIP					
<i>Over Wi-Fi</i>	<p>---</p> <p>The user needs to go to specific places (such as pubs, hotel, ...) to access a Wi-Fi connection.</p>	<p>--</p> <p>Wi-Fi hotspots are not available everywhere and have a very limited coverage. This can have an influence on the quality of the connection if the user is too far from the modem.</p>		<p>++</p> <p>This alternative is really cheap for outgoing calls if free Wi-Fi hotspots are available but the consumer has still to pay roaming charges for incoming calls on his home number.</p>	<p>--</p> <p>Making calls through VoIP supposes the use of an Internet connection. The consumer therefore needs a laptop or a smartphone to be able to enjoy this alternative to roaming.</p>
<i>Over WiMax</i>	<p>-</p> <p>Compared to VoIP over Wi-Fi, mobility is higher since coverage is larger. However, WiMax coverage is generally limited to the size of a city.</p>	<p>--</p> <p>Initially introduced to cover areas where installing DSL would have been too costly, WiMax technology is available in a limited number of cities.</p>	<p>--</p> <p>The user cannot be reached at any time on his home number, he can however be called on his Skype name.</p>	<p>+</p> <p>Idem as above but the user needs to have a subscription to the WiMax service.</p>	<p>Some MNOs have blocked the access to software allowing VoIP (such as Skype) or are charging extra fees when the consumer is using it.</p> <p>Finally, using software to make calls via an internet connection could be considered as complex for someone who is not used to.</p>

	Mobility	Availability	Accessibility	Affordability	Ease of use
Global or regional SIM card					
<p>Multi-IMSI SIM card</p> <p><i>(i.e. different numbers (from different countries) are related to the same SIM card)</i></p>	<p>+++</p> <p>The user can use the multi-IMSI SIM card everywhere (preferably in countries for which the user has a domestic number in the case of regional SIM card)</p>	<p>+</p> <p>Some regional or global SIM card offers are available in the EU but there are not very much known by the consumers.</p> <p>The multi-IMSI SIM card allows access to voice, SMS and data services as a traditional SIM card.</p>	<p>+++</p> <p>The consumer can at any time be reached on each of the different numbers.</p>	<p>++</p> <p>Multi-IMSI SIM cards allow reducing sharply roaming charges: the user pays a local rate to call within the country in which he is located and an international rate to call abroad. As incoming calls are automatically forwarded to the local number of the country the user stays in, they are free or at a reduced tariff.</p>	<p>---</p> <p>These offers are not very common in the EU (large part of global SIM card uses UK and US numbers). There is a lack of brand recognition.</p> <p>The consumer has to deal with different numbers. He must give the right number to the right person.</p> <p>The technique of call back is quite sophisticated and could be difficult to</p>

<p><i>Call back</i>⁶⁹</p>	<p>+++ This global SIM card can be used everywhere.</p>	<p>+ A lot of offers for international SIM card are available and can be ordered on-line for example. With a global SIM card, the availability of voice, SMS and data services is high.</p>	<p>+ Incoming calls on the home number can be forwarded to the other number if customers ask for it. This option is generally charged to the user.</p>	<p>++ This can reduce the roaming charges since for incoming calls the user does not pay to receive calls on the foreign/international number. He pays if he wants to forward the calls received on his home number (cheaper than roaming charges). For outgoing calls, the rate for using the call back system is also usually lower than roaming.</p>	
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⁶⁹ The call back system works with a SIM card and a number from a foreign country (such as Isle of Mann, Iceland, etc.). The particularity of the system is for outgoing calls: the user dial the number he wants to call, but his call is routed to a hub of his provider. After a few seconds, the hub is calling back the user, the user's phone rings, when he hangs up he is in communication with his contact.

The above table shows that all assessed possible alternatives to roaming are only partial substitutes. Looking at the five criteria, we can conclude that:

1. Mobility: With the exception of VoIP over Wi-Fi (and WiMax), all the above possible alternatives allow for a high degree of mobility;
2. Availability: Possible alternatives linked to global or regional SIM card ensure quite a good availability but are not common in the EU. The same applies to the dual SIM card handset. Other assessed alternatives related to VoIP suffer from a limited coverage of the network and local SIM card could incur problems with subsidised blocked handsets.
3. Accessibility: Dual SIM card handsets and multi-IMSI SIM cards (regional SIM cards) allow the consumer to be reached at any time on his usual number. Using VoIP reduces the accessibility of the user who can only be reached e.g. on his Skype name. Consumers choosing a local SIM card need an additional handset to remain reachable as does the user of the call back system if he does not choose to forward his call on the foreign number.
4. Affordability: All of the possible alternatives allow for lower *traffic* charges (at least for outgoing calls) but some of them require previous investment or fees: dual SIM card handsets are expensive, using of an internet connection to connect to Skype is usually not free (except when free public hotspot is available).
5. Ease of use: A lack of ease of use is the main reason why consumers are not taking up the above-presented services. Indeed, none of them is at the same time easy to understand, user-friendly and without significant search efforts⁷⁰. These possible alternatives are therefore workable for business travelers often going to the same place but seem rather unrealistic for an occasional (holiday) traveler.

It can thus be concluded that none of the assessed possible alternatives is a perfect substitute to roaming. This conclusion is confirmed in the recent BEREC report on International mobile roaming regulation⁷¹: “*Competitive pressure is not to be expected to come from technology developments in the international roaming market at present. None of the technologies [...] could be considered as full substitutes for roaming services at present. They rather complement international roaming services*”⁷². However, according to the 2010 IDATE’s report on the mobile market, the number of mobile VoIP users is expected to sharply grow in the next future⁷³.

1.2. Possible substitution between services within the roaming market

Given the significant differences between domestic and roaming tariffs, consumers often try to keep roaming expenses under control when travelling. The 2010 BEREC report on International Mobile Roaming Regulation points out that recent consumer surveys led in 4 European countries highlight that “*many consumers use their mobile less when roaming than*

⁷⁰ Information is often provided in foreign languages which makes the task more difficult.

⁷¹ See. BEREC Report – International Mobile Roaming Regulation – December 2010

⁷² “*International mobile roaming services: Analysis and policy recommendations*”, OECD, March 2010, P.58

⁷³ See “*Mobile 2010 : market & trends, Facts & figures*” , IDATE, 2010, P.36

when at home. The main reason is cost⁷⁴. The surveys also conclude that one of the most convenient ways for the consumer to reduce roaming charges is decreasing the frequency and the duration of voice calls and replacing them, when possible, by a more intensive use of SMS. According to the BEREC report, 54% of Irish and 42% of British interviewees have, during the last year, used SMS instead of making calls when travelling.⁷⁵

Another possible substitution between services within the roaming market is using VoIP over mobile data networks instead of traditional voice calls. This possible alternative is not widespread throughout the EU probably due to the high cost of mobile data roaming. Moreover, as already discussed in the previous section⁷⁶, using VoIP is only a partial substitute to roaming as it is mostly useful for outgoing calls. However, compared to VoIP over Wi-Fi or WiMax, VoIP over mobile data networks can offer some advantages in terms of availability and mobility for the user. Indeed, the coverage of mobile networks is on average quite large in EU countries⁷⁷ and the consumer can use the VoIP services anywhere in the visited country as far as mobile data network coverage is available (he/she is not limited into the relatively narrow Wi-Fi or WiMax coverage).

The reason for substituting one roaming service for another mainly depends on their relative prices. Indeed, consumers prefer sending SMS over calling when abroad mainly because this is cheaper. In case of a sharp decrease in data roaming charges, we could thus expect a further decline of voice calls.

1.3. Innovations affecting the roaming market

Technological innovation enables the development of new products to be put on the market. In general, this has a positive impact on prices for consumers. Indeed, by putting new technologies on the market, the supplier creates new and more advanced needs for consumers, usually leading to decreasing prices for older and less advanced existing technologies. Moreover, innovation increases the availability of supply since more products are put on the market and additional possible alternatives appear. This increasing competitive pressure should normally also lead to decreasing prices for the consumer.

As already mentioned in the table above describing possible alternatives to roaming, dual-SIM handsets are not really common in the EU. But innovation in this area could be considered for the future since one manufacturer has recently launched the first 3G touch screen dual-SIM phone on the EU-market and other ones have also announced the introduction of new dual-SIM handsets. If manufacturers decide to team up with service providers by offering dual-SIM phones linked to special tariff plans, increasing competition to roaming services could appear from this side.

Still regarding innovation linked to devices, smartphone sales increased sharply during the past year⁷⁸. More and more subscribers are using data services probably due to the

⁷⁴ See. BEREC Report – International Mobile Roaming Regulation – December 2010. P.58

⁷⁵ See. BEREC Report – International Mobile Roaming Regulation – December 2010. P.63

⁷⁶ See section concerning VoIP in the table presenting different possible alternatives to roaming

⁷⁷ According to a 2008 survey of IDATE, in 2007, the mobile 3G coverage varied from one Member State to another (from 50% in Hungary and Latvia to 100% in Malta) but in average between 70 and 80% of the territory was covered.

⁷⁸ Last year, smartphones market penetration was on average 18% in the five biggest EU Member States (France, Germany, Italy, Spain and UK).

See http://www.allaboutsymbian.com/news/item/11342_comScore_data_shows_smartphone.php

development of new devices⁷⁹ such as smartphones, tablet computers, e-reader, games consoles and digital cameras enabling surfing on internet. According to the 2010 BEREC report “*these devices are expected to change communication structures such that people will communicate via email or social networks instead of making voice calls*”⁸⁰.

The increasing demand for data services has also an impact on networks. Indeed, a more intensive use of mobile data can lead to problems of network saturation⁸¹. The development of the new mobile technology LTE could help to address this problem. Considered as the future for 4G technology, LTE should enable increasing capacity, higher transfer rates and more spectrum efficiency. The EU has decided to invest 18 million EUR in research for LTE in 2010⁸² and the first LTE networks was launched by TeliaSonera in Sweden and Norway in 2009⁸³. Today, auctions for the attribution of LTE spectrum are progressively taking place in the EU and the European commission has fixed December, 31 2012 as a deadline to complete it.

2. BARRIERS TO COMPETITION

The market failures presented in the two previous sections could also be considered in terms of *barriers to competition*. Indeed, the above mentioned elements represent obstacles that make it more difficult for potential new entrants to enter the market or that create unequal conditions under which operators are trying to compete.

The present section resumes the main relevant barriers to competition on the European roaming markets⁸⁴. These obstacles can be divided in 3 categories:

- *Structural barriers* coming from industry characteristics such as technology, cost or demand. This also includes technical barriers;
- *Strategic barriers* arising from the behavior of some operators on the market (mainly incumbents) to protect themselves against other ones;
- *Regulatory barriers* resulting from acts issued or performed by executive authorities such as administrative obligations, exclusive rights, licenses, etc.

The following table presents the main barriers to competition within the wholesale and the retail markets. As already explain in the section 2.1, the wholesale market can actually be divided into two different markets (wholesale inbound roaming market and wholesale resale roaming market) including different activities and different players. Logically, the table below thus also distinguishes between these two markets.

⁷⁹ See. BEREC Report – International Mobile Roaming Regulation – December 2010. P.57

⁸⁰ See. BEREC Report – International Mobile Roaming Regulation – December 2010. P.56

⁸¹ See <http://www.abs-cbnnews.com/technology/02/17/10/smartphones-growing-problem-networks>

⁸² See

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1238&format=HTML&aged=1&language=EN&guiLanguage=fr>

⁸³ See http://www.gsacom.com/news/gsa_289.php4

⁸⁴ Note that other barriers to competition have been identified in BEREC report -2010. The summary presented in this section only considered elements which have been identified as relevant within the framework of this study and which could be changed by an action at the European level.

