

EU retail roaming regulation triggers competition mechanisms of wholesale roaming markets that make wholesale prices competitive

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Abstract

The European Commission reviews wholesale roaming markets to assess whether under the current Regulation the functioning of these markets is sufficiently competitive to enable the abolition of retail roaming surcharges by 15 June 2017. Jaunaux et al. (2015) demonstrates that RLAH can be achieved under current wholesale regulation. According to both the Regulation text itself and to one of the pillars of the decision of the European Court of Justice upholding the first European roaming regulation (ECJ C-58/08 8 June 2010), a wholesale roaming regulation can be justified in parallel of retail regulation in order to prevent the existence of competitive distortions between mobile operators on the internal market.

Therefore, wholesale roaming markets regulation should only address identified competitiveness issues. This paper addresses the question of the competitiveness of the wholesale roaming market regarding two aspects: the existence of competitive mechanisms and incentives in wholesale roaming markets and the average level of wholesale roaming market prices in comparison with the correspond level of full production costs. It shows that wholesale roaming markets exhibit competition mechanisms and incentives triggered by roaming volume growth resulting from the perspective of RLAH retail regulation. It also shows that in 2015, the average level of wholesale roaming market prices in Europe is equivalent the average level of wholesale roaming production costs. Therefore the wholesale roaming market can be considered as competitive.

I. Introduction

According to the Regulation on open internet and roaming 2015/2120 (thereafter the Roaming regulation) in its article 19, “By 29 November 2015, the Commission shall initiate a review of the wholesale roaming market with a view to assessing measures necessary to enable abolition of retail roaming surcharges by 15 June 2017”. The Commission aims to analyse if the current situation of the wholesale roaming market enables the implementation of Roaming Like at Home (RLAH). Its objective is to consider the main regulatory options available at the wholesale level to enable RLAH including the revision of current wholesale caps.

As demonstrated in Jaunaux et al. (2015)², a new wholesale roaming markets regulation consisting in revising the current wholesale caps is not a prerequisite to enable RLAH within EEA countries. RLAH is sustainable with current roaming wholesale markets conditions in the vast majority of EEA Member States.

In addition, according to both the TSM text itself and the decision of the European Court of Justice upholding the first European roaming regulation (ECJ C-58/08 8 June 2010), the justification of regulating wholesale roaming market in parallel with retail roaming regulation is to prevent competitive distortions between mobile operators in the internal market. Hence, wholesale roaming markets regulation should only address identified competitiveness issues if any. Therefore, the only question is whether the wholesale international roaming market is currently competitive in order to know if and how wholesale roaming market should be regulated.

This paper analyses this issue from two angles:

- Assessing the degree of competitiveness of international wholesale roaming market mechanisms and incentives

¹ Orange Regulatory Affairs. Preliminary version presenting the authors' views, which does not engage Orange.

² Jaunaux et al. “Roam Like At Home: Balancing Political Objective with Heterogeneity of Mobile Costs and Usages in Europe”.

- Comparing the current level of wholesale roaming inbound prices to wholesale roaming inbound full costs in order to evaluate if roaming prices are competitive.

The outcome of this analysis is that prices exhibit competitive response to volume growth, competitive prices with normal relations between prices and costs and therefore that there is no ground for wholesale regulation to impose a global reduction of wholesale price levels. If any, the role of regulation in the wholesale market is to provide regulated prices above market prices as a safety net for all categories of providers and buyers. In addition, regulation could encourage a form of coordination between market players to test alternative pricing structures in the wholesale market such as capacity based pricing.

The paper is organized as follows. The second section presents how the wholesale international roaming market works and drives the fast downward trend of wholesale roaming market prices. The third section proves that in 2015 the average EU level of wholesale inbound roaming prices does not exceeds the average EU level of wholesale roaming costs. The fourth section concludes that wholesale roaming market is competitive in the EU and does not require intrusive regulation.

II. International wholesale roaming market mechanisms are competitive

The analysis of wholesale roaming market's mechanisms shows that competition takes place. In subsection 2.1., it is shown that mobile network operators and full MVNOs can choose between different types of access and at least three different operators' offers to buy wholesale roaming services, whereas securing the ability of light MVNOs to provide RLAH is a national rather than an European issue. Subsection 2.2. proves that the evolution over time of wholesale roaming average prices reflects the competitiveness of roaming wholesale markets.

2.1. The analysis of the functioning of the international wholesale roaming market reflects that there is no competition issue

This section assesses the degree of competitiveness of wholesale market mechanisms regarding the situation of each kind of actors.

2.1.1. The situation of light MVNOs

Light MVNOs must pass all their traffic through their host MNOs because they do not have their own SIM cards and core network equipments. A light MVNO cannot get "Roaming OUT" services directly through visited public mobile network operators. However, this situation is independent from the characteristics of the international wholesale roaming market but depends on the conditions negotiated between the host MNO and the light MVNOs in the domestic market and notably of the integration of "Roaming out" in the access conditions proposed by the host MNO. Therefore, addressing the situation of light MVNOs is a national issue and is out of the scope of the European wholesale roaming regulation.

2.1.2. Even the smaller full MVNOs and MNOS can offer international roaming services via Roaming hubs and dual IMSI solution

Small and recently established mobile operators in particular with relatively low numbers of employees dedicated to negotiating roaming and clearing agreements can choose to pass roaming traffic through third-party hubs in order to increase rapidly their coverage.

