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Balancing Roam Like At Home political objective with structural cost differences between domestic provision of mobile services

Laure Jaunaux*, Philippe Deniau*, Marc Lebourges*

Very Preliminary – Subject to significant changes

Abstract

This paper analyses the consequences on European markets of the introduction of “Roam Like At Home” (RLAH) obligation. Regulatory authorities have two main preoccupations when implementing RLAH obligation: the sustainability at retail level for home markets and the sustainability of RLAH at wholesale level for visited markets. We demonstrate that wholesale roaming regulation cannot be led by a roaming retail cost recovery principle as roaming retail services within RLAH obligation cannot be considered anymore as an autonomous economic activity. It is essential for regulation to ensure that roaming providers are able to recover full costs of providing wholesale roaming services. However, wholesale roaming regulation can be justified only if the market is not competitive. Competitive wholesale roaming markets would not erase the heterogeneity of mobile service provisions costs between European Member States, which implies that either some national mobile market may be subject to increase of domestic price or to depart from pure RLAH and allow RLAH+, that is a limited charge on top of domestic price, above a given level of roaming usages.

I. Introduction

In its first reading opinion adopted on 3 April 2014, the European Parliament (EP) proposed to abolish retail roaming surcharges as of 15 December 2015 in order to allow customers to “Roam Like At Home (RLAH).” Following the vision of the Parliament, the European Commission asked the BEREC to assess the state of the wholesale roaming market and define the fair use criteria in order to support the discussions between the European Commission, the Parliament and the European Council.

RLAH obligation is commonly interpreted as the fact that a mobile operator is not allowed to levy any surcharge on call/SMS/data sent from a visited country within EU/EEA until the fair use limit is reached. The implementation of the RLAH obligation supposes the deletion of any specific roaming service at retail level. At retail level, RLAH is no more neither an economic market nor a relevant market. On the contrary, at wholesale level, roaming remains a specific activity.

This change in the conception of international roaming services has implications on the form of regulation that should be chosen by regulatory authorities.

Policy makers identify two main preoccupations when implementing RLAH obligation: the sustainability of domestic retail prices applied to international roaming service and the sustainability of wholesale roaming price for visited markets when compared to domestic wholesale prices and mobile service provision costs. The BEREC in the report “International Roaming Analysis of the impacts of “Roam Like at Home”” demonstrates that these objectives are incompatible with each other¹. We demonstrate that

*Orange Regulatory Affairs. Opinion expressed are those of the authors and may not correspond to those of Orange.

¹ The theoretical model presented in Appendix I demonstrates the incompatibility of pursuing simultaneously these two objectives.

the first objective is economically unfounded as retail roaming service is not a specific market anymore under RLAH obligation. Furthermore, founding wholesale regulation on a retail cost recovery principle would generate high distortion of domestic markets with a potential decrease of 89% of domestic ARPU in average in EEA countries. If retail roaming services are not distinct mobile services anymore due to RLAH set, on the contrary, wholesale roaming service remains a specific autonomous mobile operator activity. Thus, roaming regulation should ensure that the cost recovery principle is respected at wholesale level. However, wholesale roaming markets may be regulated only if they are not competitive. But the current average level of wholesale prices is not an obstacle to achieve the political objective of RLAH obligation in most EEA countries. Due to significant heterogeneity of mobile service provision costs between Member States, there may be a risk of home market distortions in markets where mobiles costs are low, domestic usage is very high or people travel a lot abroad. In such cases, regulatory authorities should either accept that RLAH comes along with a waterbed effect in these Member states or diverge from a “pure” RLAH principle and allow RLAH+, a small premium on top of RLAH above a given level of roaming usages, to avoid averaging prices between travelers and non-travelers.

This paper is organized as follows. The first session points out that imposing “Roam like at home” implies that roaming service is not a specified market neither from an economic point of view nor from a legal perspective and this has some implications in terms of regulatory decision. The second session highlights that regulating wholesale markets in order to make RLAH sustainable both at retail and wholesale levels leads to a major economic contradiction. The third session underlines the fact that the insufficient competition in the wholesale roaming market would be the only rationale to regulate the wholesale roaming market. The last session concludes.

II. Wholesale regulation cannot be led by a retail cost recovery principle as Roam like at home is not a market anymore

This session explains why international retail roaming services under RLAH obligation is not a market anymore neither from an economic point of view nor from a legal perspective which has implications in terms of regulation: retail roaming cost recovery is not anymore a relevant economic requirement to regulate the wholesale roaming market as retail roaming is not anymore an autonomous economic activity.

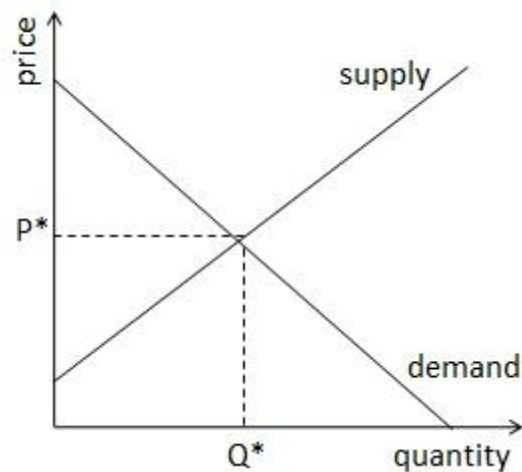
- International roaming service subject to RLAH price is not any more a specific economic activity

Current international roaming ensures that mobile customers can make and receive calls, send and receive SMS and data when travelling outside the geographical coverage area of their mobile operator network. Using a visited network requires that the home mobile network operator (MNO) concludes a roaming agreement with at least one MNO of the visited country. The home MNO will have to pay different wholesale inter-operator tariffs (IOT) to operators in different countries ultimately reflecting differences in production costs between countries. Thus, the home MNO’s retail price has a two-part structure (see Oxera (2014) for more details) with:

- One component covering domestic usage;
- The other element covering international usages. If the customer travels abroad, international roaming services are premium services with higher price per minute, per SMS and megabyte than domestic tariff notably because the traffic should be routed by the visited network.

Until now, international retail roaming has been an add-on service that had specific costs and prices. International retail roaming is therefore clearly a specific and autonomous market economically speaking. The implementation of “Roam Like At home” obligation implies on the contrary the end of the concept of an autonomous roaming market.

In economics, a market is defined by a supply and an offer. The equilibrium price and quantity is located at the intersections of the market supply and market demand curves. It is the combination of these forces that determine how much of a good or service is produced and consumed in an economy and at what price. There is a market for each good where the equilibrium is determined by demand and offer for the product.



Considering “Roam like at home” principle, the price for mobile services becomes a one-part tariff where there is no more distinction between domestic and international usages and prices.

The “Roam like at home” principle induces that the international roaming price is equal to the domestic price within the “fair use clause”².

Therefore, within the fair use clause, the RLAH pricing is no more determined by supply and demand for roaming services but in line with domestic prices. International retail roaming is no more a differentiated service but a component of the domestic mobile offer. This may not stand for usages outside the fair use limit, depending on how they are regulated, but is out of the scope of this paper which is focused on the implementation of the “Roam like at home” principle.

In parallel, the domestic market and the RLAH market could be considered as two separate and competitive markets with same retail prices if and only if they support the same production costs. But mobile production costs differ between countries. Therefore, there would be a contradiction between mandating RLAH and continuing to consider roaming and domestic services as separate markets (see Appendix I for more details).

