

International mobile roaming: competition, economics and regulation

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Abstract

International mobile roaming has been subject to market interventions since the 1990s, first requiring operators to provide customers with roaming, then trying to limit the increasing prices, that were seemingly immune to the effects of competition. The European Commission, in trying to improve the wholesale roaming market, caused the introduction of a system of non-discriminatory prices that were not subject to competition but instead to low levels of price transparency and with incentives to increase prices. While the operators achieved economies of scale by foreign acquisitions, they failed to abolish roaming surcharges, because of commitments made to obtain merger approvals from the European Commission. The originally random selection of a roaming operator in foreign country was gradually brought under control by a range of traffic direction technologies, allowing the negotiation of discounts. However, the inter-operator relationships seem frozen, seldom changing partners, demonstrating little evidence of competition. Analyses of the wholesale markets by national regulators revealed little. The approach was abandoned in favour of European Union legislation setting price caps, supported by price transparency measures. Impact assessments had to be based on incomplete models and may have overestimated price elasticity. The reduction of prices within Europe led operators to raise prices for non-European operators and for their own retail customers going beyond Europe. Some customers prefer to switch SIM cards, buying service from the foreign operator. In the absence of a massive data collection exercise and the creation of a dynamic model of the roaming markets, interventions continue to be doomed to imprecision and unpredictable side-effects.

1. Introduction

Roaming is a feature of cellular networks, allowing a customer of one operator to use the network of another operator, based on a wholesale inter-operator agreement. National Roaming (NR) is used to facilitate market entry and extend coverage (e.g., in rural areas). International Mobile Roaming (IMR) provides incentives to operators to adopt a common technology to benefit from revenues generated by inbound roaming customers coming from foreign networks and to attract and to retain domestic customers by offering them a service for when they travel abroad, which generates direct and indirect revenues.

IMR was originally developed for first generation mobile technology in Scandinavia and taken up in the second generation standards for GSM.¹ It was included in 3G platforms, in particular UMTS, with the additional possibility of NR and IMR on GSM networks, while 3G networks were under construction. IMR is also included Long Term Evolution (LTE), sometimes known as 4G.²

The success of IMR in attracting new operators and new customers for GSM pushed other technology platforms to adopt their own versions of IMR, notably CDMA the principal rival cellular wireless technology.³ The absence of IMR is a problem for operators using TD-SCDMA, a form of 3G still found only in China, resolved by handsets that can roam on GSM

¹ Thomas Haug (2002) "A commentary on standardization practices: lessons from the NMT and GSM mobile telephone standards histories" *Telecommunications Policy* 26 (3-4) pp 101-107.

² GSMA (2010) *GSMA leads mobile industry towards a single, global solution for voice over LTE*. London: GSM Association. <http://www.gsm.org/newsroom/press-releases/2010/4634.htm>

³ <http://www.cdg.org/roaming/index.asp>

networks. IMR was also taken up by Wi-Fi and WiMAX groupings, to attract additional operators and to respond to customer expectations of an international service.

For individuals, IMR is part of a bundle of services that includes:

- Origination and termination of calls;
- Origination and termination of text messages;
- Mobile broadband; and
- Optionally:
 - value-added services,
 - a mobile handset.

The costs of roaming seem, too infrequently, to feature at the time of the selection of the operator and the tariff plan. Even where corporations negotiate prices, attempting to use countervailing buyer power, IMR has proved to be the one part of the bundle that is least likely to be discounted. This gave rise to complaints to regulators in the late 1990s, which continue to the present day.⁴

Competition has driven down prices for mobile services, such as monthly subscriptions, per-minute and per-SMS charges, with noticeable reductions in the per unit revenues earned by the operators. By comparison, IMR has been relatively resistant to this downward pressure, partly because some customers simply use the service, valuing its convenience over the costs (which they may not pay themselves), and partly because it is not properly evaluated at the time of entering into contracts. High IMR prices helped generate revenues to offset other, downward pressures on Average Revenue Per User (ARPU) – the indicator most favoured by financial analysts. Moreover, any blame associated with high charges could always be placed on foreign operators.

A variety of economic analyses of roaming markets were attempted by the Competition Directorate-General (DG) of the European Commission (EC) in granting exemptions to the global inter-operator scheme under Article 85 (3) of the European Community Treaty (now Article 101 (3) of the EU Treaty), in the sector inquiry into IMR and in a series of merger cases. Some national regulators in the European Union (EU) also analysed wholesale markets. The EC produced impact assessments for the two Roaming Regulations, together with analyses by consultants for the operators and for the European Parliament (EP). The OECD has identified possible policy options.⁵ Despite these, the level of understanding of IMR markets is quite limited, not least because of the shortage of data.

This paper examines first the issue of excessive prices. It then examines the challenges of price transparency, then the price caps introduced by the European Union in its regulations, followed by the waterbed effect. Conclusions are drawn and future research issues identified.

2. The inter-operator agreement and non-discrimination

From the early 1990s GSM licences were issued in every European country, initially in the 900 MHz band and later in the 1800 MHz band, typically two in each. The first inter-operator roaming agreement was signed in 1992 (between Telecom Finland and Vodafone UK), but the growing number of operators and the desire to ensure that all could offer equivalent pan-European IMR services meant that the scale was growing exponentially. The

⁴ Ewan Sutherland (2001) “International roaming charges: over-charging and competition law” *Telecommunications Policy* 25 (1-2) pp 5-20.

⁵ OECD (2010) *International mobile roaming services: analysis and policy recommendations*. Paris: Organisation for Economic Cooperation and Development. DSTI/ICCP/CISP(2009)12/FINAL.

more agreements an operator signed the greater were the roaming revenues; increased foreign coverage ensured no calls were lost abroad and that more foreign visitors would be served at home.

In order to simplify negotiations the GSM Association, representing all the operators, proposed a framework, known as the Standard Terms for International Roaming Agreements (STIRA). This presented a legal problem, since it violated Article 85 (1) of the EC Treaty, in that it:

- Limited market entry;
- Set trading conditions; and
- Shared markets.

On 11th November 1997, the EC granted a letter of comfort to the GSM Association for the STIRA under Article 85 (3) which permitted exemptions where an agreement:⁶

... contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit and which does not:

- a) Impose on the undertakings concerned restriction which are not indispensable to the attainment of these objectives;
- b) Afford such undertaking the possibility of eliminating competition in respect of a substantial part of the products in question.

This exemption was valid only within the EU and the European Economic Area (EEA). The GSM operators, having been found in violation of Article 85 (1), a precondition for the application of Article 85 (3), were very likely in violation of §4 of the Sherman Act in the USA and equivalent provisions in other national laws designed to prohibit such agreements. However, the issue was never investigated elsewhere, perhaps because any domestic collusion was against operators from foreign countries. Where visiting operators were able to pass on the high costs to their customers, with a good margin, they had no reason to complain to a foreign competition authority. Moreover, any complaint was likely to result in reciprocal action against itself. If anything, the incentives were to remain silent and gently raise prices.

The benefits of STIRA were seen to be:

- Reducing the costs of negotiating individual bilateral agreements;
- Accelerating the availability of IMR services;
- Ensuring IMR services were available over the widest possible area;
- Achieving greater contractual fairness between parties; and
- Avoiding discrimination.

The principle of non-discrimination had an unanticipated anti-competitive effect, when combined with a technology that ensured visiting customers were shared almost equally. Not only did it eliminate discrimination, it effectively suppressed competition and discounting – every operator was treated equally.

There was a very high level of wholesale price transparency due to:

- Industry conferences and meetings;
- The GSM Association Infocentre; and

⁶ EC (1997) Case 36.153 in European Commission Comfort Letters. Brussels: European Commission. <http://ec.europa.eu/competition/antitrust/closed/en/comfor97.html>

- Trans-border commercial groups.

Combined with the absence of retail competition this created circumstances in which prices could easily move upwards.

One provision was directly anti-competitive, that is the restriction of inter-operator roaming agreements to those holding a spectrum licence, excluding Network Service Providers (NSPs), Mobile Virtual Network Operators (MVNOs) and others. *Prima facie*, this was a refusal to deal by an association of undertakings which ought to have been grounds for STIRA being seen not to comply with Article 85 (3) a and b.

The initial price scheme was known as Normal Network Tariff (NNT), in which the visited operator charged a “normal” retail tariff as the wholesale charge, to which the home operator added up to fifteen per cent as a retail margin. However, DG Competition did not consider these charges to be cost-oriented, urging an improved scheme:

... the present system in which charges are based on the domestic tariff of the operator would be replaced by an inter-operator tariff relating to the operator's costs in providing the service, which should result in lower prices for consumers. This move is expected to take place within a reasonable time-frame.⁷

In 1998 a second letter of comfort was requested by the GSMA covering the Inter-Operator Tariff (IOT) scheme to replace the NNTs. The GSMA claimed that the introduction of IOTs would reduce retail roaming prices.⁸ On 30 November 1999, the EC granted the second letter of comfort to the GSMA under Article 85 (3) for the IOTs.⁹ The new scheme was phased in by European operators between May 1998 and April 1999. One important change for customers was that for the first time they were to be charged for calls forwarded from their home operator.

The introduction of IOTs saw a significant increase in wholesale roaming charges, now that they were detached from retail prices:

... a comparison between the last NNT-based charges and those under IOT in Q4 2000 shows increases of up to 212% for international roamed calls to EEA countries (at peak time) and up to 294% for domestic roamed calls (at off-peak). The data collected clearly demonstrate that substantial increases still took place for certain operators after the IOT scheme was put in place.¹⁰

Some increases had been made under the NNT system by changing from a business to a higher priced consumer tariff. DG Competition failed to realise that the operators would be under no pressure to bring IOTs into line with costs.

There can no dispute that geographical coverage for IMR services was quickly achieved and that customers using the GSM service benefitted. For post-paid customers there was easy access to ubiquitous roaming by the late 1990s within and far beyond the EU. However, the economic benefits fell largely to the operators, because of the high and increasing prices they were able to charge and the resulting significant contribution to their profits. Customers did not receive a fair economic share of the benefits, because the IMR service was not subject to

⁷ Page 116 of the European Commission, *XXVIIth Report on competition policy*, Brussels: EC, 1997. http://ec.europa.eu/competition/publications/annual_report/1997/broch97_en.pdf

⁸ Aoife Sexton (2001) “Roaming from a verbal to a visual world” presentation to the *ITU Strategic planning workshop on 3G licensing*. Geneva: International Telecommunication Union.

⁹ EC (2000) *Comfort letters 1999*. Brussels: European Commission. <http://ec.europa.eu/competition/antitrust/closed/en/comfor99.html>

¹⁰ EC (2000) *Working document on the initial findings of the sector inquiry into mobile roaming charges*, Brussels: European Commission.

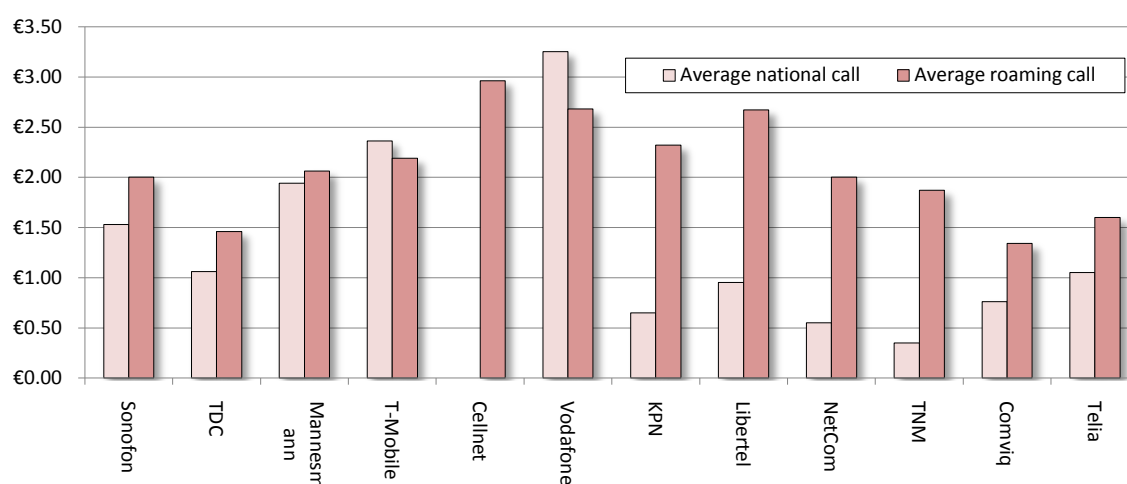
competition and the prices either remained high or increased. The launch of GPRS or mobile broadband roaming services was to prove worse, with the prices so high that even enterprise users balked at using the service, being effectively barred from its technical benefits.

In retrospect, the decision to move away from the NNTs was little short of foolhardy. Just as competition was driving down retail prices, wholesale prices were decoupled and left to what were autonomous and unconstrained decisions of the mobile operators. There is no evidence that DG Competition had modelled the various possible scenarios to test what might happen with changes to the wholesale price system. It coincided with a time when the operators came under pressure to increase their revenues, leading, almost inevitably, to higher prices for customers that were to be sustained for several years.

3. Excessive prices

In 1999, International Telecommunications Users Group (INTUG) complained that the prices for IMR within the European Union (EU) were persistently, unjustifiably high and that competition was not bringing them down.¹¹ In surveys, INTUG compared prices for pairs of countries, showing significant variations, which seemed inexplicable and were certainly unrelated to the costs incurred (see Figure 1).

