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International Mobile Roaming Services

ANALYSIS AND POLICY RECOMMENDATIONS

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INTERNATIONAL MOBILE ROAMING SERVICES: ANALYSIS AND POLICY RECOMMENDATIONS

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FOREWORD

The Working Party on Communication Infrastructures and Services Policy discussed this paper at its meeting in December 2009. The Working Party agreed to recommend the paper for declassification to the Committee for Information, Computer and Communications Policy (ICCP). The ICCP Committee agreed to the declassification of the paper in March 2010.

The paper was drafted by Mr. Agustín Díaz-Pinés, of the OECD's Directorate for Science, Technology and Industry. It is published under the responsibility of the Secretary-General of the OECD.

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INTERNATIONAL MOBILE ROAMING SERVICES: ANALYSIS AND POLICY RECOMMENDATIONS

MAIN POINTS

The first report on international mobile roaming services ("International Mobile Roaming Charging in the OECD Area", DSTI/ICCP/CISP(2009)8/FINAL[1]), provided information on market development and pricing of International Mobile Roaming Services (IMRS) in the OECD area. It found prices to be unreasonably high, considering the underlying costs, and identified some of the causes for high roaming prices. High wholesale charges, the fact that consumers do not seem to take into account roaming services when choosing a bundled mobile offer, lack of contestability and low consumer awareness of roaming prices and of substitutes were found to be among the reasons for this price level. This report is a follow-up that proposes solutions to the described problems, and assesses their viability and possible side effects.

The development of on-net offers by operators with large footprints is a desirable market-driven solution to the problem of high wholesale roaming charges. This response was referred to as "internalisation" in the first roaming report. Although trans-national footprints are needed in order to avoid wholesale charges, on-net offers based on the internalisation of wholesale costs and traffic steering to subsidiaries are a natural solution to launch reasonably priced and convenient retail roaming offers. However, the number of operators with large footprints remains low, and some on-net offers are likely to be focused on roaming in a particular region (*e.g.* Zain in East Africa). Due to competition dynamics at the retail level and the fact that roaming services are an element of the mobile services bundle, trans-national operators are likely to decide not to lower retail prices in order to retain high revenues from non price-elastic customers.

In the event of a marketplace dominated by few operators with large footprints, smaller operators may be put aside, due to their inability to internalise wholesale roaming costs. Bigger players may impose high wholesale charges and make them unable to launch competitive retail roaming offers. The natural response for smaller operators is to form alliances in order to get substantial wholesale rate reductions. Although such alliances have existed for some time and did not prove to be very successful in bringing down overall wholesale costs, they may be again a valid response in a new scenario with increased operator consolidation and the presence of a higher number of on-net offers. As a last resort, regulatory intervention may be warranted to allow for improved market contestability.

Another way forward to improve market contestability in roaming services was termed "localisation" in the first report. Global Mobile Virtual Network Operators (global MVNOs) are those operators that gain access to local airtime on local terms and conditions, thus avoiding wholesale roaming rates. Even though a number of global MVNOs have entered the market during the last few years, this option still remains not very widespread. It faces some important drawbacks, such as customers being reluctant to have two mobile service providers, lack of brand recognition, etc. They also face serious challenges to expand their customer base such as low bargaining power compared to "national" MVNOs, and relatively low volumes

to justify investments. However, global MVNOs remain as an alternative to provide better market contestability and this report supports enhancing their visibility and consumer awareness. National regulatory frameworks as well should enable global MVNOs to develop by allowing access to airtime on local terms and conditions.

The World Trade Organisation (WTO) framework could also be used to provide a cross-country legal framework for roaming services. Roaming services are arguably covered by the General Agreement on Trade in Services (GATS), since they are important for access to and use of public communications. It is not explicitly mentioned whether wholesale roaming providers can be declared major suppliers of an essential facility, according to the WTO Reference Paper. This report finds a way forward regarding roaming services in the current WTO provisions, which would mean initiating a MFN ("most favoured nation") dispute settlement procedure against a country to make their existing wholesale roaming conditions (national or international) available to operators from any other WTO member. These conditions may not necessarily be the same for every operator, and may vary depending on volumes, distance, etc. A second way forward would be using the WTO framework and the evidence of applicability to encourage NRAs regulate wholesale roaming services, in that visited network providers offer just, reasonable and non-discriminatory rates to home operators.

Publication of Inter-Operator Tariffs (IOTs) and negotiated wholesale rates would bring them to public record, enabling consumers to separate wholesale charges and retail margin in their roaming bills. While publication of IOTs should be encouraged, as they are widely known by the industry and do not represent the final outcome of wholesale negotiations (but only a cap for wholesale roaming rates), imposing the publication of the outcome of these negotiations would face strong commercial confidentiality and regulatory concerns, such as providing a price point for collusion leading to higher prices. Instead, this report advocates that data collections be conducted by NRAs in order to produce a benchmark to inform regulatory policy without explicitly publishing wholesale rates of individual operators. This publication would address the need for public scrutiny of wholesale rates while preserving commercial confidentiality and avoiding regulatory concerns.

This report acknowledges that directly regulating roaming prices may be the only way to guarantee that consumers are not unreasonably charged. The aim of this intervention should be to protect consumers and remove international barriers for trade and travel. Whether regulating retail roaming prices should address internal market concerns will depend on regional provisions, such as the European Union's (EU) internal market rationale for regulating IMRS. Under the traditional approach, regulation is first introduced at the wholesale level to tackle any bottlenecks to competition and the underlying causes for high retail prices. Then if it is clear that, due to a lack of retail competition, the benefits of wholesale regulation will not be passed through to the retail level, retail price regulation may be warranted to ensure that consumers benefit. On the other hand, it has also been argued that, if the concern is consumer protection and removal of barriers for trade and travel, the intervention may be restricted to retail prices. However, this may make smaller operators have their margins squeezed, which may warrant a consistent wholesale regulation as well. If the aim is to promote competition, that may serve to justify wholesale intervention. The dynamics between wholesale and retail level should be carefully analysed and co–ordinated with other measures to improve competition in the roaming market. As the EU experience proves, wholesale rates reductions are not necessarily passed on to consumers.

Since some National Regulatory Authorities (NRAs) and policy makers would request reciprocity from their counterparts if a price regulation is to be enforced, the best way forward to regulate wholesale roaming prices internationally would be to have a mutual agreement between two or more countries to regulate wholesale and/or retail prices. Those do not necessarily have to be identical and should be based on established criteria. Thus, operators from both countries would be subject to comparable wholesale price regulations that guarantee that operators do not charge each other unreasonable wholesale prices, and

that operators do not charge their customers unreasonable retail prices. A multilateral approach, that is, having a framework agreement to which countries could adhere, may be less resource demanding than multiple bi-lateral agreements in terms of the effort required for agreeing on it, although it will need to gather agreement from many countries. However, in the event that two countries reach and implement a roaming agreement this may serve as an example, add momentum and trigger further developments, eventually making additional countries join.

Again, if the objective is to protect consumers, it may not be appropriate to impose cost-oriented prices. Different considerations may be taken into account if the aim of the intervention is to improve competition dynamics. As to establishing an adequate price cap for retail and wholesale roaming services, a top-down approach is preferred, since it would consider roaming charges in light of equivalent domestic services plus roaming-specific costs, allowing for a much simpler approach when setting a regulated price cap.

Some Alternative Calling Procedures (ACPs) for roaming have been identified, as well as other alternatives such as SMS or e–mails. Even though some of them are becoming increasingly seamless, they still fail to be perfect roaming substitutes. Their main drawbacks are the loss of incoming calls to the customer's usual number, lack of mobility (hotel phones, payphones, international calling cards), language barriers (purchasing a local SIM-card), technical and commercial constraints (mobile or fixed VoIP calls, etc.). Even though ACPs are not likely to become a widespread alternative to roaming, their use should be promoted and consumers should be more aware of them in order to make an informed choice.

Temporary Number Portability (TNP) has been proposed by the Australian Parliament as a measure to decouple the mobile services bundle which may allow consumers to switch mobile provider only for roaming services. Although this may entail an extra cost that has to be assessed and may not be in line with the operators' business models, it is a possibility that should be assessed by means of a cost-benefit analysis. In many OECD countries, NP only takes a few days and the procedure may be extended to TNP. It is up to NRAs and policy makers to assess whether TNP fits into the existing regulatory framework and commercial practice.

This report strongly supports the implementation of transparency measures that increase consumer awareness of retail roaming charges. Operators should inform consumers of roaming charges by means of SMS, websites and/or personalised information. Consumers should be given clear instructions so as to avoid bill-shock or guarantee their awareness of roaming charges.

Accordingly, any measures promoting awareness of the (imperfect) substitutes for roaming are strongly advocated. Consumers should be provided with comprehensive information about the availability of substitutes, main drawbacks and advantages, so that they are able to make an informed choice as to their willingness to use roaming services. NRAs and policy makers should launch information campaigns and websites that reflect existing commercial alternatives for roaming services.

A possible side effect of roaming price regulation is "water-bedding" effects, in that operators may want to recoup the lost revenues by increasing the price of domestic services. While the economic theory recognises their existence, and that they are stronger the more intense the competition is, empirical evidence is usually difficult to obtain. There are other factors that may prevent the price of domestic mobile services to rise, such as economic, commercial and technological trends, of which it is very difficult to establish a causal link. The fact that the share of revenues coming from roaming services is generally a small fraction of total mobile revenues makes the impact of any waterbed effects likely to be limited. This effect, however, should be taken into account when assessing the impact of roaming price regulation as it may be stronger for some types of operators. Any foreseen tariff rebalancing or revenue transfer between operators due to price regulations should also be carefully assessed. Another effect of decreasing roaming

revenues may be reduced investment by operators. That should also be investigated when pursuing roaming price regulations.

INTRODUCTION

In the context of work on international mobile roaming services (IMRS), a first report, DSTI/ICCP/CISP(2009)8/FINAL, provided information and analysis on market developments and pricing in IMRS. The present report, as a follow-up, aims to examine and suggest possible solutions and policy options that may address the problem of high international mobile roaming charges.

As noted in the first part of the work on mobile roaming there are a number of factors which result in high roaming prices:

- Consumers do not take into account international roaming charges when choosing a mobile service provider. IMRS are sold in a bundle, which includes local calls, access, possible handset subsidy, etc.

- High wholesale charges are, at least for outgoing communications, the major contributor to high retail prices. Although heavy end-users are likely to obtain better prices, they cannot put pressure on wholesale charges.

- The international mobile roaming market is not a contestable market, *i.e.* it is not a market subject to significant competitive market forces and it is difficult to introduce competition in this market.

- IMRS charges are not made very transparent to users.

- Since there are no close substitutes for IMRS, demand has tended to be price inelastic and, consequently, providers have been able to maintain high prices.

- Where substitutes exist they are not perfect and the average user is not familiar with them. Although alternative calling procedures to IMRS are becoming increasingly seamless, knowledge and brand recognition by consumers remain generally low.

In assessing policy options in order to agree on a set of recommendations on IMRS that may be put in place by governments, or be part of a self-regulatory process by mobile operators, there are two ways forward which are, to a certain extent, complementary.

Firstly, policy makers can try to address one of the core problems: high wholesale charges as one underlying reason for high prices. This may be done in a number of ways, such as policy makers trying to deal with the result of lack of market contestability at the wholesale level, *i.e.* the high wholesale charges themselves, or by means of enforcing policies that bring contestability to the wholesale market without regulating wholesale prices. To that aim, fostering the development of large footprints that enable the launch of on-net offers, or finding ways to bypass the framework for roaming agreements (IOT framework) may bring some contestability to the wholesale market.

Secondly, we can consider policies addressing the consumer perspective. In particular, these policies should tackle the fact that IMRS are sold in a bundle with domestic mobile services, and that consumers do not pay attention to IMRS prices when subscribing to a domestic provider. It is therefore the retail dynamics and their relationship to wholesale roaming services that will be addressed in this section. This set of policy options includes increasing consumer awareness of IMRS prices, exploring the possibility of purchasing roaming services separately (decoupling the bundle), as well as regulating retail charges themselves.