This type of access is of course more costly taken apart but results from a global business choice made by the operator, as the technical provision of roaming services is totally externalized. The contract negotiation generally remains in the hands of operators but it can also be handled by the hub.

This type of access is essentially used by full MVNOs and small MNOs. But largest and more mature mobile operators can also use this kind of solution for punctual needs. They tend to cherry-pick relationships.

There are five major third-party technical/commercial hubs players competing in the market: BICS, MACH, Syniverse, Comfone and TNS.

An operator can also propose to its clients the establishment of an ongoing relationship between the end-user and an alternative roaming provider probably but not necessarily based in the end-user's home country, via what is called the "dual IMSI" solution. It is essentially used by MVNOs and MNOs new in the market to get coverage. There are four or five competing "Dual IMSI" products offered currently in the market.

2.1.3. Full MVNOs can negotiate their wholesale "Roaming out" prices with visited MNOs or group of MNOs

The Roaming III Regulation ensures that there is no entry barrier to wholesale roaming market. According to Article 3, "mobile network operators shall meet all reasonable requests for wholesale roaming access". In addition, full MVNOs have a very good negotiation position as they only have "Roaming OUT" wholesale volumes to buy. Full MVNOs cannot offer RIN services in return as antennas are operated by their host MNO. Considering they can negotiate with at least three operators per Member State and that they do not ask for "Roaming IN" volumes in return, visited operators compete with each other to offer their best prices to get this "net" traffic and the corresponding revenue.

We see that in this case even operators with low traffic volumes are generally able to negotiate low wholesale charges. MNOs are looking for every potential revenue sources coming from the sale of "Roaming in" volumes especially in the context of RLAH implementation. Indeed, RLAH retail regulation implies that the general level of retail price applying to roaming provision will not be affected by wholesale roaming prices. Hence, MNO are not deterred because of potential knock-on effects on the general level of retail roaming price, from lowering wholesale price to secure large wholesale roaming sales, as the general retail roaming level of price is ruled by RLAH obligation.

Full MVNOs could also form an alliance together for example to negotiate better prices. But to date, we are not aware of any alliance between full MVNOs or more generally between small actors, which would have naturally emerged if mutualizing volume demand was required to obtain low prices.

2.1.4. MNOs adopt voluntarist retail strategy to grow in volumes and optimise conditions on the wholesale market

A MNO can negotiate directly with a visited mobile network operator or with a MNO operating as a group. Currently, some operators initially with low volumes of roaming traffic have already included RLAH services in their domestic offer. This shows that the present situation of the wholesale roaming market is not an obstacle to the implementation of RLAH. Some MNOs have even conducted an voluntarist retail policy which leads to a significant increase of volumes of "Roaming out". With these high volumes, they can obtain very low wholesale prices equivalent to big actors or even lower and also more roaming traffic in return. Some historically small actors in wholesale roaming market recently became big ones thanks to this strategy. It illustrates that the market forces induce a decline in price independently of the tightening of the European regulation.

2.1.5. MNOs operating as a Group negotiate directly with visited mobile operators

In Group contracts there is generally a unique averaged price for all the countries where the Group operates.

It is not because there is a Group agreement between two operators that all the traffic is routed to its partner in each country. First, because traffics are not symmetrical, second because room has to be left to local negotiations. MNOs do not steer 100% of traffic to a single operator for strategic reasons, keeping open an outside option, and also to provide an optimal customers' experience.

2.1.6. Matching the various needs of wholesale roaming clients justifies the requirement of market flexibility

To match the various needs of wholesale customers, roaming wholesale market must be extremely flexible and creative concerning the type, location, duration and pricing formulae. This could not be satisfied if prices and offers were mainly driven by regulation. It is only if prices and offers are mainly driven by commercial negotiations that the wide variety of needs of wholesale customers may be met.

2.1.7. Adopting an alternative pricing structure such as a capacity based pricing structure should be studied

Capacity based pricing could be studied considering the alignment between domestic and roaming prices and usages. It would be consistent with this evolution to look also for continuity between the domestic and roaming cost structures of MNOs: as the cost structure of MNOs for providing domestic service is capacity based, the cost structure of providing roaming service could also move towards a capacity based model.

However, the implementation of such a change would require coordination which may not naturally emerge from a competitive market and would imply regulatory intervention. Such regulatory intervention should then only concern price structure and not price levels, which are under strong competitive pressure as shown in the present paper.

2.2. The wholesale roaming prices show a steady downward trend independently of caps' evolution

The competitiveness of the market is reflected in the wholesale prices evolution. This section compares the evolutions of wholesale roaming prices and caps.

Wholesale prices decreases observed these last years come from two factors:

- High volumes growth due to retail price decrease imposed by roaming retail regulation. This induces high volumes of wholesale "roaming in" bought and thus a better power to negotiate good unit prices letting play the competition between different providers. Sellers on this market are not deterred from lowering wholesale roaming price by concerns over potential knock-effects on the prices of retail roaming provision as the latter is ruled independently by RLAH retail obligation.
- Cost efficiency gains due to technical evolution.