Barriers to Competition	Wholesale market	Retail market
<p><i>Structural barriers</i></p>	<p><i>Inbound market</i></p>	<p>Inelasticity of demand means it is rational for MNOs to take high markups: Demand for roaming services depends mainly on demand for travelling. Since consumers are not going to reduce their consumption of roaming services when price are higher, providers have no incentive to reduce them. It is very unlikely that this will be corrected ‘organically’ by the retail market.</p> <p>Lack of perfect / good substitutes to roaming services: This reduces consumers’ bargaining power. If they had some other alternatives, providers would have more incentives to reduce their retail prices in order to keep their market share.</p> <p>Lack of competitive offers from MVNO: Consumers cannot benefit from possible competitive pressure from MVNOs for roaming services.</p>
	<p>-</p> <p><i>Resale market</i></p> <p>Strong dependency of MVNOs on its home MNO: MVNOs have few other alternatives than to buy resale roaming services from their domestic MNOs. This lack of substitutes reduces MVNOs’ bargaining power which could allow them to conclude better deals.</p> <p>Supply in resale market does not allow for differentiation: MVNOs are limited in offering distinctive products to their end-users as they can only sell what they get from MNOs. The limits in terms of available services on the roaming resale market reduce the competitiveness of MVNOs.</p>	
<p><i>Strategic barriers</i></p>	<p><i>Inbound market</i></p> <p>The volume of roaming traffic that can be offered in return largely determines the wholesale prices in the inbound market :</p> <p>The IOT is then solely applied on the price for “unbalanced traffic”. This is possible only since MNOs can steer the traffic to a preferred foreign network. This implies that Small MNOs cannot enjoy as good a deal as large MNOs. Furthermore, MNOs part of a group or an alliance offer discount prices to their partners. MNOs which are not part of a group or an alliance must pay higher wholesale prices.</p>	<p>Bundling of roaming with domestic mobile services: Consumers cannot buy domestic services from one providers and roaming services from another one.</p> <p>As roaming services are marginal compared to domestic services, there is no competition for roaming services at the retail level.</p>

Barriers to Competition	Wholesale market	Retail market
	<p>Resale market</p> <p>High risk of price squeeze in resale market</p> <p>Domestic MNOs are selling roaming services to MVNOs at a very high cost, often close to the price at which MNOs are selling services to their end-user on the retail market. This is due to the fact that domestic MNOs are at the same time MVNOs providers at the wholesale level and MVNOs competitors at the retail level.</p>	
Regulatory barriers	<p>Inbound market</p> <p>Important barrier to entry</p> <p>Although MVNOs could in principle negotiate freely with MNOs, the membership of GSMA is in practice required to negotiate commercial agreements with foreign MNO, so MVNOs are excluded</p>	-
	<p>Resale market</p> <p>Supply in resale market is mainly limited to the home MNOs: MVNOs cannot directly negotiate and buy roaming services from foreign MNOs.</p>	

Table 11: Overview of structural, strategic and regulatory barriers in the roaming market

Based on the above table, it can be concluded that the policy options for dealing with the (reasons behind the) problems identified, will need to focus both on the stimulation and strengthening of *competitive market developments* as well as on promoting the interest of *consumers* and ensuring a high level of consumer protection in the retail market (cf. Chapter 3 for the more detailed development of the policy objectives).

3. OVERVIEW OF HOW THE DIFFERENT STAKEHOLDERS ARE AFFECTED

The analysis of how the different stakeholders are affected is first of all expressed in direct relation to problem; i.e. the high level of wholesale and retail roaming charges. Furthermore, it is analyzed what the specific interests of each type stakeholder are analysed with regard to roaming regulation.

Category of stakeholder	How are they affected?
Network operators and service providers	
<i>MNOs</i>	<i>How are they affected by a high level of roaming rates?</i>
	<p><u>Big and group-integrated MNOs</u></p> <p>Not negatively affected by high level of wholesale roaming rates since they enable them to increase overall revenues.</p> <p><u>Small MNOs</u> (with a small domestic market share)</p> <p>Negatively affected by high wholesale inbound tariffs since this implies they will have to squeeze their margin when competing at the retail level</p>
	<i>What are their specific interests regarding roaming regulation?</i>
	<p><u>Big and group-integrated MNOs</u></p> <p>Interested in keeping wholesales tariffs as high as possible to ensure the highest possible level of roaming revenues; any regulation is considered as a constraint for pricing and product differentiation.</p> <p><u>MNOs located in countries with a positive balance</u></p> <p>Interested in keeping high wholesale tariffs since these operators do in principle not pay for wholesale inbound services (only for unbalanced traffic, there is an actual payment at the wholesale level).</p>

Category of stakeholder	How are they affected?
	<p><u>Small MNOs</u> (with a small domestic market share)</p> <p>Interested in price reductions imposed by a regulation as this is the easiest way of getting better deals;</p> <p>Interested in new bargaining systems for wholesale inbound services which are no longer based on the volume of services they can offer to buy from the foreign MNO (a practice which currently reduces their bargaining power).</p> <p><u>All MNOs</u></p> <p>Interested in a regulation that keeps administrative and compliance costs (e.g. linked to transparency measures) as low as possible</p>
MVNOs	<i>How are they affected by a high level of roaming rates ?</i>
	<p><u>Full and light MVNOs</u></p> <p>Affected by high level of wholesale resale tariffs since these reduce their margin if they want to be able to compete at the retail level</p>
	<i>What are their specific interests regarding roaming regulation?</i>
	<p><u>Full MVNOs</u></p> <p>Interested in being more independent from their home MNO, e.g. by being able to negotiate directly with foreign MNOs (or via an intermediary third party allowing to reduce overhead costs related to roaming agreements)</p> <p><u>All MVNOs</u></p> <p>Interested in reducing wholesale tariffs in order to avoid significant margin squeeze (margin could be reduced to 0 –and even become</p>

Category of stakeholder	How are they affected?
	<p>negatives- if the MNO resells wholesale resale services at the same price than his retail price⁸⁵)</p> <p>Interested in a regulation that only imposes transparency measures on those operators that can actually control the relevant parts of the value chain required to implement the measures in to avoid excessive administrative and compliance costs to the other ones. Need to keep a balance between the benefit for the consumer and the costs imposed to the services provider.</p>
Resellers	<i>How are they affected by a high level of roaming rates?</i>
	<p><u>All resellers</u></p> <p>Affected by the high wholesale resale tariffs as their margin is reduced to enable them to compete on the retail market</p>
	<i>What are their specific interests regarding roaming regulation?</i>
<p><u>All resellers</u></p> <p>Interested in reducing wholesale tariffs to avoid significant margin squeeze (margin could be reduced to 0 –and even lead to loses- if the MNO resells wholesale resale services at the same price than his retail price)</p> <p>Interested in a regulation imposing transparency measure on the operators who can organize and who control this part of the value chain to avoid excessive administrative and compliance costs to the other ones. Need to keep a balance between the benefit for the consumer and the cost imposed to the services provider</p>	
<i>Providers of other than mobile</i>	<i>How are they affected by a high level of roaming rates?</i>

⁸⁵

See. BEREC Report – International Mobile Roaming Regulation – December 2010, P.38

Category of stakeholder	How are they affected?
<i>technologies</i>	<p><u>All providers of other than mobile technologies</u></p> <p>Not directly affected by high level of roaming rates but benefit indirectly from this since the higher the roaming tariffs, the more consumers are interested in finding another telecommunications solution and the less demanding they are regarding finding the “perfect substitute to roaming” characteristic of the product</p>
	<p><i>What are their specific interests regarding roaming regulation?</i></p>
	<p><u>All providers of other than mobile technologies</u></p> <p>Interested in keeping roaming tariffs as high as possible to benefit from revenues due to new costumers trying to avoid roaming charges. The higher the roaming charges, the higher the alternative providers’ tariffs could be set and thus the higher their revenues could be (for as far as their price setting is indeed affected by international roaming prices).</p>
Customers	
<i>Businesses</i>	<p><i>How are they affected by a high level of roaming rates?</i></p>
	<p><u>Businesses with a large amount of roaming services consumption</u></p> <p>Less affected by high level of retail roaming rates than the next category since they can negotiate attractive terms of contract based on their large volumes.</p> <p><u>Businesses with a lower amount of roaming services consumption</u></p>

Category of stakeholder	How are they affected?
	<ul style="list-style-type: none"> – travelling to different destinations <p>The most affected by the high retail prices of roaming services as they are “intermediate frequent roamers”⁸⁶ but do not consume enough to be able to benefit from reductions</p> <ul style="list-style-type: none"> – often travelling to the same destination(s) <p>Less affected by the high retail prices for roaming services than the previous category since they have more incentive to dedicate time for the search of a good alternative to roaming such as local SIM card for example</p> <p><i>What are their specific interests regarding roaming regulation?</i></p> <p><u>All businesses</u></p> <ul style="list-style-type: none"> – Interested in lower retail prices for roaming services to reduce their roaming charges and to avoid the need to search for alternatives to roaming which are imperfect substitutes – Interested in keeping transparency measures allowing them to monitor their roaming expenses and to prevent “bill shock”.
<i>Individual consumers</i>	<p><i>How are they affected by a high level of roaming rates?</i></p> <p><u>Individual consumer never using roaming services</u></p> <p>Not affected by the high level of retail roaming rate as up to now it was not proofed that changes in roaming tariffs have an effect on the price or quality of domestic services</p>

⁸⁶ See. BEREC Report – International Mobile Roaming Regulation – December 2010, P.9

Category of stakeholder	How are they affected?
	<p><u>Individual consumers travelling frequently to different destinations</u></p> <p>Most affected by the high level of retail roaming rates since they are consuming a significant amount of roaming services but do not have incentive to search for alternatives to roaming⁸⁷ since the duration of the stay is often too short. Neither do they have any negotiating power to obtain a better deal from their provider.</p> <p><u>Individual consumer often travelling to the same destination(s)</u></p> <p>Less affected by the high retail prices for roaming services than the previous category since they have more incentives to take time searching of a good alternative to roaming such as e.g. a local SIM card.</p> <p><i>What are their specific interests regarding roaming regulation?</i></p> <p><u>All individual consumers using roaming services</u></p> <ul style="list-style-type: none"> – Interested in lower retail prices for roaming services to reduce their roaming charges and to avoid the need to search for alternatives to roaming which are imperfect substitutes – – Interested in keeping transparency measures allowing them to monitor their roaming expenses and to prevent “bill shock”
Public authorities	
NRA s	<i>How are they affected by a high level of roaming rates?</i>
	<p><u>All NRA</u>s</p> <p>Not directly affected by high level of roaming rates but this affects the domestic consumers the NRA is supposed to protect from too high</p>

⁸⁷ Except substitute such as international SIM card, but these are not really user-friendly.

Category of stakeholder	How are they affected?
	<p>retail prices.</p>
	<p><i>What are their specific interests regarding roaming regulation?</i></p>
	<p><u>NRAs from countries with a positive roaming balance</u></p> <p>Less interested in wholesale tariffs regulation since lower wholesale prices would reduce national providers' margin and could result <i>in fine</i> in increased domestic prices (until now this effect has never been observed, but more severe price cuts could however change this).</p> <p><u>All NRAs</u></p> <ul style="list-style-type: none"> - Very interested in regulation at the EU-level since they cannot fulfill the task of domestic consumer protection they are assigned by taking measures at the national-level;

4. TABLE OF IMPACTS

The following main qualitative impacts per specific objective have been identified:

Specific objective	Impacts
<p>Objective 1: <i>Reduce distortions between Member States</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Better level playing field for electronic communications operators across the EU; • Increased development of a European single market for electronic communications.
<p>Objective 2: <i>Ensure an optimal level of governance</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Reduced risk of negative cross-country externalities for specific parts of the European consumers.
<p>Objective 3: <i>Ensure that competitive market developments are stimulated and that technological developments are not hindered</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Increased availability of wholesale roaming services at the same conditions for all operators (e.g. incl. small players and MVNOs) (conditions = price en access, possibility of direct bilateral contracts,..) • Reduced risk of price squeeze via the availability of cost based wholesale services to all operators; • Reduced technical barriers for the provision of roaming services; (cf. own IMSI codes, implementation of bill shock,) • Increased probability that the most efficient technological solution for making calls abroad can develop; (not hindering development of substitutes) • Increased development of retail services in addition to the regulated service provisions. <p>Environmental impacts</p> <ul style="list-style-type: none"> • Reduced need for additional specific equipment (terminals, cards,..) for being able to make calls in other EU Member States.