Figure 1 Comparison of local and roaming call rates in 1999¹²



The operators offered a variety of explanations. They claimed IMR was a premium service, justifying high prices, comparable to a bottle of wine in a restaurant. They complained that it was unfair to pick out one pricing component from many, though separate wholesale markets for access and termination had already been recognised and analysed. They warned that other prices would rise if IMR rates were reduced. They suggested that competition and technological innovation would shortly drive down IMR prices. Some of the higher prices were said to be on infrequently travelled routes and so should be of little concern. These views were not consistent, suggesting the operators had a limited understanding of how IMR fitted into their business models and that some of the responses might have been reflexive and defensive.

¹¹ Allan Fischer-Madsen and Ewan Sutherland (1999) *INTUG Europe report on roaming prices in Europe*. Brussels: Europe.

¹² Allan Fischer-Madsen (1999) *Roaming charges: an analysis*. Brussels: International Telecommunications Users Group.

In 2000, an interim report on the sector inquiry into IMR by the European Commission noted concerns over excessive pricing and possible price collusion at wholesale and retail levels, with almost identical wholesale rates in some countries.¹³

Operators had easy access to the wholesale prices of their rivals and had the incentive to raise their own wholesale prices to match those of their rivals, knowing any increase would be passed on to customers of foreign operators with a substantial mark-up.

The concern of high prices has not been limited to the EU. In the Southern Africa Development Community (SADC) ministers noted the very high prices for roaming and called on regulators to identify the means to reduce them.¹⁴ Similarly, in the Arab League, ministers mandated regulators to look at ways to reduce prices, which were seen as being high and seemingly random.¹⁵ In Australia, Senator Stephen Conroy, the Minister responsible for telecommunications in Australia, noted the increasing level of complaints from individuals and small businesses about IMR prices, observing that they discouraged the use of mobile phones when overseas.¹⁶ This led to an inquiry by the Standing Committee on Communications of the House of Representatives.¹⁷

A decade after the first INTUG survey, the OECD noted the perception “that IMRS prices are unreasonably and inefficiently high”.¹⁸ Taking the same approach as INTUG, looking at country-pairs, it found prices for IMR calls varied by a factor of up to eight, while calling home with IMR could be twenty times more expensive than using the local mobile service. TCL observed a difference of a factor of five between wholesale and retail data prices in the EU.¹⁹ It seemed that little had changed, except for the worse.

4. Geography, mergers and economies of scale

The EC has, from time to time, suggested spectrum licensing at the EU level, something bitterly resisted by the member states. While spectrum continues to be allocated at a national level the mobile operators have built up substantial, if still incomplete, footprints by obtaining licences in a range of countries and by acquisition of smaller operators. Similar patterns can be found in Africa and in Asia, though the latter has been more constrained by economic nationalism. In contrast, the operators in the USA sold off their foreign interests to concentrate on the domestic market in which they too have made extensive acquisitions.²⁰ Their aims have been to sustain growth and to achieve economies of scale, in particular for the purchase of equipment for network infrastructure and for resale to customers. More recently they wanted to create trans-national platforms for the development of innovative

¹³ EC (2000) *Working document on the initial findings of the sector inquiry into mobile roaming charges*. Brussels: European Commission.

¹⁴ Ewan Sutherland (2010) *International mobile roaming in Africa*. Johannesburg: LINK Centre. Public Policy Paper No 10. <http://papers.ssrn.com/abstract=1550264>

¹⁵ Ewan Sutherland (2010) *International mobile roaming in the Arab World*. Working paper. <http://papers.ssrn.com/abstract=1554831>

¹⁶ Stephen Conroy (2008) “Address to APEC meeting, Bangkok, Thailand”. http://www.minister.dbcde.gov.au/media/speeches/2008/apec_meeting_bangkok_thailand

¹⁷ House of Representatives – Standing Committee on Communications (2009) *Phoning Home: inquiry into international mobile roaming*. Canberra: Commonwealth of Australia.

¹⁸ OECD (2009) *International mobile roaming charging in the OECD area*. Paris: Organisation for Economic Cooperation and Development. DSTI/ICCP/CISP(2009)8/FINAL.

¹⁹ Tariff Consultancy Ltd. (2010) *Global mobile roaming pricing 2010*. London: TCL.

²⁰ Thomas W. Hazlett (2003) “Is Federal preemption efficient in cellular phone regulation?” *Federal Communications Law Journal* 35 pp 155-93.

services and the purchase of high value content, which they believed were to provide future revenue growth.

The footprints of the European operators vary greatly in extent and coverage of larger markets, led by Vodafone, T-Mobile and Telefónica (see Table 1). Telecom Austria and Telekom Slovenije have strong presences in South-East Europe, while Telenor has substantial interests in Asia and Portugal Telecom in Africa. While the operators built up these trans-national concerns, they proved more reluctant to offer pan-European services to their customers, in part constrained by the Competition Directorate-General of the European Commission.

Table 1 *Trans-national operators present in the more populous European countries*

Country	Pop. (M)	Vodafone ^ø	Orange*	T-Mobile	Telefónica	KPN	Telekom Austria	Telia Sonera	Telenor	HWL
DE	82.0	✓	-	✓	✓	✓	-	-	-	-
FR	64.4	SFR‡	✓	-	-	-	-	-	-	-
UK	61.6	✓	✓	✓	✓	-	-	-	-	✓
IT	60.0	✓	-	-	-	-	-	-	-	✓
ES	45.8	✓	✓	-	✓	-	-	-	-	-
PL	38.1	-	✓	-	-	-	-	-	-	-
RO	21.5	✓	✓	OTE§	-	-	-	-	-	-
NL	16.5	✓	-	✓	-	✓	-	-	-	-
GR	11.3	✓	-	OTE§	-	-	-	-	-	-
BE	10.8	P †	✓	-	-	✓	-	-	-	-
PT	10.6	✓	-	-	-	-	-	-	-	-
CZ	10.5	✓	-	✓	✓	-	-	-	-	-
HU	10.0	✓	-	✓ ¶	-	-	-	-	-	-
SE	9.3	P	-	-	-	-	-	✓	✓	-
AT	8.4	P	✓	✓	-	-	✓	-	-	✓
CH	7.7	P	✓	-	-	-	-	-	-	-
BG	7.6	P	-	OTE§	-	-	-	-	-	-
DK	5.5	P	-	-	-	-	-	✓	✓	✓
SK	5.4	-	✓	✓	✓	-	-	-	-	-
FI	5.3	P	-	-	-	-	-	✓	-	-
NO	4.8	P	-	-	-	-	-	✓ •	✓	-
IE	4.5	✓	-	-	✓	-	-	-	-	✓

^ø For details of Vodafone partners, see Table 3.

* Originally Hutchison, later acquired by France Telecom.

§ Minority holding, but management control through agreement with the Greek government.

¶ Majority holding by DTAG.

‡ Ownership is split between Vodafone and Vivendi.

† Proximus, a subsidiary of Belgacom, was formerly a joint venture with Vodafone, now it is only a partner.

• Trading as Netcom.

In the putative but ultimately abandoned merger between Telia and Telenor, the EC had to consider all the issues arising from joining two geographically adjacent incumbent operators, with their extensive provision of fixed and mobile services.²¹ For example, Telia and Telenor could have abandoned IMR surcharges between the two countries and created

²¹ See, in particular, ¶159 of EC, Telia and Telenor, Case No. COMP/M.1439, 1999.

mobile tariffs that covered both Norway and Sweden. It was claimed by competitors of the prospective merged undertaking – who were licensed in only one of the two countries – that they would not be able to match its offers, since they would be obliged to pay for roaming in the other country. To match Telia-Telenor they would have needed prices equivalent to national roaming or MVNO access, rather than conventional wholesale IMR rates. Additionally, the rivals would have had to purchase other wholesale inputs from the merged entity.

The issue arose again in the successful merger of Telia and Sonera (the Finnish incumbent operator).²² The potential internalization of roaming was seen as raising the costs for rivals, because of their need to buy roaming services in one or more countries, which would have strengthened TeliaSonera's positions on the mobile retail markets in Finland, Sweden, Norway and the Baltic States. Although retail mobile markets were treated as single entities, the EC placed considerable emphasis on the demand within that market from corporate customers for trans-national services. It recognised that while demand existed for pan-Nordic mobile services it was not being met.

The key argument was:

110. In the provision of bundled service offerings there is generally a risk that providers of essential parts of the package (such as call termination, access to the local and national infrastructure, and wholesale international roaming) can foreclose providers of the other parts either through direct bundling or by offering price structures that only makes it attractive to buy its solution.

The EC obtained a commitment from TeliaSonera that it would provide wholesale IMR on its networks in both Finland and Sweden to third party mobile network operators in both countries. In doing so, it removed any incentive for Telia-Sonera to launch a pan-Nordic retail tariff plan and thus deprived customers of a very significant benefit of geographic consolidation.

A unified offer covering Finland and Sweden, one without roaming surcharges, would have been of interest to a significant number of customers, primarily, but not exclusively enterprise users. The obvious response of rival operators would have been to strike deals or to make acquisitions to enable them to make retail offers more broadly across Scandinavia, by including Denmark, Norway and the Baltic States, perhaps also adding Germany and the United Kingdom. For enterprise customers such offers would have been and remain today very attractive. The operators already had experience, admittedly not always very positive, of using alliances to meet the fixed network requirements of businesses.²³

For a short period in the early 2000s, Sonofon, an operator based in Denmark, managed to achieve a balance in its traffic with other Scandinavian countries that eliminated out-payments for roaming.²⁴ It was able to cut roaming charges significantly and to make attractive offers to business customers. It was subsequently acquired by Telenor as it extended its Nordic footprint.²⁵

²² See, in particular ¶¶12-19, ¶¶99-112 and ¶¶119 of EC, Telia and Sonera, Case No. COMP/M.2803, 2002.

²³ Svein Ulset (2002) *The rise and fall of global network alliances: success or failure?* Bergen: Institute for Research in Economics and Business Administration. SNF working Paper No. 86/2002.

²⁴ Sonofon (2001) presentation to the *IBC GPRS Roaming Conference*. London.

²⁵ Telenor and Sonofon. Case No. COMP/M.3339.

The acquisition by Vodafone of Mannesmann AG in 2000 was highly contentious, being the first hostile take-over of a company in Germany.²⁶ DG Competition continued to view trans-national services and tariffs as anti-competitive, with the rivals of Vodafone complaining that they would not be able to provide “the same type of services on a pan-European basis ... in the short to medium term”.²⁷ Whereas Vodafone’s Offer stated it would have a global platform by mid-2000 to provide uniform messaging services, location based content and mobile e-commerce. It made no mention of pan-European tariff structures.

Accepting the argument of Vodafone’s rivals, the EC argued that:

This situation is likely to entrench the merged entity into a dominant position on the emerging pan-European market for internationally mobile customers for the foreseeable future because customers of other operators would generally prefer the merged entity to other mobile operators given its unrivalled possibility to provide advanced seamless services across Europe.²⁸

This analysis was flawed in several respects. The argument had advanced from the TeliaSonera case, with the effects no longer being on the existing mobile access market, but in some new and emerging market. While it was true to say that enterprise customers were looking for pan-European services, they were much more concerned with pan-European price plans than with advanced functionality, which they suspected might not work or could not deliver benefits to their enterprises – indeed it might never be used.²⁹ Moreover, Vodafone in 2000-2001 still had quite significant geographic gaps in its coverage, which would have made its offer of interest only to some of the enterprises.³⁰ The EC ignored the possibility that leading rivals could have made deals, formed alliances or made acquisitions to address any trans-national requirements of their own enterprise customers. The pan-European market did not exist then and does not exist today, therefore the allegedly dominant position being constructed by Vodafone was, at best, highly speculative.

There was a separate market to supply fixed services to business customers, this required special access infrastructure, in particular the construction of dedicated lines to individual premises.³¹ For mobile networks all that was being required by businesses were pan-European tariffs and billing systems.³²

In May 1998, AT&T launched its Digital One Rate tariff plan, the first truly national plan in the USA, eliminating surcharges for national roaming with its various regional and local partners. It attracted new customers and increased the use of its network, so that leading rivals had to launch their own national tariff plans. However, it took many years for these to dominate in the market, even today they sit alongside some local and regional tariffs. The authorities in the USA have seen a single national market, though in mergers they have forced divestiture of licences or spectrum, recognising specific local concentrations. It is clear that no separate market existed in the USA along the lines conjectured by the EC.

²⁶ Gregory Jackson & Martin Höpner (2001) *An emerging market for corporate control? The Mannesmann takeover and German corporate governance*. Köln: Max-Planck-Institute for the Study of Societies. Discussion Paper No. 01/4.

²⁷ EC (2000) *Commission clears merger between Vodafone Airtouch and Mannesmann AG with conditions*. Brussels: European Commission. Press release IP/00/373.

²⁸ EC (2000) *Vodafone Airtouch and Mannesmann*. Case COMP/M.1795.

²⁹ Interviews with members of EVUA.

³⁰ Vodafone subsequently withdrew from Belgium and Sweden.

³¹ This was defined as the supply of global telecommunications services to multinational business customers. See, for example, DG Competition Case COMP/M.2642, 2001.

³² Interviews with members of EVUA.

Vodafone was persuaded by the EC to make commitments to enable third party non-discriminatory access to the merged entity's integrated network in order to provide advanced mobile services to their customers, covering:

- Exclusive roaming agreements;
- Third party access to:
 - roaming arrangements,
 - wholesale arrangements,
 - standards,
 - SIM-cards; and
- A set of implementing measures aimed at ensuring their effectiveness.

These had no positive effect on the market as they were never used by another operator, indeed there appears to have been no serious effort to do so within the three years the commitments applied. Vodafone continued to earn money, as before, from wholesale and retail IMR.

The commitment was renewed in the acquisition of Eircell.³³

The failure of this commitment caused retrospective doubts at DG Competition, with some staff conceding that the commitments had blocked Vodafone from making precisely the pan-European offers that the EC had been seeking since 1999.