The promotion/emergence of (imperfect) substitutes will also be taken into account, although such substitutes are, by their nature, not a part of the roaming market. Thus, the core problem (high roaming prices) may not be solved, but it would be mitigated via the use of alternatives to roaming services.

It is noteworthy that market contestability, as it is used throughout the report, may refer to both wholesale or retail markets. As the ITU ICT Regulation Toolkit notes,[2] a market is said to be contestable when barriers to entry and exit are so low that the threat of potential entry prevents the incumbent from exercising market power. Dynamics of retail and wholesale roaming markets will be approached separately, since they are influenced by different factors.

These two categories of policy options are not mutually exclusive and some of the aspects addressed may well fall into more than one. Even though retail regulation addresses the consumer perspective and wholesale regulation is meant to tackle high wholesale charges, both have been merged in the same section for the sake of clarity, as they are interlinked. This paper will examine the different options which could be used to address the core problems. For each one of them, potential impacts will be evaluated, as well as implementation challenges and expected results, providing relevant evidence or best practice when possible.

POLICIES ADDRESSING HIGH WHOLESALE PRICES

Development of Alliances/On-Net Offers

The report "International Mobile Roaming Charging in the OECD Area" (DSTI/ICCP/CISP(2009)8/FINAL) provided information and analysis on market developments and pricing in IMRS. One of the key factors recognised as having potential to place some pressure on wholesale rates for roaming services was termed "Internalisation". The development of new traffic-steering techniques, from 2002 on, allows operators to steer around 80% or more of the roaming voice and SMS traffic to preferred networks, selected by the home operator (but less for data roaming traffic). The basic utility of this instrument is that roaming traffic is much more predictable and provides home operators with more negotiating power against visited networks, since the amount of directed traffic is higher. The outcome of these developments was the formation of alliances among mobile operators, whose members were expected to pay lower wholesale roaming prices. As pointed out in the first phase of this work, alliances have not been successful in radically changing the roaming services market although, together with internalisation, they have contributed to lowering wholesale roaming charges.

Mobile operators with large trans-national footprints have moved to reduce retail prices with the launch of "on-net" offers, either purely on-net, in that only the foreign subsidiary's networks are used for roaming, or not purely on-net, where operators manage to negotiate reduced prices for selected visited networks, but that were still based on on-net internalisation of roaming wholesale charges. An example of the latter is Vodafone Passport that offered roaming services at domestic rates plus a per-call fee. While Vodafone Passport is not a merely on-net offer, in that another visited network could be used without an extra charge, it is true that it is mainly based on the trans-national footprint of Vodafone, thus mainly by-passing wholesale charges.

Another very representative example of "on-net" offers is Zain. This Kuwaiti-based company has a footprint of 16 countries in East Africa and some others in the Middle East. The "One Network" launched in 2006, simply eliminates IMRC across African countries within its footprint, and customers just pay the applicable national rates. It is also possible for customers to top-up their prepaid accounts in any of these countries, and use the remaining credit in any of them.

Zain's "One Network" offer has special characteristics that help in understanding why "on-net" offers are not more widespread nowadays. The straightforward answer for that is that operators are actually making profits out of the current IOT framework, and alliances do not substantially bring roaming charges closer to domestic rates. However, Zain's example is slightly different. Nearly 100% of its customer base is pre-paid and its footprint reaches almost exclusively developing countries. As a result, Zain customers' willingness to pay IMRC may be very low or almost inexistent, contrary to some customer segments in developed countries. That being said, Zain may have no customers from whom to extract high IMRC, since its customers would just simply not use roaming services and most likely purchase a local SIM-card. In other words, Zain's customers are likely to be very price-elastic and thus revenue maximisation requires low IMRS prices.

A similar offer addressed to low income customers was launched in the Caribbean.[3] Although Digicel offered conventional post-paid roaming services from the outset, in 2004 it began to offer pre-paid roaming. It launched Digiroaming, a tariff with simple, low price call charges across all its networks (Aruba,

Barbados, Grenada, Jamaica, St. Lucia and St. Vincent and the Grenadines). It was initially limited to customers in and travelling between these destinations.[4]

Rather than trying to extract roaming revenues from a customer base with no willingness to pay, Zain has chosen IMRS as a tool to ensure customer fidelity, helped by relatively high cross-border mobility in some parts of East Africa.[5] It also facilitated cross-border customers belonging to the same family, group of friends, etc., communication across countries. Thus, Zain uses its very wide footprint as a commercial tool for customer retention, brand improvement and competitive advantage. In fact, some of their competitors have started to respond to competition from "One network", notably MTN, Orange, Tigo and Vodafone.[6]

In other countries, however, the situation has been quite different from that in East Africa. Some operators benefit from demand inelasticity and the customer base's willingness to pay. Operators have so far chosen to keep high retail IMRC, which encourage high wholesale charges, and not to try and create more elastic demand by a significant reduction of roaming charges. Although some offers such as Vodafone Passport have been very successful in the market, they often keep high per-call fees and were not launched until the EU put considerable pressure on European operators to lower roaming charges.

Clearly, "internalisation" is a market-oriented solution to the problem of high IMRC. Operators with large footprints may be able to offer advantageous roaming deals overcoming the problem of high wholesale charges. However, whether they actually offer them depends on a number of factors that will be analysed in depth in the following sections, such as the customers' willingness to pay, price elasticity and presence and knowledge of seamless substitutes.

As an alternative to cost-internalisation by operators with large footprints, smaller operators have the option of forming trans-national alliances. Four of them appeared from 2004 to 2006 and one of their aims was to increase effectiveness of traffic direction for IMR. However, these alliances did not succeed in breaking away from the IOT system and did not offer substantive reductions in roaming charges. Concern was expressed by industry analysts that the alliances lacked win-win scenarios necessary for success.[7]

The market-oriented "internalisation" solution to high roaming charges has sometimes not been considered by public authorities in carrying out competition law enforcement. They feared the impact on overall mobile market competition of footprints that are too large and the ability to launch seamless international calling plans that may harm smaller operators. In fact, (in its merger with Mannesmann[8]) Vodafone committed to allow other operators reasonable margins both at the inter-operator and at the retail level, in order to prevent margin squeezes on other competitors. While this could have theoretically prevented Vodafone from eliminating roaming charges completely, it still gave Vodafone the possibility to reduce roaming charges significantly, *i.e.* to the level where a reasonably efficient competing operator could make a reasonable return. However, this did not happen as a consequence of the merger and, most likely because of the relatively low competitive pressure in the roaming market, there would have been little incentive for Vodafone to actually eliminate or lower roaming charges.

Another interpretation may point out that Vodafone was discouraged from reducing wholesale roaming charges due to its commitments (in particular, to allow other operators reasonable margins), that may have enabled competitors to replicate its offers. According to the EC's reasoning, competitors would be unable to replicate the new entity's network and would have to rely on roaming agreements with Vodafone in order to offer "equivalent" pan-European services. There was a perception that the merger would lead to a dominant position in the emerging pan-European market for internationally mobile customers because customers of other operators would generally prefer the merged entity to other mobile operators given its large footprint across European countries.

In order to address these concerns, Vodafone submitted some undertakings, which cover exclusive roaming agreements, third parties' access to roaming agreements, standards and SIM-cards and a set of implementing measures aimed at ensuring their effectiveness. In particular, the provision of a roaming tariff and/or wholesale services would be made on a non-discriminatory basis between operators of the Vodafone's Group and other mobile operators. The non-discrimination principle would apply to both pricing and quality of the service. These undertakings were applicable for three years, although never used.[9] The non-discrimination principle was implemented in terms of IOTs, as they are non-discriminatory tariffs available to the GSMA members.

Large international footprints provide mobile operators with a competitive advantage, especially when addressing the heavy roamers' segment. However, due to limited spectrum availability it would not probably be feasible for a large number of similar companies to develop large footprints across the OECD area. The following table shows where selected internationalised operators are present. Even though a more accurate picture could be built taking countries where operators have shares below 50%, it gives a general image of mobile operators' footprints in OECD countries and the potential for on-net offers. Hutchinson (trading as 3) is focused on 3G communications and it has a lower market share than the other four operators listed.

Table 1: Selected mobile operators' footprints in the OECD area[10] (over 50% stake in capital)

Vodafone	Orange (France Telecom)	T-Mobile (Deutsche Telekom)	Movistar/O2 (Telefonica)	3 (Hutchinson)[11]
(12 countries) Australia, Czech Republic, Greece, Hungary, Ireland Italy[12], Spain, Netherlands, New Zealand, Portugal Turkey, United Kingdom	(7 countries) Belgium, France, Poland[13], Slovak Republic, Spain Switzerland, United Kingdom	(8 countries) Austria, Czech Republic, Germany, Hungary, Netherlands, Slovak Republic, United Kingdom, United States	(7 countries) Czech Republic, Germany, Ireland, Mexico, Slovak Republic, Spain, United Kingdom	(7 countries) Australia, Austria, Denmark, Ireland, Italy, Sweden, United Kingdom

It is not clear to what extent the possibility of capturing a bigger slice of the roaming market acts as an incentive for market players to expand their networks and purchase foreign operators. It is clearly a factor in the investment decision but, as roaming revenues still represent a relatively low share of the mobile market, the roaming market is not likely to be a key criterion for whether or not to invest in another country.

National roaming in the US shares many similarities with international roaming, due to the presence of many regional operators that have to sign national roaming agreements if they want to offer nation-wide services. In this regard, the FCC decided that no price regulation for national roaming would be imposed on carriers on the grounds that this would discourage the expansion of networks beyond their regional footprints and would give less room for price differentiation of regional call plans. The FCC obliged carriers to provide roaming services on reasonable request, on a just, reasonable and non-discriminatory basis. No specific price regulation was imposed, although the FCC may always intervene in the event that a carrier demands unreasonable conditions.

Generally, therefore, more customers would benefit if trans-national networks are deployed and cross-country phone plans are brought to the market. These potential benefits for larger operators' customers should be set against the consumer benefits of enabling smaller operators to operate on the market, such as

by avoiding margin squeeze. Enabling a certain number of players to enter the market, so that the overall mobile market remains competitive, is important to benefit consumers. In particular, small, new and independent operators may have the necessary incentives to disrupt the *status quo* by offering lower prices or new services, leading larger operators to compete and benefitting consumers. Nonetheless, this policy should avoid to the extent possible preserving excess or inefficient capacity in the marketplace.

Many factors should be taken into account when addressing the regulation of roaming services. Competition by smaller operators should be fostered, but the overall functioning of the market including the benefits that larger operators may deliver in terms of scale economies and large footprints should also be borne in mind. An analogy could be made with other issues of telecoms regulation, such as local loop unbundling, etc., where regulators and policy makers must take into account the need to enable investment and to foster competition and innovation. Some policy approaches could favour one in the short term, while having a negative impact on the other in the longer term, and this is why a reasonable and balanced approach needs to be found.

Trans-national footprints clearly enable mobile operators to provide roaming services at rates close to domestic ones since they are no longer reliant on wholesale charges levied by foreign operators. This way, trans-national networks provide the foundations for sustainable and market-driven lower roaming rates. Whether providers want to reduce roaming rates or they prefer to keep high retail roaming charges depends on the elasticity assessment conducted by them. Due to competition dynamics at the retail level and the fact that roaming services are an element of the mobile bundle, operators may not lower prices but instead retain high revenues by non price-elastic customers.

Smaller players could have access to reasonable wholesale roaming services by coming together and forming trans-national alliances. However, for various reasons it may not be possible to form such alliances in which case smaller operators would be at a disadvantage unless they have access to a dispute resolution procedure in the country where roaming is taking place. This procedure would aim at ensuring reasonable wholesale roaming conditions and that they are not charged excessive charges by visited networks. In a way, this would mean a similar guarantee to that used in the United States for national roaming. However, the visited country's NRA would very likely have an incentive to put in place such a dispute resolution procedure only if reciprocity is assured (its domestic operators have access to a similar procedure in other countries). In other words, it is unlikely that such dispute resolution procedures would develop unless there was reciprocal agreement among two or more countries to develop such a mechanism.