Specific objective	Impacts
<p>Objective 4:</p> <p><i>Strengthen the competitiveness of European industry</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Increased availability of roaming services at competitive prices; • Increased availability of pan-European mobile offers.
<p>Objective 5:</p> <p><i>Ensure user choice and transparency</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Increased control by the user of its international roaming expenditure; • Increased choice regarding the applicable roaming tariff plan; • Increased probability that users will find in an easy way the best possible roaming tariff plan.
<p>Objective 6:</p> <p><i>Ensure that prices are at levels reflecting underlying costs (as they would result from competitive market forces)</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Reduced difference between international roaming and domestic retail charges; • Increased transfer of price reductions at the wholesale level to the retail level.
<p>Objective 7:</p> <p><i>Ensure that consumers can benefit from prices reflecting underlying costs</i></p>	<p>Economic impacts</p> <ul style="list-style-type: none"> • Reduced risk that roaming prices would increase materially for some specific customer segments (cf. ‘no losers policy’) • Social impacts • Social inclusion: Increased affordability of roaming services for social groups

ANNEX II QUALITATIVE ASSESSMENT

	OPTION 1			OPTION 2 A			OPTION 2 B			OPTION 2C			OPTION 3A			OPTION 3B			Option 3c			OPTION 3D		
	No Regulation			Caps of 2012			Annually adjusted caps			Roam like home/local			Decoupling			Improved wholesale access conditions			3a+3b+safeguard caps			Spot market		
IMPACTS	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total	Magnitude	Likelihood	Total
ENSURING THE DEVELOPMENT OF A SINGLE COHERENT REGULATORY FRAMEWORK																								
OBJECTIVE 1: REDUCE DISTORTIONS BETWEEN MEMBER STATES																								
ECONOMIC IMPACTS																								
<i>Better level playing field for electronic communications operators across the EU</i>	-	2	-4	0	3	0	+	3	3	0	3	0	+	3	3	0	3	0	+	2	4	+	0	0
<i>Increased development of a European single market for electronic communications</i>	-	2	-4	0	2	0	0	2	0	+	1	+1	+	2	2	+	2	2	+	2	4	+	0	0
TOTAL OBJECTIVE 1	-8		0			3			1			5			2			8			0			
OBJECTIVE 2: ENSURE AN OPTIMAL LEVEL OF GOVERNANCE																								
ECONOMIC IMPACTS																								
<i>Reduced risk of negative cross-country externalities for specific parts of the European consumers</i>	-	1	-2	0	3	0	0	3	0	0	3	0	0	3	0	0	2	0	0	3	0	0	3	0
TOTAL OBJECTIVE 2	-2		0			0			0			0			0			0			0			

STIMULATING AND STRENGTHENING SUSTAINABLE COMPETITION IN THE DIGITAL SINGLE MARKET

OBJECTIVE 3: ENSURE THAT COMPETITIVE MARKET CONDITIONS ARE STIMULATED AND THAT TECHNOLOGICAL DEVELOPMENTS ARE NOT HINDERED

ECONOMIC IMPACTS

<i>Increased availability of wholesale roaming services at the same conditions for all operators (e.g. incl. small players and MVNOs)</i>	-	-	-	0	1	0	0	1	0	0	1	0	0	1	0	+	2	2	+	2	2	+	0	0	
<i>Reduced risk of price squeeze via the availability of cost based wholesale services to all operators</i>	-	-	-	0	1	0	0	2	0	0	2	0	0	1	0	+	2	4	+	2	4	+	1	2	
<i>Reduced technical barriers for the provision of roaming services</i>	0	3	0	0	1	0	0	1	0	0	1	0	+	2	4	0	1	0	+	2	2	-	3	-6	
<i>Increased probability that the most efficient technological solution for making calls abroad can develop</i>	+	+	1	2	0	1	0	-	1	-1	-	2	-2	0	1	0	+	2	2	+	2	2	0	1	0
<i>Increased development of retail services in addition to the regulated service provisions</i>	-	1	-1	0	1	0	0	1	0	+	1	1	+	2	4	+	2	2	+	2	4	+	1	1	

ENVIRONMENTAL IMPACTS

<i>Reduced need for additional specific equipment (terminals, cards,..) for being able to make calls in other EU Member States.</i>	0	0	0	0	2	0	0	3	0	0	2	0	-	2	-2	0	0	0	-	2	-2	0	0	0
TOTAL OBJECTIVE 3	-14			0			-1			-1			6			10			12			-3		
OBJECTIVE 4: STRENGTHEN THE COMPETITIVENESS OF EUROPEAN INDUSTRY																								
ECONOMIC IMPACTS																								
<i>Increased availability of roaming services at competitive prices</i>	-	2	-4	0	1	0	+	2	4	+	2	6	+	1	1	++	1	2	+	1	1	++	0	0
<i>Increased availability of pan-European mobile offers</i>	+	1	1	0	1	0	0	1	0	0	1	0	+	2	2	+	1	1	+	2	4	0	0	0
TOTAL OBJECTIVE 4	-3			0			4			6			3			3			5			0		
PROMOTING THE INTEREST OF CONSUMERS AND ENSURING A HIGH LEVEL OF CONSUMER PROTECTION FOR ALL EU CONSUMERS																								
OBJECTIVE 5: ENSURE USER CHOICE AND TRANSPARENCY																								
ECONOMIC IMPACTS																								
<i>Increased control by the user of its international roaming expenditure</i>	-	2	-6	0	3	0	+	3	3	0	3	0	+	1	1	0	1	0	+	2	2	0	3	0
<i>Increased choice regarding the applicable roaming tariff plan</i>	-	2	-2	0	1	0	0	1	0	+	1	1	+	2	4	+	1	2	+	2	4	+	1	1
<i>Increased probability that users will find in an easy way the best possible roaming tariff plan</i>	0	2	0	0	1	0	0	1	0	0	1	0	+	1	1	0	1	0	++	2	4	+	1	1

TOTAL OBJECTIVE 5		-8		0		3		1		6		2		10		2								
OBJECTIVE 6: ENSURE THAT PRICES ARE AT LEVELS REFLECTING UNDERLYING COSTS (AS THEY WOULD RESULT FROM COMPETITIVE MARKET FORCES)																								
ECONOMIC IMPACTS																								
<i>Reduced difference between international roaming and domestic retail charges</i>	-	2	-4	+	0	0	+	2	4	+	2	2	+	1	1	+	1	1	+	2	4	+	1	1
<i>Increased transfer of price reductions at the wholesale level to the retail level</i>	-	2	-6	0	1	0	+	2	4	+	2	2	+	1	1	+	1	1	+	2	4	+	1	1
TOTAL OBJECTIVE 6		-10		0		8		4		2		2		8		2								
OBJECTIVE 7: ENSURE THAT ALL CATEGORIES OF CONSUMERS CAN BENEFIT FROM PRICES REFLECTING UNDERLYING COSTS																								
ECONOMIC IMPACTS																								
<i>Reduced risk that roaming prices would increase materially for some specific customer segments (cf. 'no losers policy')</i>	-	3	-6	0	2	0	+	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
SOCIAL IMPACTS																								
<i>Social inclusion: Increased affordability of roaming services for all social groups</i>	-	2	-6	0	2	0	+	2	2	0	1	0	0	1	0	0	1	0	+	1	1	0	1	0
TOTAL OBJECTIVE 7		-12		0		3		0		0		0		1		0								
TOTAL		-57		0		20		11		22		19		44		1								

The assessment of all of the impacts under each of the options is done by analysing the magnitude of the expected impact, as well as the likelihood that the impact will actually occur as a result of the proposed policy option.

The notation used to express the magnitude (compared to the baseline scenario) is the following:

- - - very negative impact
- - negative impact
- slightly negative impact
- 0 no impact
- + slightly positive impact
- + + positive impact
- + + + very positive impact

The likelihood will be expressed as follows:

- 0 no likelihood
- 1 low likelihood
- 2 medium likelihood
- 3 high likelihood

These scores give an additional weight to the score expressing the magnitude of the impact. As such and in contrast to the score for the magnitude, the value given for the likelihood is an absolute score, i.e. not relative to the score of the baseline scenario.

ANNEX III

Quantitative Economic Analysis

STEP 1: Determination of the relevant parameters for the Status Quo of the International Roaming market

In a first step, the relevant traffic and total revenue data by service of each Member State have been identified⁸⁸:

– Traffic data

- Volume of retail voice calls made (m min, 2009);
- Volume of retail voice calls received (m min, 2009);
- Volume of retail SMS sent (m, 2009);
- Volume of retail data usage (m MB, 2009).

– Revenue data

- Total revenue for retail voice calls made (m € 2009);
- Total revenue for retail voice calls received (m € 2009);
- Total revenue for retail SMS sent (m € 2009);
- Total revenue for retail data usage (m € 2009).

These data provided the inputs for the calculation of average revenue per Minute/SMS/MB (Average Unitary Revenue, AUR) for each country and every service:

– Revenue data

- Average revenue for retail voice calls made (€min, 2009)
- Average revenue for retail voice calls received (€min, 2009)
- Average revenue for retail SMS sent (€ 2009)
- Average revenue for retail data usage (€MB, 2009)

For each individual Member State and for each service the volumes and average unitary revenue for 2009 are:

⁸⁸ BEREC information for 2009 has been employed, which is the latest full calendar year available.

MEMBER STATE	RETAIL SERVICES							
	Retail voice calls made		Retail voice calls received		Retail SMS		Retail data	
	Volume (m min)	AUR (€/min)	Volume (m min)	AUR (€/min)	Volume (m)	AUR (€)	Volume (m MB)	AUR (€/MB)
AT	-	-	-	-	-	-	-	-
BE	256,9	0,46	173,6	0,21	194,1	0,19	13,9	3,37
BG	18,0	0,61	34,8	0,24	13,0	0,17	0,4	5,27
CY	22,0	0,55	17,7	0,20	19,5	0,15	0,5	1,31
CZ	39,4	0,53	63,9	0,20	121,4	0,18	3,5	3,97
DK	-	-	-	-	-	-	-	-
EE	37,6	0,53	63,1	0,12	14,9	0,18	0,4	3,89
FI	76,4	0,49	60,7	0,21	47,5	0,17	4,4	3,11
FR	453,0	0,47	312,0	0,21	240,5	0,16	30,2	4,63
DE	834,0	0,49	700,4	0,20	375,7	0,20	60,7	2,25
GR	54,4	0,51	59,4	0,24	22,8	0,18	1,7	5,12
HU	50,7	0,50	71,6	0,22	51,3	0,19	2,8	2,88
IE	-	-	-	-	-	-	-	-
IT	364,0	0,49	370,4	0,20	278,7	0,16	24,8	3,37
LV	11,1	0,47	26,5	0,10	19,2	0,13	0,4	3,59
LT	13,4	0,51	23,2	0,21	31,2	0,15	0,5	3,67
LU	-	-	-	-	-	-	-	-
MT	4,0	0,58	2,6	0,29	5,6	0,17	0,3	1,95
NL	388,0	0,48	287,6	0,21	246,4	0,20	28,8	2,09
PL	171,5	0,49	216,8	0,21	248,8	0,17	5,2	3,69
PT	79,3	0,47	117,7	0,18	47,2	0,20	5,4	2,65
RO	59,3	0,48	106,0	0,21	52,7	0,16	3,4	2,97
SK	51,7	0,51	64,1	0,21	48,2	0,19	1,8	3,80
SI	21,5	0,54	28,1	0,23	22,5	0,17	0,7	4,97
ES	271,6	0,50	319,7	0,20	74,4	0,18	26,8	3,24
SE	-	-	-	-	-	-	-	-
GB	811,4	0,37	504,2	0,14	699,4	0,13	60,0	1,23
TOTAL	4.089,4	0,46	3.624,3	0,19	2.874,9	0,17	276,4	1,71