² According to the Proposal of the European Parliament in Recital (75), “While roaming providers assess themselves the volumes of roaming voice calls, SMS and data to be covered at domestic rates under their various retail packages, **they may, notwithstanding the abolition of retail roaming charges by 15 December 2015, apply a “fair use clause” to the consumption of regulated retail roaming services provided at the applicable domestic price level, by reference to fair use criteria.**”

- International roaming service through RLAH principle is not a relevant market

The small but significant and non-transitory increase in price (SSNIP) test is an economic tool used to define if a market is a relevant one. In this subsection, we show if the RLAH can be proved to be a relevant market under a SNIPP test.

The SSNIP test seeks to identify the smallest relevant market within a hypothetical monopolist could impose significant increase in price. The SNIPP test estimates the residual elasticity of demand of the firm that is how a change in prices by the firm affects its own demand. The test consists of observing whether a small increase in price would provoke a significant number of consumers to switch to another substitute product. If the increase in price induces a product substitution, the product of the firm does not constitute by itself a separate relevant market. There are other substitute products that should be included in the relevant market.

This test is often used by regulatory and competition authorities in order to define the scope of the competition rules in respect of restrictive practices and abuses of a dominant position (Regulation EC n°1/2003) as well as the scope of the merger regulations (Regulation n°139/2004).

In the RLAH case, regarding a price increase of international roaming services by itself has no sense as its price is imposed to be in line with domestic prices. An increase of the component “RLAH” would generate automatically an increase in the domestic price. Therefore, as far as a relevant market needs to pass the SSNIP test, RLAH cannot be a relevant market.

This has implications in terms of regulation. It implies that separate retail roaming activity costs recovery has no economic relevance and must not be used as a regulatory principle for wholesale roaming pricing, contrary to a common opinion among policy makers.

III. Regulate wholesale markets in order to make RLAH sustainable both at retail and wholesale levels leads to a major economic contradiction

As mention in introduction, regulatory authorities have currently two main preoccupations when planning the implement RLAH obligation in a sustainable and economically consistent way:

- Roaming retail prices sustainability when compared to wholesale roaming prices;
- Domestic wholesale prices and network costs when compared to wholesale roaming prices.

This session analyses the potential market distortion risks of each condition of implementation of RLAH.

- a. Pursuing the RLAH sustainability at retail level for home markets involves a risk of drastic destabilization of domestic markets

The RLAH sustainability at retail level leads to decrease market roaming wholesale price caps under the lowest home domestic wholesale roaming prices level.

To assess the effect of this potential regulatory measure, we use data from BEREC report on RLAH and analyse the case where the regulatory authorities intend to revise downward wholesale caps in order that each individual retail roaming minute priced at domestic level provides a regular margin on top of wholesale caps, including when the domestic prices correspond to the lowest European retail price. According to BEREC report, Estonia is the lowest average revenue per user (ARPU) market.

We know from the Estonian market, the domestic ARPU and average usage per user (AUPU). We make two main assumptions:

- We consider that wholesale domestic prices are around 50% of retail domestic prices, which is a reasonable simplified hypothesis;
- Wholesale roaming have the same price structure than wholesale current caps³ (same repartition between voice, SMS and data).

Based on the minimum domestic retail prices, which according to BEREC are Estonian, we find the values of European wide roaming wholesale price which would be adjusted to ensure the profitability of RLAH retail activity for Estonian operators:

- 0.14 Eurocents per minutes;
- 0.06 Eurocents per SMS;
- 0.14 Eurocents per MB.

Lowering the caps at such a level leads to a situation where operators are not allowed to recover their costs for providing wholesale roaming services. This creates a distortion in visited domestic markets. Moreover, these roaming wholesale services at very low prices can be used everywhere in Europe to provide substitutes to domestic retail mobile services. To illustrate this effect, we model the resulting retail prices applicable everywhere in Europe. The impact of such a scenario can be assessed by applying these wholesale costs to domestic consumptions of each EEA country, which gives the average wholesale price paid per customer for domestic service. Under the simplified but reasonable assumption of a ratio of 2 between retail and wholesale price that we have taken, the level of retail ARPU per country under these circumstances can be derived. The comparison between the resulting retail prices and the current ones are given in the Figure 1.

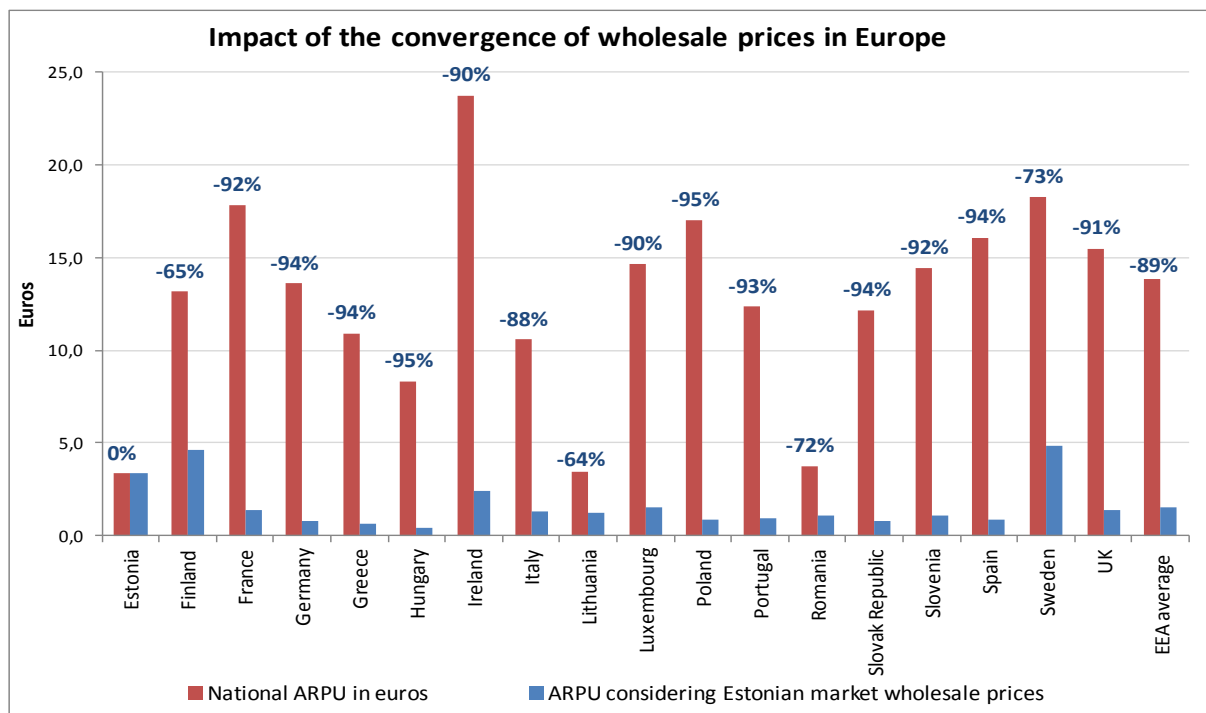


Figure 1. Simulations of the impact on EEA domestic ARPU of a wholesale price convergence towards the Estonian case

³ The average price for voice and data are the same as it is the case for current caps (5 Eurocents). The price for data represents 0.4% of the price for voice or data.

In average, current domestic retail ARPU would be reduced by 89%. Funding wholesale regulation on the retail cost recovery principle is economically unfounded and entails a major risk of destabilization of domestic markets.

- b. The current level of wholesale roaming price is not an obstacle to sustainable RLAH at retail level in general in Europe.

In this subsection we evaluate the ability to roaming providers to offer RLAH in EEA countries with the current level of wholesale roaming prices from three different angles:

- The existence of a sufficient margin between retail price and average wholesale costs including RLAH;
- The estimation of the additional costs associated with RLAH considering the number of days spent in EEA countries per month;
- Deriving from the previous estimation, the RLAH cost per day spent in an EEA country.