In Australia, the House of Representatives Communications Committee inquired into whether international mobile roaming charges are fair, after the Australian Competition and Consumer Commission found in 2005 that "the prices of international roaming services may exceed their underlying costs of provision by a significant amount".[14] The Committee released a report[15] on 19 March 2009 that agreed on the high cost of using mobile phones abroad and released some recommendations. As the Australian Inquiry on roaming points out, in some cases reciprocity or bilateral co–operation is necessary in order to guarantee that the home country's citizens will benefit from lower wholesale roaming charges. That inquiry notes that regulating the wholesale cost of roaming is very complicated due to the international element involved (namely the lack of jurisdiction on the wholesale charges faced by Australian providers), and advises that international agreements be reached.

However, some regulatory frameworks (*e.g.* European Regulatory Framework) allow for the imposition of wholesale IMRS obligations if market dominance ("significant market power") is found, whether or not these principles are observed by their counterparts in the country sending roaming customers. Nevertheless, the EU regulatory framework for electronic communications has not proved sufficient to enable the EU NRAs to act effectively in the consumers' interest in this specific area[16], which ultimately led to the need for direct regulation of roaming rates in the EU, by means of the EU roaming

regulation. However, if under the EU regulatory framework, market dominance had been found by a NRA, no reciprocity would have been needed in order to warrant wholesale regulation, although that would benefit visiting customers and not its own customers roaming abroad.

Global MVNOs

The first phase of the OECD work on IMRS stressed the importance of "localisation", that is, the ability of "foreign" service providers to be treated in the same way as local MVNOs. This way, foreign mobile operators would be by-passing the IOT framework and thus not paying roaming charges, but rather reaching agreements similar to what MVNOs had at the national level.

It should be recalled that the main reason in creating MVNO frameworks was to develop market contestability given that spectrum limited the number of mobile network operators (MNOs) in a country, consequently limiting competition in the market. Typically, a MVNO has much lower entry and exit costs, and usually signs an agreement with a mobile network operator (MNO) in order to resell its airtime under a new brand. MVNOs typically are assigned their own numbering resources, manage their own SIM-cards and transport networks, bill customers, have their own distribution and marketing networks and provide some services that may differentiate them from MNOs. The term "virtual" refers to the fact that they do not own spectrum resources, so they must agree with a MNO on airtime resell.

Traditionally, MVNOs have provided service working on a national basis and have usually targeted low expenditure mobile consumers. Even though in many jurisdictions NRAs have to licence MVNOs and entitle them to access numbering resources, the driver of MNO-MVNO relationships has been commercial negotiation in most OECD countries, although in a number of countries MNOs are required to enter into negotiation with MVNOs and in some cases wholesale access terms have been imposed by the NRA. NRAs usually keep the right to mediate in the event that no agreement is reached. In some cases, no or few conflicts have arisen, contrary to the NRA's expectations.[17]

Assume, as defined in the first phase of the work on IMRS, a global MVNO is considered a "foreign" service provider that is treated in the same way as local MVNOs paying domestic wholesale rates, rather than wholesale roaming rates. If the same provider gets MVNO access in a number of countries, this enables local pricing for roaming services. While the model is not widely used by MNOs or "conventional" MVNOs, it is used by some "global-MVNOs", that are in fact providers focused on roaming calls and travellers, who use this regulatory tool to bypass the IOT system. They need regulatory frameworks that enable MVNO treatment to get access to numbers and airtime on local terms and conditions and agree on roaming or billing agreements with an MNO or MVNO in the visited countries. Then, a global-MVNO uses its own infrastructure to interconnect those different customers, thus bypassing the IOT framework. This is why they are potentially able to offer very competitive rates.

The existence of roaming hubs or convenient international gateway possibilities is a requirement for viable interconnection across countries for global-MVNOs and for providers taking the approach of reducing roaming charges. While not being an MVNO, Zain's "One Network" took advantage of the recent liberalisation of East Africa's international gateways. Without convenient and reasonably priced international gateway connections, operators would not be able to launch cheap roaming plans.

Nonetheless, there are only a few offers from such global-MVNOs, which were analysed in the previous OECD report. Examples include Transatel, Camel Wireless, Rebtel, CallGSM, Mint Telecom, etc. These companies have somehow remained as niche offers, not very well known in terms of branding, with a relatively small customer base. Some of them offer the possibility of call-forwarding from the home number to the visited country's local number (obtained by means of MVNOs agreements). This may

enhance substitutability, since consumers would be able to receive calls. This feature is however not available for free, although forwarded calls are generally reasonably priced.

Taking into account the number of countries where MVNO access seems to be possible (as an example, CallGSM has up to 50 local identities), MVNO access requirements do not seem to be a barrier for those providers to launch their offers, although MVNO agreements are subject to commercial negotiation and as such, a provider may not find the terms offered by MNOs commercially attractive.

A challenge that MVNOs focused on roaming may face when negotiating access is that they may not have as much traffic as purely national MVNOs may have, and so their negotiating power may be lower than that of the purely national MVNOs, as volumes are lower too. Average wholesale rates that MVNOs pay are supposedly far lower than many roaming rates negotiated within the IOT framework. In countries where MVNOs are entering the market, NRAs should act as a dispute resolution body (NRAs may even regulate wholesale MVNO access) that guarantees reasonable conditions for airtime deals.

The concept of global-MVNOs as a viable model to bypass high roaming charges depends on how these global MVNOs are structured and largely relies on the price-elasticity of the customer base, and whether customers are willing to use a close substitute. It should be borne in mind that customers may not want global MVNOs as their domestic mobile service provider but only as a roaming substitute. Then, if customers still keep their subscription with another domestic provider, and do not switch to the new one, global MVNOs are not perfect substitutes, as customers would not be able to receive calls to their domestic (non-MVNO) number. In addition, MVNOs generally are low-cost offers that are mainly addressed to low–expenditure customers. In most countries, high-expenditure customers including heavy roamers have a preference for MNOs as providers of domestic mobile services. Although that may change in the short-medium term, MVNOs face the challenge of the heavy users' segment being focused on MNOs.

A question that may arise is why there are not many documented MNOs (see Sympac)[18] that are established overseas and that request MVNO access in another country in order to bypass the IOT framework and gain access on local conditions. Being able to sign roaming agreements, MNOs may not be interested in breaking away from the IOT framework, although they may get lower wholesale rates as an MVNO. Another reason for that may be the possible loss of roaming traffic in the MNO's home market, since its counterparts would likely switch to the selected network.

The emergence of global-MVNOs as an alternative to roaming is heavily dependent on brand awareness, price elasticity of consumers and their promotion as substitutes to roaming. They may well fit into the preferences of customer segments that are very price-elastic and very aware of roaming costs and roaming substitutes. Global MVNOs may have to appeal to NRAs in order to get reasonable MVNO access conditions, considering that their traffic might well be below national market oriented MVNOs. Global MVNOs have as their most important drawbacks the fact that they are imperfect roaming substitutes, the loss of incoming calls, the fact that a SIM-card must be replaced (when no handset lock prevents it), etc.

A WTO Solution?

One framework that might be used to address the trans-national element of IMRS is provided by the World Trade Organisation (WTO), through:

- The WTO Agreement[19]
- The General Agreement on Trade in Services (GATS)[20]

- Telecommunications Reference Paper[21], scheduled as an additional commitment under Article XVIII of GATS. Today, 82 WTO countries have committed to it[22].

- Annex on Telecommunications[23].

For clarity, the Telecommunications Reference Paper and the Annex on Telecommunications will be included as Annexes to this report.

The Reference Paper

The Reference Paper states that "Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices", where a major supplier is defined as having "the ability to materially affect the terms of participation (having regard to price and supply) in the relevant market for basic telecommunications services as a result of: (a) control over essential facilities: or (b) use of its position in the market. Further, an essential facility is defined as one that "is exclusively or predominantly provided by a single or limited number of suppliers", and that "cannot feasibly be economically or technically substituted in order to provide a service". It distinguishes basic from value-added telecommunications, with mobile services considered to be basic telecommunications.

It is not clear whether visited operators could be considered as major suppliers, in other words, whether, after defining a market, one or more players can be said to be dominant in that market, that are anti-competitively exercising market power.[24] In fact, this dominance analysis has been conducted by some EU regulatory authorities, and no dominance was found, provoking the outcome of the EU roaming regulation, since tools in the EU regulatory framework did not seem to address the roaming problem adequately. Since no dominance (individual or collective) could be found, the EC withdrew the wholesale international mobile roaming market from the new recommendation of relevant markets for SMP assessment, issued in December 2007.[25] The EC found that it was not possible for a single NRA acting alone to address the exceptional concerns of this market (*e.g.* cross-borders), and removed it from the list while enforcing *ad hoc* regulation. The WTO instruments, also a trans-national entity, might be suitable to tackle the problems of IMRS. Once a "major supplier" has been found, the Reference paper also requires that it "make publicly available either its interconnection agreements or a reference interconnection offer".

On the basis of the existing Telecommunications Reference Paper, it could be argued that competitive safeguards could be applied to IMRS. Since most countries have three or four mobile networks (less commonly two or five), the roaming service may only be offered by a limited number of suppliers. Additionally, the visited mobile network can be thought of as not feasibly being economically or technically substituted in order to provide the (roaming) service, since there are entry barriers (*e.g.* spectrum licences) to mobile service provision. Therefore, visited networks would match the definition of "essential facility". The question here is whether MNOs (either individually or jointly) have "the ability to materially affect the terms of participation (regarding price and supply) in the relevant market, as a result of the control of essential facilities, and the use of its position in the market". Indeed, if visited operators are able to exert negotiating power on home operators selling wholesale roaming well above cost, dominance[26] could be demonstrated in that home operators obtain supernormal profits when selling wholesale roaming services.[27]

Another option would be to seek to show that the STIRA (Standard Terms for International Roaming Agreements) violates competition law. The STIRA were cleared by the EC in 1996 and 1998 that granted letters of comfort,[28] following a request by the GSM Association. The STIRA remains in "commercial confidence". This, of course, could be challenged again if existing conditions have changed, such as mobile market evolution, changes in regulatory frameworks, development of traffic steering techniques,

penetration of GSM technologies, or the overall functioning of the IOT framework. Any possible finding of STIRA's violation of competition law would be likely to dissolve existing roaming contracts, and an alternative way-forward would need to be found in that event.

The Reference Paper also contains some undertakings on interconnection, which apply to linking with suppliers providing telecommunication services. However, this addresses interconnection obligations as a regulatory instrument that a government should enforce in order to allow users of one supplier to communicate with users of another supplier and to access services provided by another supplier. The WTO framework does not address interconnection as a service, so no schedules or commitments can address an "interconnection service", although some stakeholders, such as the Australian Telecoms Users Group (ATUG), argue that the existing WTO provisions on interconnection should be applied to IMRS.[29] IMRS can be considered a joint provision of Mode 1 (wholesale provision) and Mode 2 (retail provision) Modes of Supply, under the GATS framework. Some regulatory frameworks may use a definition of "interconnection service" under which IMRS may fall, but the GATS clearly states that interconnection refers to communication between users of different suppliers, which is not the case of roaming.

There is another approach to IMRS regarding interconnection. Without access to the original number (the one belonging to the home network) no service substitution can take place, since access to this number is a requirement to provide an equivalent service. In other words, no service would be a roaming substitute if it does not provide incoming calls to the home network's number. Therefore, the SIM-card (or more specifically, access to the home number) is essential to provide a substitute service. Third parties could therefore request access to the SIM (and to the number) in order to provide a seamless service. This would be somewhat unusual but, from the point of view of technology, it is possible to provide an additional IMSI over the air to a SIM and allow the delivery of another identity for the roamer. The party requesting access to the SIM can be any of the visited country's network operators (now trading independently of the home provider) or any other MVNO present in the visited country. In order to provide a seamless service that does not involve a roaming agreement with the home operator, access to the SIM and provision of IMSI are the missing parts of the value chain. The rest of the elements can be provided by any other operator, and they include domestic services, SMS, international transit and call termination service back home or to a third country.