In late 2006, one operator eliminated IMR surcharges in East Africa, under the "One Network" brand, later extending the offer across its footprint, covering much of Sub-Saharan Africa.³⁴ Originally, the licences had been built up by Celtel, which was acquired by Zain in 2005 and then sold on to Bharti Airtel in 2010. The creation of this vast trans-national footprint of contiguous licences had been made – without intervention by competition authorities – in pursuit of growth and economies of scale. Given that nearly all of its customers were using pre-paid services, Zain used One Network to avoid them switching to a rival when they crossed a national border, providing them with the incentive that they could be contacted on the same number at all times, while paying local calling rates and topping up their credit locally. They also used One Network to gain publicity for the rebranding, from Celtel to Zain, and to attract and retain higher spending customers.

The One Network tariff plan was extended to Zain's operations in North Africa, the Near East and the Persian Gulf, where it continues in use today.³⁵ It has been met with commercial responses from a number of operators, especially in respect of travel between Egypt, Bahrain, the Kingdom of Saudi Arabia and the United Arab Emirates – including by Orange and Vodafone.

In the Caribbean Digicel copied the One Network concept.³⁶ It had licences on several islands and used these to offer cheaper on-net calls, aimed at discouraging customers from switching SIM-cards when travelling between islands.

Zain and Digicel fully internalised roaming costs, interconnecting their national networks through their own international gateways, keeping traffic on their own networks, avoiding any payments to other operators. They then used low on-net rates and their geographical

³³ EC (2001) *Vodafone Group plc and Eircell*. Case M.2305.

³⁴ Ewan Sutherland (2010) *International mobile roaming in Africa*. Johannesburg: LINK Centre. Public Policy Paper No. 10. <http://papers.ssrn.com/abstract=1550264>

³⁵ Ewan Sutherland (2010) *International mobile roaming in the Arab World*. Working paper. <http://papers.ssrn.com/abstract=1554831>

³⁶ Ewan Sutherland (2009) "International Mobile Roaming in the Caribbean" presented at the 9th. *Conference of the Organisation Of Caribbean Utilities Regulators (OOCUR)*, Tobago.

footprints to discourage customers from switching to rivals when they crossed borders. At the same time they charge high wholesale IMR rates to operators in the developed world in order to maximise their inbound revenues, knowing that whatever price they charge will be passed on to end customers with a very substantial retail margin.

One complication of these offers is that it can be used for free international calls. Supposing a family living in Uganda have a member who is a migrant worker in Kenya, then if that person uses a Zain Uganda SIM card, it is possible to receive free calls from home for an indefinite period. To be cost effective, the person would switch to a local SIM card for other calls.

The evidence from Africa, the Near East and the Persian Gulf, is that rival operators can and do respond to trans-national offers from rivals. They may not offer the blanket coverage of Zain and Digicel, but instead focus on specific routes that are heavily travelled, cutting deals with other operators and making offers to ensure they attract and retain their retail customers. It has required that rivals collaborate, never the easiest of business strategies.

While the European Commission aspired to pan-European services, when faced with their possibility it preferred to give priority to the interests of small, national operators and to forego and even thwart its own aspiration.

5. Traffic direction and operator alliances

Almost as soon as there were complaints about the high prices, the operators began to argue that technical developments would soon allow home operators to direct customers onto a specific foreign network introducing competition and wholesale price discounting.³⁷ As a consequence, they held that regulatory intervention would be unnecessary.

In theory countervailing buyer power could be exercised by a foreign operator if it was able to direct traffic away from an operator in response to a price increase or, with that as a threat, to negotiate a substantial discount. Once traffic direction was effective the traditional approach in which customers had an almost equal chance of being on each of the available networks in a foreign country could be abandoned. However, the non-discrimination obligation in STIRA, to which all the operators were a party, remained an obstacle to the practice of discounting the IOTs.³⁸

Negotiations also depend on the bilateral nature of the trade, with any two operators exchanging traffic and revenues. An operator may require coverage in a particular country, as an important business or tourist destination and thus not be in a strong position to negotiate.

Prior to traffic direction the only commercial leverage for an operator was to terminate a roaming contract with a particular operator. This threat was largely ineffective since it would also mean the loss of incoming roaming traffic, which would then be divided among the operator's domestic rivals, along with the associated revenues. Where the operator being terminated was part of a larger group, it also risked retaliation.

Boosting incoming traffic was possible only by building up network coverage and increasing signal strength in airports, ferry ports and border crossings in a bid to capture foreigners on arrival. In the early 2000s, the UK operators freely admitted to checking and

³⁷ Ulrich Stumpf (2001) "Prospects for improving competition in mobile roaming", presented at the 29th Telecommunications Policy Research Conference, Washington DC.

³⁸ Roger Salsas & Christian Koboldt (2004) "Roaming free? Roaming network selection and inter-operator tariffs" *Information Economics and Policy* 16 (4) pp 497-517.

boosting their signal strengths in London's Heathrow Airport yard by yard in an effort to capture the greatest number of visitors.

With the increasing effectiveness of traffic direction an obvious concern for operators was of the loss of large volumes of revenue that might not easily be won back or be replaced. In particular, if geographically extensive groups, such as Vodafone, Telefónica de España, T-Mobile and France Telecom, which had large numbers of enterprise customers, were to internalise roaming traffic, this could adversely affect their domestic rivals.

By 2005, Vodafone could achieve over 90 per cent effectiveness in traffic direction.³⁹ Not only could it internalise roaming, but it was able to negotiate deals with third parties. For example, Digicel became its principal partner in the Caribbean to which it could deliver large volumes of traffic and thus significant revenues.

The various operations of the Vodafone group are shown in Table 2, including those using other brands and vice versa. Table 3 shows the various non-group partners for roaming and content distribution.

Table 2 *Vodafone Group and partners*

<i>Europe</i>	<i>Rest of the world</i>	<i>Vodacom brand</i>	<i>Holdings</i>	<i>Branding only</i>
Albania	Australia	South Africa	Kenya – Safaricom	Faroe Is.
Czech Republic	Egypt	DR Congo	France – SFR	Iceland
Germany	Fiji	Lesotho		
Greece	Ghana	Mozambique		
Hungary	India	Tanzania		
Ireland	New Zealand			
Italy	Qatar			
Malta	Turkey			
Netherlands				
Portugal				
Romania				
Spain				
United Kingdom				

Table 3 *Vodafone partners⁴⁰*

<i>Partners - Europe</i>		<i>Partners - RoW</i>	<i>MTS</i>	<i>Digicel</i>
Austria – A1	Lithuania – Bité	Azerbaijan – Azerfon	Armenia	Caribbean
Belgium – Proximus	Luxembourg – Tango	Chile – Entel	Russia	Pacific
Bulgaria – Mobitel	FYROM – VIP	Afghanistan – Roshan	Turkmenistan	
Channel Is. – Airtel	Norway – TDC	Bahrain – Zain	Ukraine	
Croatia – VIPnet	Serbia – VIP	Hong Kong – SmarTone	Uzbekistan	
Cyprus – Cytamobile	Slovenia – Si.mobil	Japan – Softbank		
Denmark – TDC	Sweden – TDC	Libya – Al Madar		
Estonia – Elisa	Switzerland – Swisscom	Malaysia – Celcom		
Finland – Elisa		Singapore – M1		
		Sri Lanka – Dialog		
		Taiwan – Chungwha		
		Thailand – dtac		
		UAE – du		

³⁹ Richard Feasey (2005) "Next generation mobile regulation" presented to the OFCOM Conference on Next Generation Regulation, Edinburgh.

⁴⁰ http://www.vodafone.com/start/about_vodafone/partner_markets.html

One defensive response was the creation of groups, which could secure roaming traffic (see Table 4). The operators preferred to form these alliances to provide IMR services at “inefficiently high wholesale prices”, softening competition on the retail market and harming consumers through “excessively high per call prices”.⁴¹ Officially, the idea came from the airline industry, in imitation of Star Alliance, SkyTeam and One World, because this was preferable to references to the ill-fated Concert, Global One and Unisource alliances of telecommunications operators.

Table 4 *Mobile operator alliances*

Region	Name	Launch	Operator members
Europe	Freemove	2003	Orange, Telecom Italia Mobile, T-Mobile, TeliaSonera
	Starmap	2004*	Amena (Spain), O ₂ (UK, Ireland, Germany, Czech Rep.), Orange (Austria), Pannon (Hungary), Sonofon (Denmark), Sunrise (Switzerland), Telenor (Norway), Wind (Italy)
Asia	Bridge	2004	Airtel (India), AIS (Thailand), C ^{SL} (Hong Kong SAR), CTM (Macau SAR), Globe (Philippines), Maxis (Malaysia), Optus (Australia), Singtel (Singapore), SK Telecom (South Korea), Taiwan Mobile (Taiwan), Telkomsel (Indonesia)
	Conexus Mobile	2006	BSNL (India), FasEasTone (Taiwan), Hutchison Telecom (Hong Kong SAR), Indonesia (Indosat), Japan (NTT DoCoMo), KT (South Korea), MTNL (India), Smart (Philippines), Starhub (Singapore), True move (Thailand), Vinaphone (Vietnam)

* Starmap ceased operations in 2007.

In January 2006, Telefónica de España announced that it would leave the FreeMove alliance as a condition of the approval for its acquisition of O₂.⁴² Its place was quickly taken by TeliaSonera. In 2007, the Starmap alliance closed.

A significant danger from the alliances was that IMR wholesale markets would not see any improvement in competition, since traffic was now substantially locked up, with little prospect of operators switching to a rival block. While the transition from old to new appeared to be competitive, since customers were no longer roaming randomly, once operators had locked onto a single foreign partner there were few opportunities for further change, short of leaving an alliance. The wholesale price now depended on the specific dynamics of a relationship in which operators might have very little knowledge of the discounts available from rival groups.

Lupi and Manenti, in an analysis of a two-country two-firm framework, using the traditional wholesale IMR system, showed that traffic direction without complete control failed to improve the efficiency of the market.⁴³ Where operators acted uncooperatively with imperfect traffic direction, then competition would not guarantee reductions in wholesale prices and, consequently, in retail tariffs. Alternatively, they suggested that efficiency could be achieved by a wholesale price cap.⁴⁴

Traffic direction was made effective (see Figure 2) by the combination of three technologies:

- Lists of preferred and forbidden networks on SIM-cards;
- Over The Air (OTA) instructions to SIM-cards; and

⁴¹ Benno Buehler (2009) *Do international roaming alliances harm consumers?* Milano: Fondazione Eni Enrico Mattei. FEEM Working Paper No. 93. <http://papers.ssrn.com/abstract=1515786>

⁴² Telefónica and O₂, Case No. COMP/M.4035.

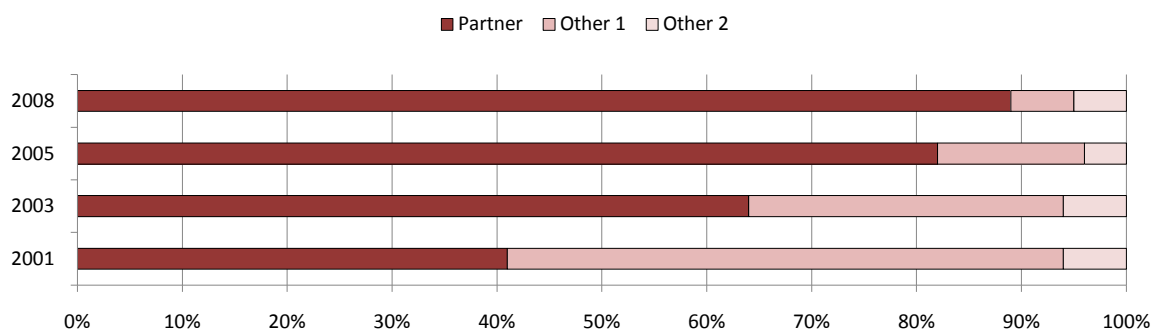
⁴³ Paolo Lupi & Fabio M. Manenti (2009) “Traffic management in wholesale international roaming: towards a more efficient market?” *Bulletin of Economic Research* **61** (4) pp 379-407.

⁴⁴ Paolo Lupi and Fabio M. Manenti (2006) *Roaming the woods of regulation: Public intervention vs. firms’ cooperation*. Padua: University of Padua, Dept. of Economics. <http://www.decon.unipd.it/assets/pdf/wp/20060019.pdf>

- Prohibited Visitor Location Register.⁴⁵

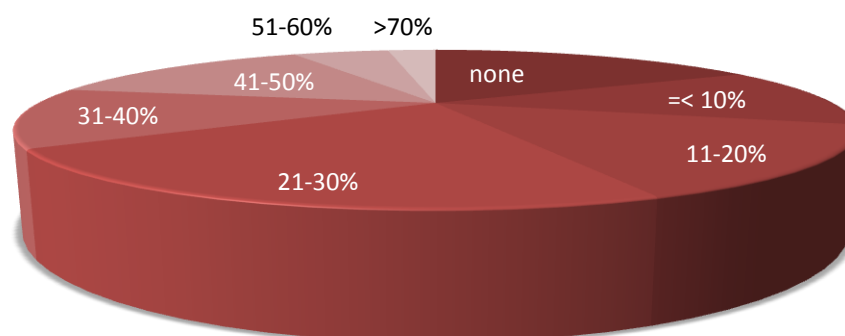
There are rumours of technical counter-measures, but few details and only hints as to their effectiveness and costs.

Figure 2 *Traffic direction to a partner network*⁴⁶



In practice, discounting against IOTs goes as high as 70 per cent or more, though this level is offered by relatively few operators. However, the available data are far too limited to allow patterns to be identified.