Table 12: Overview of the volumes and average unitary revenue by Member State for each retail service in the reference year 2009 (Based on BEREC information)

MEMBER STATE	WHOLESALE SERVICES					
	Wholesale voice calls made		Wholesale SMS		Wholesale Data	
	Volume (m min)	AUR (€/min)	Volume (m)	AUR (€)	Volume (m MB)	AUR (€/MB)
AT	-	-	-	-	-	-
BE	225,0	0,28	158,2	0,07	15,2	0,73
BG	38,0	0,21	26,7	0,05	2,6	1,04
CY	29,4	0,28	20,7	0,05	2,0	1,24
CZ	84,4	0,30	59,3	0,09	5,7	1,19
DK	-	-	-	-	-	-
EE	18,0	0,32	12,7	0,10	1,2	1,55
FI	42,7	0,30	30,0	0,08	2,9	0,88
FR	684,2	0,25	481,0	0,07	46,2	0,70
DE	558,1	0,27	392,3	0,07	37,7	0,59
GR	150,1	0,29	105,5	0,07	10,1	1,15
HU	98,0	0,21	68,9	0,07	6,6	0,69
IE	-	-	-	-	-	-
IT	429,6	0,26	302,0	0,08	29,0	0,55
LV	22,7	0,25	16,0	0,10	1,5	0,94
LT	11,2	0,30	7,9	0,08	0,8	0,75
LU	-	-	-	-	-	-
MT	18,2	0,31	12,8	0,10	1,2	1,28
NL	222,3	0,24	156,3	0,08	15,0	0,55
PL	128,5	0,24	90,3	0,08	8,7	1,06
PT	142,3	0,21	100,0	0,06	9,6	0,43
RO	64,4	0,27	45,3	0,08	4,4	0,64
SK	42,5	0,27	29,9	0,09	2,9	1,06
SI	20,1	0,28	14,1	0,10	1,4	1,58
ES	645,5	0,20	453,8	0,07	43,6	0,54
SE	-	-	-	-	-	-
GB	414,4	0,24	291,3	0,07	28,0	0,43
TOTAL	4.089,4	0,25	2.874,9	0,08	276,4	0,67

Table 13: Overview of the volumes and average unitary revenue by Member State for each wholesale service in the reference year 2009 (Based on BEREC information)

Based on the lack of reliability of the figures for these five countries, it has been deemed necessary to exclude them from the impact assessment, at 13,98 % of the overall traffic (retail voice) and 13,91 % of the total roaming revenues (including retail and wholesale).

The inputs presented above will be used to parameterize the demand functions at national level.

STEP 2: Estimation of the demand parameters

In a second step, the demand parameters are estimated in order to define a demand function for each Member State. The final purpose of the resulting demand function is to quantify the amount of roaming services demanded according to the willingness of the consumers to pay for these services.

The linear demand system⁸⁹ that has been used follows the standard mathematical demand expression $q = A - Bp$, but applied to multiple goods or services, where A expresses the intercepts and B the slopes, i.e. the effect of prices on demand.

$$\begin{bmatrix} q_1 \\ \vdots \\ q_4 \end{bmatrix} = \begin{bmatrix} A_1 \\ \vdots \\ A_4 \end{bmatrix} - \begin{bmatrix} B_{11} & \cdots & B_{14} \\ \vdots & \ddots & \vdots \\ B_{41} & \cdots & B_{44} \end{bmatrix} \begin{bmatrix} p_1 \\ \vdots \\ p_4 \end{bmatrix}$$

On the basis of the volumes and average unitary revenues presented in the step 1, a linear demand system has been implemented at the level of each Member State. This demand system has been used as a local approximation to the actual demand system in order to determine changes in traffic volumes following a variation in prices of the relevant services.

On the one hand, the (own- and cross-) elasticities for all relevant services have been estimated, using a system of instrumental variable fixed-effects panel models⁹⁰, at EU level. On the other hand, the intercepts and slopes defining the demand functions are obtained at Member State level.

Own- and Cross-Price elasticity

In order to perform quantitative estimates of the welfare effects of changing the existing Roaming Regulation in the Economic Model, an econometric estimation of EU-wide demand elasticities for the four services “roaming calls made”, “roaming calls received”, “roaming SMS” and “data roaming” has been performed. In order to be consistent with welfare calculations, a system of four demand equations, each for one of the services just mentioned, has been estimated, with cross-equation constraints that guaranteed Slutsky symmetry at the sample mean.

The estimated demand elasticities are the following:

ECONOMETRIC ESTIMATES				
	Price of calls made	Price of calls received	Price of SMS	Price of data
Demand for calls made	-0.27			0.05
Demand for calls		-0.24		-0.09

⁸⁹ Using a linear demand function responds to a conservative approach. Changes in consumer surplus under a linear demand function are smaller than those under a constant-elasticity one, where the latter are again smaller than in a system in which the elasticity increases in the range of lower prices.

⁹⁰ In econometrics, the concept of panel data refers to multi-dimensional data. Panel data usually contains observations on multiple phenomena observed over multiple time periods for the same firms and/or individuals. The panel employed for the econometric analysis with regards to the relevant roaming services contains 13 quarters (2007Q2 to 2010 Q2) over the 27 Member States.

received				
Demand for SMS			-0.24	
Demand for data	0.21	-0.13		-1.23

According to economic theory, the variation in price of a good has the following impact on an operators' revenues for the same good:

$$d/dp (p \cdot q) = q \cdot (1 - \text{eps}),$$

where eps is the (absolute value of the) demand elasticity

This has the following consequences:

- If $\text{eps} < 1$ (as is the case in most of the estimates), a lower price implies a decrease in revenues, since there is no contrary effect from higher quantities.
- If $\text{eps} > 1$ a lower price actually increases revenues, since the increase in quantities over-compensate the effect of the price reduction
- If we just consider $0 < \text{eps} < 1$, a lower value for eps implies that a decrease in price leads to a stronger reduction in revenues.

Given the elasticities that have been estimated for voice calls and SMS, lower price caps will decrease revenues. For data a price cap will increase revenues (but not profits).

Demand function: Intercept and slopes

The demand parameters A and B considered in the linear demand system for each country result from the following calculations:

$$\text{Slopes: } B_{ij} = -\frac{\varepsilon_{ij} q_{i0}}{p_{j0}}$$

$$\text{Intercepts: } A_i = \left(1 - \sum_{j=1}^4 \varepsilon_{ij}\right) q_{i0}$$

Own-price elasticities $\varepsilon_{ii}, i = 1, \dots, 4$

Cross-price elasticities $\varepsilon_{ij}, i, j = 1, \dots, 4; j \neq i$

Initial prices and volumes $p_{i0}, q_{i0}, i = 1, \dots, 4$

STEP 3: Determination of the relevant prices by service for each regulatory option

In a third step, based on the configuration of each regulatory option, the relevant prices over the relevant period (2012-2014) are determined. In general terms, the applicable price by service for each scenario is chosen as the minimum between the present price cap (if applicable) and the price (freely) driven by market forces, as predicted by an underlying roaming market model.

For each individual Member State, for each service and for each regulatory option, the average unitary revenue has been estimated, leading to the following (average) values at EU level for each year of the relevant period:

REGULATORY OPTION	RETAIL AUR	WHOLESALE AUR
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2012	Retail voice calls made (€min)	Retail voice calls received (€min)	Retail SMS (€)	Retail data (€MB)	Wholesale voice calls made (€min)	Wholesale SMS (€)	Wholesale Data (€MB)
OPTION 1 - NO REGULATION	1,87	0,46	0,72	3,31	1,42	0,54	1,18
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	0,35	0,11	0,11	2,65	0,18	0,04	0,49
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	0,24	0,10	0,05	0,51	0,14	0,03	0,30
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	0,32	0,11	0,10	0,90	0,14	0,03	0,30

Table 14: Overview of the average unitary revenue at EU level by service for each regulatory option corresponding to the year 2012

REGULATORY OPTION	RETAIL AUR				WHOLESALE AUR		
2013	Retail voice calls made (€min)	Retail voice calls received (€min)	Retail SMS (€)	Retail data (€MB)	Wholesale voice calls made (€min)	Wholesale SMS (€)	Wholesale Data (€MB)
OPTION 1 - NO REGULATION	1,87	0,46	0,72	3,31	1,42	0,54	1,18
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	0,35	0,11	0,11	2,65	0,18	0,04	0,49
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	0,17	0,09	0,05	0,34	0,10	0,03	0,20
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	0,28	0,10	0,09	0,70	0,10	0,03	0,20

Table 15: Overview of the average unitary revenue at EU level by service for each regulatory option corresponding to the year 2013

REGULATORY OPTION	RETAIL AUR				WHOLESALE AUR		
2014	Retail voice calls made (€min)	Retail voice calls received (€min)	Retail SMS (€)	Retail data (€MB)	Wholesale voice calls made (€min)	Wholesale SMS (€)	Wholesale Data (€MB)
OPTION 1 - NO REGULATION	1,87	0,46	0,72	3,31	1,42	0,54	1,18

OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	0,35	0,11	0,11	2,65	0,18	0,04	0,49
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	0,10	0,08	0,03	0,17	0,06	0,02	0,10
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	0,24	0,10	0,08	0,50	0,06	0,02	0,10

Table 16: Overview of the average unitary revenue at EU level by service for each regulatory option corresponding to the year 2014

Prices driven by market forces – Determination of unregulated retail and wholesale prices

Unregulated retail prices are determined in a country-wise Nash equilibrium as a function of given regulated or unregulated wholesale prices. Unregulated wholesale prices are determined taking into account the derived demand resulting from home networks' retail pricing.⁹¹

STEP 4: Estimation of the quantities (traffic volume) by service for each regulatory option

In a fourth step, with the aim of estimating the quantities (traffic volume) for each regulatory option, it is assumed that the demand will follow the expressions determined in step 2.

For each individual Member State, for each service and for each regulatory option, the quantities (demand) have been estimated, leading to the following (total) values at EU level for each year of the relevant period:

REGULATORY OPTION	RETAIL AUR				WHOLESALE AUR		
	Retail voice calls made (m min)	Retail voice calls received (m min)	Retail SMS (m)	Retail data (m MB)	Wholesale voice calls made (m min)	Wholesale SMS (m)	Wholesale Data (m MB)
2012							
OPTION 1 - NO REGULATION	824,79	2.331,19	616,33	314,32	824,79	616,33	314,32
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	4.352,10	3.990,69	3.099,85	277,37	4.352,10	3.099,85	277,37
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	4.444,15	4.309,00	3.358,20	526,81	4.444,15	3.358,20	526,81
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	4.289,25	4.208,45	3.142,91	474,68	4.289,25	3.142,91	474,68

⁹¹ Technically speaking, in the case where both wholesale and retail prices are unregulated we consider a subgame-perfect equilibrium where networks choose wholesale prices in a first step and retail prices in a second step, after having observed (foreign networks') wholesale prices.

Table 17: Overview of the traffic volume at EU level by service for each regulatory option corresponding to the year 2012

REGULATORY OPTION	RETAIL AUR				WHOLESALE AUR		
2013	Retail voice calls made (m min)	Retail voice calls received (m min)	Retail SMS (m)	Retail data (m MB)	Wholesale voice calls made (m min)	Wholesale SMS (m)	Wholesale Data (m MB)
OPTION 1 - NO REGULATION	824,79	2.331,19	616,33	314,32	824,79	616,33	314,32
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	4.352,10	3.990,69	3.099,85	277,37	4.352,10	3.099,85	277,37
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	4.596,59	4.379,46	3.358,20	546,15	4.596,59	3.358,20	546,15
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	4.366,21	4.282,48	3.185,97	502,49	4.366,21	3.185,97	502,49

Table 18: Overview of the traffic volume at EU level by service for each regulatory option corresponding to the year 2013

REGULATORY OPTION	RETAIL AUR				WHOLESALE AUR		
2014	Retail voice calls made (€min)	Retail voice calls received (€min)	Retail SMS (€)	Retail data (€MB)	Wholesale voice calls made (€min)	Wholesale SMS (€)	Wholesale Data (€MB)
OPTION 1 - NO REGULATION	824,74	2.344,05	616,33	314,74	824,74	616,33	314,74
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	4.352,10	3.990,69	3.099,85	277,37	4.352,10	3.099,85	277,37
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	4.749,03	4.449,95	3.444,32	565,48	4.749,03	3.444,32	565,48
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	4.443,16	4.310,39	3.229,02	528,36	4.443,16	3.229,02	528,36

Table 19: Overview of the traffic volume at EU level by service for each regulatory option corresponding to the year 2014

STEP 5: Estimation of the revenues and costs by service for each regulatory option over the relevant period

In a fifth step the revenues and costs are estimated as the multiplication of the quantities by service and the applicable average unitary revenue and cost.