The Annex to the GATS

The Annex on Telecommunications to the General Agreement on Trade in Services (GATS) addresses the specific characteristics of the telecommunication services sector. According to Article XXIX, any Annex is an integral part of the GATS. The provisions of the Annex are in addition to the general rules of the GATS, supplementing and strengthening them. The Annex guarantees suppliers of liberalised commercial services reasonable and non-discriminatory access to basic telecommunications networks and services.[30] This includes suppliers of basic and value-added telecommunications, as well as suppliers of services delivered using telecommunications. The Annex supplements and strengthens the provisions in the GATS in Article VI on domestic regulation, Article VIII on monopoly and exclusive suppliers and Article IX on business practices.

The Annex applies to measures imposed by member states that affect trade in services. The measures are defined very generally in Article XXVIII to include: a law, regulatory rule, procedure, decision or administrative action.[31] In particular, the Annex applies to measures affecting access to and use of public telecommunications, both for the provision of basic telecommunications and value-added services. Mobile communications are, in principle, included in this Annex. While wholesale mobile services are not specifically mentioned they are important for access to and use of public telecommunications and, as such, could be assumed to be covered by the Annex.

Unlike the Reference Paper there is no obligation in the Annex to find the operators to be major suppliers and dominant, nor does it focus on interconnection. Article 2(c)i limits the application of the Annex to commitments made in the schedule of a member. More than 90 governments have made specific commitments on mobile cellular services in their GATS schedules, although it should not be necessary to list cellular or mobile services as a separate subsector. Besides, unless otherwise stated in the sector column, any basic telecom services may be provided on a facilities-basis or by resale and through any means of technology[32]. Article 5(a) of the Annex states:

> *"Each Member shall ensure that any service supplier of any other Member is accorded access to and use of public telecommunications transport networks and services on reasonable and non-discriminatory terms and conditions, for the supply of a service included in its Schedule."*

Non-discriminatory treatment is defined in a footnote, as being understood:

> *"… to refer to most-favoured-nation and national treatment as defined in the Agreement, as well as to reflect sector-specific usage of the term to mean "terms and conditions no less favourable than those accorded to any other user of like public telecommunications transport networks or services under like circumstances".*

Article 5(a) is to be applied using paragraphs 5(b) to 5(f). The first of these grants suppliers access to and use of any public telecommunications transport network or service offered within or across the border of that member state. This must be understood to include mobile telecommunications and services.

The central provision of the GATT and the GATS is the regulation of regulation, requiring the avoidance of discrimination. This is laid down in terms of Most Favoured Nation (MFN) and National Treatment obligations.[33] Article XVII of the GATS on National Treatment states:

> *"1. In the sectors inscribed in its Schedule, and subject to any conditions and qualifications set out therein, each Member shall accord to services and service suppliers of any other Member, in respect of all measures affecting the supply of services, treatment no less favourable than that it accords to its own like services and service suppliers.*
>
> *2. A Member may meet the requirement of paragraph 1 by according to services and service suppliers of any other Member, either formally identical treatment or formally different treatment to that it accords to its own like services and service suppliers.*
>
> *3. Formally identical or formally different treatment shall be considered to be less favourable if it modifies the conditions of competition in favour of services or service suppliers of the Member compared to like services or service suppliers of any other Member.*

Regarding the GATS and its Annexes, it is the schedule that sets when a WTO member phases in obligations for a particular service. Mobile communications are included in the GATS, either generally under "Voice telephone services", or specifically under Telecommunication services/Other(o)/Mobile telephone services.[34] The GATS distinguishes between four modes of supplying services (trade): cross-border trade, consumption abroad, commercial presence, and presence of natural persons. Thus, roaming would be a mixture of Modes 1 (cross-border trade: service flows from the territory of one Member into the territory of another Member) and 2 (consumption abroad: situations where a service consumer moves into another Member's territory to obtain a service)[35]. Roaming services would be a form of provision of mobile service across borders, in that mode 1 would address the wholesale relationship between visited and home network operators, and mode 2 would be related to the retail provision of roaming services. Therefore, if roaming services are not to be included under the current commitments, they have to be explicitly excluded by a country in its schedule. This has not been the case so far. Only Uganda sets some constraints on roaming, namely the access via the major licence operator's network.[36]

During the debates of the EU roaming regulation, it was argued[37] that providing regulated wholesale prices only to operators in the EU and the EEA would be discriminatory. However, in its dealing with the WTO all the countries in the EEA and EU are to be treated as a single nation. Consequently, "national treatment" includes the provision of wholesale IMRS at regulated prices in the 30 Member States of the EEA and the EU.

By contrast, where countries wish to explore bi- or multi-lateral regulation outside the scope of an overarching supra-national authority, it might be contended that, if a wholesale price cap were applied to the visited networks of the countries concerned, then those visited networks would, under the GATS, have to offer capped prices not just amongst themselves, but also to operators ("service providers") from all WTO-signatory countries. An alternative view is that, at least where the countries involved are party to a comprehensive trade agreement, they may be able to rely on Article V of the GATS which exempts WTO Members from the most-favoured nation provision of the GATS.

Accordingly, in countries where there is national automatic roaming it could be argued that there should also be an obligation for mobile operators to offer national roaming services on a just, reasonable and non-discriminatory basis to foreign operators. In other words, operators from other countries should be able to sign wholesale deals with mobile operators, under the same "national treatment" and MFN obligation.

One option may be to use the WTO framework to request that national roaming access conditions be applied to every other country, on the basis of the MFN and National Treatment obligations. That would initiate a dispute procedure that is likely to be time-consuming and politically challenging. It is doubtful whether any WTO member would be willing to engage in such a process, whose outcome may take some years and be politically compromising. It is not clear either whether mobile roaming services represent an important enough profit loss for a WTO member's operator to initiate such a dispute settlement procedure.

Finally, it should be noted that the use of WTO rules to address the issue of unreasonably high or discriminatory rates need not be effectuated simply by dispute settlement. Rather, if an awareness of the relevance of these rules develops, NRAs may be persuaded to either regulate or threaten to regulate unreasonable and discriminatory rates, without actually having to litigate, recognising that the threat of litigation is an important motivating element.

It is noteworthy that the WTO framework is normally used by governments to conduct claims against other countries on behalf of their industry, that is, it is the trade barriers posed by a country to a third country's industry that ultimately make the third country's government initiate a dispute settlement procedure. In the roaming case, as the industry generally is against further regulation of roaming services, it would be somewhat unusual that a government intervened initiating a dispute under GATS lacking support from industry, or rather, against its will.

As a summary, roaming services can be assumed to be already covered under the current GATS provisions on telecommunications services. Using the Reference Paper provision to prove that one or more providers (visited operators) have a dominant position (as major suppliers of an essential facility) and apply remedies has proved to be a difficult challenge (*e.g.* the European Union). Therefore, the use of the MFN principle is a way to explore by governments, in that just, reasonable and non-discriminatory conditions should be offered to any operator requesting them.

To Publish or Not to Publish

The first report on international roaming addressed the issue of publications of IOTs and/or negotiated wholesale charges as a tool to promote transparency, market scrutiny of roaming charges, as well as a

means to separate wholesale and retail charges for consumers, improving awareness of cost causation by visited operators and/or retail margins. However, the possible publication of IOTs and/or negotiated wholesale rates raised some concerns by operators and regulators about commercial confidentiality, discouragement of discounts and the facilitation of tacit collusion around the published price, and impossibility to impose obligations on wholesale rates disclosure on operators.

First, a distinction should be made between the publication of IOTs (non-discriminatory wholesale roaming rates available to each GSMA member with the exception of competitors from the same country), and the publication of actual wholesale rates that operators charge each other. Usually, operators negotiate discounts below the IOT (which is non-discriminatory and can be obtained without negotiation), depending on the bargaining power of both counterparts, such as volume reductions, traffic balance, etc. Sometimes, operators negotiate discounts below the IOT with one of the visited country's operators, to which the majority of the traffic is directed through traffic-steering techniques, and then have roaming agreements at IOT price with the rest of the operators in that country, that will eventually provide routes for traffic overflow or complement coverage.

One problem of the IOT framework is that it is not transparent so that it is not evident to what extent initiatives such as traffic steering, hubs, etc., as well as other technologies, are placing competitive pressure on wholesale rates. One possible way forward to inform this question would be that IOTs, like retail prices, were a matter of public record. Arguments have been made that IOT publication would lead to collusive behaviour, in that it would discourage further discounts or negotiation between providers, placing a reference cap onto any negotiation on wholesale rates, thus supporting the ability of firms to fix prices at higher levels than otherwise would be the case. Another example of the publication of wholesale rates was the case of the settlement rates for international fixed telephony services and in this case publication may have helped in lowering wholesale (and retail) prices, although commercial and technological developments are likely to have been much greater disruptive forces. There is value in having greater transparency as a means of supporting benchmarking of IOTs and, for example, acting to highlight situations where operators raise IOTs in an unreasonable, unjustified manner.

When discussing the publication of IOTs, they seem to be already a matter of public record, except for those operators in the same country. In addition, due to trans-national operator footprint and the very common presence of subsidiaries in several countries, operators should be able to know IOTs in almost every country including their own, the exception to this being perhaps one operator having no subsidiaries abroad. In this case, this operator would not be able to know the IOTs published by its competing counterparts.

A different question is whether publication of actual (after negotiation) wholesale rates should be a matter of public record. Unlike IOTs, actual wholesale rates are the result of bilateral commercial negotiation, depending on volumes, bargaining power, etc. Wholesale rate publication would reveal the actual level of charges levied between operators, and bring to public scrutiny actual retail margins applied. In what refers to transparency and information for consumers, this would be the best option (for consumers who are aware and sufficiently engaged to seek and use such information). It would however raise concerns regarding commercial confidentiality and discourage negotiations between operators.

In respect of IOTs, this report advocates that they should be brought to public record, as they apparently are very well known by industry players and thus, it would not lead to anticompetitive behaviour. Since IOTs are non-discriminatory rates that operators have to offer to each other, it may provide consumers with an overall impression on wholesale charges, although further discounts may be negotiated by operators.

Regarding actual wholesale rates, this paper has strong reservations about the pertinence of mandating (in the event that it could be mandated) the publication of negotiated wholesale rates. This would mean a strong limitation of market freedom, commercial innovation, and might have collusive implications. It would raise serious concerns for commercial confidentiality.

Again, the question of the necessary legal basis to impose obligations arises, since it is not clear to what extent NRAs or public authorities may oblige operators to publish IOTs or negotiated wholesale rates. Most national regulatory frameworks allow data collection for the purpose of statistical collection, benchmark and information for consumers, so it would not be difficult to extend this obligation to the publications of IOTs/wholesale rates. This may be against the conditions set by GSMA which, as industry association, would be willing to protect its interests. However, if telecommunications policy makers agree on the convenience of publishing IOTs, such publication should be enforced. Since publication of IOTs in one country would basically affect foreign roamers in that country and vice-versa, multi-national agreements would be advisable, so that policy makers act in a co-ordinated way that fulfils the objectives of greater transparency of IOTs and better consumer information in a more effective and timely way.

One possible way forward regarding wholesale rates (not IOTs) publication is that regulators check their competitive state, collect the data and produce an internal benchmark to inform regulatory policy, while ensuring commercial confidentiality and avoiding influencing the negotiation of discounts. Countries could consider going further and enabling NRAs to publish aggregate data on the average wholesale price for their particular country, without revealing individual operator data to the public. This is the approach taken by the European Regulators Group –ERG – data benchmark report on roaming,[38] which NRAs are empowered to produce in order to verify compliance with the retail and wholesale price caps under the EU Roaming Regulation. This option would provide policy makers and consumers with a clearer view of the wholesale and the retail margin components of their retail roaming prices, while leaving room for some commercial confidentiality. This is the approach that this report proposes to take. Again, such data collection would need to be supported by a legal basis, as mentioned before. Therefore, it is advisable that countries develop the legal basis to enable NRAs to collect these data.