Figure 3 *Maximum discounts provided on IOTs in 2008 (percentages)*⁴⁷



The extent of any savings for the operators from traffic direction is unclear, as is the extent to which these are being passed on to retail customers. Likewise, the costs to the operators of developing traffic direction are unknown. The operators continue to maintain multiple contracts in each country, since any additional coverage generates revenues and avoids disappointing customers.

6. National market analyses

In 2002, the EU adopted comprehensive legislation for the regulation of telecommunications markets.⁴⁸ The directives applied an approach largely drawn from competition law, in which markets were to be defined, then analysed, with one or more of a set of remedies imposed

⁴⁵ When a customer attempts to register with the VLR of a foreign operator that the home operator has listed as prohibited the handset has to search for an alternative network.

⁴⁶ Jack Mannetje (2009) "Effective steering techniques" presentation to the *Informa Global Roaming Summit*, London.

⁴⁷ Stainthorpe, op. cit. at page 7.

⁴⁸ Paul Nihoul & Peter Rodford (2004) *EU Electronic communications law: competition and regulation in the European telecommunications market*, Oxford: Oxford University Press.

on any operators found to have dominance. At the insistence of the European Parliament, wholesale international roaming was included in the list of markets to be analysed.

Despite a legal obligation to conduct analyses expeditiously, all the NRAs were slow and many failed to act (see Table 5). Some blamed the ongoing investigation at DG Competition, others seemed to think it not worth the effort. One of the most interesting omissions was Cyprus where the state-owned CYTA was clearly the dominant provider and thus would have been a good test of remedies.⁴⁹

Table 5 *Markets analysed by European NRAs*

Country	Consultation	Report	Notification to EC	EC comment	EC reference
Austria			Notification	SG-Greffe (2006) D/204932	AT/2006/0466
Denmark				SG-Greffe (2006) D/204316	DK/2006/0419
Czech Rep.					CZ/2006/0452
Estonia			Notification		EE/2007/0629
Finland		Report		SG-Greffe (2005) D/207094	FI/2005/0304
France	English French	-	-	-	-
Greece			Notification		EL/2006/0558
Ireland		Report	Notification		IE/2006/0477
Italy		Report	Analysis	SG-Greffe (2006) D/203019	IT/2006/0393
Poland					PL/2006/0517
Sweden				SG-Greffe (2006) D/205497	SE/2006/0496
Slovenia			Notification		SI/2006/0434
Spain			Notification		ES/2006/0460
Norway		Report			

Ficora, the regulator in Finland, conducted the first market analysis in 2005.⁵⁰ The sources of roaming customers were found to be highly concentrated, with Sweden alone accounting for nearly 30 per cent, the next 30 per cent coming from Estonia, Germany and the UK, another 20 per cent came from the rest of the EU and only 20 per cent from beyond the EU. There had been a substantial but unexplained growth in the volume of IMR, rising 40 per cent between 2002 and 2005. This was not driven by falling prices, which instead had risen slightly over the same period.

In the first half of 2005, Ficora estimated that half of all IMR voice calls made in Finland originated from mobile networks to which visitors had been directed. This had caused market shares to alter, with a significant shift from Finnet and Sonera to Elisa. However, Ficora was unable to determine the effects of this on revenues. Finnish operators were being paid less than half the average wholesale rate they paid to foreign operators, though there was no reason given for this.

In 2006 ComReg analysed the wholesale roaming market in Ireland, noting that 75% of roaming traffic originated from visitors from the UK.⁵¹ There were large variations in retail prices, between countries and operators, for roamers travelling to Ireland. Since the

⁴⁹ CYTA has had SMP on the MACO market for some years and remains the dominant operator, with MTN making relatively slow progress.

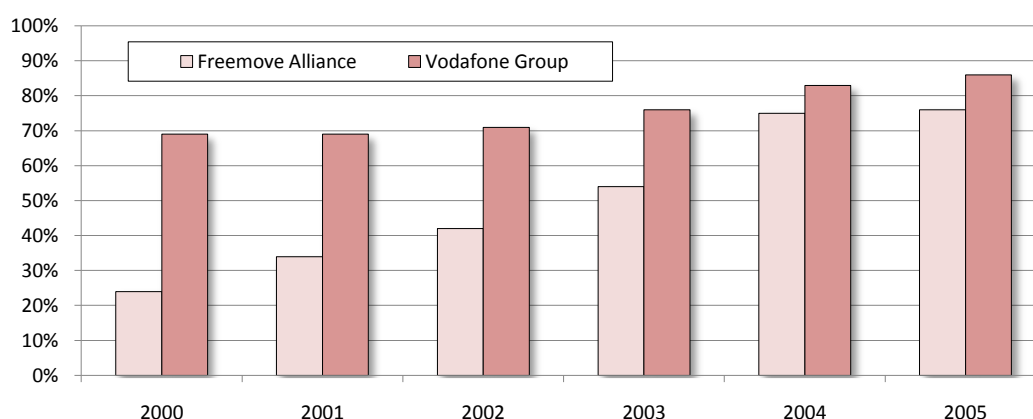
⁵⁰ Ficora (2005) *Markkina 17: Kansainvälinen verkkovierailu kansallisessa matkaviestinverkossa*. Helsinki: FICORA. <http://www.ficora.fi/en/index/viestintavirasto/lehdistotiedotteet/2005/smp17.html>

⁵¹ ComReg (2006) *Market Analysis – wholesale international roaming*. Dublin: Commission for Communications Regulation. Doc. 06/35.

discounting by Irish operators was not disclosed (or possibly not collected) there is no indication as to whether the variations were primarily of domestic or foreign origin.

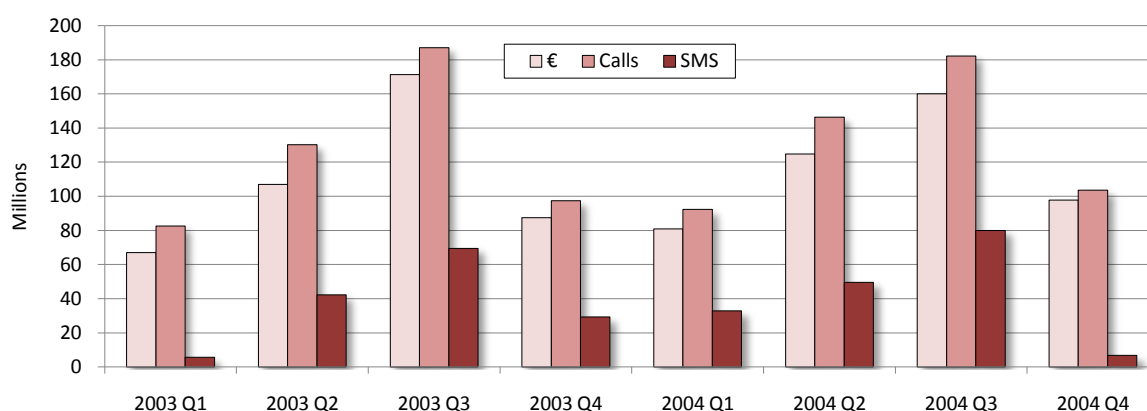
Both the Starmap Alliance and the Vodafone Group were succeeding in diverting traffic away from other operators to their own partners (see Figure 4). For O₂ group traffic had grown from 11% to 46% of its voice roaming volumes between Q1 2000 and Q4 2004, while for Vodafone, O₂ group traffic had fallen from 33% to 4% during the same period.

Figure 4 *Voice traffic delivered to operators in Ireland by their groups*



The analysis by AGCOM of the Italian market showed a strong seasonality, the influence of holiday makers (see Figure 5).⁵² Some seasonality can be seen in the data for visitors to France.

Figure 5 *Volumes of inbound roaming into Italy*

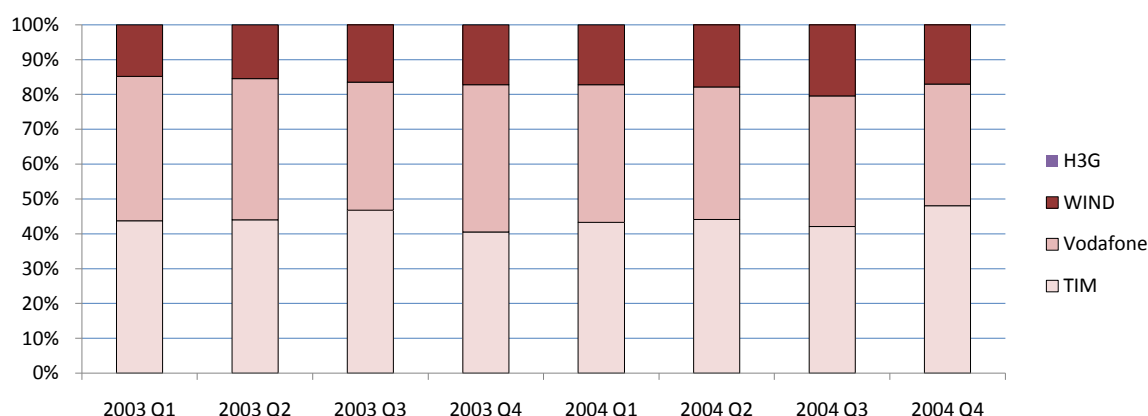


Perhaps as a consequence of the different mix of tourists and business travellers, there were also changes in market shares (see Figure 6). At that time 3 (HWL), with only a UMTS network, was too early to win significant roaming traffic.

⁵²AGCOM, *Mercato nazionale all'ingrosso per servizi internazionali di roaming per le reti telefoniche pubbliche mobili, Identificazione ed analisi del mercato, valutazione di sussistenza di imprese con significativo potere di mercato ed individuazione degli obblighi regolamentari*, Napoli: Autorità per le garanzie nelle comunicazioni. Delibera n. 381/06/CONS.

<http://www.agcom.it/Default.aspx?message=viewdocument&DocID=1989>

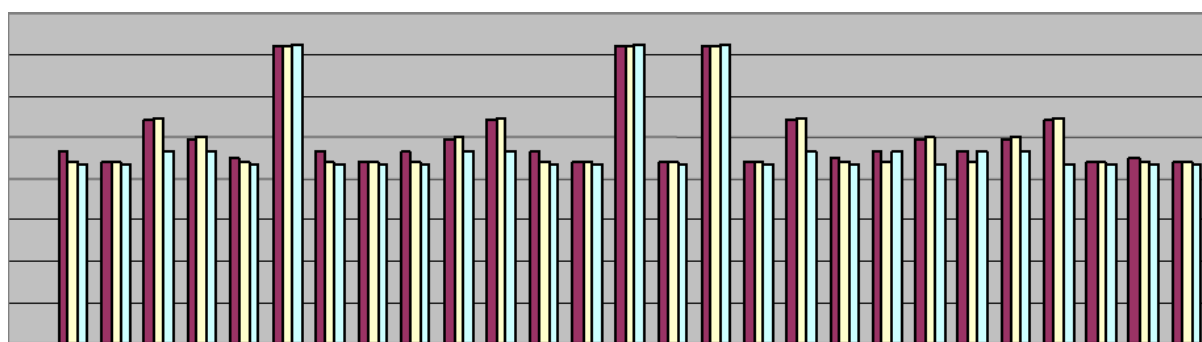
http://www2.agcom.it/eng/mkt_analysis/mkt_17_summary.pdf

Figure 6 *Market share in terms of revenue - voice calls and SMS*

NPT found the wholesale IMR market in Norway was evenly divided between Netcom (TeliaSonera Group) and Telenor in 2006.⁵³ The wholesale charges were at levels far above the production costs, with no explanation for this difference, though they were in line with wholesale prices in other European countries. This may not be consistent with Ficora which had suggested low IOTs in Scandinavia and points to a systemic problem, that there is no set of IOTs and wholesale prices available to check discounts and explain variations.

The very high levels of Norwegian IOTs and their consistency for several years was held to illustrate the lack of effective competition. While traffic direction was being used, NPT noted that its effect might be counteracted by the alliances of operators.

ARCEP, the French regulator, provided a schematic chart of undiscounted IOTs, which were remarkably consistent between the three French operators and the various EU member states (see Figure 7). The three outliers are said to be Mediterranean countries, suggesting that sun and sand generate some measure of market power. Given that the operators all appear to have access to IOT pricing information, it is unclear why ARCEP removes the numerical values and the names.