These evaluations are built on the reasoning developed in section II of the present paper, which has shown that retail RLAH should not be considered as a separate and autonomous economic activity, but only as a component of the provision of domestic mobile services. Therefore the revenues and costs attached to the provision of retail RLAH are included in our evaluation in the revenues and costs attached to the provision of domestic mobile services in proportion of their weight in the average mobile usage per year.

- The existence of a sufficient margin between retail price and average wholesale costs including RLAH

We analyse the existence of a sufficient margin between domestic retail prices and average wholesale costs in each EEA countries (domestic costs for domestic consumptions and international roaming costs for roaming consumptions). The BEREC report “International Roaming Analysis of the impacts of “Roaming Like at Home”” provides data on domestic ARPU and AUPU in most of EEA countries.

We consider the following assumption concerning RLAH usage;

- EEA consumers pay international roaming services at the domestic tariff (RLAH principle);
- International consumptions are based on the average time spent by EU citizens in EEA countries (Eurobarometer survey data) and the percentage of EU citizen that travel;
- International consumptions are counted in domestic AUPU. The RLAH tariff equal to the domestic tariff induces that the international usage is the same that the domestic one;
- All EU citizens can fully have the same behavior at home and abroad.

We do not model the case where retail roaming provision is a direct substitute of domestic mobile service in the visited countries. The current draft European Regulation allows mobile operators to include contractual provisions prohibiting permanent RLAH at retail level. Such provision can be efficient at retail level as the provider monitors individual usage of each subscriber. But would be neither technically nor legally robust if applied at wholesale level. Technically, wholesale relations do not identify individual customers. Legally, such provisions could be challenged in court based on general European law provisions such as prohibition of vertical restrictions or prohibition of discrimination between EU providers.

Estimating correctly the consequences of RLAH implies estimating the part of the bundle that is consumed abroad. This can be done using Eurobarometer Data survey on the number of days spent per

year abroad in EEA countries by EU citizens that travel but bringing it to monthly data (see figure 2). The EEA average of days spent abroad is of 0.6 days per month per citizen for travelers.

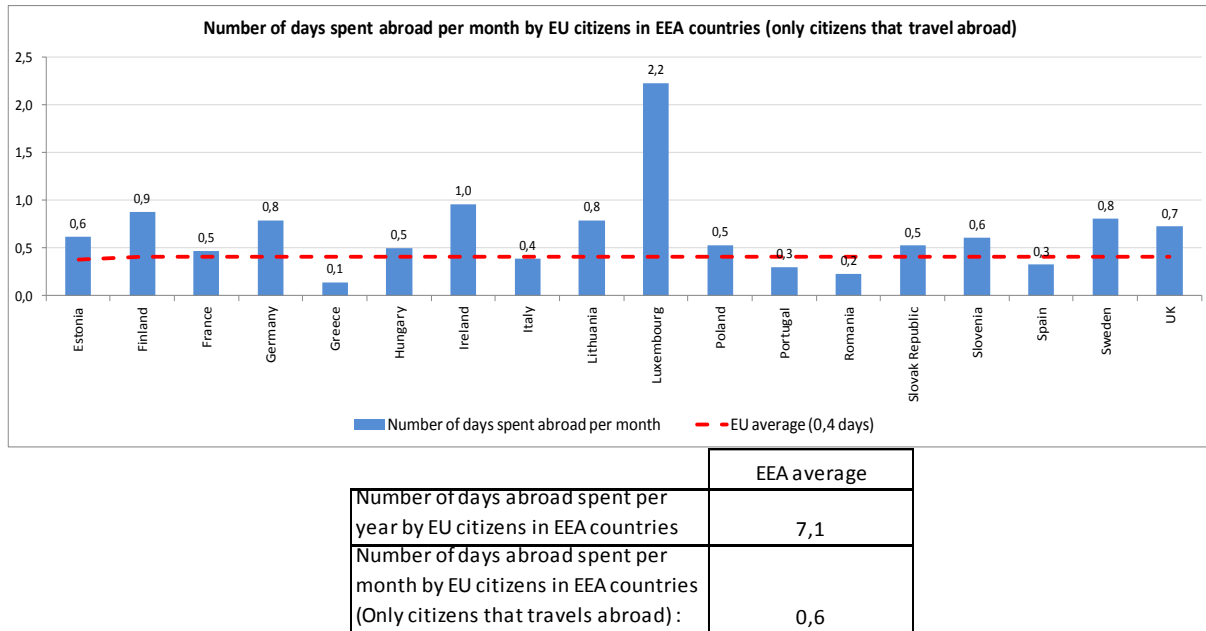


Figure 2. Number of days abroad per month considering European citizens that travel. Source: estimation from Eurostat statistic and Eurobarometer Survey.

As the above data are from travelers only, we should weighted the previous results by the percentage of the population that effectively travel in the calculation (see figure 3).

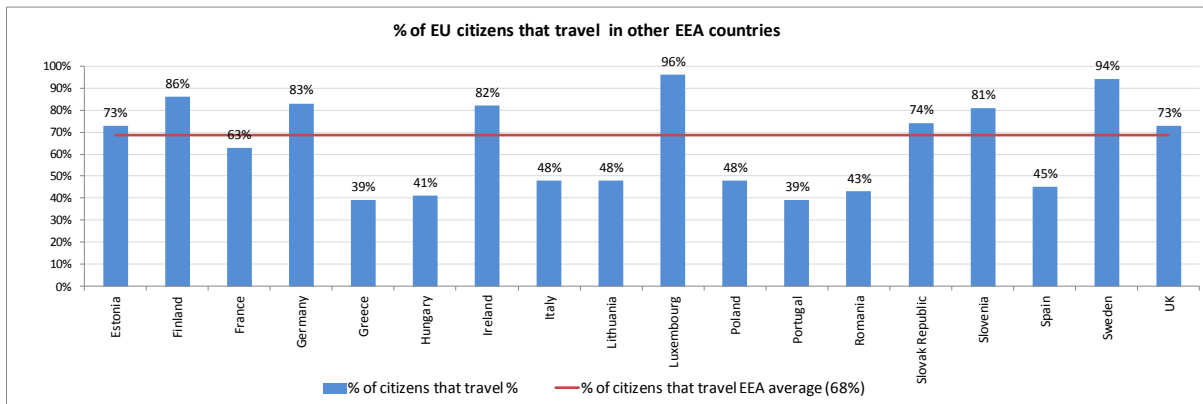
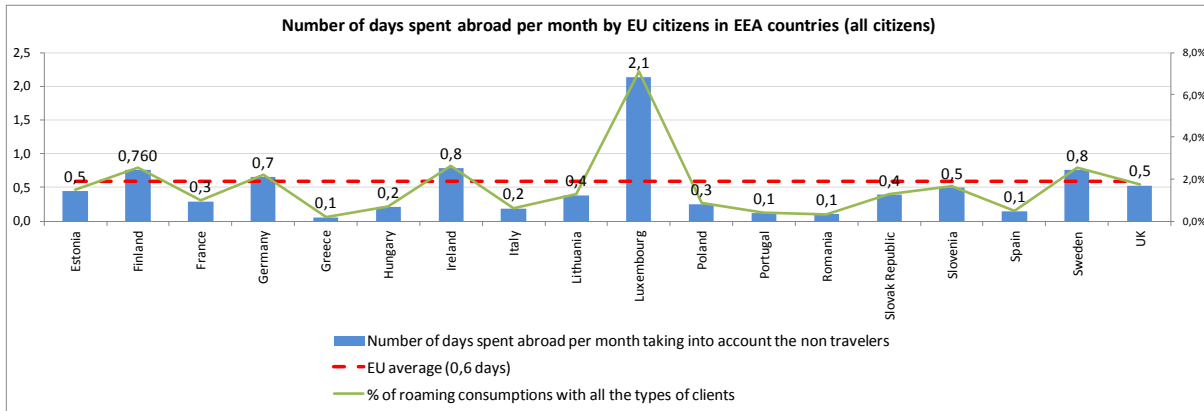


Figure 3. Trip habits. Source: estimation from Eurostat statistic and Eurobarometer Survey.