For each individual Member State, for each service and for each regulatory option, the revenues and costs have been estimated for each year of the relevant period. Accumulated over the period, they lead to the following (total) values at EU level:

REGULATORY OPTION	ACUMULATED REVENUES			
2012-2014	Retail voice calls made (m €)	Retail voice calls received (m €)	Retail SMS (m €)	Retail data (m €)
OPTION 1 - NO REGULATION	4.628	3.228	1.330	3.125
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	4.570	1.316	1.023	2.205
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	2.323	1.181	439	550
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	3.661	1.322	859	1.043

Table 20: Overview of the EU accumulated (over the relevant period 2012-2014) revenues by service for each regulatory option

REGULATORY OPTION	ACUMULATED COST			
2012-2014	Retail voice calls made (m min)	Retail voice calls received (m min)	Retail SMS (m)	Retail data (m MB)
OPTION 1 - NO REGULATION	3.651	552	1.045	1.134
OPTION 2.a - PRICE-CAP - "CONTINUATION À L'IDENTIQUE" (Baseline scenario)	3.058	946	635	426
OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	2.114	1.037	558	357
OPTION 3.c STRUCTURAL SOLUTION with safeguard caps	2.014	1.011	525	326

Table 21: Overview of the EU accumulated (over the relevant period 2012-2014) costs by service for each regulatory option

STEP 6: Estimation of the industry profits (or producer surplus), consumer surplus and social welfare for each regulatory option over the relevant period

In a sixth step the profits on the industry, the consumer surplus and the social welfare are estimated:

- industry profits/losses are determined as the difference between the total revenues and the costs incurred consumer surplus due to the consumption of all four services is determined through the calculation of the indirect utility

Indirect utility or consumer surplus:

$$V(p) = V_0 + \frac{1}{2}q'B^{-1}q$$

Unknown constant V_0 cancels in comparisons

By summing industry profits and consumer surplus, the absolute social welfare is estimated for each Member State and for each regulatory option. For the purpose of this impact assessment, while ensuring economic correctness, the absolute values of the social welfare will be “normalized” through the baseline scenario⁹².

Since the services considered (voice calls made and received, SMS and data) are substitutes or complements to each other, it would be economically incorrect to present separate consumer surplus estimates for each single service. Thus the social welfare results (variation) are presented on a country-basis:

- Industry profits
- Consumer surplus
- Total welfare

Apart from the welfare (and surplus) for the baseline scenario and each regulatory option, the rest of the outputs of the model are the following:

- Retail and wholesale prices
- Retail and wholesale volumes
- Operator profits
- Consumer surplus

The above results are presented in aggregated form per service at EU level⁹³ in the following table.

EU TOTAL ACCUMULATED	OPTION 2.b - PRICE-CAP INCL. RETAIL DATA	OPTION 3.c STRUCTURAL SOLUTION with safeguard caps
Voice calls made		
	OPTION 2.b.	OPTION 3.c
Prices (€/min)	0,17	0,28
Quantities (m min)	13.789,77	13.098,62
Revenues (m €)	2.322,92	3.661,46
Costs (m €)	2.114,19	2.013,65
Profits (m €)	208,73	1.647,81

⁹² Economically speaking, there is no accurate way to calculate the absolute welfare numbers based on the available data. However, the variation (or gain) in social welfare of a regulatory option in comparison with a baseline scenario is an alternative appropriate and much more robust decision-making tool. Essentially, by considering only variations between scenarios, the "arbitrary" or "non-estimable" part of consumer surplus cancels.

⁹³ Member States and relevant services can be considered separately for the presentation of prices and volumes at retail and wholesale level, whereas only Member States can be considered for the determination of producer and consumer surplus

Voice calls received		
	OPTION 2.b.	OPTION 3.c
Prices (€/min)	0,09	0,10
Quantities (m min)	13.138,41	12.801,33
Revenues (m €)	1.181,03	1.321,88
Costs (m €)	1.036,96	1.010,55
Profits (m €)	144,07	311,33

SMS		
	OPTION 2.b.	OPTION 3.c
Prices (€/SMS)	0,04	0,09
Quantities (m SMS)	10.160,72	9.557,90
Revenues (m €)	439,15	859,35
Costs (m €)	557,93	524,94
Profits (m €)	-118,78	334,41

Data		
	OPTION 2.b.	OPTION 3.c
Prices (€/MByte)	0,34	0,69
Quantities (m MByte)	1.638,44	1.505,53
Revenues (m €)	550,49	1.043,13
Costs (m €)	356,59	325,85
Profits (m €)	193,91	717,29

	OPTION 2.b.	OPTION 3.c
Consumer surplus (m €)	6.323,50	3.656,73 ⁹⁴
Total profits (m €)	-4.901,99	-2.373,19
Welfare (m €)	1.421,51	1.283,54

Table 22: Overview of the model outputs at EU and service level, accumulated (over the relevant period 2012-2014) for each regulatory option

Assessment of the economic impact under each option

To put the figures presented above into perspective, the estimated producer and consumer surplus⁹⁵, as well as the resulting social welfare, are compared to the total retail turnover of the roaming segment corresponding to the year 2009⁹⁶.

⁹⁴ The consumer welfare impacts calculated for this option constitute a conservative minimum and the actual welfare benefits are likely be higher (taking into account the benefits of increased competition which will arise from this option).

⁹⁵ Producer and consumer surplus variation of each regulatory option against the baseline scenario

⁹⁶ Figures as of 2009 BEREC data employed in the economic model.

ANNEX IV – ECONOMIC MODEL

Description of the Economic Model for the determination of the economic impact (Social Welfare) of each regulatory option

This section provides a general description of the architecture and main assumptions employed in the economic model that determines the social welfare for each regulatory option. The results of the economic model have been presented in section 5 of this document.

General architecture of the Techno-Economic Model

Model structure

The model structure is outlined in the following diagram:

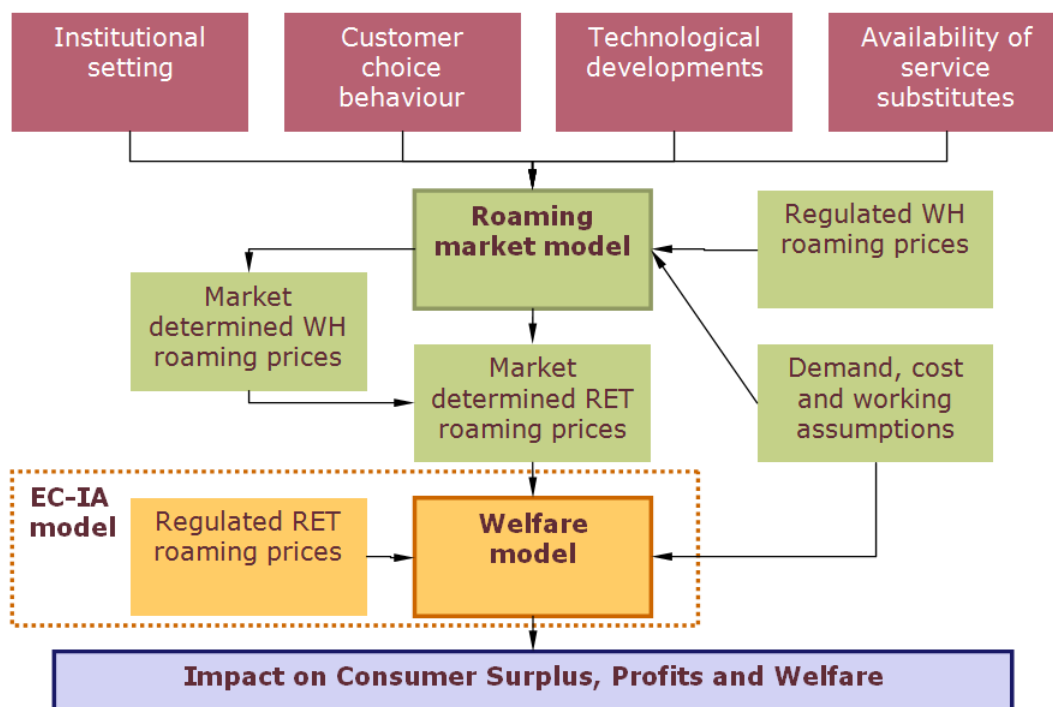


Figure 6: Overall structure of the economic model

Given the available data, the general structure of the model has been maintained from the formerly proposed. In particular, with the available per-country data on roaming volumes and revenues we have been able to determine changes in prices, consumption and financial in- and outflows on a per-country basis. We have not been able, though, to determine pair-wise flows between countries or operators due to the absence of sufficiently disaggregated data.

As concerns modelling inputs (the red boxes in), we have the following further comments:

- (2) Institutional settings: “Roaming hubs”, networks that function as intermediaries between multiple roaming partners, are the only significant new development. The introduction of these Roaming Hubs makes it unnecessary for hub client networks to negotiate and conclude multiple bilateral roaming agreements. Even so, it is not clear

as of yet whether apart from increased efficiency especially for small operators these hubs will change competitive conditions at either retail or wholesale level.

- (3) Customer choice behavior: The WIK final report indicates clearly that the majority of roaming customers gives little attention to roaming when they chose their contract, and that they also do not search actively for substitutes. This observation has been used as a model input, that is, we have explicitly modeled this fact and its implications for roaming price setting.
- (4) Technological developments: We have maintained the model assumptions at the current technological framework (including traffic redirection). Dual-SIM phones and other options involving active search by customers but which would be made possible through changes in technology or implementation, especially in the visited country, have been discarded in the WIK report.
- (5) Service substitutes: Substitutes away from voice / SMS / data roaming have been discounted in the WIK report. Therefore we have concentrated on the potential substitution between voice calls, SMS and data roaming (non-zero cross elasticity).
- (6) The other parts of the structure are affected by data availability as discussed below.

Modelling methodology

The economic model estimates the effects at Member State level and then the EU total effect is calculated as the aggregate of the country values.

Our roaming market model follows the modeling tradition of Laffont Rey Tirole (1998a/b), simplified where possible to reduce the additional complexity created by the introduction of roaming services into the modeling framework, and be adapted to a setting with:

- All 27 countries, in order to capture cross-national impacts;
- Multiple mobile network operators in each country;
- Sensitivity analysis concerning customer choice behavior and roaming network selection.

The model has been calibrated with data about demand, traffic flows, institutional and technical details, based on BEREC data and other information that we have received. The calibration of demand is based on an econometric estimation of EU-wide own- and cross-elasticities of demand for voice calls made and received, SMS and data. Since there is no country-specific cost data, we have used a common set of cost parameters for all countries. Qualitative information about institutional details, the existing regulation and technology has also been taken into account.

The output of the roaming market model is both conceptual and provides quantitative indications of how roaming retail pricing could evolve in different regulatory settings. We have obtained results on in- and outflows per country (while the available data provide no information on flows between country pairs).

Treatment/Differentiation of services (i.e. voice, sms, data)

SMS and data services have been included in the quantitative assessment alongside voice calls made and received. We have determined the quantity, price and welfare effects of the different regulatory options for each service in each country. Moreover, substitution relationships between these three types of services have explicitly been taken into account. We have estimated econometrically a set of EU-wide own- and cross- demand elasticities for voice calls made and received, SMS and data. These are four own-elasticities and (essentially) six cross-elasticities, four of which have been found not to be significantly different from zero.