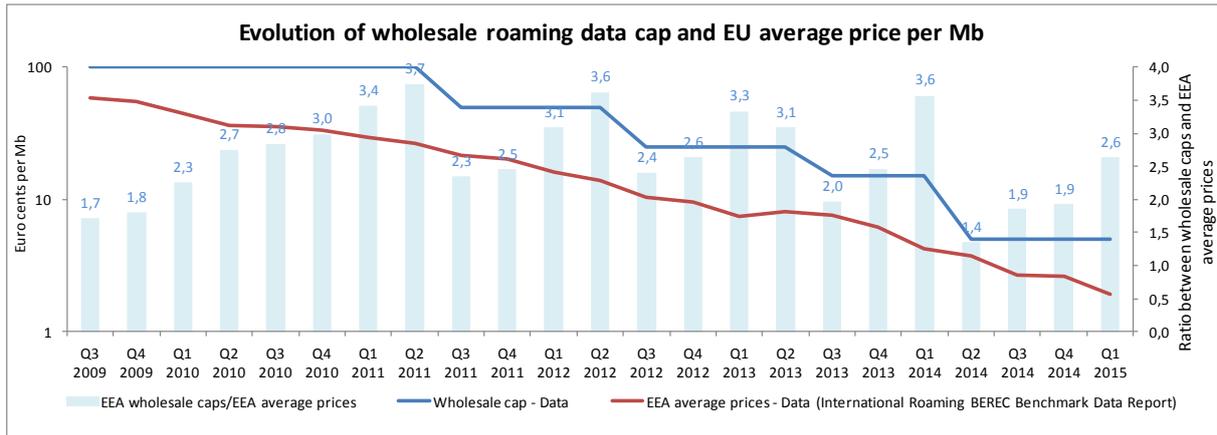
As figures in this section clearly illustrate it, the evolution of wholesale prices is not induced by the evolution of wholesale caps, but by the growth of retail volumes triggering competitive mechanisms and incentives present in the wholesale roaming market.

2.2.1. The steady decline of EU average wholesale data prices

Figure 1 shows that EU average price for data decreases significantly independently of the caps' evolution. The evolution is presented on a log scale³ (see figure 1).

A provider is always tempted to offer lower wholesale prices to capture new clients. This negotiation process leads to prices that are close to full costs or even drop below in some countries. A mobile operator is thus bound to offer wholesale prices that are competitive. Wholesale regulation is unnecessary in the purpose to lower wholesale prices.

Figure 1. Evolution of EU wholesale average price per Mbyte

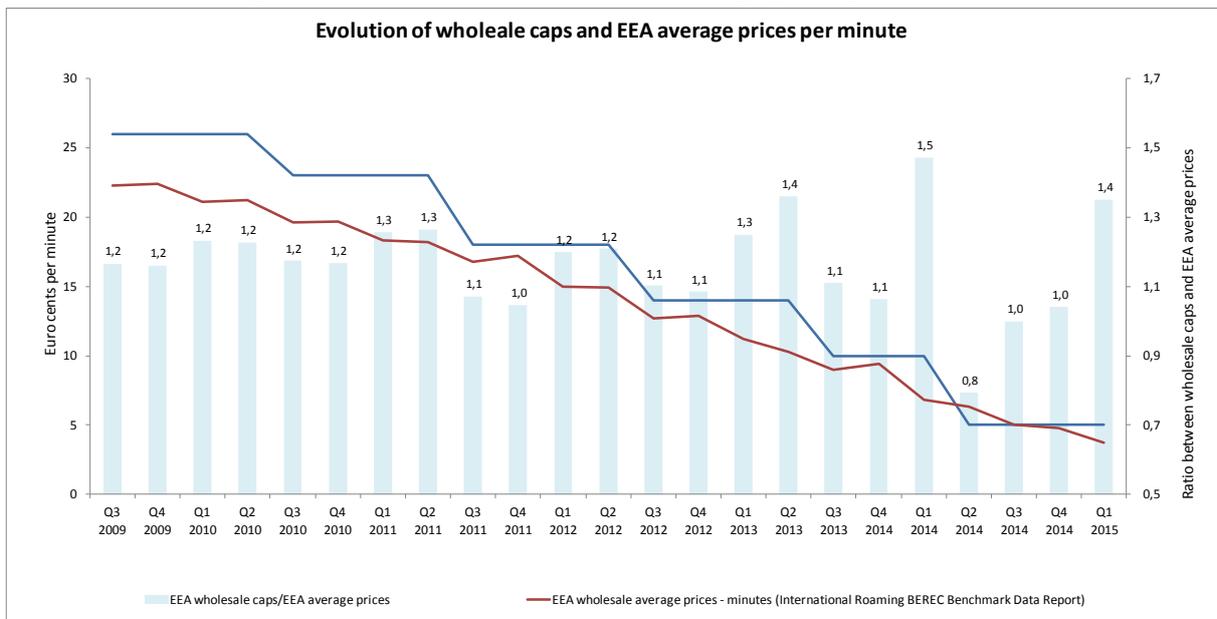


Source: International roaming BEREC data report

2.2.2. A decline of EU voice average price despite the stability of wholesale caps

Figure 2 shows that voice market prices keep on decreasing even when caps are stable.