Taking into account the whole population, the EEA average number of days spent abroad is of 0.4 day per month per citizen. Thus, the international consumption represents a weak part of the AUPU (EEA average: 1.4%).



	EEA average
Number of days abroad spent per month by EU citizens in EEA countries (Only citizens that travels abroad) : Dm	0.6
% of citizens that travels at least oncle per year: T	68%
Number of days abroad spent per month by EU citizens in EEA countries considering the non travellers: Dm*T	0.4
International consumptions in % of AUPU: Ic	1.4%

Figure 4. Number of days abroad per month considering all European citizens. Source: estimation from Eurostat statistic and Eurobarometer Survey.

We consider the following assumptions to estimate wholesale costs of domestic offers including RLAH fair use:

- We keep the simple but reasonable assumption that domestic wholesale prices represent 50% of the domestic retail price. These costs are incurred by the mobile retail provider during the proportion of the time when the bundle is consumed in the domestic market;
- International roaming wholesale costs are approximated considering an authors' estimate of the current level of average wholesale prices in EEA countries in Q3 2014 based on available market information: 3.4 Eurocents per min, 1.7 Eurocents per SMS and 2.1 Eurocents per MB. These average prices have been estimated considering a continuation of previously observed trends: a 50% decrease in the average price for voice and data compared to the EEA average price estimated by the BEREC in Q1 2014 (International Roaming BEREC Benchmark DATA report) and a stability in the average price for SMS⁴.

We estimate the existence of a gross margin between the domestic ARPU and the average wholesale costs including RLAH.

Average wholesale costs can be expressed as follows:

$$\begin{aligned}
 & \textit{Average wholesale costs (including RLAH)} \\
 & = \textit{Domestic wholesale costs} * (\textit{part of the ARPU consumed at home}) \\
 & + \textit{International roaming costs} * (\textit{part of the ARPU consumed abroad})
 \end{aligned}$$

⁴ The average prices are calculated on unbalanced data because they represent the real value in the market and not considering balanced and unbalanced traffics as it is usually do by the BEREC that has the disadvantage of not reflecting clearly the dynamics of competition in wholesale international roaming markets.

Average wholesale costs

$$= 0.5 * ARPU * (\text{part of the ARPU consumed at home}) \\ + \text{EEA average wholesale prices Q3 2014} \\ * (\text{part of the ARPU consumed abroad})$$

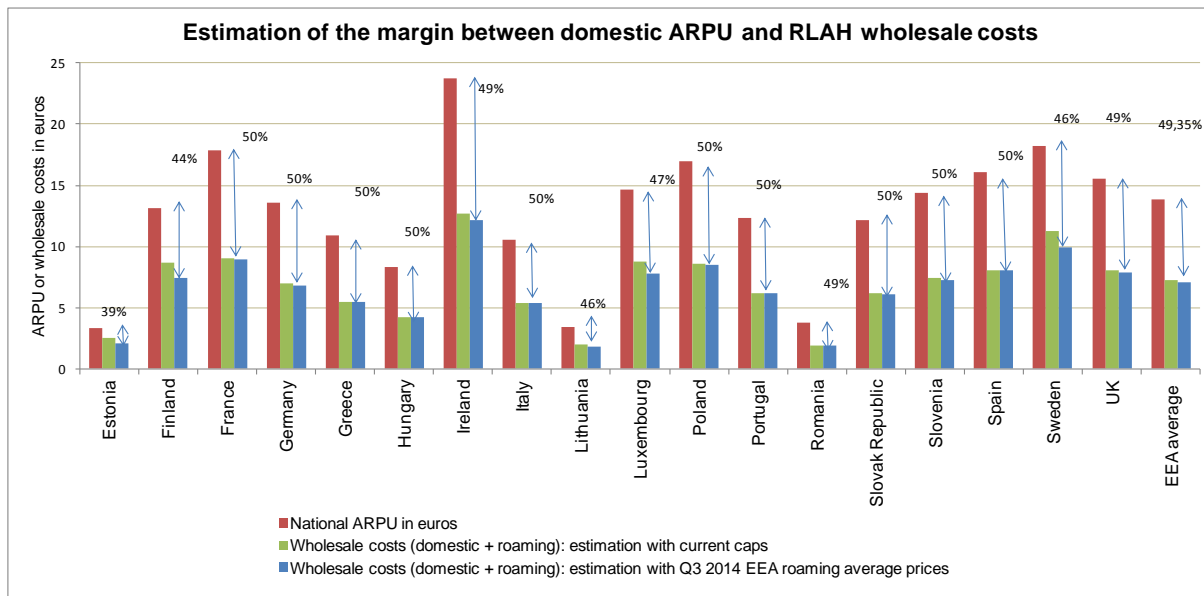
Results are presented in figure 5.

This figure shows that RLAH can be offered on a sustainable basis to an average customer in nearly each country essentially because international consumptions represent a weak part of the bundle as previously mentioned.

Among EEA countries, there are only four countries for which the impact of including RLAH in domestic services is significant in average:

- Estonia, because of very low domestic ARPU according to BEREC statistics (3€);
- Finland, because of high domestic data consumption (1.6 GB);
- Luxembourg, because of a high number of days spent abroad per month (2.1 days);
- Sweden, as Finland because of high domestic data consumption (1.7 GB).

These specific cases have to be addressed but in general in Europe RLAH can be introduced with no significant economic impact for mobile service providers under current wholesale prices.



	EEA average
Domestic ARPU in euros (estimation made with BEREC data)	13.9
Wholesale costs in euros (estimation with current caps)	7.2
Margin in % (estimation with current caps)	48.1%
Wholesale costs in euros (estimation with EEA average prices Q3 2014)	7.0
Margin in % (estimation with EEA average prices Q3 2014)	49.3%

Figure 5. Estimation of the ability for roaming providers to offer RLAH

- Additional costs associated with RLAH scenario

In the same vein, we can illustrate the ability to roaming providers to offer RLAH with estimating the additional costs associated with RLAH obligation.

In this objective, we compare the domestic wholesale costs (wholesale costs associated with a 100% consumption of the bundle at home) and the average wholesale costs (wholesale costs taking into account that a proportion of the bundle is consumed abroad).

As mentioned above, we suppose that domestic wholesale costs can be estimated as 50% of the domestic retail ARPU.

The RLAH additional cost can be expressed as:

$$\begin{aligned}
 \text{RLAH additional cost} &= \text{Domestic wholesale cost (100\% of the bundle consumed at home)} \\
 &- \text{average wholesale cost (considering a part of the bundle consumed abroad).}
 \end{aligned}$$

Results are presented in figure 6.