Figure 7 *IOT levels for international calls in 2005*

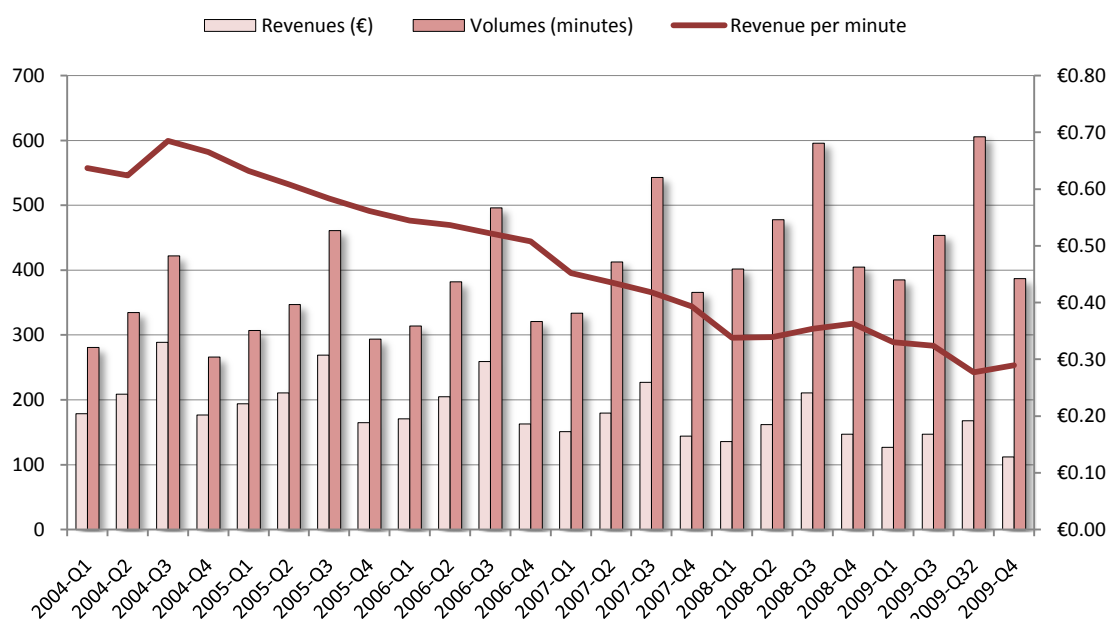
ARCEP reported strong growth of outbound roaming revenues from France, rising from €215 to €350 millions between 2000 and 2004, while inbound roaming only rose from €480 to

⁵³ NPT (2006) *Analyse av det nasjonale grossistmarkedet for internasjonal roaming i offentlige mobilkommunikasjonsnett (marked 17)*, Oslo: Norge Post- og teletilsynet.
<http://www.npt.no/ikbViewer/Content/marked17.pdf?documentID=49405>
http://www.npt.no/ikbViewer/Content/analyse_marked_17.pdf?documentID=49395

€600 millions.⁵⁴ There were significant changes in market shares, with an evening out of the three operators, though with SFR apparently benefitting from increased volumes delivered through its partnership with Vodafone.

ARCEP later abandoned its market analysis and calling for action from “Brussels”, presumably meaning the EC.⁵⁵ However, it continued to collect data from the operators on a quarterly basis showing a peak in the third quarter from summer tourists (see Figure 8).

Figure 8 Roaming-in revenues in France⁵⁶



OPTA, the regulator for the Netherlands, argued market analyses for IMR would not succeed.⁵⁷

While all regulators analysing the market considered the definition provided by the EC, none chose to modify it or to define an alternative, nor did any of the competition authorities who were consulted. Since there was no dispute as to the problem of persistently excessive pricing there was clearly an economic problem. Ordinarily, a competition authority would be expected to find a market definition that matched the problem. Instead, the regulators confirmed the definition and confirmed the problem, but failed to find any operator or group of operators with dominance, pointing to a fundamental flaw in their approach.

⁵⁴ ARCEP (2006) *The market for international roaming: Public consultation on the national market for international roaming services on public mobile telephone networks*. Paris: ARCEP.

⁵⁵ Paul Champsaur (2005) "Roaming : Bruxelles doit prendre ses responsabilités" : une interview de Paul Champsaur, président de l'ARCEP, publiée dans *La Tribune*.

⁵⁶ Source: ARCEP quarterly market observatories.

Le roaming-in correspond à la prise en charge par un opérateur mobile français des appels reçus et émis en France par les clients des opérateurs mobiles étrangers. Le revenu correspond à des reversements entre opérateurs. Le rapport revenu/volume ne correspond à aucun tarif et en particulier pas à un tarif facturé au client.

⁵⁷ OPTA (2005) *International mobile roaming*. Den Haag: Onafhankelijke Post en Telecommunicatie Autoriteit. RPN04.

After the passing of several years, the expenditure of considerable effort, supported by extensive data gathering powers and substantial analytical capacity, the NRAs added remarkably little to our understanding of IMR markets. Despite a common position of the European Regulators Group (ERG), the data released were very inconsistent.⁵⁸ What is suggested is that strong geographic and pricing patterns in IMR exist but, because of the lack of data, these are poorly described and thus not yet understood. Although traffic direction appeared to be working on a technical level, there was minimal evidence of operators switching partners after the initial round of changes, suggesting traffic patterns might now be frozen. No further data on this or on levels of discounting are likely to be published, unless further regulatory proceedings are opened at the national or EU level. Significant Market Power (SMP) status was not imposed on even a single operator, nor was any root cause identified for the excessive prices and the lack of retail competition which the NRAs described.

7. Operator price schemes

The approach of the Vodafone Group to roaming has been evolutionary. It took a considerable time to integrate its acquisitions and to use its geographical scope as leverage against rivals, often seeming to outsiders to be a series of mediæval fiefdoms operating with only limited suzerainty to Headquarters in Newbury (later Paddington).

In January 2001, Vodafone launched the Eurocall scheme, which it notified to the European Commission.⁵⁹ Later it launched Worldcall, expanding the scope of Eurocall, which was to become Passport some years later. Vodafone noted that:

Previous attempts to regulate wholesale charges – as when the Commission imposed non-discrimination obligations on Vodafone following the Mannesmann acquisition – had the effect of inhibiting price reductions rather than accelerating them. Vodafone Passport was not and could not have been launched until these restrictions were removed.⁶⁰

The networks participating in the EuroCall scheme were Vodafone Group companies and affiliates (see Table 6). They undertook to discount IOTs between themselves, with a maximum retail roaming charge of €0.80 per minute.⁶¹ It created simplified retail tariffs with a uniform maximum price when roaming on any of the participating networks, aimed at attracting and retaining higher spending and especially enterprise customers.

⁵⁸ ERG (2005) *Common position on wholesale international roaming*. Brussels: European Regulators Group. ERG (05) 20rev1

⁵⁹ Case COMP/C1/38.074 Vodafone Eurocall and wholesale preferred roaming scheme. *Official Journal C 42* p 13 (8 February 2001).

⁶⁰ Vodafone Group plc (2006) *Response to Commission call for comments on proposed regulation of international roaming charges: comments of Vodafone*. Newbury: Vodafone Group.
http://ec.europa.eu/information_society/activities/roaming/docs/comments/vodafone.pdf

⁶¹ A document on the Eurocall scheme was posted on the Vodafone web site at the time and subsequently withdrawn. [An electronic copy is on file with the author.]

Table 6 *Vodafone Eurocall Scheme in 2001*

Country	Operator
Austria	Tele.ring Telecom Service GmbH
Belgium	Belgacom Mobile SA ("Proximus")†
France	Société Française du Radiotéléphone ("SFR")‡
Germany	Mannesmann Mobilfunk GmbH ("D2")
Greece	Panafon SA
Italy	Omnitel Pronto Italia SpA
Netherlands	Libertel NV
Portugal	Telecel SA
Spain	Airtel Moviles SA
Sweden	Europolitan AB
United Kingdom	Vodafone

† Jointly owned by Vodafone and Belgacom.

‡ Jointly owned by Vodafone and Cegetel.

The approval of the EC was required because the agreements restricted competition and thus fell within the scope of Article 81 (1) of the EC Treaty (now Article 101 (1) of the EU Treaty). An exemption was possible under Article 81 (3) (now Article 101 (3) EU).

In 2005, once the merger commitments had expired, the Eurocall and Worldcall schemes were replaced by Vodafone Passport.⁶² This had no monthly subscription fee, but a "small" set-up charge for each roaming call made or received, after which the home network charges applied.⁶³ For example, for Vodafone UK the initial charge was £0.75. It was an attractive offer for longer calls, suggesting the scheme was aimed more at enterprise customers.

In September 2006, Vodafone reported some ten million customers using Passport.

Vodafone greatly expanded its footprint for the Passport scheme, by signing up partners, such as Digicel in the Caribbean and Chungwha in Taiwan (see Table 3). To do so, it used traffic direction technology, ensuring that partners would obtain some 90 per cent of the traffic from the customers of Vodafone Group and its partners in a particular country.

Other groups and the alliances created similar schemes, such as T-Mobile's WorldClass in order to compete with Vodafone. By the time of the second Roaming Regulation there were a significant number of such schemes (see Table 7).

Table 7 *Operator roaming tariff schemes offered in the United Kingdom*

Operator	Name	Scheme description
Vodafone	Passport	£0.75 call set-up fee then usual tariff
Orange	Business Traveller Europe	£7/month, free incoming calls, £0.23/min
T-Mobile	Worldclass	£0.25/min in Ireland and £0.55/min in 18 countries.
Telefónica/O ₂	My Europe Extra	£10/month, free incoming calls, calls to the UK and EU for £0.25/min

Although the operators maintain these are better value than the tariffs complying with the Roaming Regulations this is not easily proved and ERG data suggests the savings are quite modest.

⁶² Vodafone (2005) *Vodafone UK launches new mobile roaming tariff*. Newbury: Vodafone Group.
<http://www.3g.co.uk/PR/July2005/1751.htm>

⁶³ Vodafone Group (2006) *Vodafone reports 10 million Vodafone Passport customers*. Newbury: Vodafone Group.
http://www.vodafone.com/start/media_relations/news/group_press_releases/2006/press_release19_09.html

8. Operator opposition to price caps

The EC has held three consultations on IMR, with the arguments and level of detail increasing as the operators appreciated the seriousness of its intention. Nonetheless, much of the content was more political than economic. Indeed, Vodafone questioned the rationale of the first proposals, suggesting they were political rather than economic.

The first consultation was from February 20th to March 22nd 2006.⁶⁴ The GSMA responding that it was “very sceptical” about the need for the regulation. It pointed to a fall of around 8 per cent in the average retail IMR prices from a sample of operators over the previous year. It attributed this directly to competition, though it could equally well have been caused by the threat of regulation.

The *Comision del Mercado de las Telecomunicaciones* (CMT) wanted to continue to use the existing legislative framework, a view shared by the majority of operators. Other regulators and governments supported the EC, either in seeking an alternative to the regulatory framework or, more bluntly, in seeking means to eliminate the IMR surcharges. While there was widespread support for wholesale price controls, there was much less support for retail price controls.

The ERG, with CMT dissenting, noted the high retail prices, that “the market is unlikely to address this issue fully in the short to medium term”, that these were substantially the result of high wholesale prices, several times the level of the underlying costs, and that it had “currently no reasonable expectation” that the wholesale prices would fall. It suggested a uniform Europe-wide cap on wholesale roaming charges.

The second consultation on roaming was held from April 3rd to May 12th 2006 for a potential regulation with the suggestion of a “Home Pricing Principle”.⁶⁵

The ERG, again with CMT dissenting, supported a roaming regulation. While the legislative framework was considered generally sound “the exceptional case of international roaming markets” required a different approach. However, no description of or explanation for the exception were provided. It proposed a wholesale cap of €0.30 per minute (“twice the level of the 75th percentile of the national average rates for mobile termination”) as an “expedient proxy” for cost-orientation. It suggested that, at least initially, there should not be a retail cap, in effect that the EC should wait and see whether the wholesale reductions were passed on to retail customers.

ETNO claimed “Positive signals are already coming from the market” a view echoed by several of its members. The GSMA called for the EC to demonstrate that the proposal would deliver the desired outcomes, by means of an impact assessment, though this would have been quite unusual at the stage of a consultation, more usually accompanying a legislative proposal. It noted different costs in different member states and warned that operators would have to charge below cost for certain calls and therefore to recover the losses from raised charges elsewhere. It argued that the regulation would be discriminatory, since its effects on operators would vary significantly, depending on the individual operators and

⁶⁴ 2007 public consultation on roaming: first phase

http://ec.europa.eu/information_society/activities/roaming/regulation/archives/1st_phase/index_en.htm

⁶⁵ EC (2007) *Proposal for a Regulation (EC) of the European Parliament and of the Council on mobile roaming services in the Single Market*, Brussels: European Commission, 2007.

All non-confidential responses are available at:

http://ec.europa.eu/information_society/activities/roaming/regulation/archives/2nd_phase/index_en.htm

their markets (e.g., holiday destinations would be harder hit). There were also possibilities of price squeezes.

In May 2008, the EC launched its third consultation, as part of its review of the first Roaming Regulation.⁶⁶ The operators were, in general, opposed to its extension for a further period and to the addition of caps on SMS and mobile broadband – opposed more vehemently to retail than to wholesale caps. It was put by GSMA that:

If the Commission had reviewed the broader European mobile market in sufficient detail as part of its impact assessment, it would have discovered a highly competitive, well functioning market, with intense competitive rivalry and steadily declining prices.

Yet, the market was not this diffuse retail “mobile market”, but the wholesale roaming market, with the EC and many NRAs and NCAs having previously determined that a separate wholesale roaming market existed. Moreover, the GSMA referred to mobile broadband as an emerging market, effectively conceding the point on separate markets.

The levels of competition being reported are very confusing, in part the result of the enthusiasm of the operators to see competition in order to avoid further regulation, in contrast to the regulators who saw little, if any, competition. It is not clear what the various parties understood by “competition” – it seems mostly to have been that prices were declining, often from a very high base, so it became an interpretation of the speed of decline. The consultation process being largely political meant that competition could be defined as each party wanted it.

Despite the competition seen by the operators, it was claimed that the price cap had “stymied” retail competition. There were retail prices that were almost identical with the retail caps and the non-regulated offers, such as Vodafone Passport, that were said to be cheaper and more popular. It is far from clear whether there could be said to be more (or less) competition.

Despite the short period of implementation, the operators reported significant drops in roaming revenues, plus increased costs from implementation of the Regulation. While a numerical value for the rise in the volume of use following the price reduction cannot be derived from the various contributions, the GSMA estimated elasticity as being -0.25. Whatever the value, the operators were agreed it was insufficient to compensate for the price reductions. Business users had not increased their use, being characterised as price insensitive. Holiday-makers were seen as infrequent travellers who had limited roaming requirements and no need for additional communications.⁶⁷

The costs of developing and installing the systems required by the Regulation had displaced other commercially directed development work, made worse by the need for haste to achieve the legislated deadline. The effects were reported to be harder on smaller operators. The GSMA estimated the costs of implementation of the first Regulation at €150 millions or about €1 per roamer.