Figure 2. Evolution of EU wholesale average prices per minute



Source: International roaming BEREC data report

³ The interest of a log scale is to represent on a same graph the evolution of a variable that has a large amplitude variation. The amplitude is particularly important for wholesale data prices and less for voice and SMS prices that's why we use the log scale only for data in order to better represent the price evolution and especially recent changes.

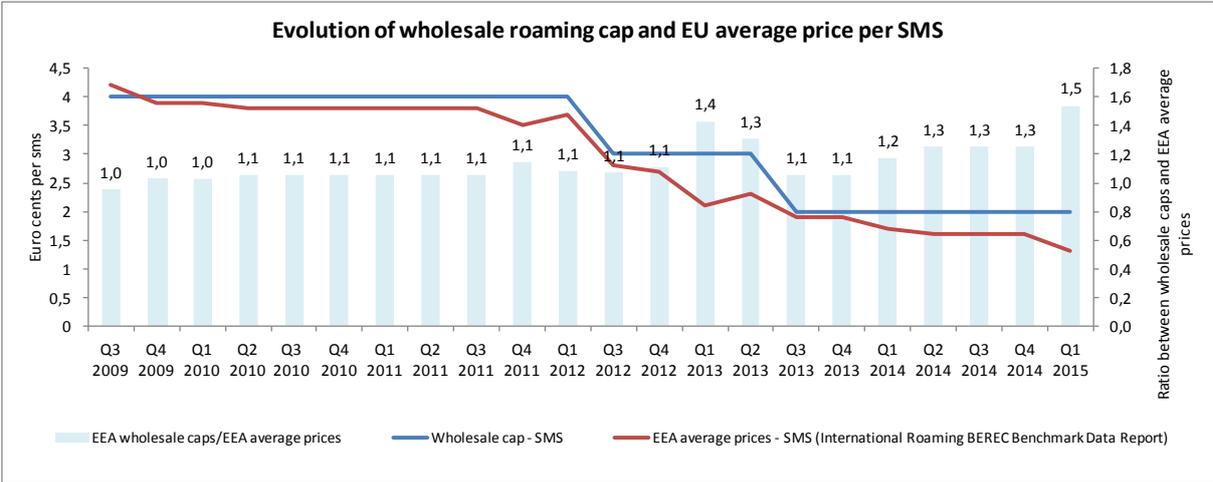
The decrease is notably limited by a lesser traffic growth, technical evolution more concentrated on data than on voice services. Wholesale roaming voice price evolution is also influenced by the continuous heterogeneity of mobile termination rates (MTR) across Europe.

Today, there is no much room to lower wholesale voice caps as the mobile termination rate is in average higher than 1 eurocent per minute in Europe. As a reminder, the termination rate normally corresponds to the pure incremental cost of a minute of a domestic half call. The pure incremental costs of an end-to-end mobile minute corresponding to 2 half calls, should therefore be around 2 eurocents. As full costs normally are above twice pure incremental costs, the full cost of an end to end mobile call should at least be in the range of 4 eurocents which is approximately the current level of EEA average price per minute (3.7 eurocents per minute).

2.2.3. There are fewer stakes on SMS

The figure 3 demonstrates that there is a continuous decrease in SMS wholesale price independently of the evolution of regulatory caps.

Figure 3. Evolution of EU SMS wholesale average prices



Source: International roaming BEREC data report

To conclude this section, the analysis of wholesale roaming market mechanisms shows that full MVNOs and MNOs have room to negotiate. The market presents all the characteristics of a competitive market. The competitiveness of wholesale roaming market is being reflected in the current trends of EU market prices, responding by sharp decreases to volume growth independently of regulatory decisions and well below wholesale caps.

III. The current level of wholesale roaming inbound prices are equivalent to roaming wholesale costs at EU level

To complete the assessment of the competitiveness of the wholesale roaming market and to evaluate if the outcome of this wholesale market in terms of price is competitive, this section compares the current level of wholesale inbound roaming average prices to wholesale inbound roaming costs. As mentioned earlier, regulatory intervention on the wholesale market would only be justified to address competition issues on the roaming wholesale market.

Concerning wholesale inbound roaming prices, we use the data published each quarter by BEREC in its benchmark report on international roaming prices, with extensive data collected from European operators.

Concerning wholesale inbound roaming cost, we model the costs of a generic European operator using the cost model of a French generic operator publicly available on the website of Arcep, the French regulator (ARCEP publishes each year the costs model of a generic French mobile operator), adjusted in order to replace the average usage of French mobile subscribers by the average usage of European subscribers. This adjustment is required to compare wholesale roaming prices and wholesale roaming costs in average in Europe, for a consistent basket of usage. We consider that using a European adjusted model of a French generic operator is relevant for the purpose of this general analysis, as metropolitan France (to which Arcep model applies) and European Union have very similar demographic densities, which is a strong determinant of network cost per subscriber: 113 inhabitants/km² for EU vs. 118 inhabitants/km² for metropolitan France, according to Wikipedia. The comparison between wholesale inbound roaming price and wholesale inbound roaming cost for an identical and relevant basket of usage per user reveals that in 2015, average European wholesale roaming prices and costs are equivalent. Therefore the observed relation between prices and costs corresponds to the one expected from a competitive market.