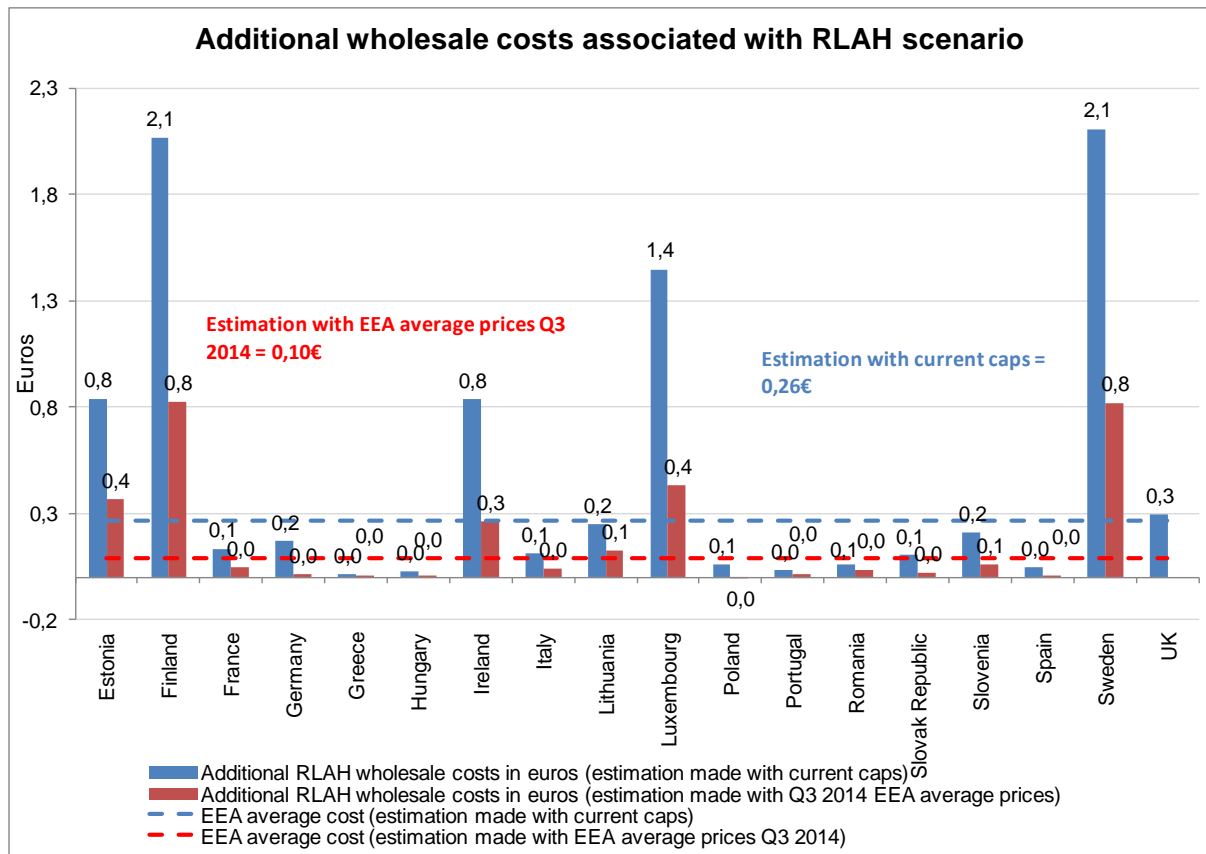


Figure 6. Estimation of additional cost associated with RLAH

In EEA average, RLAH additional cost per customer, corresponding to 1.4% of the bundle consumed abroad, turns out to be negligible i.e. 0,1 € per customer per month considering Q3 2014 EEA average wholesale prices for in average 0.4 day spent in EEA countries. The general level of wholesale prices is not a barrier to the introduction of RLAH.

Moreover, the estimation does not consider the wholesale revenues coming from the inbound traffic.

In consequence, there is no need to review wholesale caps prior to the entry into force of RLAH.

- RLAH cost per day spent in an EEA country

RLAH cost per day spent in an EEA country stems from the precedent estimate. We know the average number of days spent abroad per month (considering also those who do not travel) and the RLAH associated cost. In consequence, we can estimate the cost of 1 day spent in an EEA country.

Results are presented in Figure 7.

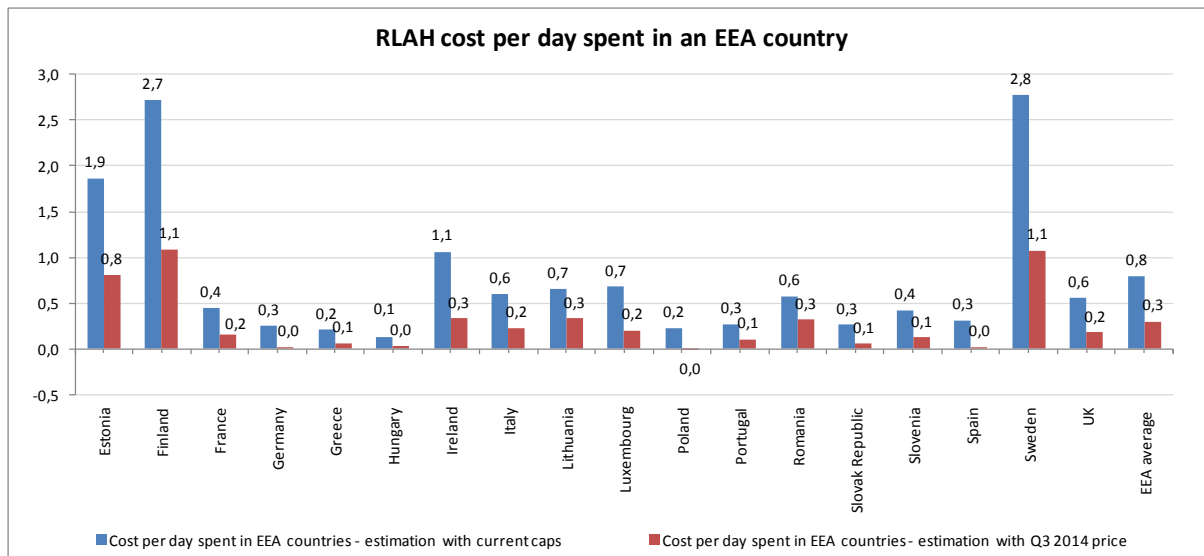


Figure 7. RLAH cost per day spent in an EEA country

RLAH cost per day spent in an EEA country is of 0.3€ in average with a maximum of 1.1€ per day per customer in Finland and Sweden considering Q3 2014 average wholesale prices.

To synthesize, it is not necessary to revise downward wholesale current caps to implement RLAH obligation in most EEA countries.

However, in low ARPU countries (Estonia), in markets where the data consumptions are high (Finland and Sweden) or countries where inhabitants travel a lot in other EEA countries (Luxembourg), RLAH could induce waterbed effects increasing domestic retail prices. An alternative to such an outcome would require that mobile providers deaverage prices between customers with low roaming usages and customers with high roaming usages and charge roaming slightly above domestic price when usages overpass a certain limit. At the end, the European Commission should accept the concept of “RLAH+” proposed by European Council under Latvian Presidency at the beginning of 2015, which allow this slight overcharge above a defined level of usage to prevent waterbed effects.

It should be underlined that a revision of wholesale roaming caps would not eliminate the issue of waterbed effects, which originates in the heterogeneity of mobile service provider costs between EEA countries. This heterogeneity is independent from the functioning of wholesale roaming market even if waterbed effects may be amplified if competition in wholesale roaming prices happens to be insufficient. Therefore the assessment of the competitiveness of wholesale roaming market may be a legitimate regulatory concern in itself but it is neither a prerequisite to RLAH introduction, nor a solution to prevent

RLAH to generate waterbed effects in specific countries. This element should be grounded on sound regulatory principles, as detailed in the following section.