⁶⁶ EC (2008) *Public consultation on a review of the functioning of Regulation (EC) No. 717/2007 and its possible extension to SMS and data roaming services*, Brussels: European Commission.

Responses can all be found at:

http://ec.europa.eu/information_society/activities/roaming/regulation/consult08/contributions/index_en.htm

⁶⁷ Mobikom market research showed two-thirds of consumers had no need to talk more, so lower prices would not increase their use.

Some operators (e.g., Mobilkom Group) argued that the loss of roaming revenues was causing a reduction in investment in their networks. However, there was very little evidence produced to support this.

Mobile broadband roaming or data roaming was repeatedly said to be a nascent or emerging market. The GSMA called it a “young, emerging market” and drew attention to the small size of the market, the high growth rates and the technological evolution from GPRS to, ultimately, LTE.⁶⁸ However, rapid technological advancement does not normally cause a market to continue to be seen as emerging.⁶⁹ The ECJ has recently ruled on the definition of emerging markets.⁷⁰

The problem is that mobile broadband roaming services had been launched several years before (see Table 8). If in mid-2008 mobile broadband roaming was still “emerging” it demonstrates a serious market failure, given that the technology had been planned from the 1980s, been available from the late 1990s and deployed for several years. 3G, an extension of GPRS, had been the subject of enormous speculation by the operators about future revenues from mobile broadband. The very small contributions of GPRS services to ARPU seem to confirm the problems the operators had in making this market work. The choice then is accept it as no longer emerging or as failed, with one of the primary causes of the failure being prices that were too high for prospective customers.

Table 8 *Press releases on roaming with GPRS*

<i>Date</i>	<i>Companies</i>	<i>Announcement</i>
30 th August 2000	Sonofon, Europolitan and Nokia	First GPRS roaming with WAP
14 th September 2000	Nokia and Sonera	First ever GRX-based GPRS Roaming
5 th July 2001	Telenor and Sonera	GRX-based GPRS roaming between Norway and Finland
7 th January 2002	Telia	Announcement of GPRS roaming
21 st February 2002	Mobilkom Austria	Central Europe's first offer of GPRS roaming
25 th March 2002	Vodafone	First commercial European GPRS roaming service
1 st July 2002	O ₂ and Hutchison	GPRS roaming between Britain and Hong Kong
4 th February 2003	O ₂	GPRS roaming agreements in over 20 countries
18 th November 2003	China Mobile and AT&T Wireless	GPRS roaming launch

Clearly some roaming customers expected to use the mobile broadband service as they did at home, generating potentially very large bills, while others used it very lightly, perhaps switching to Wi-Fi or hotel broadband for heavier applications. This suggests that much of the problem was the failure to convey to a few customers the large and structural difference between home and roaming tariffs, one flat rate and the other per unit of data transferred.

Some smaller operators claimed to be offering low wholesale prices but were unable to generate any business, it having been secured within the large groups and alliances. On the other hand, wholesale price reductions had helped them where, for lack of numbers of outgoing roamers, they would not otherwise have been able to obtain a discount.

Traffic steering was said to be leading to discounting, below the wholesale cap. Although little evidence was produced, Mobilkom Austria Group and the Portuguese operators had wholesale rates below the level of the cap. However, traffic direction for mobile broadband

⁶⁸ The order of availability of the technologies was: HSCSD, GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA and LTE.

⁶⁹ Obvious examples would be microprocessors used in computers and broadband Internet access where the market remains relatively constant, despite rapid technological progress.

⁷⁰ European Court of Justice Case C-424/07 European Commission v. Federal Republic of Germany.

was not as effective and the large price differentials between partners and other networks was causing average prices to remain high.

Volume discount agreements resulted in delayed rebates. The payments were received long after customers had paid their bills, apparently creating a disincentive to pass on savings as reduced retail rates.

There was no evidence produced in the consultations to support high underlying costs for SMS. Several operators blamed high retail prices on wholesale rates, suggesting a lack of competition on the wholesale market.

Some non-EU operators had seen the new wholesale prices and were trying to get similar treatment. Meteor, a small Irish operator, had negotiated deals with non-EU operators at levels below the wholesale cap.

Transatel pointed to the failure to increase competition by introducing structural changes (i.e., allowing MVNOs like themselves).

Overall, little consensus emerged on competition or even on the definition of markets in which competition might be measured. The emphasis was instead on finding some economic rational or statistical evidence to support a political position.

9. Price transparency

One of the major arguments was how to reduce IMR price levels without introducing further and unnecessary distortions to the market. A central question was the extent to which price transparency might help – whether by telling customers their IMR charges they would react. If they reduced their use of the roaming service or switched to alternatives, to a significant extent, it would cause the operators to bring down their retail prices.

In 2000, the EC's sector inquiry had identified the lack of information for consumers as a significant problem. The operators addressed this through a code of conduct.⁷¹ It was announced the day before a closed session in which the EC was to brief national competition authorities and regulators on the progress made in the sector inquiry. The operators later had Ovum evaluate compliance with the code, initially finding 28 of 45 operators were not compliant but they quickly fell into line.⁷² A revised code was issued, reflecting "best practice" amongst operators.⁷³

Although no assessment was made of the effectiveness of the provision of information under the Code, the Eurobarometer survey in 2006 showed that more than four out of ten Europeans did not have a clear idea of the cost of IMR.⁷⁴ In 2005, a survey of Finnish consumers found 42 per cent had no idea of the costs incurred from using a mobile phone abroad.⁷⁵ An earlier survey in Ireland found awareness of the costs of using a mobile phone

⁷¹ GSM Europe (2001) *Code of conduct for information on international roaming retail prices*. Blackrock: GSM Association.

⁷² Keshinee Shah & David Lewin (2002) *GSM Europe Code of Conduct for information on international roaming retail prices - Code of Conduct monitoring - Results for first year of implementation (December 2001-October 2002)*. London: Ovum for GSM Association.

⁷³ GSM Europe (2003) *Code of conduct for information on international roaming retail prices*, revised, London: GSM Association.

⁷⁴ Eurobarometer (2007) *Special Eurobarometer: Roaming Special Eurobarometer 269 / Wave 66.1 – TNS Opinion & Social*. Brussels: European Commission.

⁷⁵ <http://www.ficora.fi/en/index/viestintavirasto/lehdistotiedotteet/2005/roaming05.html>

abroad was only 48% of mobile customers.⁷⁶ It seems that the code was far from being effective.

In response to complaints by some regulators in the Arab states, the operators tried again to use a code of conduct to address the lack of consumer information on IMR prices and a web site.⁷⁷ These have never been evaluated.

During the 1999 review of the EU legislation, Wim van Welzen, a Dutch MEP, suggested that operators provide real-time price information on IMR charges. A similar point had been made by Ovum for the EC, in a report on price transparency.⁷⁸ The response from the GSMA was that it would cost €100 million per operator, because of the need for “advanced real time signalling between the visited network, the home network and the service provider”.⁷⁹ There was no indication of the source of this estimate, which across the then 15 MSs would have amounted to a not entirely plausible total of more than €4 billion.

In October 2005, Commissioner Reding launched a web site with roaming prices within the EU, using information collected by EC staff from the web sites of operators.⁸⁰ The GSM Association responded with its own website with pricing data, which had links to the various web sites of its members.⁸¹

In 2007, a report for the European Parliament examined a range of technical options for price transparency, suggesting a service providing greater tariff transparency should not necessarily be offered to customers without a charge.⁸² Nonetheless, Article 6 (1) of the Roaming Regulation eventually required operators to provide customers with a message, free of charge, containing the prices they would pay for any EU member states they visit.⁸³ Article 6 (3) required information to be provided to subscription customers on signing a contract and with any subsequent changes to the roaming tariffs.

One of the factors in the impact assessment was an assumption that, with the reduction of prices and an increase in their transparency, customers would increase their use of IMR services. While only very limited data are available, its interpretation was complicated by the depth of the recession, which caused demand to fall sharply. As the Group CEO of Vodafone noted, the year-on-year drop in IMR revenues from 2008 to 2009, of around 15 per

⁷⁶ ODTR (2002) *Consumer awareness of mobile roaming – A report by the ODTR, part of a joint ODTR/Oftel study on mobile roaming*. Dublin: Office of the Director of Telecommunications Regulation. ODTR 02/33.

⁷⁷ GSM Europe (2006) *Code of conduct for information on international roaming retail prices in the Arab region*. London: GSM Association. http://www.gsma.org/documents/gsmec_coc_int_roaming.pdf

⁷⁸ John Horrocks, David Lewin & Claire Milne (1998) *Tariff transparency in a multi-operator Environment: A report to the Information Society Directorate General*. Brussels: European Commission.

⁷⁹ GSM Europe (2001) *“Real time” tariff information – the feasibility of implementation*. London: GSM Association.

⁸⁰ EC (2005) *Roaming: Commission launches consumer website on the costs of mobile roaming in Europe*. Brussels: European Commission. Press release IP/05/1217.

see also http://europa.eu.int/information_society/activities/roaming/index_en.htm

⁸¹ GSMA (2006) *New web site helps consumers to find best mobile roaming rates*. London: GSM Association. <http://gsmworld.com/newsroom/press-releases/2051.htm> see also <http://www.roaming.gsmeurope.org/>

⁸² Alessandro Palmigiano, Colin Blackman, Erik Bohlin, Simon Forge, Andrea Renda, Tanya Sammut-Bonnici & Sabrina Vecchio Verderame (2007) *Technical issues on roaming: transparency, technical aspects and data: overview related to the proposed regulation on roaming*. Brussels: European Parliament.

⁸³ Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC.

cent, matched the reduction in business travel within his company. O₂ has presented charts comparing IMR traffic volumes in the EU with the rest of world which suggest that there was very little difference in the changes in volume and that the price reductions and increased transparency in the EU had not caused any increased use.⁸⁴ However, much more data are required to make a proper assessment.

Both the United Arab Emirates⁸⁵ and Bahrain⁸⁶ adopted price transparency measures based on the EU approach, requiring operators to send a text message with applicable prices in the home currency and billing language. Neither regulator provided an impact assessment of the costs and possible benefits, nor have they undertaken surveys to determine the extent to which this has helped consumers.

One of the considerations in the revision of the 2007 Roaming Regulation was the problem of “bill shock”, with small numbers of consumers spending without limit for the use of data services in foreign countries and generating enormous bills. It is clear that at least some customers had entirely failed to grasp the differences between domestic and roaming tariff structures for mobile broadband. Strangely, the anti-fraud measures which are supposed to identify strange behaviour among roaming customers seem not to have detected these customers.

The legislative solution was for operators to be required to set a limit, by default €50, with a warning message to customers at 80 per cent, with a requirement for positive confirmation before spending is allowed to go beyond the limit.⁸⁷ This began to be implemented in March 2010.

Clearly, these provisions have cost the operators significant sums. It is certainly something about which they complain, though without yet having published figures. Beyond the EU, the Federal communications Commission has opened a notice of inquiry into “bill shock”.⁸⁸

Among business and other high-spending customers there is some price insensitivity – people who simply use the service and do not care very much about the prices. Their companies do care and try to negotiate lower prices and will, where possible, limit the use of IMR services. Whereas, some consumers are highly price sensitive and use local SIM-cards. However, there is very little direct evidence of their numbers or the effects they have, these have to be inferred from the customer data.

Price transparency has been improved by means of regulation, if not by codes of conduct, at some cost to customers. While it is clearly not unhelpful, there is no evidence that it is cost-effective. More seriously, it is unclear how much effect it has had on levels of prices and usage.

⁸⁴ O₂ (2009) Presentation at *Informa Global Roaming Summit*, London.

⁸⁵ TRA (2007) *Directive No 3 of 2007 – International roaming notification*. Abu Dhabi: Telecommunications Regulatory Authority.

⁸⁶ TRA(2008) *Regulation No. 1 of 2008 on Notification of International Tariffs by SMS*, Manama: Telecommunications Regulatory Authority, 2008.

Amended by TRA (2009) *Resolution No. (7) of 2009 amending some provisions of the Regulation issued by Decision No. (1) of 2008 on Notification of International Roaming Tariffs by SMS*.

⁸⁷ Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services.

⁸⁸ FCC (2010) *Comment sought on measures designed to assist U.S. wireless consumers to avoid ‘bill shock’ pleading cycle established*. Washington DC: Federal Communications Commission. CG Docket No. 09-158. DA 10-803.

10. Price caps

The proposal for an EU regulation, that is a statute based on the EC Treaty without national transposition, was intended to be a quick and sure market intervention, ignoring a range of more subtle but slower and far from certain market interventions.⁸⁹ The choice of Viviane Reding, then Commissioner for the Information Society, was a set of retail and wholesale price caps, with a glidepath to be followed by a review.⁹⁰

The EC concluded that there was “little evidence that the market alone can deliver” the required price reductions.⁹¹ In this it was supported by the regulators, excepting only Spain. A range of options was evaluated:

- No policy change;
- Self-regulation;
- Co-regulation;
- Soft law;
- Targeted regulation;
- Wholesale regulation only;
- Retail regulation only; and
- Both wholesale and retail regulation.

Mobile VoIP was dismissed, as likely to become a reality only in the medium term. Even in 2010, its effect on the use of IMR is so limited as to be difficult to evaluate.

The EU market for IMR was estimated at €8.5 billion or 5.7 per cent of total annual mobile revenues. IMR prices affected at least 147 million EU citizens annually, of whom 37 million were leisure travellers.⁹²

The consumer surplus from the proposed regulation was estimated by the EC to be:

- between €5.28 and €5.96 billion with retail and wholesale price caps;
- between €2.20 and €2.30 billion with only wholesale price caps; and
- between €1.50 and €1.55 billion with ‘no policy change’.