Wholesale Price Regulation

A possible approach to ensure reasonable wholesale roaming charges is direct price regulation, which should be aimed at increasing market contestability and giving room for price arbitrage and profit realisation. Regulated wholesale charges should also avoid margin squeeze, especially for smaller operators. Wholesale price regulation enables operators to pass savings through to the retail level and offer lower retail tariffs. However, where the retail level is not sufficiently competitive, retail price regulation may be necessary to ensure that consumers benefit. Therefore, retail price caps mainly focus on ensuring a reasonable price level for end-users. Both types of price regulation address different needs, but are very much related to each other. In terms of cost origination, retail charges contain a share of wholesale charges and NRAs should therefore consider them in order to conduct a comprehensive analysis.

That is why both types of price regulation have been merged in one single section, which has been included in the chapter “Policies addressing the consumer perspective”. There, the approach to wholesale roaming charges together with retail price regulation will be discussed, even though wholesale price regulation may better fit in this section.

POLICIES ADDRESSING THE CONSUMER PERSPECTIVE

Retail and Wholesale Price Regulation

In the previous report, IMRS prices were found to be too high, in that consumers pay much higher prices than the underlying costs of providing the service. It was also argued that this creates problems for consumer protection, since consumers pay far higher prices for IMRS than otherwise would be the case, *i.e.* if roaming services were subject to competitive forces. Further outcomes of this harming situation are barriers to international trade and travel. As a consequence, there is a widespread feeling among regulators, policy makers and consumers for the enforcement of rules that prevent consumers from being unreasonably charged for roaming services.

As highlighted in the first part of this work, there are a number of reasons why prices remain unreasonably high (IMRS are bundled with domestic services, high wholesale charges, etc.). This report deals with possible ways forward to tackle this problem. Some of them may directly address the problem: high prices for IMRS, others may intend to bring some contestability to the market or increase awareness of IMRC, substitutes, etc. This is why, regardless of other measures to promote competition, consumer awareness, etc., retail price regulation addresses exactly the main concern of regulators, policy makers and consumers: high retail charges. The example of the EU roaming regulation and other initiatives that aim at regulating retail prices will be overviewed. Although not the only one, high wholesale charges have been identified as one of the underlying factors for the problem of high retail prices. Even though wholesale price regulation would better fit into the previous section, the fact that wholesale and retail price regulation might be applied together, as in the EU roaming regulation, and the links between the level and form of both types of regulation, have made it more advisable to deal with them together in this section.

Retail price regulation: what should be the regulated price?

The only example of enforced roaming price regulation is, so far, the amended EU regulation, where a glide-path for retail caps was set. Retail and wholesale regulation were introduced to prevent excessive pricing. These rates were thought of in conjunction with wholesale rates, in order to provide a large enough price gap for the development of competition and regulatory exit. In this regard, cost-orientation was not advocated.

Table 2: EU regulated retail roaming rates (without VAT)

RETAIL RATES (Price in EUR/min)	JULY-OCTOBER 2007	SUMMER 2008	SUMMER 2009	SUMMER 2010	SUMMER 2011
MAKING A CALL *(mark-up)*	0.49 *(63%)*	0.46 *(64%)*	0.43(65%)	0.39 *(77%)*	0.35 *(94%)*
RECEIVING A CALL	0.24	0.22	0.19	0.15	0.11
SENDING A SMS	-	-	0.11	0.11	0.11

Source: European Commission.

Table 3: EU regulated wholesale roaming rates (without VAT)[39]

WHOLESALE RATES (in EUR/min)	JULY-OCTOBER 2007	SUMMER 2008	SUMMER 2009	SUMMER 2010	SUMMER 2011
MAKING A CALL	0.30	0.28	0.26	0.22	0.18
RECEIVING A CALL	-	-	-	-	-
SENDING A SMS	-	-	0.04	0.04	0.04

Source: European Commission.

In the 2007 EU Roaming Regulation Impact Assessment, the EC acknowledged that retail-only regulation was likely to squeeze margins of smaller operators, since they would not be able to negotiate good wholesale rates, and would therefore force them to offer roaming services below cost, although the EC has further tools to avoid abuses, such as margin squeeze tests that would lead to penalties for operators. Moreover, the approach of EU competition law is to apply wholesale price regulation to treat the competition bottleneck and, if competition at the retail level is not focused on roaming services so that lower wholesale rates may not be passed through to retail roaming prices, both retail and wholesale price regulation may be introduced. This is the approach of the EU roaming regulations. The EC examined several options for establishing a retail cap: home pricing principle (retail roaming prices would be "pegged" to the customer's home prices for comparable domestic mobile services), the visited country approach (consumers would be charged the actual domestic rate within the visited country), European home market approach (retail prices would be set at a level 30% above the wholesale rate, which would in turn be drawn by multiplying the average EU mobile termination rates –MTRs – by a factor).

For the 2007 Regulation, the EC estimated the wholesale charge incurred by an operator when a customer receives a call while roaming to be less than EUR 0.10 on average. The operator would have to pay a termination rate to the mobile operator in the visited network, together with a transit charge. The home operator will have either received a termination charge from the originating network or retail on-net tariff from the caller. The initial proposal argued that the actual net real cost to operators may be less than EUR 0.10. In its opinion, the MTR provides a good basis for the cost component of receiving calls. It advocated setting the retail level at a 30% margin above the wholesale rate, which would be at MTR level for receiving calls, twice the MTR for making calls within the visited country, and three times the MTR for calling back home or to another EU country, that is, in line with the European home market approach. The EC considered that the 30% margin above the wholesale rate would ensure that savings are passed on to consumers, as well as providing operators with some comfort. Meanwhile, the European Regulators Group (ERG), proposed a wholesale rate of twice the 75th percentile of the average MTR within the EU to allow for cost recovery by efficient operators.

At the request of the European Parliament's Committee on Internal Market and Consumer Protection, Copenhagen Economics delivered an assessment[40] of the EC proposal on roaming. It had a number of differences with the Commission proposal. Namely, it proposed using national average MTRs instead of national peak MTRs, since NRAs regulate average and not peak MTRs, and advocated to use the 75th percentile, in line with the ERG opinion, which would be high enough to ensure cost recovery by an efficient operator. It also proposed a single cap for roaming local calls and calls back home or to a third EU country. It argued that it makes no sense to attribute an additional MTR (then at around EUR 0.116/min) in order to cover international transit which is priced at around EUR 0.02, since international transit (intra-EU routes) represents the major cost difference between calls made back home/calls to a third country and

local calls. Copenhagen Economics quoted confidential information from several operators as their source. It also suggested that there should be a cost difference for calls made depending on the call's termination network (fixed or mobile), as MTRs are much higher than fixed termination rates (average fixed termination rate was around EUR 0.01/min and the MTR around EUR 0.1234/min, using the ERG data from 2006).

At the retail level, that study also disagreed with the 30% mark-up initially proposed by the Commission, as it believed that the method of "proportionate allocation" of retail costs is a better way of assessing retails costs for roaming in eurocents per minute, instead of adding up a fixed percentage of wholesale costs, acknowledging the fact that operators incur retail costs (marketing, handset subsidies, etc.), and should be borne proportionately by all the mobile services in the bundle (domestic calls, SMS, etc.). Following this method, EUR 0.14 per minute was found to be the adequate retail mark-up both for calls made and received. A.T. Kearney was identified as the source that estimates average retail costs per minute to be around EUR 0.10 for a sample of European operators, based on activity-based cost (ABC) allocation method. The calculated reasonable return in the telecommunications industry, calculated by means of averaging across measures (profit margin, EBIT, EBITDA, etc.) was found to be 15 %. However, the return is only calculated on the retail costs, which gives less than EUR 0.02/min.[41]

Additionally, this study suggested that retail price caps be applied on average over all calls, not for individual calls, and proposed a consumer protection tariff well above these levels that would have been offered to all consumers by all providers. Finally, they estimate the roaming specific costs (operational, marketing, etc.) to be around EUR 0.02/min.

Another study commissioned by the same European Parliament Committee[42], on technical issues of roaming, describes in one of its sections the technical infrastructure of roaming and analyses whether the system creates increased costs. Its conclusion was that IMRS costs are between 10% and 20% higher than a national-only system, a figure supported by a separate estimate that suggests added costs of about EUR 0.02-0.03/call.

Finally, a trade-off was reached between the European Commission, the European Parliament and the Council, with the outcome charted in the previous tables. It is noteworthy that the retail mark-up increases over time (from 63% to 94%), aiming at giving more opportunities for retail-rates below the cap. The absolute margin slightly decreases (from EUR 0.19 to EUR 0.17). However, as ERG reports have shown, the majority of retail prices are at or near the cap, indicating a lack of competition at the retail level. These caps and the EU regulation were designed to ensure users do not pay excessive prices for roaming compared to competitive national prices, thereby contributing to the smooth running of the internal market. The EC in the Impact Assessment[43] of the proposed amended regulation identifies the consumer protection problem as follows:

"However despite these gains, it appears that the structural problems with this market have remained intact. While voice roaming services may be an important source of revenues and profits for a mobile operator, from the point of view of consumers prices for voice roaming are perceived as prices for only one element of a larger mobile bundle purchased – and as a less important element of this bundle than, say, domestic voice, domestic SMS or a (subsidized) mobile device included in the mobile price plan".

In order to carry out a retail price regulation, consideration should be given to the price difference between calls made and calls received. These two types of calls may be considered as substitutes to some extent, since customers might switch from making calls to receiving them depending on price levels. If receiving becomes cheaper, fewer or shorter calls might be made and vice versa.

The experience of the EU Roaming Regulation so far has not provided clear evidence that setting wholesale and retail price caps and transparency measures fosters competitive tariffs. The ERG benchmark data collections[44] for 18 months of regulation show that a majority of average voice roaming prices by country are at or near the regulated caps. Before setting a growing retail mark-up, it is necessary to consider the question of money transfers between net out-payers and net recipient operators. Clearly, having low wholesale rates and not so low retail tariffs could favour operators that are net roaming out-payers. On the other hand, having high wholesale rates and low retail tariffs could favour net-receivers. Therefore, balanced wholesale and retail regulation is needed to ensure a balanced effect on different types of operators. The amended EU Roaming Regulation, which entered into force in June 2009 has increasing retail-wholesale margins[45] with the intention that alternative players can find profit opportunities in setting retail prices well below the cap, forcing dominant operators to lower them too. The EU will consider evidence on price trends, including from the ERG, when reviewing the functioning of the Regulation in June 2010 and June 2011.

The EU amended the roaming regulation in 2009 and extended it, among other issues, to SMSs, which were regulated at the wholesale and retail level, as Tables 2 and 3 show. The ERG updated the roaming regulation guidelines as a result.[46] The rationale for setting the retail and wholesale regulated price was amongst others, the following:

The Danish National IT and Telecom Agency (Danish regulator) released in 2008 the study "Analysis of Prices and costs for Mobile Data Services Abroad"[47]. In its cost model, the costs to the visited network (wholesale costs) can be categorised in origination and international transit costs. It also assumes that operators should be compensated for the lack of wholesale cost coverage for receiving SMS (around EUR 0.004). In its view, the total wholesale cost would be EUR 0.008 (origination[48] would be about EUR 0.004 and international transit costs close to zero). At the retail level, according to NITA, the costs to the home operator for an SMS sent from abroad would be in total (breaking down costs into handling/receiving SMS, SMS termination, retail costs) EUR 0.0268/SMS. This estimate assumes that 20% of the SMS traffic goes to networks abroad (thus costing 0) and the operator has got a 25% market share. The retail mark-up is set at EUR 0.0348. This analysis could vary depending on differences in national SMS termination rates. The ERG discussed this study in its submission[49] to the Commission's public consultation on extending the 2007 EU Roaming Regulation, which the EU took into consideration in setting a EUR 0.11 retail and EUR 0.04 wholesale cap. Again, international transit costs are based on intra-EU traffic. It is also worth pointing out that Danish domestic SMS charges are among the lowest in Europe, with a SMS costing typically EUR 0.003. NITA has used its LRAIC[50] model for mobile termination with a real pre-tax WACC of 8.6 %.

In its Memorandum of Understanding,[51] the AREGNET also proposed a retail cap consisting of a mark-up of the regulated wholesale charge. This mark-up was due to be 50% the first year, 40% the second year, and 30% thereafter. As for the wholesale rates:

- For international outgoing roaming calls to a certain destination, the wholesale rate was set as the retail tariff charged by the visited operator to its users for international calls to that destination, plus a mark-up, which was again 50%, 40% and 30% for the first year, second year and thereafter, respectively.