IV. Insufficient competition would be the only rationale to regulate the wholesale roaming market

This session aims to explain that regulation of wholesale roaming market cannot be justified by anything else than the observation that it would be not a competitive market.

- a. Wholesale roaming regulation is only justified if the market is considered not to be competitive

Wholesale regulation cannot be led by a retail roaming cost recovery principle under RLAH constraints: we have demonstrated that such a principle would not be economically justified (session II), may massively disrupt domestic market and is not required to achieve RLAH political objective (session III).

Wholesale roaming regulation could be economically justified but only if it is demonstrated that European markets are not competitive. Considering the drastic and constant decline of roaming prices in recent years, the answer to this question is not obvious. If the wholesale roaming markets are competitive, they will lead to heterogeneous wholesale roaming prices between European countries because competitive prices are close to costs and costs are heterogeneous. Therefore, wholesale regulation will not solve the structural issue of costs differences between Member States national markets.

- b. If the wholesale roaming market should be regulated after RLAH is set, there is no justification to a cost orientation as wholesale roaming is a one-way access pricing problem

Supposing that a regulation is needed, wholesale roaming should be regulated as a “one-way access” (see Appendix II), with regulated prices including all fixed and common costs. It cannot be regulated as a “two-way access” which would be relevant for reciprocal access such as interconnection.

Indeed, defining a market as a “two-way access” is subject to the following criteria:

- The complementarity of the wholesale services with the retail services and not the substitution between the two;
- The reciprocity of exchanges: each firm must contract with the other and services provided are *a priori* balanced.

A “two-way” access pricing corresponds to the case where, in order to provide its retail service to end-users, a firm A must purchase wholesale inputs from the firm B and at the same time and correlatively, firm B must purchase wholesale inputs from the firm A to provide its retail service to end-users.

This model is applied to interconnection and is based on the criteria of reciprocity and reversibility (Economides and White, 1994, P. 625). It means that, to provide a complete service to end-users, firm A must purchase essential inputs to firm B and vice versa. There is a reciprocal network access i.e. a two-way access. If reciprocity lacks, it is known as one-way access.

In the specific case of international roaming, there is fundamentally no obligation of reciprocity.

The absence of reciprocity results from two factors:

- the absence of monopoly situation;
- the absence of *a priori* symmetry of exchanges.

This is the conjunction of these two elements that determines whether the condition of reciprocity is verified or not. In the case of international wholesale roaming, none of these conditions are met (see Appendix II for more details).

In consequence, if regulation is needed, it should not be based on a pure LRIC as it is traditionally the case for one-way access pricing but consider all the full costs.

V. Conclusion

The revision downward of wholesale roaming price caps has been advocated by many policy makers as necessary and unavoidable to implement RLAH obligation. This paper demonstrates that it is not the case as retail roaming under RLAH obligation does not anymore constitute an independent economic activity. The main concern of regulatory authorities should be to ensure that roaming providers are able to recover all costs of providing regulated wholesale roaming services.

The current level of wholesale roaming prices would not be an obstacle to implement RLAH obligation in most EEA countries. However, there is a risk of waterbed effects in four EEA countries characterized by low ARPU, high data consumptions or inhabitants travelling a lot in other EEA countries. A new regulation of wholesale roaming services would not structurally resolve these specific effects, which results from costs difference between national markets. There are two possible solutions:

- Accepting that RLAH comes along with a degree of waterbed effects in some Member States;
- Or diverging from a “pure” RLAH principle by introducing the principle of “RLAH+” above a given level of usage.

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APPENDIX I: If retail roaming under RLAH is considered as a separate economic activity, RLAH obligation in the EU creates constraints between prices which imply uniform equal domestic and roaming wholesale prices throughout the EU, potentially in contradiction with the heterogeneity of mobile network costs between EU countries

The draft regulation " Connected Continent " would prohibit European mobile operators to differentiate the price of their services depending on whether they are consumed in the country of the operator , or while roaming in another country of the European Union. The purpose of this note is to show that this requirement induces strong couplings between mobile prices charged in different EU countries. If retail roaming under RLAH stays considered as a separate economic activity, these couplings lead to uniform domestic and roaming wholesale prices for mobile services across the EU. This effect is independent of any direct competitive pressure that would result from permanent roaming.

The proof of this statement is based on simple assumptions, justified by requirements of proportionality and subsidiarity which applies to the «Connected Continent " draft regulation (in the words of the judgment of the European Court of Justice on the first Roaming I Regulation) :

- According to the principle of proportionality, the wholesale price of intra-EU roaming regulation resulting from "Connected Continent" cannot be lower than the wholesale price observed on the domestic markets. Indeed, the domestic wholesale markets are considered competitive, according to the Recommendation on relevant markets adopted by the Commission in 2007. The "Connected Continent" rules may lead to the imposition of rates corresponding to those of a competitive market, but may not impose tariffs below those of a competitive market. Therefore, if it implied that roaming wholesale prices should be below competitive domestic wholesale prices, it would not be proportionate anymore.

- According to the principle of proportionality, if retail roaming under RLAH were to be considered as a separate economic activity, the rate of its commercial gross margin should be greater than or equal to the rate of commercial gross margin on domestic activity. Indeed, domestic mobile retail markets have always been regarded as competitive. The "Connected Continent" rules may lead to the imposition of commercial gross margin rates for roaming retail activity corresponding to those of a competitive market but cannot lead to the imposition of a commercial gross margin lower than the one observed in a competitive market. Otherwise, it would not be proportionate anymore.

- According to the subsidiarity principle, the conditions formulated in the two preceding paragraphs must be individually observed in every country, not just on average at European level. Indeed, it would be contrary to the principle of subsidiarity that European regulation requires mobile operators in some EU countries to operate their wholesale or retail roaming activities below the profitability level of a competitive market.

On this basis, it is shown in the following paragraphs that an obligation to «Roam Like Home " mathematically leads to a uniform wholesale mobile price throughout the European Union, and to an identical wholesale price for intra EU roaming and for domestic business.

According to the draft regulation, we do not distinguish in the modelling between the domestic retail price and retail price of roaming within Europe, for customers of country i : the retail price r_i means the retail prices charged by operators in the country i for domestic use in country i and for use when

customers of country i are roaming in other countries the EU. Wholesale price w_i^r means roaming wholesale price charged in country i vis-à-vis operators of other countries of the EU when their customers are roaming in country i . Wholesale price w_i^d is the wholesale price charged in country i vis-à-vis the national MVNO market.

The m_i^r symbol denotes the rate of commercial gross margin for retail roaming activity, that is to say, the ratio of:

- In the one hand, the difference between the retail price of intra-EU roaming for customers of country i and the average purchase price of roaming on the wholesale market of the countries visited EU corresponding to uses these customers,
- In the other hand, the retail price of intra-EU roaming for customers country i .

The symbol m_i^d denotes to the rate of commercial gross margin for retail domestic activity, that is to say, the ratio of:

- In the one hand, the difference between the domestic retail price and the domestic wholesale price in country i
- In the other hand, the domestic retail price in country i .

By definition of the rate of the commercial gross margin on activity roaming, we have the equation:

$$r_i \cdot (1 - m_i^r) = \left(\sum_j \alpha_{ij} \cdot w_j^r \right)$$

where α_{ij} is the proportion of roaming use of customers of country i made in country j of the EU. By definition $\sum_j \alpha_{ij} = 1$, and all α_{ij} are greater than zero or equal to zero.