3.1. Estimating the level of EU wholesale inbound roaming prices

The BEREC benchmark report gives each quarter data relative to wholesale inbound roaming prices in each country. Wholesale inbound roaming prices are those paid by visiting mobile operators to European operators to offer roaming out services to their clients when they travel into Europe. The latest one has been published on October, the 1st 2015⁴. In this report, the average wholesale prices to have access to each country’s network while roaming out is available for voice, SMS and data services. The EU average data are presented in Table 1. For 2013 and 2014, we calculate the annual average data. For 2015, we use the most recent BEREC data relative to the first quarter. In addition, as international wholesale roaming is a fast changing market we also model figures for 2015 full year by extending from 2014 to 2015 the price trend per service observed between 2013 and 2014: -43% for voice, -36% for SMS, -51% for data. The outcome of this extrapolation does not appear to provide unrealistic figures.

Table 1. EU average wholesale inbound roaming unit prices

	2013	2014	Q1 2015	2015 M
Minute	10.0	5.7	3.7	3.2
SMS	2.5	1.6	1.3	1.0
Data (price per Mbyte)	6.8	3.3	1.9	1.6

Source: International roaming BEREC benchmark data report and Orange calculations

To obtain the level of wholesale inbound roaming prices, we need to have estimations on the average consumption made by Europeans when they roam in another European country. In the absence of data relative to European roaming consumption per client, we will consider in the spirit of RLAH that a roamer have the same consumption patterns when he travels than at home. In the document “International Roaming: Analysis of the impacts of “Roam Like at Home” (RLAH)” published by BEREC in December 2014⁵, we can gather for voice, SMS and data the monthly European average consumption per client for the year 2013 using the data collected over EU28. Countries are weighted by their number of SIM cards.

⁴ The document is available at: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5440-international-roaming-berec-benchmark-data-report-october-2014-8211-march-2015

⁵ http://berec.europa.eu/eng/document_register/subject_matter/berec/opinions/4826-international-roaming-analysis-of-the-impacts-of-8220roam-like-at-home8221-rlah

Thus, EU monthly average domestic consumption per client coming from BEREC RLAH report is used as a proxy to estimate the EU average consumptions of roamers when they are visiting another European country.

Therefore, we assess wholesale inbound roaming prices on this basket of EU average domestic usage. We estimate the missing years using traffic evolutions given by WCIS up to 2015 (see Table 3).

Table 3. EU average AUPU evolution – 2013/2015

	2013	2014	2015
Voice AUPU evolution	5%	7%	10%
SMS AUPU evolution	1%	-2%	-6%
Data AUPU evolution	42%	54%	29%

Source: WCIS – average 4 last quarters' data for each year with the latest figure in Q3 2015.

Weighted European average monthly domestic consumptions per client are presented in Table 4:

Table 4. Weighted EU monthly average domestic consumptions per client – 2013/2015

	2013	2014	2015
Minute	125	134	147
SMS	76	74	70
Data (MB)	292	450	580

Source: BEREC data, WCIS evolution and Orange calculations

The EU average wholesale inbound roaming prices are presented in Table 5.

Table 5. EU wholesale inbound roaming price for a basket of yearly EU domestic usage/user

	2013	2014	Q1 2015	2015 M
EU average wholesale roaming price for an EU average yearly domestic usage basket (€/subscriber)	34.2	23.7	17.4	14.8

Source: BEREC data, WCIS evolution and Orange calculations

3.2. Estimating the level of EU average wholesale inbound roaming costs for EU average basket under RLAH

In this subsection, we estimate the full wholesale costs of roaming activity at EU level. In subsection 3.2.1, we estimate the average cost per user of a generic European operator, modelled as the cost per user of a French generic operator, according to ARCEP model, adjusted to take into account European average domestic usage instead of French average domestic usage. In subsection 3.2.2, we convert network costs for a domestic usage into network costs roaming usage by taking into account to some degree the specific seasonality of roaming activity as compared to domestic activity. Finally, in subsection 3.2.3 second we add specific wholesale roaming commercial and marketing costs plus a contribution to the MNO common costs.

3.2.1. Estimation of domestic network costs relative to a basket of EU average consumption

We consider that the characteristics of a European generic operator are likened to those of the generic operator in Metropolitan France with network costs dimensioned for EU average consumptions. There is no a priori bias to consider this hypothesis. Furthermore, the population

density that is the most important factor to consider estimating unit costs and the main source of economies of scale is very close between European Union (113 inhabitant/ km²) and Metropolitan France (118 inhabitant/ km²). So the generic operator in Metropolitan France appears to be a fairly good model to approximate the network costs of average European generic operator.

For practical reasons, we use the ARCEP model of a generic mobile operator in France to estimate its annual network costs⁶. ARCEP model of a generic operator has been designed taking into account the actual costs and technical configurations of actual metropolitan French operators. According to the ARCEP model the network costs for a generic mobile operator is of 157 million euros per month in 2015⁷. These network costs are calculated on the basis of French pattern of consumptions. To calibrate the ARCEP model on EU average consumptions, we use data from RLAH BEREC report⁸ in order to express the EU average consumption in terms of French ones. We observe that:

- The EU average minutes consumption represents 77% of the French consumption;
- The EU average SMS consumption represents 35% of the French consumption;
- The EU average Mbytes consumption represents 151% of the French consumption.