- For domestic outgoing roaming calls (*i.e.*, outgoing roaming calls within the visited country), the wholesale rate was set at the retail tariff charged by the visited operator to its users for the domestic calls within the visited country, plus a similar mark-up.

- For incoming calls, a home provider shall not charge its user a retail tariff higher than its retail tariff applied to such a user for international calls to a visited operator's network. The maximum

> wholesale rate would be that of the normal rate applied for the termination of an international incoming call originating on the network of the home provider and terminating on the network of the visited operator.

The AREGNET MoU also states that, for the purposes of calculating the appropriate wholesale rate, the visited operator's retail tariff for international calls to a specific destination (reference tariff) is calculated as an annual average of various retail tariffs for international calls to that destination, provided using the equivalent technology to the one used to provide the regulated roaming calls, applied by that visited operator. Accordingly, retail tariff for domestic calls is calculated as an annual average of various retail tariffs for domestic calls provided using the equivalent technology as well.

The AREGNET MoU was endorsed by the Arab Telecommunications and Information Council of Ministers on 4 June 2008, except for the part which concerns tariff regulation. The Council had reservations and invited the Arab countries to endeavour to find a mechanism that would allow them to apply the recommended regulation.[52]

Clearly, the rationale that underpins the set-up of regulated prices by the AREGNET MoU is service and tariff comparability. Some mark-ups were also set to make for retail operator's profits, and also to value the premium service that roaming means compared to equivalent domestic services (*e.g.* the MoU caps wholesale rates by setting a mark-up on the equivalent service, that is, wholesale rate for roaming calls made to the visited country should not be charged higher that the equivalent domestic calls plus a mark-up). In short, the methodology followed to establish wholesale rates has been that of trying to find equivalence with the comparable domestic service. It could be referred to as a top-down approach, by way of contrast to the bottom-up approach that intends to find out the cost incurred by roaming service providers.

AREGNET also identifies some challenges for the potential implementation of its MoU, such the different stages of liberalisation that countries in the region have reached. Since roaming prices are linked to domestic prices, the model would punish operators where liberalisation and tariff rebalancing has progressed further. International calls (taken as reference for cap set-up), might not be cost-oriented, especially in countries with a non-liberalised telecommunications sector.

Wholesale caps, retail caps or both?

The aim of a price regulation must always be clear. When NRAs set caps on wholesale prices, they normally do it in order to promote competition and contestability in a specific market, by allowing alternative providers to replicate the incumbent's retail offer with a relatively low investment level, or to allow them to make use of a resource that they need to provide the service (*e.g.* mobile termination). Retail IMRS are not normally purchased independently leading some analysts to state that it is not a market, at least if competition law principles are used (supply- and demand-side substitutability, among others), that is, the retail market would be the bundle of retail mobile services.

However, it can also be argued that there is a demand curve for IMRS and this demand curve is dependent on the growth of the mobile subscriber base, that is, the demand curve for IMRS shifts outwards as the subscriber base grows. Mobile operators subsidised the more price-sensitive side of the market (terminal subsidies) and charged higher retail prices in the market where demand increased strongly as the subscriber base grew (and were not concerned that wholesale prices in other countries were high since they themselves followed the same practice). Strong growth in IMRS occurred as businesses began using roaming extensively and were less price sensitive since individual users were in most cases not paying the charges (as opposed to the companies that paid the bills). The situation changed as residential subscribers

entered the mobile and subsequently the roaming market, since their demand curve is supposed to be different from that of the business segment, namely more price-sensitive.

The rationale for intervening in the IMRS market is to ensure consumers do not pay excessive prices for roaming services, to lower barriers for international trade and travel, etc. Setting a wholesale cap for roaming services alone could address the competition bottleneck of high wholesale prices but, if competition at the retail level is focused on services other than roaming, the benefits may not be passed through to consumers. Other measures are also necessary to improve retail competition (such as raising consumer awareness, providing the means to decouple the mobile services bundle, etc.). Otherwise the dynamics of the retail market may remain the same, except for the fact that prices are regulated. In this regard, setting a high mark-up between wholesale and retail caps, while leaving room for retail competition to develop, may not be sufficient in itself.

On the other hand, setting a wholesale cap would be very helpful to avoid margin-squeeze, especially for smaller providers, who might not be able to obtain volume discounts at the wholesale level. Nonetheless, if competition at the wholesale level takes place, there will not be a need to establish wholesale caps, since competition would bring wholesale rates to a reasonable level. A wholesale cap would also be necessary to overcome one of the identified problems for high IMRC: high wholesale charges. However, setting only a wholesale cap does not guarantee by itself that those reductions will be passed on to consumers in the absence of a well-functioning retail market.

In this regard, a retail cap can be considered as aiming at protecting consumers, while a wholesale cap is supposed to improve competition. If both objectives are aimed at, it makes sense to establish both a wholesale and a retail cap.

As has been illustrated with the examples given before, there are basically two ways of approaching the task of setting a cap. If a top-down approach is taken, analogy must be made regarding comparable national services, plus an additional charge that accounts for costs incurred due to the fact that the service is provided overseas. If a bottom-up approach is taken, all costs incurred to provide the roaming service should be analysed, choosing one of the available methodologies used by NRAs, such as the LRAIC model (when these are constructed in a way that enables roaming costs to be accurately measured; *e.g*. some are designed for voice MTR regulation only).

Since the ultimate aim of the regulating roaming prices is not to set a cost-oriented cap, but to protect consumers and lower international barriers for trade and travel, it is not compulsory to choose a methodology that seeks to find a cost-oriented cap. On the contrary, a top-down approach would perfectly serve the regulatory objectives and guarantee an acceptable price for consumers. This approach involves a lot more simplicity, and an easier way to justify the caps to consumers. The reasoning behind the caps proposed by AREGNET is fully in line with this top-down methodology and provides, regardless of the discussion on mark-ups on wholesale costs and retail charges to allow for profitability, a much more intuitive approach. The ultimate aim is that subscribers are offered comparable roaming prices for comparable domestic services, that is, they are not unreasonably charged for services that are offered to domestic subscribers, once the extra cost (*e.g.* international transit) is accounted for. That being said, it is important not to tie roaming regulation too closely to domestic prices, as that could create an incentive for operators to refrain from lowering domestic prices.

In contrast, the FCC recently agreed to regulate[53] automatic roaming services (roaming services, according to the terminology used in this report). It placed national roaming services under the conditions of CMRS (commercial mobile radio services) and therefore there is a common carrier obligation to provide roaming services to other carriers upon reasonable request and on a just, reasonable, and non-

discriminatory basis. Therefore, where a carrier receives such a request, it serves the public interest for that CMRS carrier to provide automatic roaming service to the requesting carrier.[54]

To provide guidance as to the reasonableness of automatic roaming requests, the FCC established the presumption that a request for automatic roaming is reasonable, in the first instance, if the requesting carrier's network is technologically compatible with the host carrier's home market(s).[55] Additionally, the FCC established a home roaming exclusion relating to this automatic roaming obligation, stating that a would-be host CMRS carrier is not required to provide automatic roaming to a requesting CMRS carrier in the requesting carrier's home market.[56] The FCC defined the requesting carrier's home market to include any geographic location where that carrier has a wireless licence or spectrum usage rights (*e.g.* spectrum leasing arrangements) that could be used to provide CMRS. A number of carriers asked the FCC to reconsider the home market exclusion, and those petitions for reconsideration are pending before the FCC.

For clarity, it is worth mentioning that automatic roaming services, following the FCC terminology, are provided on a national basis, between carriers that do not have spectrum in the same area.[57] American "national roaming" shares many similarities with IMRS, since it is provided among carriers in regions where they do not have spectrum. From the point of view of the implementation of regulation, the main difference is the legal basis for the FCC to enforce agreements and impose obligation, which is generally lacked by IMRS between providers in different countries.

In that agreement, the FCC explicitly stated that price regulation was not warranted, with the arguments that:

- Capping roaming rates may provide carriers with a benchmark that reduces incentives to lower retail prices paid by customers. In addition, smaller regional carriers may have an incentive to reduce the discounts they offer on regional calling plans thereby driving up the prices regional subscribers pay within their plan's calling area.

- Roaming rates regulation may deter investment in network deployment, reducing incentives for smaller carriers to expand the geographic coverage of their networks. If the competitive advantage of building out nationwide or large regional networks is reduced, larger carriers incentives to expand, upgrade or maintain their existing networks would diminish.

Clearly, imposing roaming caps in the United States reduces incentives to expand networks. It is interesting to discuss to what extent this conclusion may be drawn for cross-country expansion. The main driver for expansion, however, is capturing revenues in another market, either US sub-national regional markets, or any national market. From this point of view, the same arguments that state that price regulation is not warranted in the United States may hold for any attempt at regulating IMRS rates (*e.g.* EU roaming regulation). Nonetheless, there is one characteristic that applies to the US case: national roaming rates are not considered to be abusive or so high as to harm consumers, which was one of the main bases on which the EU moved to regulate roaming prices. In the US case, network expansion incentives offset other considerations, since rates are not found to be harmful for consumers. In the EU case, consumer protection offsets any potential disincentive for cross-country consolidation. The contribution of roaming to overall revenues and investment budgets may also be different.

Wholesale prices for incoming calls

As for incoming calls, wholesale prices have been left aside in the EU roaming regulation and debate. This is due to the fact that visited operators usually charge mobile termination rates (MTR) to international transit operators for inbound roaming calls. Therefore, regulating wholesale inbound charges has not been an issue,[58] as it has been included under the standard (national) MTR regulation framework. As a matter of

fact, all 27 EU regulators treat incoming roaming calls as being identical to incoming domestic calls and MTRs have been the focus of very active regulatory activity in the EU.[59]

Other countries do not use MTRs for inbound roaming charging, but the so-called "Mobile Subscriber Roaming Numbers" or MSRN termination fees, which remain unregulated. For example, Australia explicitly excludes MSRN termination from the MTR framework.[60] Although both national and MSRN mobile termination share many similarities, there is a difference in that a roaming call can potentially be terminated by more than network, and not by only one as is the case of national mobile termination. Reductions of MSRN termination fees in this latter group of countries would be helpful in reaching a more efficient set of prices for incoming communications, but do not help in creating a contestable market.

Possibilities in regulating retail and wholesale roaming charges

Once the rationale for regulating IMRC is clear and an agreement has been found in that mobile subscribers should be protected against extremely high roaming charges, and international trade and travel should be favoured by this intervention, the next step towards a potential roaming charges regulation in OECD countries should be to examine whether they have a legal basis to regulate roaming prices.

In general there are three types of authorities or competent bodies that may be in a position to regulate roaming prices. These three types of authorities may act based on relevant legislation in force or adopted to address these issues (such as fostering competition or protecting consumers):

- **Telecommunications NRAs**: whenever *ex-ante* sectoral regulation is warranted, they are entitled to impose *ex-ante* obligations when dominance (or significant market power, following the EU terminology) is found.

- **Competition authorities**: although their intervention is effected *ex-post*, they may be entitled to regulate prices.

- Authorities responsible for **consumer policy** are normally entitled to set obligations on transparency, price information, etc., although there is no evidence of Consumer Policy authorities being entitled to impose price regulations.

What is stated for the first two options may hold for retail charges paid by residents of a country but it would be harder to justify the regulation of wholesale prices paid by operators from other countries and which therefore has no direct impact on residents of the country imposing them. However, as it was pointed out before, some regulatory frameworks (*e.g.* the EU's) foresee the possibility of imposing wholesale obligations even without reciprocity from their counterparts, at least from the point of view of market power assessment (which concerns telecommunications NRAs and competition authorities).