In each country, wholesale price for roaming must be higher or equal than wholesale price for domestic MVNO. Therefore:

$$r_i \cdot (1 - m_i^r) = \left(\sum_j \alpha_{ij} \cdot w_j^r \right) \geq \left(\sum_j \alpha_{ij} \cdot w_j^d \right)$$

In each country, if we assume that retail roaming activities under RLAH is a separate economic activity, then the gross commercial margin rate of the roaming activity must be equal or exceed the gross commercial margin of the domestic activity. Therefore:

$$r_i \cdot (1 - m_i^d) \geq r_i \cdot (1 - m_i^r) = \left(\sum_j \alpha_{ij} \cdot w_j^r \right) \geq \left(\sum_j \alpha_{ij} \cdot w_j^d \right)$$

By definition, the domestic wholesale price is linked to the domestic retail price by the gross commercial margin rate of domestic activity: $w_i^d = r_i \cdot (1 - m_i^d)$. Therefore:

$$w_i^d = r_i \cdot (1 - m_i^d) \geq r_i \cdot (1 - m_i^r) = \left(\sum_j \alpha_{ij} \cdot w_j^r \right) \geq \left(\sum_j \alpha_{ij} \cdot w_j^d \right) \quad \text{Expression (1)}$$

Retaining only the extremes of Expression (1), we get:

$$w_i^d \geq \left(\sum_j \alpha_{ij} \cdot w_j^d \right) \quad \text{for every } i$$

This set of inequalities cannot be satisfied unless all domestic wholesale prices in all countries are equal. The proof is the following⁵. Let us suppose that there are differences between domestic wholesale prices between countries. If we consider the minimum of these w_i^d prices, this minimum price must:

- In the one hand, be strictly smaller than all w_j^d prices, which implies that it is also below all centroids between w_j^d , whatever the weights chosen
- In the other hand, under formal inequality above, be greater than or equal to the particular centroid between w_j^d corresponding to the weights α_{ij}

As the two conditions are contradictory, the initial hypothesis that there could be differences between domestic wholesale prices cannot stand. Consequently, there cannot be any differences between domestic wholesale prices in different countries. Therefore we have:

$$w_i^d = w^d \text{ for every } i$$

Now, let us come back to Expression (1) above:

$$w_i^d = r_i \cdot (1 - m_i^d) \geq r_i \cdot (1 - m_i^r) = \left(\sum_j \alpha_{ij} \cdot w_j^r \right) \geq \left(\sum_j \alpha_{ij} \cdot w_j^d \right)$$

knowing that $w_i^d = w^d$ for all i , we get:

$$w^d \geq \left(\sum_j \alpha_{ij} \cdot w_j^r \right) \geq \left(\sum_j \alpha_{ij} \right) \cdot w^d = w^d$$

hence $w^d = \left(\sum_j \alpha_{ij} \cdot w_j^r \right)$

As w_i^r must be greater or equal than w^d for all i , this equation cannot be satisfied when any of the w_i^r exceeds w^d . It follows that all w_i^r are necessarily equal to each other and equal to w^d . So:

$$w_i^r = w^r = w_i^d = w^d = w \quad \text{for all and every } i$$

This development shows that imposing equality between domestic and roaming tariff rate on retail markets in each country of the Union, and assuming that retail roaming activity under RLAH stays a separate economic activity, necessarily leads to a fully uniform wholesale price w , identical for domestic and for roaming activities, and unique for all countries of the EU. This result is general in the sense that it does not require any specific assumptions, except those formalizing obligations of proportionality and subsidiarity to which the Connected Continent is legally subject to.

However, if the requirements of proportionality and subsidiarity of the European regulation, combined with the requirement of equal prices between domestic prices and roaming rates, plus the requirement of a separate economic balance of retail roaming under RLAH, result in uniform prices of wholesale trade in Europe, this consequence could itself be in contradiction with the same requirements of proportionality and subsidiarity of the Regulation, if the efficient costs of providing wholesale offers differ between EU countries. Indeed, as the Regulation should close the gap between actual prices and competitive prices, it should bring prices close to costs. If de facto it implies uniform wholesale prices in Europe, although the corresponding efficient production costs differ from one country to another, then such a regulation cannot satisfy the proportionality and subsidiarity requirements to which it should be submitted.

⁵ The authors thank their Orange colleague Adam Ouarou for the mathematical proof.

APPENDIX II: Wholesale Roaming is one-way access pricing problem

Introduction

Several stakeholders advocate for a given type of wholesale roaming price regulation that is supposed to be appropriate for supporting the Roaming Like At Home, as proposed by the European Parliament in its text adopted in 1st reading on the 3rd of April 2014. They argue using data from several countries in Europe that in the countries analyzed there is no effective competition at wholesale level in EEA countries. They pretend to demonstrate that the wholesale roaming market is a two-way access market by using an erroneous analogy with interconnection markets, subject to price control based on pure LRIC cost orientation.

The present explanatory document is dedicated to the demonstration that this argument is unfounded. Furthermore it points out that this reasoning is also irresponsible, because it would imply competition distortion within domestic markets.

This appendix does not address other issues raised by the implementation of Roam Like At Home, for instance whether or not wholesale roaming markets are evolving towards effective competition or the structural and permanent reasons of cost differences between Member States national markets.

This present note demonstrates in part I that international wholesale roaming:

- is a one-way access market because wholesale roaming offers are technical substitutes of domestic wholesale mobile access offers;
- is not a two-way access market, because two-ways access implies reciprocity in firms' exchanges. Reciprocity depends on two conditions, monopoly and symmetry, neither of which are met in the case of international wholesale roaming.

All the conditions under which wholesale roaming could be analysed as a "two ways access" are additionally contradicted by the BEREC in its recent report "International roaming – analysis of the impacts if "Roam Like At Home" (RLAH)". BEREC, indeed, acknowledges that roaming and domestic retail offers are substitutes and can compete to each other.

1. Wholesale roaming is a one-way access because it is a technical substitute of domestic mobile wholesale access.

A market is a "one-way access" when a firm B in order to provide a complete service to end-users must purchase an input from a firm A. The main example in Telecommunications sector is the access to the local loop. It results that firm B after having access to A's network offers a service that is a complete substitute to the service offered by A.

As in the local loop example, wholesale roaming offers could be a substitute to wholesale domestic offers if wholesale roaming caps would be set at the level or below domestic wholesale prices. This risk is pointed out by the BEREC in its recent report on RLAH page 7 "*Wholesale roaming regulation should not amount to de facto regulation of national wholesale access markets. In markets where MVNOs have national roaming wholesale access prices set by commercial agreement, if wholesale roaming caps are set below this commercial level, MVNOs might not be able to compete against roaming services being offered on the visited network, which could undermine domestic competition in those markets.*". Indeed,

in this case, customers could switch from MVNOS or MNO of this country to opt for a cheaper foreign operator's offer used in permanent roaming.

In general, there is a heterogeneity of ARPU in EEA countries due notably to heterogeneity of domestic wholesale access prices. If wholesale caps are set at a level close to the cheapest wholesale domestic access prices, foreign operator can propose roaming offers used in permanent roaming on a sustainable basis in the visited country. This would result in the alignment of domestic ARPU with the lowest one in EEA countries which would deeply destabilize domestic markets.

In this sense, international roaming differs substantially from two-way access like interconnection where the services offered by firms A and B are complementary: Firm A when originating a call needs the services of Firm B to terminate it and vice versa.

According to the analysis set out above, international roaming is a one-way access.

2. Wholesale roaming cannot be a two-way access problem because of the absence of reciprocity

Defining a market as a "two-way access" needs the requirement of two conditions:

- the complementarity of the services offered by the two firms as mentioned earlier but also;
- the reciprocity of exchanges.