Modelling assumptions

We describe in this section the main assumptions of the model, related to its parameterization (i.e. status quo, pricing and costing), time period and demand.

In accordance with the availability of country data, modelling assumptions have been made either at EU level or at Member State level.

Assumptions at EU level

EU-specific parameters that are taken into consideration can be classified into the following main categories:

- DEMAND, function parameterized on the basis of a common EU own- and cross-elasticity estimation
- PRICING when homogeneous across EU Member States, depending on the regulatory option estimated on the basis of the price caps and other relevant factors such as the market equilibrium
- COSTING when homogeneous across EU Member States, all services except for incoming calls (calls received), determined as indicated in the Annex VI “Breakdown of Roaming services”

We describe below the main assumptions and data constraints behind these three different parameter categories determined at EU level.

1. Demand

Due to the small number of observations per country (13 quarters) it is not possible to reliably estimate the set of own- and cross-price elasticities, which involves 10 parameters to be estimated, at the country level. Therefore we have opted to econometrically estimate a common set of elasticities for all Member States, controlling for country effects.

2. Pricing

In the options which include retail or wholesale price caps the same cap is used for all EU countries. Furthermore, due to the complexity and uncertainty in capturing wholesale arrangements, the setting of market-determined wholesale prices has been captured by an EU-wide parameter. Market-determined retail prices, though, will differ between countries.

3. Costing

A set of EU-wide wholesale and retail network and commercial cost values has been used. Total retail cost, including wholesale payments, on the other hand, may differ between countries due to differences in foreign wholesale prices.

Assumptions at Member State level

The economic model distinguishes, in general terms, 27 “Roaming Economies” corresponding to and calibrated separately for each EU Member State. In other words, the differences across countries in market outcomes (retail / wholesale traffic and prices) and roaming balances are taken into consideration to the maximum extent permitted by the quality and granularity of the data.

Country-specific parameters that are taken into consideration can be classified into the following main categories:

- STATUS QUO at retail and wholesale level (as of 2009, latest full calendar year available)
 - Traffic data; volume per service
 - Revenue data; Average Revenue Per Minute/SMS/MB
- DEMAND function parameterized on the basis of country specific intercepts and slopes
- PRICING when heterogeneous across EU Member States, depending on the regulatory option estimated on the basis of the price caps and other relevant factors such as the market equilibrium
- COSTING when heterogeneous across EU Member States, such as the cost of incoming calls (calls received), the MTR level is determined according to the estimated glide-path from current national situation to a EU convergent value of 2cEUR in 2014.

We describe below the main assumptions and data constraints behind these four different parameter categories determined at Member State level.

1. *Status quo*

The calibration of the economic model has been based on country-specific volumes and revenues of 2009, the last full year available, both at the wholesale and retail levels. These volumes and revenues are available separately for roaming voice calls made, roaming voice calls received, SMS and data.

Due to the lack of data on pairwise traffic flows between countries, we had to adopt the assumption that wholesale volumes in each country correspond to a fixed service-dependent share of the corresponding EU-level predicted retail volume. This service-dependent share has been set equal to the corresponding shares in 2009.

Since BEREC has not collected any data on the wholesale volumes of received roaming calls, whose wholesale price is the “normal” MTR, we have made the forward-looking assumption that MTRs are equal to the cost of mobile termination involved, as indeed follows from the EC Recommendation on MTRs. This assumption implies that the corresponding wholesale profits are zero, so that not knowing the volumes has no further impact on the welfare estimates.

2. Demand

Each country is characterized by a set of aggregate linear multi-product demand functions, which has been calibrated based on a set of demand elasticities that is common at EU level and country-specific volumes and revenues for 2009.

3. Pricing

Market-determined roaming retail prices, as predicted by the economic model, are calculated separately for each country based on the country-specific demand system and country-specific total retail cost. If price caps are in force, the market price is assumed to be the minimum of the price cap and the market-determined price.

4. Costing

While network and commercial wholesale and retail costs are assumed to be at a common level across the EU, the wholesale component of total retail cost is country-specific. This applies as much to the IOT for voice calls made, the MTR of voice calls received, and the wholesale prices for SMS and data. More precisely, for each service and country, the corresponding wholesale component of retail cost is assumed to equal to the weighted average of the wholesale prices in the other countries, where the weights are the wholesale traffic shares mentioned above (rescaled as only to apply to foreign countries).

Inputs of the Economic model

General Demand Inputs:

The data employed in the calibration of the techno-economic model are the following, all per country for the year 2009 and obtained from ERG and BEREC:

- Retail volumes and revenues of voice calls made
- Retail volumes and revenues of voice calls received
- Retail volumes and revenues of SMS
- Retail volumes and revenues of data roaming
- Wholesale volumes and revenues of voice calls made
- Wholesale volumes and revenues of SMS
- Wholesale volumes and revenues of data roaming

Further data, including the whole data series for retail volumes and revenues, has been used in the econometrical estimation of the set of demand elasticities.

Other Inputs:

The rest of the main inputs used for estimating economic impact of the different roaming regulatory options are presented below.



Main model inputs

Demand own- and cross elasticities

Source: Estimations based on BEREC and EUROSTAT data

Elasticity data	Call made	Call received	SMS	Data
Call made	-0,27			0,05
Call received		-0,24		-0,09
SMS			-0,24	
Data	0,21	-0,13		-1,23

Market efficiency parameters

Option 1	1 July 2012	1 July 2013	1 July 2014
Attentiveness	0,15	0,15	0,15
Traffic concentration	0,50	0,50	0,50
Option 4	1 July 2012	1 July 2013	1 July 2014
Attentiveness	0,33	0,47	0,60
Traffic concentration			
Option 5	1 July 2012	1 July 2013	1 July 2014
Attentiveness	0,24	0,31	0,38
Traffic concentration			

Cost data

Euro per minute	1 July 2012	1 July 2013	1 July 2014	Unit
Retail voice calls made	0,0542	0,0542	0,0542	€/min
Retail voice calls received	0,0534	0,0534	0,0534	€/min
Retail SMS	0,0283	0,0283	0,0283	€/message
Retail data	0,0200	0,0200	0,0200	€/MByte
Wholesale voice calls made	0,0542	0,0542	0,0542	€/min
Wholesale SMS	0,0081	0,0081	0,0081	€/message
Wholesale Data	0,0800	0,0800	0,0800	€/MByte

Mobile termination rates	EU (wA)
MTR (€/min, 2009 average)	0,06
2010	0,05
2011	0,04
2012	0,03
2013	0,03
2014	0,02
MTR (€/min, forward-looking)	0,02

ANNEX V

THEORY FRAMEWORK FOR THE DETERMINATION OF UNREGULATED RETAIL AND WHOLESALE ROAMING PRICES

Retail roaming model

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8 February 2011

1 Benchmark Roaming Model Setup

The following presents the conceptual setup of the generic roaming market model, including voice calls made and received, SMS and data. This model portrays consumers and mobile networks in a generic “home country”. Domestic subscribers roam in “visited countries” and foreign subscribers roam in the “home country”. The resulting market outcomes will be aggregated at country level and then applied to all 27 EU countries.

1.1 Consumers and Networks

Countries and networks. There are L countries (generically called i, j), with N_i MNOs ($k, h \in O_i, |O_i| = N_i$) respectively. In each country i , M_i mobile subscribers are present, with preferences for MNOs modeled as a pyramid or generalized Hotelling model (see von Ungern-Sternberg 1991 or Hoernig 2010 for the general setup). In country i , the consumer with “distance” in preference space d to his chosen network has a disutility (transport cost) of $d/2\sigma_i$, where $\sigma_i > 0$ measures the strength of horizontal preferences ($\sigma_i = 0$ implies local monopolies, and $\sigma_i = \infty$ implies perfect competition). The market share of operator k in country i is s_{ik} , with $\sum_k s_{ik} = 1$.

Subscribers. Subscribers in country i take surplus related to roaming into account with weight $\gamma \in [0, 1]$ when choosing their operator. This weight can be the probability that consumers are aware of roaming retail prices, or the relative importance they attribute *ex ante* to roaming when choosing operators. While the *ex post* effect on welfare we will consider in the consumer surplus and welfare calibrations corresponds to a weight equal to 1, the γ will affect the choice of unregulated retail prices.

For simplicity, we assume that each MNO ik offers a national mobile telephony bundle at monthly fee F_{ik} which results in a gross surplus S_{ik} to each of network ik 's consumers (both excluding roaming). It charges to its subscribers a per-minute retail price p_{ik} for outgoing roaming calls and a per-minute retail price r_{ik} for incoming roaming calls, i.e. sets the same retail price for all visited countries.¹ The price for one SMS is x_{ik} and the price for one Megabyte of data is y_{ik} . Under a linear demand specification, given prices $\mathbf{p} = (p, r, x, y)^T$ we obtain an expected consumer surplus or indirect utility of the representative consumer in country i of

$$v_i(\mathbf{p}) = V_{i0} + y + \frac{1}{2M_i} (A_i - B_i\mathbf{p})' B_i^{-1} (A_i - B_i\mathbf{p}).$$

Here V_0 is an unknown constant and y is income. The corresponding demand functions are $\mathbf{q} = -dv_i/d\mathbf{p}^T = (A_i - B_i\mathbf{p})/M_i$, with $\mathbf{q} = (m, n, X, Y)^T$, or $m(\mathbf{p}) = -\partial v_i/\partial p$ etcetera, i.e. the demand parameters are calibrated such as to represent aggregate demand at country level.

Wholesale prices and costs. MNO ik sets a per-minute wholesale roaming price (IOT) a_{ik} for roaming calls originated on its network, and charges the mobile termination rate t_{ik} for roaming calls terminated on its network. The wholesale price for one SMS is b_{ik} , and the corresponding price for one megabyte of data is z_{ik} . The averages over foreign countries are a_{-i} , t_{-i} , b_{-i} , and z_{-i} .

The monthly national bundle of MNO ik has a total retail cost of C_{ik} , an originated roaming call has marginal wholesale cost per minute of c_{vo} , and a terminated roaming call has marginal wholesale cost per minute of c_{vt} .² The marginal retail costs are the following: For roaming calls made $a_{-i} + c_{vm}$ and for roaming calls received $t_{-i} + c_{vr}$, where c_{vm} and c_{vr} are additional voice roaming retail costs.³ Origination and retail cost of one roaming SMS are c_{so} and $b_{-i} + c_{sr}$, respectively, and origination and retail cost for one megabyte of data are c_{do} and $z_{-i} + c_{dr}$, respectively. Let \mathbf{c} be the vector of the four retail costs.

¹ Assuming distinct prices for roaming in different countries does not make the model more general since the available data from BEREC is aggregated on a per-country basis.

² Both marginal costs are assumed identical for all countries since we have no country-wise cost data.

³ The retail cost for receiving calls implicitly takes into account that the home operator receives his own termination charge for handing on calls from other networks.

1.2 Market shares, consumer surplus, and profits

A consumer in home country i has the following *ex ante*- and *ex-post* utilities from adhering to mobile network k :

$$\begin{aligned} U_{ik}^a &= \overbrace{(S_{ik} - F_{ik})}^{\text{Domestic bundle}} + \overbrace{(\gamma v_{ik})}^{\text{Roaming}}, \\ U_{ik}^p &= (S_{ik} - F_{ik}) + v_{ik}, \end{aligned}$$

where we have used the short-hand $v_{ik} = v(\mathbf{p}_{ik})$. The term related to roaming depicts a consumer's expected utility over roaming in other European countries. While the *ex ante* utilities U_{ik}^a enter the determination of domestic market shares, the *ex post* utilities U_{ik}^p are the relevant ones for computing consumer surplus. The domestic bundle will be dropped from the calculations below once we have isolated the relevant elements for determining roaming prices.