We apply these coefficients on the consumption per user in the data of ARCEP model of a French generic operator. We obtain network costs slightly inferior to those based on the French consumptions i.e. 151 million euros instead of 157 million euros. The number of domestic subscribers in 2015 of the generic mobile operator is 19 million⁹. This calculation shows that network costs for an EU average basket are quite stable over the period and represent 7.6 euros in 2015 (see Table 6).

Table 6. Mobile network costs for a domestic usage

	2013	2014	2015 M
Total monthly French mobile network costs - French consumptions -Generic operator ARCEP model in M€	159	156	157
Total monthly French mobile network costs - EU consumptions -Generic operator ARCEP model in M€	153	149	151
Average nb of mobile subscribers (M2M clients excluded) in millions of clients	20.7	20.3	19.9
Mobile network costs for EU average basket	7.4	7.3	7.6

Source: Generic mobile operator ARCEP model – calibrated by Orange for EU consumption

3.2.2. Estimation of network costs for EU average basket including to some degree the seasonality effect of roaming inbound traffic

We use Orange data in France to estimate the seasonality effects as we do not have data for the French generic operator or at EU level. As there are more tourists in France than in most other European countries, roaming traffic is probably more balanced between seasons in France than in other countries where tourism season is probably more concentrated over the year. The seasonality

⁶ Without prejudice of remarks which Orange may formulate in parallel on the Arcep model.
⁷ The network costs of the ARCEP model account for the costs associated with roaming in activity. However, correcting the global network costs to withdraw those induced by routing roaming in traffic over the period considered would have no material effect on the present analysis.
⁸ http://berec.europa.eu/eng/document_register/subject_matter/berec/opinions/4826-international-roaming-analysis-of-the-impacts-of-8220roam-like-at-home8221-rlah
⁹ Exclude the M2M clients as cards generate very little traffic therefore very little costs.

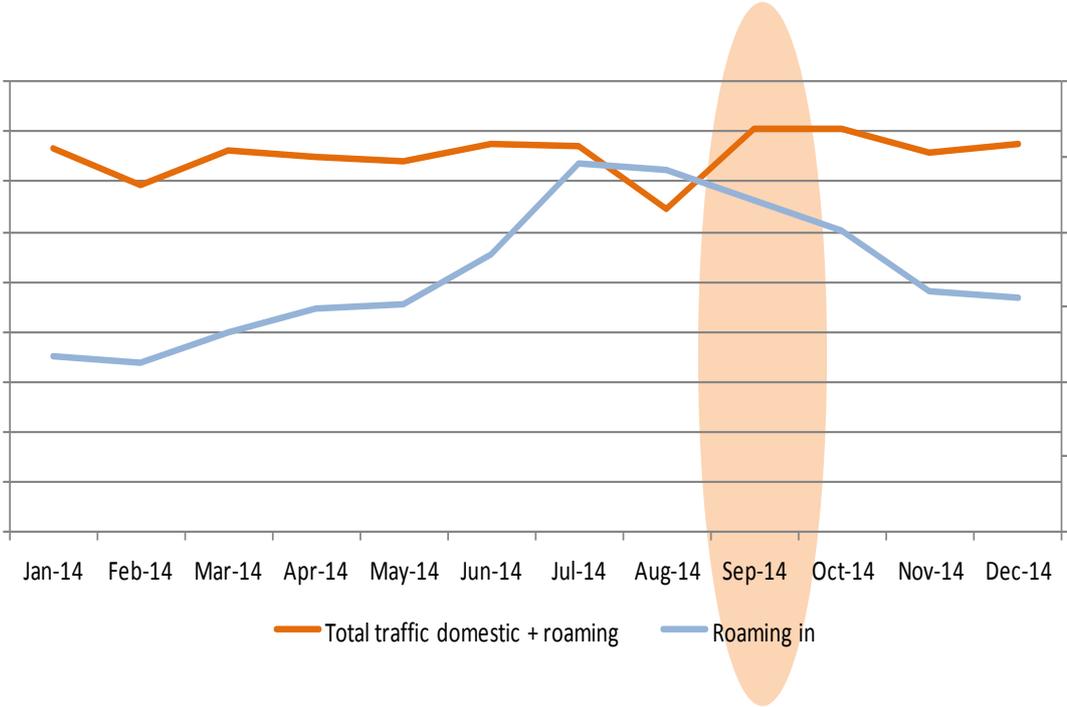
effect is so probably lower in France than in other countries. This is a first reason why our calculations can thus be considered as conservative. This subsection presents the methodology used.

Networks are dimensioned in function of the traffic during busy periods (busy month and busy hour). Thus, network costs are allocated between services in proportion of the cost driver which is the traffic during busy period. For each service (domestic, RIN and other services), we calculate the weight the traffic during busy period represents in annual traffic and we compare the service weights to obtain a unit network cost per volume of production. Services for which the ratio between the traffic during busy period and the yearly volume of production is high have a higher unit network costs than service for which this ratio is lower. The ratio “traffic at network busy period on yearly volume of production” is higher for roaming in traffic than for domestic traffic. In this subsection, we make a conservative estimate of the impact of the seasonality effect of roaming services upon roaming wholesale costs using data from Orange in France.

Voice

The engineering rule generally used in France is to dimension the network for the traffic of the second highest month in the year. To estimate the additional costs for voice generated by the seasonality of “Roaming in” traffic, we thus take into account the second month in terms of volumes of total minutes carried by the domestic network (domestic traffic + “Roaming in” traffic), which is September for the illustrative year 2014¹⁰ (see Figure 4).