A "two-way" access pricing corresponds to the case where, in order to provide its retail service to end-users, a firm A must purchase wholesale inputs from the firm B and at the same time and correlatively, firm B must purchase wholesale inputs from the firm A to provide its retail service to end-users.

As was hinted at above, traditionally, this model is applied to interconnection and is based on the criteria of reciprocity and reversibility (Economides and White, 1994, P. 625). It means that, to provide a complete service to end-users, firm A must purchase essential inputs to firm B and vice versa. There is a reciprocal network access i.e. a two-way access. If reciprocity lacks, it is known as one-way access.

In the specific case of international roaming, there is fundamentally no obligation of reciprocity. Moreover, obligation of reciprocity in wholesale roaming contracts has been prohibited in the European Roaming III Regulation.

The absence of reciprocity results from two factors as the example of interconnection will illustrate it below:

- the absence of monopoly situation;
- the absence of symmetry of exchanges.

The conjunction of these two cumulative elements is required if the condition of reciprocity is to be fulfilled. In the case of international wholesale roaming, none of these two conditions are met.

Absence of monopoly:

To illustrate our assertions we will pick up, within **Figure A and B**, two countries in European Economic Area called Country 1 and Country 2. In country 1, operators A and C provide mobile services to their

customers via their own network. Operator B and operator D provide mobile services to their customers via their own network in country 2.

In **Figure A**, we show a customer B, whose home operator is MNO B, traveling within Country 1. To make or receive calls and thanks to an agreement between Home MNO B and Visited country MNO A, customer B can attach his mobile phone to MNO A's network.

In **Figure B**, we show a customer A, whose home operator is MNO A in Country 1, traveling within Country 2. To make or receive calls and thanks to an agreement between Home MNO A and Visited country MNO D, customer A can attach his mobile phone to MNO D's network.

Figures A and B below illustrate that there is no structural monopoly in international roaming:

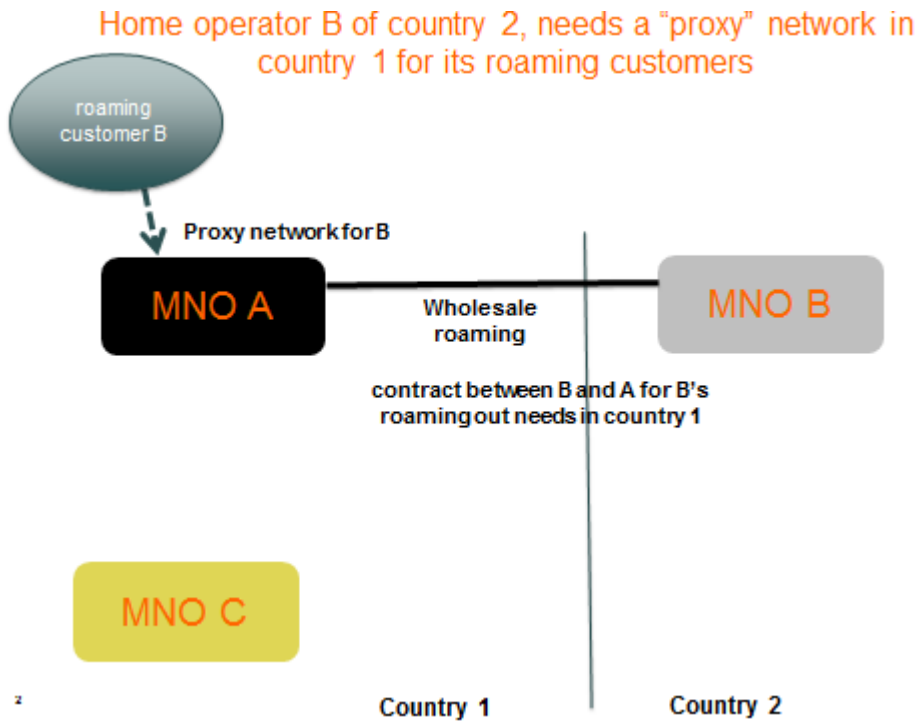


Figure A.

Home operator A of country 1, needs a "proxy" network in country 2 for its roaming customers

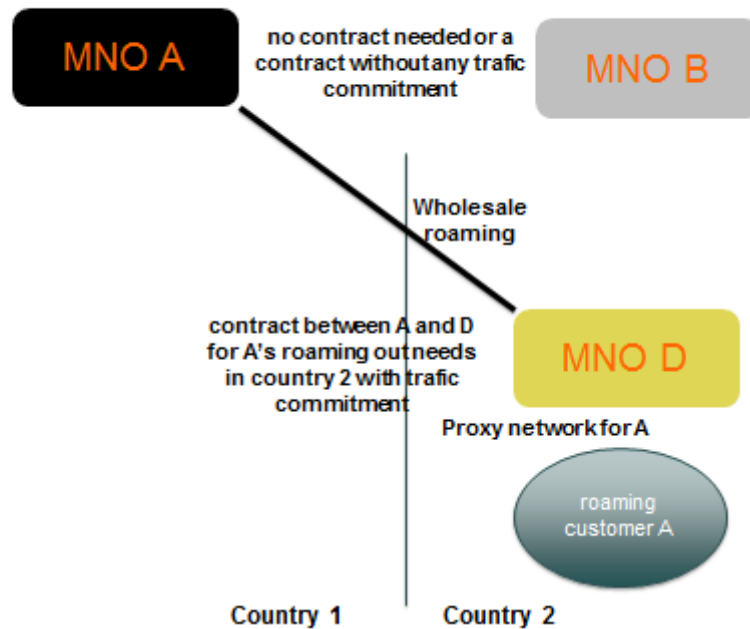


Figure B.

- in figure A, operator A is not in a situation of monopoly in country 1 as B can contract with another operator MNO C and enables its customer to use another "proxy" network in country 1;
- in figure B, in the same way, B is not in a situation of monopoly in country 2 to provide its network as a proxy for A's customers in country 2.

Absence of symmetry of exchanges:

Figures A and B also illustrate the absence of symmetrical exchanges between MNO A and MNO B

- exchanges are not symmetrical per nature in roaming ecosystem: e.g. there are more German tourists roaming in Greece than the other way around. So German operators might choose "preferred" partner in Greece and not commit to any traffic with another. In international roaming world, asymmetries are mostly structurally exogenous and independent from market players' strategies. The situation is different in the case of interconnection between two network operators. Interconnection exchanges are a priori symmetric: there is no exogenous factor imposing asymmetry in these relations. *A posteriori*, there can be asymmetric flows between operators but they endogenously derive from strategic choices of network operators, which may target traffic senders rather than receivers or the reverse;
- Therefore A does not have the same needs of B's resources in country 2 (Figure B) than B has of A's resources in country 1 (Figure A). A can decide to use D's network in country 2 for all its roaming traffic so contracts between A and B related to country 1 and country 2 have no reason to be symmetrical.

In a roaming contract, there is no one symmetrical agreement but two contracts addressing two different needs:

- one contract enabling B to use A's network as a proxy of its own network (Roaming out for B); but the aim here is not to interconnect customers of B to customers of A;
- another contract enabling A to use B's network as a proxy for the needs of A's customers roaming in B's country (Roaming out of A);
- commercial conditions of both can be combined but one can be agreed separately of the other one and this is indeed the case for most of the operators which have among their roaming contracts unilateral agreements. Moreover, Roaming III imposes the availability of unilateral wholesale contracts.

As indicated above, for wholesale roaming to be a two-way access, the three aforementioned conditions have to be met cumulatively. As none of the three conditions are met, international roaming cannot be a two-way access pricing problem