Domestic retail market shares in country i are assumed to be determined as:⁴

$$s_{ik} = \frac{1}{N_i} + \sigma_i \sum_{h \in O_i} (U_{ik}^a - U_{ih}^a). \quad (1)$$

Intuitively, consumers compare networks pairwise, and a network's market share is larger the higher is the perceived utility of its offer. Total (*ex post*) consumer surplus in country i is

$$CS_i = M_i \sum_{k \in O_i} s_{ik} U_{ik}^p.$$

Network ik has revenues of F_{ik} per consumer for the domestic bundle, plus four types of retail roaming revenues for voice calls made and received, SMS and data:

$$\begin{aligned} R_{ik}^{cm} &= p_{ik} m_{ik}, & R_{ik}^{cr} &= r_{ik} n_{ik}, \\ R_{ik}^{sms} &= x_{ik} X_{ik}, & R_{ik}^{dat} &= y_{ik} Y_{ik}, \end{aligned}$$

where $m_{ik} = m(\mathbf{P}_{ik})$ etc.. The corresponding retail profits per consumer are $\pi_{ik}^d = (F_{ik} - C_{ik})$ for the domestic bundle, and for roaming

$$\begin{aligned} \pi_{ik}^{cm} &= (p_{ik} - a_{-i} - c_{vr}) m_{ik}, & \pi_{ik}^{cr} &= (r_{ik} - t_{-i} - c_{vr}) n_{ik}, \\ \pi_{ik}^{sms} &= (x_{ik} - b_{-i} - c_{sr}) X_{ik}, & \pi_{ik}^{dat} &= (y_{ik} - z_{-i} - c_{dr}) Y_{ik}. \end{aligned}$$

⁴See Hoernig (2010) for the derivation of these retail market shares from individual consumers' preferences.

Furthermore, wholesale revenues and profits from foreign subscribers roaming on network k , for voice calls made and received, SMS and data, are

$$T_{ik} = a_{ik}m^{ik} + t_{ik}n^{ik} + b_{ik}X^{ik} + z_{ik}Y^{ik},$$

and

$$\omega_{ik} = (a_{ik} - c_{vo})m^{ik} + (t_{ik} - c_{vt})n^{ik} + (b_{ik} - c_{so})X^{ik} + (z_{ik} - c_{do})Y^{ik},$$

where the relevant quantities are aggregates over visiting customers from other countries.

Thus the total profits of network k in country i are

$$\begin{aligned}\pi_{ik} &= M_i s_{ik} [\pi_{ik}^d + \pi_{ik}^{cm} + \pi_{ik}^{cr} + \pi_{ik}^{sms} + \pi_{ik}^{dat}] + \omega_{ik} \\ &= M_i s_{ik} [F_{ik} - C_{ik} + (\mathbf{p}_{ik} - \mathbf{c})^T \mathbf{q}_{ik}] + \omega_{ik}.\end{aligned}$$

The total retail demand of subscribers with home country i for voice roaming calls made and received, SMS and data is

$$\mathbf{Q}_i = M_i \sum_{k \in O_i} s_{ik} \mathbf{q}_{ik}.$$

In particular, if all domestic networks k in equilibrium charge the same retail prices then $\mathbf{Q}_i = M_i \mathbf{q}_i$.

2 Unregulated Retail Prices

Given that firms offer bundles that contain roaming services, unregulated retail roaming prices will be chosen according to the same logic as other retail prices are set under two-part tariffs, i.e. we can find the profit-maximizing pricing structure by varying prices and subscription fees such as to leave consumer surplus constant. In this case, we will have

$$0 = dU_{ik}^a = \gamma dv(\mathbf{p}_{ik}) - dF_{ik} = -\gamma \mathbf{q}^T d\mathbf{p}_{ik} - dF_{ik},$$

or $dF_{ik} = -\gamma \mathbf{q}_{ik}^T d\mathbf{p}_{ik}$. In maximizing its profits, firm ik solves

$$\begin{aligned}d\pi_{ik} &= M_i s_{ik} d \left[(\mathbf{p}_{ik} - \mathbf{c}_i)^T \mathbf{q}_{ik} + F_{ik} \right] \\ &= M_i s_{ik} \left[\frac{d\mathbf{q}_{ik}}{d\mathbf{p}_{ik}} (\mathbf{p}_{ik} - \mathbf{c}_i) + (1 - \gamma) \mathbf{q}_{ik} \right]^T d\mathbf{p}_{ik} = 0.\end{aligned}$$

Econometric analysis for the determination of the own- and cross-elasticity of roaming services

Econometric estimation of demand elasticities

In order to perform quantitative estimates of the welfare effects of changing the existing Roaming Regulation in the Economic Model, an econometric estimation of EU-wide demand elasticities for the four services “roaming calls made”, “roaming calls received”, “roaming SMS” and “data roaming” was performed. In order to be consistent with welfare calculations, a system of four demand equations, each for one of the services just mentioned, was estimated, with cross-equation constraints that guaranteed Slutsky symmetry at the sample mean.

The data used are the following, with the origin mentioned in parentheses:

- Aggregate quarterly actual retail demand volumes⁹⁷ (calls made and received, SMS, data) by country, 2007Q2 – 2010Q2 (BEREC)
- Aggregate quarterly retail revenues (calls made and received, SMS, data) by country, 2007Q2 – 2010Q2 (BEREC)
- Aggregate quarterly wholesale revenues (calls made, SMS, data) by country, 2007Q2 – 2010Q2 (BEREC)
- Mobile subscribers by country, 2007Q2 – 2010Q2 (BEREC)
- Mobile termination rates, 2007 – 2010 (ERG, BEREC)
- Onset of regulation at retail level (calls made and received, SMS) (Roaming Regulations)
- GDP per capita, 2007Q2 – 2010Q2 (EUROSTAT)
- Arriving airline passengers, 2007Q2 – 2010Q2 (EUROSTAT)

The data series therefore is a panel of 27 countries over 13 periods, which constitutes a small and relatively short panel. Account has been taken of the panel nature of the data by including country fixed effects. The estimations were performed in Stata using the “reg3” command.

In each equation, the corresponding logarithm of demand volume per subscriber was regressed on a set of explanatory variables, which included:

- The logarithms of average revenues for calls made, calls received, SMS, data; these are a proxy for retail prices, and the resulting coefficients provide the elasticity estimates.
- GDP per capita and arriving airline passengers, in order to control for the economic cycle and travel demand variations.

⁹⁷ Actual rather than billed units have been used in order to improve the accuracy of the estimates and the economic model. This has also been indicated in the Impact Assessment of 2008.

- Seasonal quarter dummies, in order to control for seasonal variation.
- Country dummies, in order to control for country fixed effects.

Since in the unregulated market equilibrium price and demand are jointly determined, special care had to be taken to deal with the resulting endogeneity of the proxy for retail prices (average revenues), which would otherwise have produced econometrically inconsistent estimates. At the same time, the onset of retail price regulation, which occurred first for calls made and received and later for SMS, had to be correctly modelled.

Thus in our estimation we have used an instrumental variable method, with the following instruments:

- Foreign wholesale revenue per unit (call minute received, SMS, MB of data); this defines the underlying wholesale cost component and is therefore an excellent instrument for the retail prices of calls made, SMS and data.
- Average foreign mobile termination rate; this defines the underlying wholesale cost component and is therefore an excellent instrument for the retail price of calls received.
- Retail prices themselves after a retail cap was imposed, implemented as interactions with the corresponding regulation dummies; since these retail prices remained at the cap during the sample period they can be considered exogenous while regulated, and including them as instruments during the regulated period increases the efficiency of the estimation.

– **Interpretation of estimated demand elasticities**

The estimated demand elasticities are the following:

ECONOMETRIC ESTIMATES			
Price of calls made	Price of calls received	Price of SMS	Price of data
-0.27			0.05
	-0.24		-0.09
		-0.24	
0.21	-0.13		-1.23

Source: own calculations (all values significant at a 5% confidence level)

The own-demand elasticities, i.e. those that measure the effect the change in the demand of a service after a change in its own price, are found on the diagonal. The cross-price elasticities, which measure the effect of prices of other services on demand, are reported in the rest of the

table. Only estimates which are statistically different from zero at a 5% confidence level are reported here and have been used in the Economic Model.⁹⁸

The own-price elasticity estimates for calls made (-0.27) and calls received (-0.24) are at the low end of the expected range (-0.2 to -0.5). This implies that the demand for voice calls, both made and received, is rather inelastic at the prices observed. This may be explained by customers only making or receiving calls if some specific need arises. These estimates are in accordance with those predicted in the WIK-Consult, “Study on the Options for addressing Competition Problems in the EU Roaming Market” (December 2010), section 4.2.2, but are smaller than the “pessimistic” values considered in the 2008 Impact Assessment (-0.55).

A similar result holds for the own-demand elasticity of SMS, which is also found to be quite low at -0.24. Again this implies that customer send SMS while roaming only if they have some urgent need to communicate. On the other hand, as expected the own-price elasticity of data roaming is in the elastic range, though not very far, at -1.23. That is, data usage is rather sensitive to retail prices; if the latter were to fall a significant increase in demand might follow.

As concerns cross-price effects, the elasticity estimates indicate that there is a small but statistically significant substitution between making voice calls and using data. This effect may have arisen due to the increasing usage of mobile email or VOIP communications, which are both substitutes to voice calls, but from the sample data we cannot identify the exact cause. Furthermore, calls received and data roaming have also been found to be weak but statistically significant demand complements, i.e. usage of both services tends to increase if the price of either service falls.

On the other hand, there is no statistically significant substitution between voice calls made and received, or between SMS and the three other services considered. Note that the 2008 Impact Assessment, which used guessed values rather than econometric estimates, considered different scenarios for own-price elasticities, but assumed that all cross-price elasticities were zero in all of these scenarios.

Overall the estimated elasticity values fall in the expected range and indicate that demand and welfare analysis for “roaming calls made”, “roaming calls received”, “roaming SMS” and “data roaming” need to take into account that these are not independent services.

⁹⁸ The strongest of the remaining estimates was significant only at a 16% significance level, while the others were highly insignificant.

ANNEX VI

BREAKDOWN OF ROAMING SERVICES

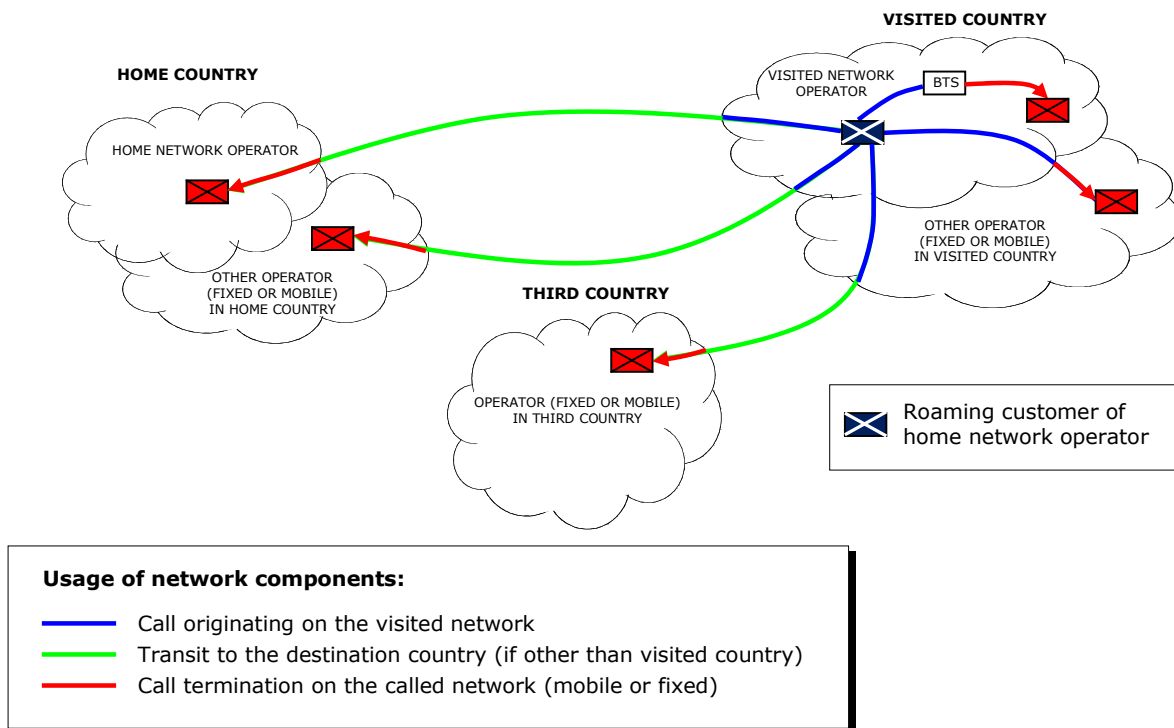
For each of the three roaming services, the following paragraphs present a schematic overview of the traffic routing and network components used as well as the production cost related to these network components. Further estimates regarding the underlying costs can also be found in the BEREC report “*International Mobile Roaming Regulation*” of December 2010.