Figure 4. Seasonality of voice traffic (domestic + “roaming in”)



Source: Orange data for France

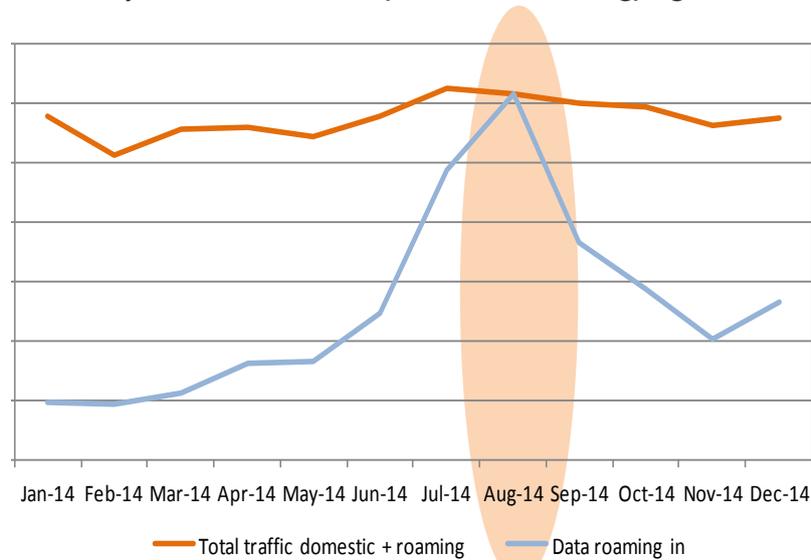
Using data corresponding to Figure 4, we observe that September represents 8.9% of annual domestic traffic vs. 10.7% for annual “roaming in” traffic. Hence average roaming minutes cost 20% more than average domestic minutes: $10.7 / 8.9 = 1.20$.

¹⁰ We observe for voice that there is no significant traffic growth between January and December 2014 so we choose not to correct from the impact of the average growth over the considered year.

Data

Likewise, to estimate the additional costs generated by the seasonality of roaming traffic for data, we take into account the second month in terms of volumes of Mbytes, August for the illustrative year 2014. To distinguish the seasonality effects from the growth effects, the domestic and the “Roaming in” mobile data traffics per month presented in Figure 7 have been corrected from the impact of the average growth over the considered year.

Figure 5. Seasonality of data total traffic (domestic + roaming) – growth effect excluded



Source: Orange data for France

It has to be reminded that the growth of “roaming in” data traffic is larger than the growth of domestic data traffic. As a large growth implies a low average utilization of capacity, due to anticipation constraints, data “Roaming in” traffic contributes more to this lower utilization of capacity due to its higher growth than the growth of domestic data traffic. However, this has not been accounted for in the calculation.

Using the data corresponding to Figure 5, we observe the weight of domestic and roaming data traffics of the month August in the annual traffic. The month of August represents 8.8% of the annual domestic traffic versus 19.8% for the annual roaming traffic. Therefore average “roaming in” Mbyte unit cost is around 124% higher than the average domestic Mbyte ($19.8 / 8.2 = 2.24$).

Global

In order to evaluate globally the impact of seasonality of average roaming usage over average domestic usage, we need to combine the seasonality effect on voice (+20%) and on data (+124%).

We have neglected SMS specific seasonality for which we have not searched specific data but which should have a similar profile than voice. We have considered that complex considerations of cost allocation between services in the context of this simple general study would be irrelevant. So, for the needs of this simple study, we just use in the arithmetic average of voice and data seasonality effects: +72% which is the average of +20% and of +124%.

In the future, data services will dominate network costs and the global seasonality effect will become aligned on the data seasonality effect.

It should be underlined that this way of calculating the effects of seasonality minimizes its impact, because it is done at a global network level. An accurate calculation would require taking into account the heterogeneity of the location of roaming peaks depending on the seasons. De facto, the corresponding loss of economy of scale between domestic and roaming traffic has more impact on the smaller roaming traffic than on the larger domestic traffic, as can easily be shown on a toy model¹¹.

The results are presented in table 7.

Table 7. Estimation of the roaming inbound network costs for a basket of EU average usages taking into account seasonality effects

	2013	2014	2015 M
Network costs for a basket of EU average consumptions in euros	7.4	7.3	7.6
Network costs of wholesale roaming inbound activity (including +72% seasonality effects) for a basket of EU average consumptions in euros	12.7	12.6	13.1

Source: Orange calculations

We obtain a network cost, including the seasonality effect of roaming activity, of 13.1 euros for a basket of EU usages in 2015.

3.2.3. Estimation of the full costs of a service sold in the wholesale market

To cover the full costs of a wholesale service, network costs should typically be increased by around 20% to take into account wholesale roaming commercial and specific costs and a fair contribution to the company common costs (see table 8).

Full wholesale costs represent around 15.7 euros for a basket of EU average usages in 2015.