Any intervention initiatives should therefore have the required legal instruments to grant price regulation. In the EU case, after conventional *ex-ante* and *ex-post* market analysis procedures proved unsuccessful to tackle high IMRC, the EU justified an intervention on the grounds of internal market provisions. This intervention was not based on market definition and analysis, SMP (significant market power) assessment and the imposition of remedies, as *ex-ante* remedies are usually imposed, but on internal market provisions. The entitlement of EU authorities to grant this legislation has been appealed and decision by the European Court of Justice (ECJ) is pending.[61] In its opinion delivered on 1 October 2009, the ECJ's Advocate General Poiares Maduro proposes that the Court confirm the validity of the EU roaming regulation.[62] However, OECD countries lack internal market provisions and intervention can only be warranted on the grounds of consumer protection and removing barriers to trade and travel.

Copenhagen Economics issued a report,[63] commissioned by the Swiss government, in which some inquiries were made into possible legal instruments for an intervention on roaming prices by the Swiss authorities, envisaging a potential bilateral agreement with the EU to regulate roaming charges. According to the report, designating Swiss mobile operators as having a dominant position in the wholesale market for IMRS may prove arduous, given the difficulties for some EU Member States to designate their own SMP operators. Even if Switzerland entered into an agreement with the EU, it would have difficulties in implementing it, since it lacks the internal market provision that the EU has. Moreover, the Swiss sector-specific legislation is based on *ex-post* regulation (with more lengthy appeal procedures). It also states that competences for regulating retail prices are spread across several authorities. The sector-specific authority does not have competence on IMRS price regulation.

The best way forward for countries to regulate retail and wholesale rates would be to have mutual agreements between two or more countries whereby a country "A" would agree to regulate its operators' wholesale mobile prices for a country "B" on the condition that country "B" also regulates the wholesale roaming prices which operators from country "A" are required to pay. Then, each country may regulate its operators' retail roaming charges as well. Such an agreement would be open to all countries that were willing to reciprocate. Wholesale prices would not necessarily have to be the same in participating countries but would need to be based on some agreed criteria allowing for differences in cost factors. Such co-ordination may be necessary in order to guarantee reciprocity and that there are no imbalances that may lead to situations where operators in one country may be discriminated against or favoured compared to another country's operators. This co-ordination may take the form of bilateral/multilateral agreements, and maybe based on a similar framework to the one used by AREGNET, that has developed a Memorandum of Understanding (MoU) to regulate wholesale and retail roaming charges. An existing legal basis and clear policy objectives are a key factor to underpin any roaming price regulation. In this way, reciprocity may be hard to enforce, since countries may have very different regulatory frameworks, legal instruments or policy aims concerning price regulation. For these considerations, the EU is an exception, since it has distinct legal instruments (pan-European regulation) and policy objectives (internal market provisions) than is the case for other OECD countries.

Alternative Calling Procedures

The first OECD report on IMRS dealt with the development of alternative calling procedures for roaming. These are known to be imperfect substitutes but are however becoming increasingly seamless. As noted for global-MVNOs, the main drawbacks consist of low consumer awareness, lack of brand recognition, reluctance to have two service providers at the same time, and the fact that roaming may be relatively infrequent for most of the consumer base, thus reducing the incentive to look for more reasonably priced and seamless substitutes. That report compiled a comprehensive list of more or less close substitutes to roaming, which will not be analysed in depth in this report.

However, the following chart will make an attempt to summarise the main drawbacks and advantages of substitutes for roaming.

Table 4: Roaming substitutes

SUBSTITUTE	ADVANTAGES	DRAWBACKS
GLOBAL MVNOs – GLOBAL SIM CARDS – REGIONAL SIM-CARDS	Local calls at local rates Price reductions (use of call-back)	No incoming calls to the customer's usual number[64] Lack of brand recognition
PURCHASING A LOCAL SIM-CARD	Local calls at local rates	No incoming calls to the customer's usual number Language barriers
DUAL SIM CARD HANDSET AND SERVICES	Retention of domestic provider	No incoming calls to the customer's usual number Availability of handsets SIM-lock
VoIP SUBSTITUTES (mobile or WiFi network)	Inexpensive over low-cost Wi-Fi access	No incoming calls to the customer's usual number[65] Data roaming charges VoIP application lock or surcharge (mobile handsets) Specific handset or laptop necessary[66]
HOTEL TELEPHONES – PAYPHONES – CALL SHOPS		No incoming calls to the customer's usual number No mobility Cost
INTERNATIONAL CALLING CARDS	Inexpensiveness	No incoming calls No mobility/some nomadicity Language barriers
USE OF SMS	Perfect substitute of domestic SMS	Weak substitute (no voice calls) High price compared to domestic SMS
SATELLITE ROAMING	Global coverage	No incoming calls[67] High prices/limited handset availability
VoIP SUBSTITUTES (fixed network)	Inexpensiveness	No incoming calls to the customer's usual number
EMAIL	Inexpensiveness More flexibility (longer text, file exchange)	No incoming calls Very weak substitute Lack of real-time communication

As shown, there are a number of substitutes for roaming with varying degrees of substitutability. While consumers may still prefer to use roaming services, more information should be provided on substitutes, to allow consumers to make informed decisions. The extent to which roaming substitutes or ACPs are used depends on price-elasticity, the importance of language barriers, technology proficiency of users when changing SIM-cards, looking for a VoIP connection, etc. Substitutes like hotel phone calls, e-mail or payphones are nothing new and have been available to consumers for a long time. The preference of consumers for roaming services suggests that the possibility of using the mobile phone as they do at home is very much appreciated.

The profitability of ACP providers is uncertain and they are not likely to address the mass market in the coming years. However, some providers addressing niche segments may well be profitable. Policy makers should favour regulatory frameworks that allow ACP providers to launch alternative offers to roaming services that provide customers with a wider range of options. Policy makers should, as the following sections will point out, focus on expanding awareness of roaming substitutes, including advantages and drawbacks that have been summarised in the previous table.

Some commercial practices such as blocking VoIP applications over handsets or charging for them may well be investigated by regulators, in the context of the overall mobile market. These may be against competition law or net neutrality provisions. As an example, the EU opened an investigation on the issue in 2008.[68] TruPhone threatened to sue Vodafone for blocking VoIP applications over its IP network[69], although Ofcom did not find any sign of anti-competitive behaviour. Vodafone and Orange were said to have disabled VoIP functions in the Nokia N95 handset.[70] These practices may well be worth looking into by NRAs or competition watchdogs, since they might be preventing the emergence of substitutes for (voice) roaming. On the other hand, competition and tariff innovation seem to be developing in this area. For example, in the United Kingdom, Three has made inclusive access to VoIP a marketing point. Vodafone, O2 and Deutsche Telekom have recently announced that they will no longer block VoIP access over their networks (*e.g.* in Germany and the United Kingdom). Some operators apply a VoIP surcharge, such as Deutsche Telekom,[71] while some apply it to customers buying small volumes of data only, and some apply no surcharge at all.[72]

Connecting directly to the visited network

Another possibility that might be explored, although no such activity has been recorded, is the possibility of a customer being connected directly to the visited operator's network, without any roaming agreement between the home and visited operator. The only relationship between the home operator and the visited operators would be for billing purposes. Once the roaming carrier or visited operator has been selected, the visited network would have to provide the visiting customer with an identity in its network, by means of a new IMSI, via over-the-air SIM-card programming. The original IMSI would only be used when incoming calls are received. This arrangement has many similarities with the one presented in the last paragraphs of the section "A WTO solution?". The main difference is that the visited network operator would not have direct, regulated access to the home number. It would have to reach an agreement instead.

If such an arrangement were to be implemented:

- Calls made would be entirely billed by the visited operator at domestic rates (local calls at local rates and calls back home or to third countries at international domestic rates).

- Received calls would be routed via the home operator to the visited network. MTRs (or, for some countries, MSRN termination fees) plus a mark-up to provide for international transit costs would then be applied.

The customer would then be billed by the home operator for the services provided by visited networks. There would be no wholesale resale, but an agreement for customers to be billed on behalf of the visited operator. An extra charge to provide for billing expenses would also be applied.

Potential challenges that may prevent such an implementation probably are the operator's willingness to put them in place, bearing in mind the balance of potential customers to be gained and lost, and whether it would fit into their existing business and commercial models. It is not clear to what extent such a relationship would be against GSMA agreements, and it would need multi-IMSI SIM cards or over-the-air programming of the customer's SIM-card.

Consumer Awareness of Retail Charges

Transparency measures aimed at increasing awareness of roaming charges by consumers are an important way of informing consumers about roaming charges and avoiding bill-shock. Contrary to price regulations, transparency measures which inform consumers about the price of calls made and received, SMS and data can hardly be contested by operators, although they entail a certain cost. They do not address directly the problem of high roaming charges, but help protect and empower consumers.

In light of several surveys[73] that pointed out that a considerable number of European mobile roamers were not aware of roaming charges, the EC decided to include some transparency measures as part of the EU roaming regulation. These include:

- By SMS and free of charge, the customer will be automatically provided, with basic personalised pricing information on roaming prices charged (including VAT), that apply to making and receiving calls, sending SMS, and providing data roaming services.

- On request and free of charge, more detailed personalised pricing information on roaming charges will be provided.

- Information about charges that apply to the use of data roaming services and, when appropriate, on the risk of automatic and uncontrolled data roaming connection and downloads, explaining in a clear way how to switch off these automatic data roaming connections.

- Notifications sent to roaming customers' handsets or other devices, when data roaming services have reached 80% of the agreed financial or volume limit (the default financial limit shall be close to, but not exceed EUR 50 of outstanding charges per monthly billing period). When the limit is reached, another notification shall indicate the procedure to be followed if the customer wishes to continue the provision of data roaming services. If the customer declines or does not respond, the home provider will cease to charge for and to provide the data roaming service.

- If the customer does not respond to the notification referred to above, the home provider will cease to provide the data roaming service.

A new version of the guidelines issued by the ERG was released aiming at facilitating the implementation of the Roaming Regulation, with particular attention to some operational issues regarding transparency measures applied to the "welcome message" and to data communication services.

Similarly, the AREGNET agreement contained certain provisions on transparency for roaming customers, including:

- Website on roaming tariffs, containing timely and updated data of all the regulated operators, in Arabic and English.

- Information on tariffs via SMS, when a user connects to a network in a visited country.

These measures, unlike roaming price regulation, were approved by the Arab Telecommunications and Information Council of Ministers.

The Australian Parliament's inquiry into international mobile roaming advised the Australian Communications and Media Authority to facilitate a meeting of the Communications Alliance (industry association) to discuss the development of a minimum standard for consumer information and awareness

of roaming and potential costs. This recommendation was endorsed by the Government of Australia. In its response, [74] , the Australian Government commits, in the framework of the review of the "Telecommunications Consumer Protection Code", scheduled to take place after May 2010, to encourage the relevant parties to consider a minimum standard for consumer information and awareness, including improving mechanisms to avoid "bill-shock", and providing price information via SMS on arrival in another country.

Similarly, a number of regional bodies have also proposed some measures on roaming tariff transparency. APEC[75] has carried out two workshops within its liberalisation steering group (LSG). In particular, 12 economies participated in 2008 in a survey[76] on IMRS. All of them stated that carriers provide information on roaming charges on their websites, while only one (Hong-Kong, China) provides data through an Agency. Five economies send SMS messages detailing prices on the visitor's arrival. Two of them (Indonesia, the United States) have company brochures mailed to customers and provide information through customer bills. The LSG[77] is also considering the development and release of International Mobile Roaming Consumer Guidelines for the purpose of empowering consumers through the provision of information on both pricing and substitute technologies.

CITEL (Inter-American Commission for Telecommunications), within the IIRSA (Initiative for the Integration of Regional Infrastructure in South America) framework, has also delivered interesting work on IMRS.[78] At its meeting on "International Roaming Services: Action Plan and lessons learnt"[79] (CITEL workshop/Second IIRSA Executive Technical Group), that took place on 4 May 2009, some proposals were presented, to be included in the Action Plan of the Technical Group. The objective of one of them was to achieve transparency of information for IMRS users, ensuring completeness, clarity, homogeneity and timeliness of information, which would be implemented by designing a standard format with the necessary information regarding services provided by each operator, facilitating comparison of prices and service conditions between operators, and by publishing this information under the "roaming" section of operators' websites and the related regulatory authority.