These estimates were neither recalibrated for the modifications to the caps made in Parliament and Council, nor were they verified with observational data after implementation.

There were considerable disagreements in Council and Parliament about the details of the price caps, in part these aimed to simplify the original rather fussy proposal, but in essence were about the extent of the initial cuts and the steepness of the glide path. The result was, inevitably, a political compromise, rather than the practice of economic science.

Speaking in June 2006, Commissioner Reding returned to the issue of EU competitiveness, noting that roaming charges were an important cost for businesses and that they should be eliminated as a cost of doing business across borders.⁹³

⁸⁹ Ewan Sutherland (2008) “The regulation of international mobile roaming” *Info* 10 (1) pp 13-24.

⁹⁰ EC (2006) *Proposal for a regulation of the European Parliament and of the Council on roaming on public mobile networks within the Community and amending Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services*. Brussels: European Commission. COM (2006) 382 final.

⁹¹ EC (2006). *Staff working paper: impact assessment of policy options in relation to a Commission proposal for a regulation on the European Parliament of the Council on roaming on public mobile networks within the Community*. Brussels: European Commission. SEC (2006) 925.

⁹² Source: GSMA.

The EP's Committee on Internal Market and Consumer Protection (IMCO) obtained external advice on the caps.⁹⁴ Instead of separate caps of €0.30/min for outbound national calls and €0.45/min to other member states, a single cap of €0.39/min was deemed "appropriate", while the consultants proposed raising the cap for incoming calls from €0.15/min to an "appropriate" €0.26/min. They also suggested changing the margins, arguing:

We find that excessive profits on retail level are more likely to be channelled back to consumers than excessive profits on wholesale level.

This was based on the belief that there was more retail than wholesale competition, though no supporting evidence was produced for this claim. Indeed, the perceived lack of retail competition had caused the prices to remain artificially high, the subject of the original complaint in 1999.

The consultants indicated that a larger mark-up would ensure that smaller operators, with allegedly higher unit costs, would avoid being squeezed. This appears to be an argument for the protection of competitors rather than of competition.

A T Kearney argued that both the roaming specific costs and the profit mark-up were higher than estimated by the consultants.⁹⁵ This was dismissed as overstating the costs.⁹⁶

Switzerland commissioned its own report into IMR which found that high IMR prices were charged to customers and noted unquantified benefits if it could enter into a bilateral agreement with the EU.⁹⁷ While no agreement was reached, operators did broadly follow the wholesale and retail price caps being treated as an honorary member of the EU by other operators. One reason was that it was convenient for operators in the EU to include Switzerland in the regulated tariff plans, it being too difficult to explain to their customers its status given its location.

Prior to the first Regulation, the ERG published a transparency report.⁹⁸ Article 7 (3) of the Regulation empowered NRAs to monitor prices, based on which the ERG has published a series of, so far, four reports on wholesale and retail prices.^{99,100,101,102} It concluded a "high level" of compliance with the Regulation at both retail and wholesale levels (see Figure 9), though it failed to notice the misclassification by some operators of French DOMs as non-EU destinations, when they were subject to the Roaming Regulation.¹⁰³

⁹³ Viviane Reding "The importance of reducing mobile roaming charges for the competitiveness of Europe's business customers" speech to the *Conference of EVUA – the Enterprise Virtual Private Networks Users Association*, Brussels, June 29, 2006.

⁹⁴ Copenhagen Economics (2006) *Roaming: an assessment of the Commission proposal on roaming*. Brussels: European Parliament. (IP/A/ALL/FWC/2006-105/Lot4/SC1)

⁹⁵ A.T. Kearney (2007) *International roaming regulation – comments on the Copenhagen Economics 'Study on roaming'*. London: A T Kearney, 2007.

⁹⁶ Copenhagen Economics (2007) *Note on specific aspects of regulation on prices for international roaming in mobile networks*. Copenhagen: Copenhagen Economics.

⁹⁷ Copenhagen Economics (2006) *Study on international roaming in mobile telecommunication networks - final report*. Copenhagen: Copenhagen Economics.
<http://www.copenhageneconomics.com/Publications/Competition---Regulation.aspx?M=News&PID=534&NewsID=84>

⁹⁸ ERG (06) 44 International Roaming Transparency Report.

⁹⁹ ERG (07) 85 International Roaming Report.

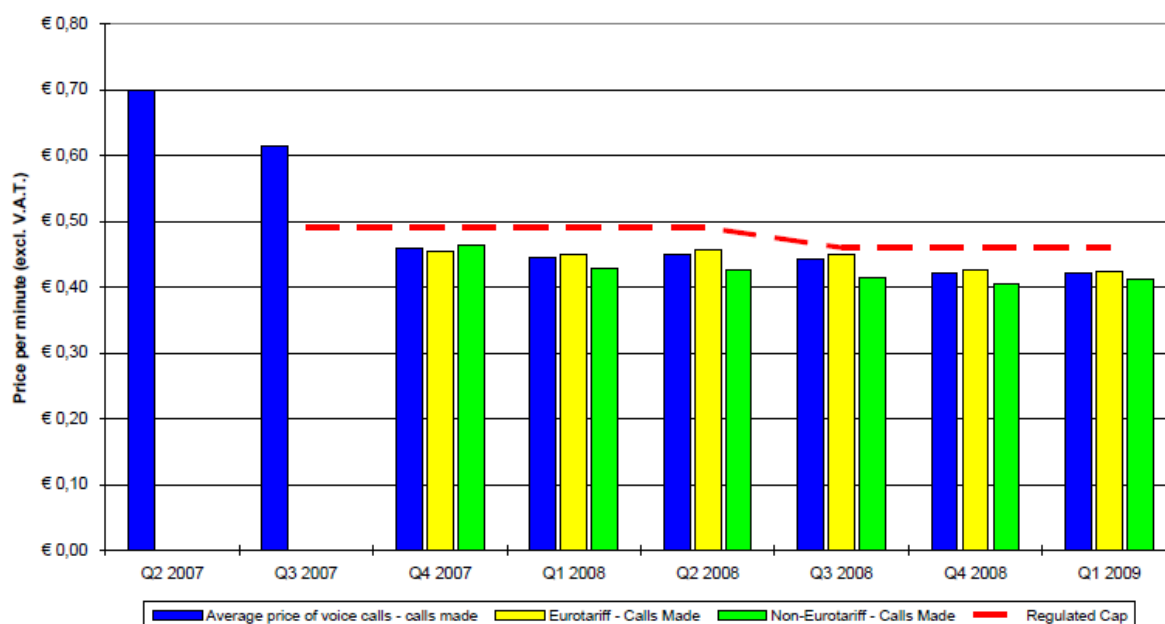
¹⁰⁰ ERG (08) 36 International Roaming Report.

¹⁰¹ ERG (09) 01 3rd Roaming Data Report.

¹⁰² ERG (09) 31 4th Roaming Data Report.

¹⁰³ For example, some operators classified Martinique as being "Caribbean" rather than "EU".

Figure 9 EU/EEA average prices per minute for retail voice calls (based on billed minutes)



The ERG reports provide only charts, without the numbers used to construct them and none of the underlying data. Consequently, it is extremely difficult to draw any conclusions from the data gathering exercise, not even to confirm the analysis of the ERG. It is possible that valuable data are held by ERG but, short of a freedom of information request, these are unlikely ever to be released.

La Federación de Consumidores en Acción (FACUA), an association of consumers in Spain, made a complaint against the three operators (Orange, Telefónica Móviles and Vodafone), alleging they had colluded in setting prices for IMR, following the introduction of the Roaming Regulation.^{104, 105} In the absence of direct evidence, it was argued that this could be inferred from the evolution of tariff structures – all three had set prices at the retail price cap. The *Comisión Nacional de la Competencia* closed the case because:

... the rates' similarity could be explained by the rational and autonomous operators' behaviour in response to external factors and changing market conditions

The changes had also lowered prices for consumers.

In 2008, the EC review proposed to extend the voice price caps with further reductions and to introduce wholesale and retail price caps for SMS.¹⁰⁶ It also proposed, experimentally, to introduce a wholesale price cap on mobile data roaming, but no retail cap. This was to test the hypothesis that regulation could be performed at the wholesale level without a retail cap.

¹⁰⁴ "Comparadas las tarifas de 'roaming' de Movistar, Vodafone, Orange y Yoigo", FACUA, Sevilla, May 2007. <https://www.facua.org/es/estudio.php?Id=80>

¹⁰⁵ Spain (2008) *Annual report on competition policy in Spain*. Paris: Organisation for Economic Cooperation and Development. DAF/COMP(2009)27/06.

¹⁰⁶ Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services. COM(2008) 579 final.

The impact assessment contained a model of the welfare effects, focused on static welfare (the sum of consumer and producer surpluses) built on the hypothesis that “any deviation from a competitive equilibrium will reduce social welfare in the static sense”.¹⁰⁷ It used three scenarios:

- An industry view of limited elasticity (i.e., declining revenues);
- Demand elasticity of minus one (i.e., constant revenues as prices changed); and
- An optimistic scenario from the ERG (i.e., rising revenues).

An assessment using data provided by the ERG suggested the value should be -0.35.¹⁰⁸

Total EU mobile revenues were estimated at €137 billion annually.¹⁰⁹ Thus the forecast decrease of €1.29 billion in voice roaming revenues in the pessimistic scenario (or an increase of €0.71 billion in the optimistic scenario) corresponded to a reduction of 0.94 per cent (or an increase of 0.52 per cent). Taking the EBITDA margin as 35 per cent, overall industry profits were €50 billion, so that the price caps would cause a decrease of 2.14 per cent (or an increase of 0.27 per cent). The EC concluded that “The impacts on industry are thus rather small”.

The Danish regulator conducted a study of prices for SMS, finding Danish roamers in the EU were paying ten times the price at home.¹¹⁰ Danish operators were paying on average €0.1718 of wholesale charges, against foreign costs of €0.0081, then adding a mark-up of €0.0966 against domestic costs of €0.0268. In an effective market, with more reasonable margins, the price would have been €0.0416, rather than the observed price of €0.3355. The Danish regulator concluded that there was little evidence of competition.

For the SMS caps proposed by the EC, the benefits are shown in Table 9, with a worst-case scenario showing a drop in industry profits of €168 million. The EC considered this to be sufficiently outweighed by the benefits for consumers.

Table 9 *Impact assessment for SMS price caps (€ millions in 2009-10)*

Scenario	Optimistic	Pessimistic
Δ Consumer Welfare	1,243	884
Δ Social Welfare	1,514	716

As part of the review, the EC had consultants prepare a report on data roaming.¹¹¹ This was described as an “emerging market”, though without any formal antitrust law tests of that term. As noted above, it was rather old still to be emerging after so many years. The mobile data or broadband service uses and has used a range of technologies with increasing speeds, from HSCSD up to HSPA+ and LTE, though all would be considered to be in the same

¹⁰⁷ Commission Staff working paper accompanying the Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services. SEC(2008) 2489.

¹⁰⁸ Matteo Aquilina, Dermot Glynn & Gian Carlo Scarsi (2009) “Mobile roaming services and the EU’s approach to pricing: the European Commission Roaming Regulation and price elasticity of demand” Presented at the *Centre for Competition and Regulatory Policy Workshop*, London, 9-10 10th July 2009. <http://www.city.ac.uk/economics/dps/CCRP%20Conference%20Papers/Glynn%20and%20Scarsi.pdf>

¹⁰⁹ EC (2008) *Progress Report on the Single European Electronic Communications Market 2007* (13th Report). Brussels: European Commission. COM (2008) 153.

¹¹⁰ Telestyrelsen (2008). *Analysis of prices and costs for mobile data services abroad*. Copenhagen: Telestyrelsen.

¹¹¹ Connect2roam, *Roaming data services*, Brussels: European Commission, 2008.

market. The wholesale data roaming market would be distinct from voice and SMS, if only because the prices were not regulated until mid-2009.

Current practice was then to bill the home operator at a rate per Megabyte, though with increments ranging from 1kB to 100kB. In 2007 the average wholesale price was €5-10 per Megabyte, but between preferred partners could be as low as €0.25 to €1.00 per Megabyte. A technical complication was that for some operators the data roaming partner was different from the voice partner.

The Megabyte, as a unit of measure, is disconnected from retail practice, where different prices apply to MMS, Blackberry service and Internet access. Regulation by such units could constrain the structure of retail tariffs, making prices per hour, per day or per holiday difficult to negotiate, especially if the prices were clustered close to the cap.

A significant problem was the very limited experience of NRAs in calculating costs for mobile broadband. There was not the ready access to cost data that there had been for mobile voice calls. Moreover, with increasing use of mobile broadband, operators were being required to make significant investments in their networks, adding to their costs. The result was that there was no easy way to arrive at a “ballpark” figure for the costs of data roaming, nor of knowing if a cap might be below cost.

For customers there is a problem of lack of knowledge and understanding of the volumes of data they are using, not least since they are not being charged in this way on fixed networks or on mobile at home. A further difference is the existence of alternatives, notably Wi-Fi and hotel broadband, which may make the market more competitive.

The use of price caps was, as required, quick and effective, if also inelegant and without an exit strategy. As one group warned, price-caps do not solve the underlying problem and that there may be a permanent need for regulation, as with mobile termination rates.¹¹² The charts from ERG appear to confirm compliance, but add very little to our understanding of the markets.