¹¹ The fact that taking roaming seasonality at a local rather than at a global level would increase roaming overcosts can be shown in the following toy example. Let us consider a network with domestic traffic during busy period of 10 and roaming traffic during busy period of 1. The annual domestic production is 100 for domestic and 5 for roaming (roaming is twice more peaky than domestic. There is some economy of scale in the dimensioning function: network capacity = 1+busy period traffic. We suppose network cost as strictly proportional to network capacity: cost = network capacity.
 In a first scenario, domestic and roaming traffics are spatially homogenous. The roaming and domestic traffic during the busy period, respectively 1 and 10, generate 11 of total traffic during busy traffic which dimension the network capacity = 1 + 11 = 12 which is also the cost. This cost is allocated to domestic and roaming traffics proportionally to their respective contribution to the total traffic during busy period: (10/11) for domestic and (1/11) for roaming. Applying these coefficients to the 12 of total cost, we find = 12 * (10/11) = 10,91 allocated to domestic traffic and = 12 * (1/11) = 1,09 allocated to roaming traffic. To find the unit cost we then have to divide it by the yearly volume of production, 100 for domestic and 5 for roaming. Hence the unit cost of domestic is 10,91/100 = 0,1091 and the unit cost of roaming is 1,09 / 5 = 0,2182, twice the unit domestic cost.
 In a second scenario, domestic and roaming traffics are located in different places. We then have the cost and capacity of the domestic network = 1+10 = 11. The cost and capacity of the roaming network is 1+1 = 2. The unit domestic cost is 11/100 = 1,1 and the unit roaming cost is 2/5 = 0,4 which is (0,4/1,1)=3,64 times more expensive. Hence the overcost of roaming is higher when roaming and domestic traffic have different locations. More the traffic peaks are in different places or time, greater are the ratio of unit costs between roaming and domestic activities.

Table 8. Wholesale full costs for EU average basket

	2013	2014	2015 M
Network costs for a basket of EU average consumptions in euros	7.4	7.3	7.6
Network costs of wholesale roaming inbound activity (including +72% seasonality effects) for a basket of EU average domestic consumptions (€)	12.7	12.6	13.1
Full costs of wholesale roaming inbound activity (including +20% specific and common costs) for a basket of EU average domestic consumptions (€)	15.3	15.2	15.7

Source: Orange calculations

3.3. Comparison between wholesale inbound roaming prices per client and wholesale inbound full costs per client

Comparing the wholesale inbound roaming average prices (§3.1 Table 5) to wholesale inbound roaming full costs (§3.2 Table 8), we find that wholesale inbound roaming costs represent 90% of wholesale inbound average price for an EU average basket if we consider EU average wholesale roaming inbound average price observed in Q1 2015 and more than 100% with the extrapolation for full 2015 of the 2013-2014 trends (see Table 9).

Table 9. Comparison between EU average wholesale inbound roaming prices and EU average wholesale inbound full costs for an EU average basket

	2013	2014	Q1 2015	2015 M
Full costs of wholesale roaming activity (taking into account seasonality effects) for an EU average basket in euros	15.3	15.2	15.7	15.7
EU average wholesale price for an EU average basket in euros	34.2	23.7	17.4	14.8
Wholesale inbound roaming costs in % of wholesale inbound roaming prices	45%	64%	90%	106%

Source: Orange calculations

The cost estimations may be considered as underestimated notably because the seasonality impact is modeled on the French market rather than on a European level, and at national rather than at local level¹².

These results show that there are good reasons to presume that current level of market wholesale price is not higher than wholesale roaming costs.

These estimations give a reasonable and conservative first picture of the situation of the wholesale roaming market. It shows that the wholesale roaming market is globally a competitive market regarding to the relation between prices and costs. Therefore the review of the regulation of

¹² See footnote 11 for more details

wholesale roaming should not have the objective to modify the general level of wholesale roaming prices resulting from market mechanism. Caps should stay significantly above wholesale roaming market prices and serve as a safeguard against any fraud or non-compliance with the terms of wholesale contracts. They should be kept at a sufficient level to avoid any domestic market distortion.

IV. Conclusion

As RLAH can be achieved under current wholesale regulation and as the objective of wholesale regulation is to prevent the existence of competitive distortions between mobile operators on the domestic market, wholesale roaming markets regulation should only address identified competitiveness issues. In this respect, wholesale roaming markets exhibit competition mechanisms and competitive level of average market prices. EU wholesale roaming average prices are in constant decline, the current level of wholesale average prices are already equivalent to the corresponding level of wholesale costs.

The results revealed in this paper prove that the presumption of policy makers should be that wholesale roaming market is competitive. Therefore, considering strict regulatory remedies such as cost orientation obligation to wholesale roaming prices, sometimes evocated in the current debate, would be completely disproportionate and unjustified. Cost orientation has no justification in this context as there is neither monopoly and nor dominance, and where the market exhibits all the characteristics of a competitive market: mechanisms, incentives and outcomes.

Moreover, it would imply a tighter regulation for wholesale roaming than for domestic wholesale markets which would contradict article 1 of the TSM *"This Regulation sets up a new retail pricing mechanism for Union-wide regulated roaming services in order to abolish retail roaming surcharges without distorting domestic and visited markets."* The European regulation of wholesale roaming should be seen as safety nets above market prices against potential market failures to address targeted and specific issues and not as an instrument meant to significantly modify the general economics of wholesale roaming market. Likewise, regulation could also encourage a form of coordination between market players to test alternative wholesale pricing structures such as capacity based pricing.