VOICE ROAMING

THE ROAMING CUSTOMER IS MAKING A CALL

The illustration below presents how a call originated from a roaming customer is routed and how these routes can be broken down in different components:

Possible scenario's for a roaming customer making a call (voice roaming)



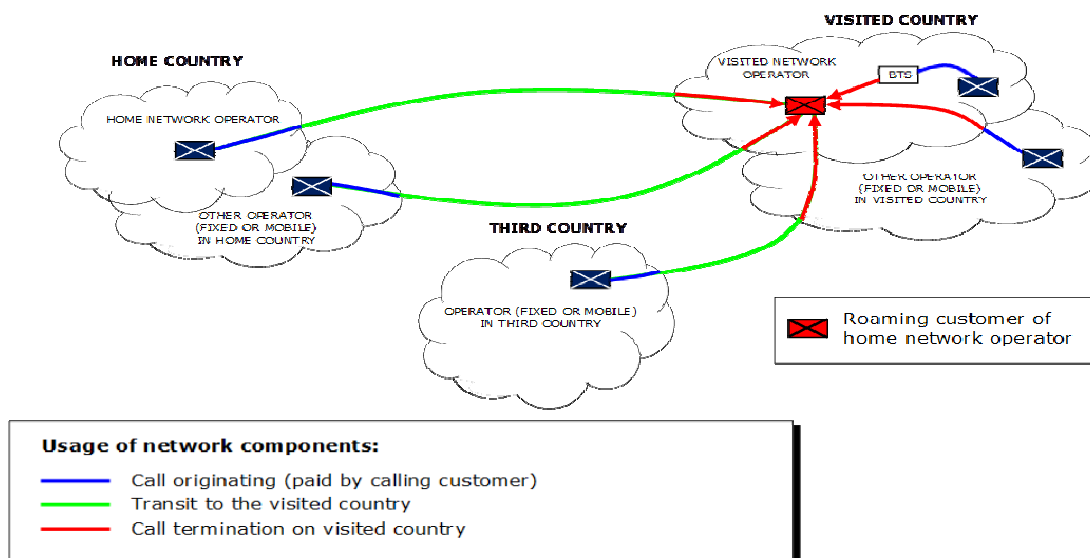
For the traffic routing, the assumption was take that direct routing between networks is always possible. Only the signalling is systematically passed through to the home network.

The costs are based on the BEREC Report “*International Mobile Roaming Regulation*” (December 2010). The wholesale and retail wholesale tariffs relate to the caps applicable at the end of the current regulatory period.

Network components used by a roaming customer making a call	Production cost incl. overhead (in cEUR)	Wholesale payment flows		Retail tariff
	Source: BEREC		in cEUR per min	in cEUR per min
Call Originating on the visited network (Proxy used = national MTR)	3,18	The home network operator pays an IOT to the visited network operator to cover the costs of the originating and terminating leg, incl. transit if applicable, as well as costs for signalling to the respective (mobile or fixe) operators. Part of the IOT is than transferred by the visited network operator for covering the transit and terminating costs.	18	35
Transit to the destination network (if applicable)	-			
Call termination on the called network (mobile or fixe)	1,54			
Sales and common costs	13%			
Total production costs	5,42			
Total cost for home network operator			18	
Margin on retail roaming tariff (in cEUR per min)				17
Mark-up on wholesale tariff				94,4%

THE ROAMING CUSTOMER IS RECEIVING A CALL

Possible scenario's for a roaming customer receiving a call (voice roaming)



For the traffic routing, the assumption was take that direct routing between networks is always possible. Only the signalling is systematically passed through to the home network.

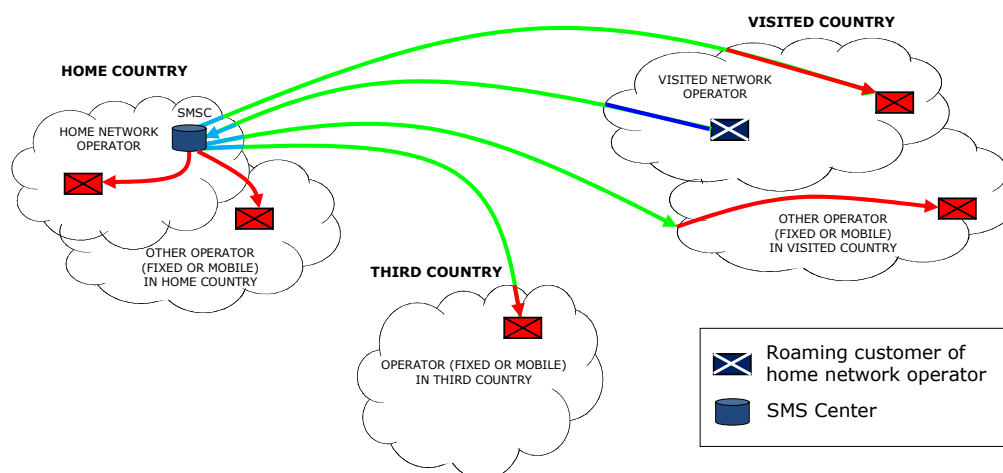
At the wholesale level, the home country operator will receive a mobile terminating fee from the operator on whose network the call was originated. The operator in the visited country then receives an (international) terminating fee from the home operator.

At the retail level, the calling party pays for the call originating leg. The customer receiving the call furthermore pays the home operator for recovering the difference between the mobile termination fee the home operator has received and the fee it paid to the visited operator, including a contribution to the sales and common costs.

SMS Roaming

THE ROAMING CUSTOMER IS SENDING AN SMS

Possible scenario's for a roaming customer sending an SMS (SMS roaming)



Usage of network components:

- Call originating on the visited network
- Transit to the home network operator (and the destination country if other than home country)
- Reception and handling of SMS
- Call termination on the called network (mobile or fixed)

For the traffic routing, the assumption was take that all SMS are first directed to the SMS Center of the home network operator.

Network components used by a roaming customer for sending an SMS	Production costs incl. overhead (in cEUR) <i>Source: BEREC</i>	Wholesale payment flows		Retail tariff
			<i>in cEUR per SMS</i>	<i>in cEUR per SMS</i>
SMS Originating on the visited network (*)	0,71 - 2,32	The home network operator pays an IOT to the visited network operator	4,0	11
International transit to the home network (if applicable) I.e. until POI				
Reception and handling of SMS				
Transit to the destination network (if applicable)				
SMS termination on the destination network				
Sales and common costs	13%			
Total production cost	0,81 - 2,67			
Total costs for home network operator				
Margin on retail roaming tariff for sending SMS (in cEUR)				7,0
Mark-up on wholesale tariff				175,0%

(*) To the cost of this network component, a cost will also be allocated for compensating the fact that no costs can be recuperated by the visited country when the roamer is receiving an SMS

Again, the costs are based on the BEREC Report “International Mobile Roaming Regulation” (December 2010). The wholesale and retail wholesale tariffs relate to the caps applicable at the end of the current regulatory period.

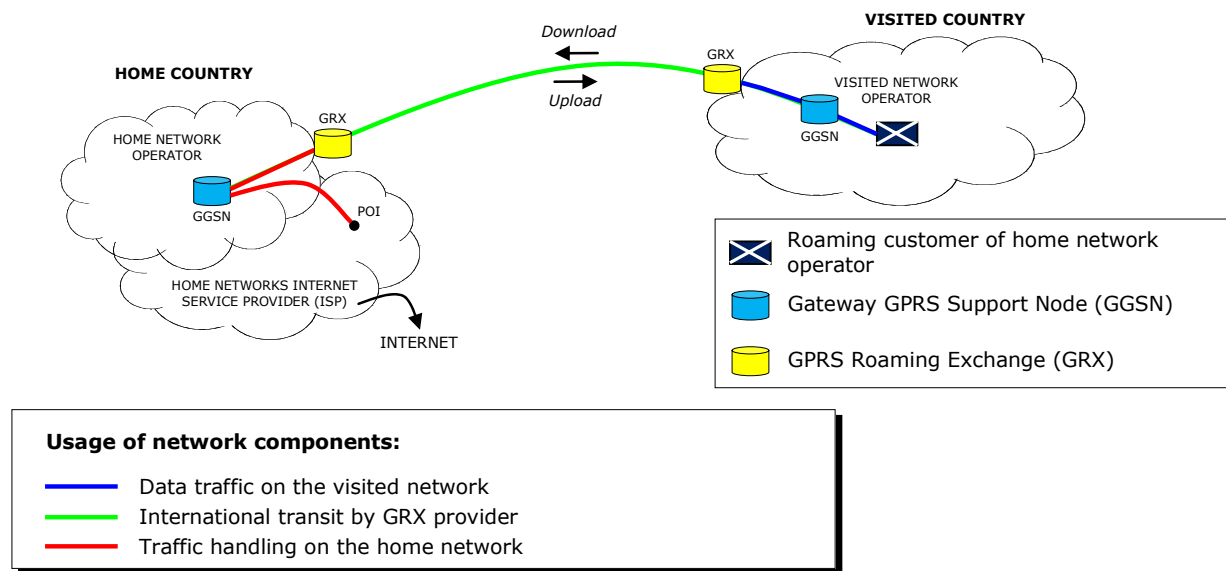
THE ROAMING CUSTOMER IS RECEIVING AN SMS

The costs related to a roaming customer receiving an SMS only consist of a cost for terminating on the visited network. No recuperation of this cost by the visited network operator is foreseen (cf. inclusion of a terminating cost in the originating cost component when sending an SMS). As the SMSs are routed directly to the visited network, no costs are incurred by the home network. No settlements are made between operators.

DATA ROAMING

Sending or downloading data via the usage of the Internet does not involve a termination to another end-user. By consequence, no distinction needs to be made between the production cost of both sending and receiving data.

Network usage by a roaming customer downloading and sending data (data roaming)



Network components used by a roaming customer for receiving and sending data	Production costs incl. overhead (in cEUR)	Wholesale payment flows	Retail tariff	
	<i>Source: BEREC</i>			
		<i>in cEUR per MB</i>	<i>in cEUR per MB</i>	
<i>Data traffic on the visited network</i>	7,03 - 13,05	The home network operator pays an IOT to the visited network operator	36,40	
<i>International transit up to the GRX provider nearest to the home network</i> <i>Share for the visited network operator</i>				
<i>International transit up to the GRX provider nearest to the home network</i> <i>Share for the home network operator</i>		The home operator pays the GRX provider for the home network's share of the international transit		137,00
<i>Handling of data traffic on the home network (via GGSN)</i>		Internal costs of home network operator		
<i>Provision of access to the Internet (ISP)</i>		Home operator makes payment to the ISP		
<i>Sales and common costs</i>	13%			
Total production cost	8,08 - 14,99			
Total costs for home network operator		36,40		
Margin on retail roaming tariff for sending / receiving 1 MB (in cEUR)			100,60	
Mark-up on wholesale tariff			276%	

The assumptions taken for the wholesale cost (36,40cEUR) and for the retail tariff (1,37EUR) correspond to the average EU tariffs applicable in Q2 2010.