11. Waterbed effects

The effect of the regulation of one (or more) of a set of prices charged by a multi-product or multi-service firm can be changes to its other unregulated prices – sometimes known as the “waterbed effect”.¹¹³ The analogy is that by pressing down on one area of the waterbed it causes another part to rise up. The colourful image is potentially misleading, since it is not a hydraulic effect, there being no economic equivalent of the bag holding the water, instead it is profit maximization that causes the supplier to raise the other prices. One recent study has shown a waterbed effect in the United Kingdom in retail mobile markets, due to reductions in mobile termination rates.¹¹⁴

In the consultations on the roaming regulations the mobile operators made much of the likely driving up of domestic prices. One putative target, possibly chosen as likely to be unpopular, was the reduction of handset “subsidies”. Since these are really cross-subsidies, recovered from subsequent calls and data traffic, aimed at inducing customers to switch

¹¹² Terje Ambjørnsen, Øystein Foros & Ole-Christian B. Wasenden (2009) *Customer ignorance, price cap regulation and rent-seeking in mobile roaming*. Bergen: Institute for research in economics and business administration. Working Paper No 05/09.

¹¹³ Aaron Schiff (2008) “The ‘waterbed’ effect and price regulation” *Review of Network Economics* 7 (3) pp 392-414.

¹¹⁴ Christos Genakos & Tommaso M. Valletti (2007) *Testing the ‘waterbed’ effect in mobile telephony*, London: Centre for Economic Performance (LSE).

from rivals and from prepaid to post-paid or to increase their use of mobile broadband, it would be seen as counter-productive to reduce or to eliminate them.

The observed waterbed effects have been in foreign rather than domestic prices. The mobile operators appear to have sought to recover their “lost” roaming revenues by:

- Negotiating increased discounts from non-European operators;
- Raising wholesale prices for non-European operators; and
- Raising retail prices for European customers travelling beyond Europe.

The evidence for this is largely anecdotal and in press releases, requiring the collection of detailed prices and price increases at retail and wholesale levels in order to measure their extent. In 2008, Informa observed evidence of operators recouping revenues from outside the EU, for example, a 22 per cent rise in charges for calls originated outside the EU, 12 per cent rise for calls home and 35 per cent rise for local calls.¹¹⁵

Nawras Mobile in Oman reported a number of recent increases in wholesale rates.¹¹⁶ In particular, it reported that the three operators in Saudi Arabia and six operators in India had raised their undiscounted IOTs to agreed “national” levels. It had suffered increases of 150 per cent and 289 per cent from operators in Turkey and Saudi Arabia. These can only be seen as anti-competitive conduct indicative of some form of collusion.

One consequence, if the wholesale price changes are being correctly reported, is that some operators in the EU and elsewhere appear to have sufficient market power – individually or collectively – to raise at least some of their wholesale prices.

If the operators can negotiate wholesale prices, then it could also work in reverse. Thus a retail price cap on roaming charges for EU citizens going beyond the EU/EEA would drive the operators to negotiate lower wholesale rates or to acquire foreign operators. There is at least some evidence to support this from experiences of national roaming.

The waterbed effect must also serve as a warning for regulators in other parts of the world, in that trying to lower roaming rates will cause other roaming prices to be raised. It is therefore important for them to ensure that any proposed measures are thoroughly evaluated and coordinated as widely as possible.

12. Plastic roaming

Some customers when they arrive in a foreign country change the SIM-card in their handset to become a local customer. Despite the loss of incoming calls and the need to tell friends and colleagues of their new number, they consider this service to be substitutable.

The issue of this form of roaming, sometimes called “plastic roaming”, has never been explored by the EC or by national regulators. There are no published surveys to attempt to measure their numbers or the sensitivity to price. Nonetheless, the decrease in IMR prices within the EU should result in a reduction in the purchase of SIM-cards by tourists and business travellers.

There was a considerable discrepancy between the Eurostat and Eurobarometer figures in 2006 for individual and household ownership of mobile phones and the numbers reported

¹¹⁵ See page 4 of Angela Stainthorpe (2008) *Global mobile roaming: operator strategies and market trends*. London: Informa Telecoms & Media.

¹¹⁶ <http://www.tra.gov.om/newsite1/NewsDetails.aspx?newsid=114>

by the operators in the EC implementation reports.¹¹⁷ At least part of this and possibly some millions of the difference could arise from plastic roaming with:

- Migrant workers with a SIM-card for the country in which they work and their home country;
- Residents of one country with a SIM-card for another country where they have a holiday home; and
- Casual visitors and tourists.

Roaming of this sort can be facilitated by handsets that allow two SIM cards, available from Nokia, Samsung and some smaller Chinese manufacturers.

Plastic roaming is even more convenient for Internet access using data-only devices (e.g., a USB modem), since a local SIM-card does not entail the loss of incoming calls. Local SIM cards are in direct competition with local Wi-Fi access, which may be more convenient and may also act as a constraint on excessive pricing.

Some operators have sought to block this option by selling 3G modems with proprietary software that explicitly blocks customers from switching to a rival or at least a non-group operator. Tying of this sort appears, *prima facie*, to be anti-competitive.

13. Wholesale prices and reciprocity

A problem with both the commercial offers of Digicel, Lime and Zain and the EU Roaming Regulations is that that they are geographically limited. For a variety of policy reasons it would be convenient to extend them geographically.

One suggestion has been some sort of reciprocal arrangement between the EU and, say, Macedonia, Switzerland or Turkey, with them adopting a legal measure to enforce the same price caps. This could not be easily crafted as a piece of legislation, with there being no simple way to add countries to the EU Roaming Regulation that are not signatories to the EU or the EEA Treaties. It risks becoming something like the AREGNET proposal for a Memorandum of Understanding between regulators, but the legal basis for which is doubtful and enforcement would be difficult. A further complication is that where the lower wholesale prices are regulated by countries not in a free trade agreement registered with the World Trade Organisation (WTO), they are open to demands for Most Favoured Nation (MFN) treatment. Operators from all other WTO signatory states would be entitled to the reduced wholesale prices.

A commercial alternative would be for some of the EU operators, perhaps the smaller players which are supposedly disadvantaged by the Regulation, to resell their wholesale access at or close to the regulated rates to non-EU/EEA operators. For example, they could allow a non-EU operator to provide its customers with a second International Mobile Subscriber Identity (IMSI). In this way a customer from, say, Morocco might piggyback the wholesale prices available to say Go Mobile in Malta, to become a virtual Maltese, with a Maltese IMSI on his SIM card, and thus benefit from lower rates. This model is also open to a larger player such as Vodafone, which has many roamers in Europe from its non-EU destination.

That these types of offers have not been seen appears to be a market failure, there being no legal prohibition on such trading. It points to possible antitrust violations by the operators.

¹¹⁷ Ewan Sutherland (2009) "Counting customers, subscribers and mobile phone numbers" *info* 11 (2) pp 6-23.

An altogether more difficult problem is how to widen the offers of Zain and Digicel. Zain has struck a deal with Mobinil in Egypt and with Paltel in Palestine to extend its footprint. These appear to be focused on key travel routes, where the benefits are significant to the operators, rather than all destinations. While such offers can be expected to expand, they show few signs of becoming global.

14. Conferences and reports

The roaming “industry” supports a small number of trade conferences and is the subject of expensive reports, mostly aimed at helping to increase revenues and to understand trends. Given the high costs most of this material is not readily available to the academic community.

Informa Telecoms & Media publishes an occasional volume on the roaming markets, with forecasts on global and continental trends, priced at £2,495 to £4,990 for one copy.¹¹⁸ Roaming is the subject of an annual summit in London in October and is included in regional events on various mobile topics.¹¹⁹ It has also organised regional events on roaming in Asia.

Tariff Consultancy Ltd has published its first roaming report, costing £1,995, on retail prices for voice, SMS and data roaming across seven European and three non-European countries.¹²⁰

Visiongain’s report is entitled “Mobile roaming 2006-2011: Increasing usage and revenue to counter regulatory burdens” making its intention quite clear.¹²¹ It is priced from £1,499 for a single user to £6,999 for a global site licence.

The GSM Association has a wide range of activities on roaming, including standardisation. The annual Mobile World Congress in Barcelona has addressed different aspects of IMR.¹²² Regional events also touch on roaming both from the regulatory perspective and expanding business opportunities. There is also the work of GSMA’s Billing, Accounting and Roaming Group (BARG). One area of concern has been elimination of fraud, with the creation of Near Real Time Roaming Data Exchange (NRTRDE).¹²³

For the most part these events are expensive and aimed at industry insiders. The data produced tends to be derived from industry questionnaires with a strong focus on forecasting future trends, aimed at helping market players track their performance against rivals and the market. There is no central repository, nor is there cross-checking of data.

15. Conclusion

Roaming has continued to attract attention from policy-makers since, as the OECD observes, prices are perceived as being “unreasonably and inefficiently high”. This has been accentuated and given publicity by bill shocks. Individuals have incurred charges of thousands of Euro for the innocuous use of mobile broadband when abroad, repeating a pattern of use they had been encouraged by the operators to adopt at home. It seems

¹¹⁸ See, for example, Angela Stainthorpe, *Global mobile roaming: operator strategies and market trends*, London: Informa Telecoms & Media, 2008.

¹¹⁹ <http://www.roamingconference.com/>

¹²⁰ Tariff Consultancy Ltd. (2010) *Global Mobile Roaming Pricing 2010*, London: TCL.

¹²¹ Visiongain (2006) *Mobile roaming 2006-2011: Increasing usage and revenue to counter regulatory burdens*. London: Visiongain. <http://www.visiongain.com/Report.aspx?rid=200>

¹²² <http://www.mobileworldcongress.com/index.htm>

¹²³ <http://www.gsmworld.com/newsroom/press-releases/2069.htm>

unlikely that roaming will lose its political edge or that operators will cease to oppose regulation and that some of their employees will continue to exaggerate the damaging effects of price caps on their operations and investments. In the absence of a robust economic model, a more rational dialogue will not be achieved.

The failure of the first decade of analysis to provide an economic model of IMR, indeed the failure to provide meaningful and consistent statistics, means that those crafting interventions continue to work with a black box. They are uncertain as to the timeliness, efficacy and side-effects of any market interventions.

Neelie Kroes, the European Commissioner for the Digital Agenda, has, under pressure from the European Parliament, called for a “durable” solution to high IMR charges. However, the only certain option is to continue with price caps, though even this is problematic in terms of further distorting markets (e.g., the waterbed effect) and uncertainties over elasticities. She has called for roaming prices to be reduced to the level of home country prices by 2015, suggesting the third roaming regulation will have to be very tough. The position is rather worse for Stephen Conroy, the Australian Minister, who has to work out unilateral measures to cut prices for his citizens when they go abroad.

There remains a major challenge to describe international roaming markets in terms of:

- Price and demand elasticities;
- Traffic and revenue flows;
- The extent and patterns of wholesale discounting;
- The technical and economic effectiveness of traffic direction;
- The switching of operators between foreign roaming partners; and
- The substitutability of local SIM cards and Wi-Fi with international roaming.

The data gathered by NRAs have been minimal, offering occasional and frustrating glimpses into the workings of the markets. The simplest option would be for the EC to conduct another sector inquiry in order to obtain the necessary data, it could then develop a market definition which might allow the use of the directives and thus structural remedies.

From such data a dynamic model could be built to try to explain recent history, including the effects of non-discriminatory wholesale prices, the mobile operator alliances, the two EU Roaming Regulations and the abolition of IMR surcharges by a very few operators, plus determining the extent of the waterbed effect. This would require the collection of a considerable volume of data, stretching back over several years. With such data existing hypotheses could, finally, be tested. It might also be possible to model the effect of the removal of the retail or the wholesale price cap, together with alternative policies.

16. Annex 1 Abbreviations

1G	First generation
2G	Second generation
3G	Third generation
4G	Fourth generation
AGCOM	<i>Autorità per le Garanzie nelle Comunicazioni (Italy)</i>
ARCEP	<i>Autorité de Régulation des Communications Électroniques et des Postes (France)</i>
ARPU	Average revenue per user
AT&T	American Telephone & Telegraph
BEREC	Body of European Regulators of Electronic Communications
BEUC	<i>Bureau européen des unions de consommateurs</i>
CDMA	Code Division Multiple Access
CEO	Chief Executive Officer
CMT	<i>Comision del Mercado de las Telecomunicaciones (Spain)</i>
DG	Directorate-General
DOM	<i>Départements d'outre-mer (France)</i>
EBITDA	Earnings before Interest, Taxes, Depreciation and Amortization
EC	European Commission
EEA	European Economic Area
EP	European Parliament
ERG	European Regulators Group
EU	European Union
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications (originally <i>Groupe Spécial Mobile</i>)
GSMA	GSM Association
HLR	Home Location Register
HWL	Hutchison Whampoa Limited
Hz	Hertz
IMR	International mobile roaming
INTUG	International Telecommunications Users Group
IOT	Inter-Operator Tariff
LTE	Long Term Evolution
MEP	Member of the European Parliament
MMS	Multimedia Messaging Service
MS	Member State
NMT	Nordic Mobile Telephone
NRTRDE	Near Real Time Roaming Data Exchange
NSP	Network Service Providers
NNT	Normal Network Tariff
MVNO	Mobile Virtual Network Operator
NPT	<i>Norge Post- og teletilsynet (Norway)</i>
NR	National roaming
NRA	National Regulatory Authority
OECD	Organisation for Economic Cooperation and Development
OFCOM	Office of Communications (United Kingdom)
OPTA	<i>Onafhankelijke Post en Telecommunicatie Autoriteit (Netherlands)</i>
OTA	Over The Air
SIM	Subscriber Identity Module
SMP	Significant market power
SMS	Short Messaging Service
STIRA	Standard Terms for International Roaming Agreements
TD-SCDMA	Time Division Synchronous Code Division Multiple Access
UMTS	Universal Mobile Telecommunications System
VLR	Visitor Location Register