Finally, the GSMA has also set up a website with information about roaming tariffs, perhaps as a response to the increasing regulatory pressure by regulators and policy makers. This website includes information on the latest price and transparency measures incorporating the new EU regulation requirements, available directly from the individual operators. However, for most operators, the only link provided is the home site of the operator, thus not compiling information directly on the GSMA site, but rather serving as a list of links to European operators.[80] There is also some information on the definition of voice, SMS and data roaming, and coverage maps.

There is widespread agreement on enforcing transparency measures that may allow consumers to make informed decisions on roaming services. Although these measures might entail some extra cost, they aim at increasing awareness and avoiding bill-shock phenomena. However, these measures should not be a stand-alone initiative and should be complemented by information on substitutes and possible measures to reach price levels that no longer harm consumers. This way, consumers will be more protected and empowered, complaints against operators should decrease, and the overall image of the mobile industry would be improved.

Temporary Number Portability

One of the underlying reasons for persistently high wholesale charges is the fact that roaming services are not purchased independently, in that they are one element of a bundle that consists of domestic mobile calls, SMS, handset subsidy, etc. That is why mobile providers have so far been able to keep roaming charges high, as the price of roaming services is not taken into account in decision making when it comes to choosing a mobile service provider, at least for the majority of the customer base, as the first OECD

report on IMRS points out. For these consumers, roaming services are not or are not likely to be a significant proportion of their bills and demand for roaming services is likely to remain inelastic. Mobile service providers have to a great extent chosen to keep roaming charges high taking advantage of the situation and the low risk of losing a customer.

Temporary Number Portability (TNP) has been proposed as a mechanism to decouple the mobile services bundle, allowing the consumer to choose a different provider. Should such a procedure be implemented, mobile services consumers would be able to switch to a different provider only for a limited period of time, and only for roaming services. The objective of TNP is to attain better contestability in the market which should have beneficial effects on competition and lead to lower roaming prices. This mechanism, however, should be put in place in the framework of a more general policy for price reduction and promotion of competition.

In one of the recommendations[81] released by the Australian Parliament, it was recommended that the Australian Communications and Media Authority develop, through the Communications Alliance, an amendment to the Code on mobile number portability to allow temporary mobile portability for roaming services. This would allow the customer to select the roaming plan offered by an Australian provider that most suited their travel arrangements.

The Australian Government's Department of Broadband, Communications and the Digital Economy responded to this report on 9 September 2009.[82] It did not agree with the Committee's recommendation to allow temporary number portability for roaming services, on the grounds that new systems would need to be designed in order to introduce temporary mobile number portability, since current systems are designed for the purpose of permanent transfer of customers rather that temporary porting. In its view, these costs may result in an increase in costs charged to Australian consumers. Significant technical barriers and operational complexities involved with billing systems and agreements between carriers would therefore prevent this implementation.

Mobile and fixed number portability has been developed in most OECD countries as a tool to foster competition. Consumers may keep their numbers when switching providers. This lowers considerably the barriers for consumers to take advantage of new tariff plans. It involves a number of technical and operational arrangements in order to allow a customer to port within a few days. Distributed or centralised databases have been put in place by operators and/or regulators to support the process. In some countries, there is a number portability fee that is either paid by the user or included as a cost of the acquiring operator.

The European Commission has included number portability as one of the key aspects of the reform of the European Directives on Electronic Communications (Telecom Package), specifically in the aspect of empowering consumers,[83] helping them switch providers more easily. Number portability is already a common practice across the EU. In 2008 60.2 million EU mobile subscribers took advantage of number portability, taking on average about 7.5 days for fixed and 8.5 days for mobile telephone numbers. According to the European Commission, the most effective countries took between 1 and 3 days, while in others it took up to 38 days for mobile numbers (Poland). According to the 14th Implementation Report[84] of the European Directives, 68.7% of Finnish subscribers have ported their numbers at least once, 39.97% in Denmark and 35.45% in Spain. Some EU countries have no inter-operator charges for NP (Spain, Estonia, Latvia and Lithuania), while in others it can be as high as EUR 22 (Germany), EUR 23 (Czech Republic), EUR 33 (Slovak Republic) or EUR 45 (Malta).

The new European Telecom Directives include the requirement for a maximum time limit for the effective porting of a number to be set at one working day. The amended Telecom Package,[85] which has

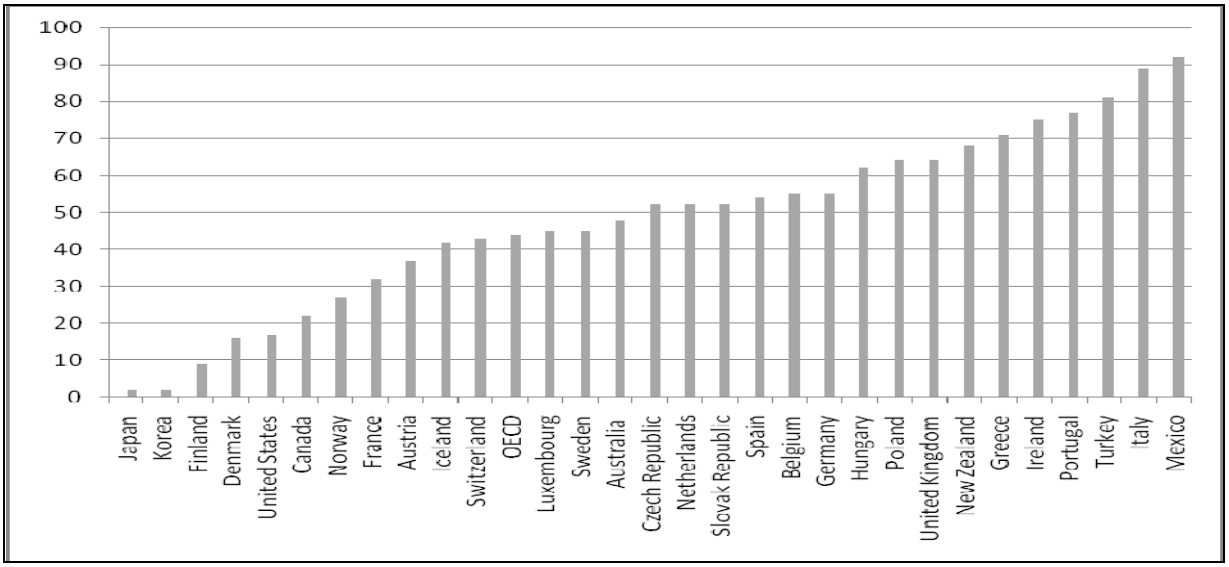
been adopted by the European Parliament and the Council on 25 November 2009, aims *inter alia* to foster competition through a faster and easier number portability procedure.

Whether the same procedure can be successfully applied to TNP, as the Australian Parliament suggests, depends on a number of factors. Since the current arrangements allow for number portability in a few days, there is no reason why this porting could not be adapted to the temporary purpose of roaming services. The cost of adaptation, however, needs to be independently evaluated and an impact assessment conducted. In some countries, portability procedures have changed during the last few years due to the emergence of a considerable number of MVNOs that make a distributed model more costly to operate. Portability registers and databases are often run by operators and are supervised by regulatory authorities that set the rules to obey and some operational requirements. It is therefore up to NRAs and policy makers to carry out a cost-benefit analysis to evaluate whether benefits offset costs if TNP is made available.

If TNP were to be enforced, it should be by means of regulatory obligations, meaning that both leaving the original provider as well as switching back would be guaranteed by NRAs. Mobile providers should then be obliged to keep the original contract conditions after the mobile customer is ported back. In addition, there are two issues that may raise concerns during the time that the user is temporarily ported to the roaming provider: monthly fees and engagement periods. NRAs enforcing TNP would have to set conditions on whether the monthly fee (or fraction) has to be paid by recipient operators during the TNP period or whether no fee should be levied. As for engagement periods, there is the question of how they are counted. In principle, the time where the customer is ported to the roaming operator should not be counted as contract duration. Handset use may also raise concerns, since many mobile markets are based on terminal subsidies and handset lock and no third parties' SIM card use is allowed.

Most post-paid mobile subscribers commit to long-term contracts to take advantage of cheaper rates. Some of these contracts are often linked to terminal subsidies that have been very much appreciated by consumers and, in some cases, have been the main drivers of the mobile services market and handset manufacturing industry. In countries like Korea or Japan, for example, most subscribers sign up for two-year periods and post-paid users are a majority of the subscriber base. As for pre-paid customers, some of these issues would be somehow eased since there are neither engagement periods nor monthly fees, although the question of handset use would remain. Thus, markets with a low proportion of post-paid customers (Italy, Mexico, Turkey, Portugal) or without widespread long engagement obligations (*e.g.* Denmark) should in principle pose fewer challenges to the enforcement of TNP.

Figure 1: % of pre-paid mobile subscribers by country



The enforcement of TNP obligations would give disruptive operators the opportunity to challenge dominant players by short-term roaming offers. They would still face the constraint of possible high wholesale roaming charges, as long as they are attached to the IOT negotiation framework, but it would give way to interesting possibilities.

The initial proposal by the Australian Parliament involves further implications if TNP is not restricted to roaming services and the subscriber uses domestic services while ported to the roaming operator. That would imply the use of two operators, with billing issues that would have to be resolved. If the subscriber is ported only for the time abroad and does not make use of domestic services, these issues would be considerably easier to deal with.

NRAs and policy makers should conduct a cost-benefit assessment of the costs involved in terms of operational arrangements, regulatory enforcement and transition costs if TNP was to be implemented. Potential benefits should be assessed, as well as the likelihood of disruptive operators taking advantage of these instruments, and not choosing to keep high roaming prices and take advantage of low-elasticity customers. Clearly, providing customers with an easy TNP procedure and raising awareness would also play a role in TNP enforcement and success.

Consumer Awareness of Substitutes

As a complement to the suggested measures on consumer awareness of roaming prices, countries should encourage awareness of substitutes by consumers. This would enable consumers to make choices about whether they want to use roaming services. Information should be provided on the process and requirements to purchase a local SIM-card, the existence of providers of multi-country SIM-cards or "global SIM-cards", the use of Wi-Fi access to place international calls, and other alternatives such as fixed-line international and local calls, etc., which were analysed in depth in the first OECD report on IMRS.

Australia has been very active in trying to enforce obligation regarding knowledge of substitutes. In fact, one of the recommendations made by the Parliament and endorsed by the government advocated the

inclusion of information on alternatives to roaming. These alternatives should include international calling cards, SMS, use of local networks, e-mail and use of hotel telephones. Accordingly, the Australian Communications and Media Authority (ACMA) has added the list of recommended alternatives to their fact sheet on International mobile roaming,[86] and this information will also include VoIP services. It agrees that there are some barriers (high data roaming charges, need for a VoIP enabled handset) to the use of VoIP but believes that there is scope for providing consumers with information about VoIP as an alternative.

Some work on roaming substitutes is being undertaken by the International Roaming Project Team of the ERG, namely in its analysis of consumer awareness of roaming prices. This group is due to provide the European Commission with an interim report by mid-2010.

Regarding the use of a local SIM-card, in many countries most handsets are SIM-locked and only the home operator's SIM-card may be inserted. Handset subsidies (and the handset lock involved) have proved to be very successful commercial strategies, since consumers may update their handset for a low, one-off cost. Although countries such as Belgium forbid handset locking, it is a widespread practice for many others (France, Japan, Korea, Spain). However, the Belgian anti-bundling law has been brought before the European Court of Justice, which found on 23 April 2009 that these laws are forbidden under Directive 2005/29/EC. That could mean the beginning of SIM-locked handset offers in Belgium.[87]

Consumer Awareness of Dual Sim-Card Handsets

Dual SIM-card handsets are an option for those who are willing to purchase a local SIM-card while in a foreign country. They may just be addressed to a minority of users, since there are apparently few consumers that have the manual proficiency or knowledge to purchase a local SIM-card. Some of the existing dual SIM-card handsets enable dual services to be active at the same time, which would enable them to be still able to receive calls, or at least to check who has called, while making local calls using a local SIM-card.

Dual SIM-card handsets have been on the market for some years now,[88] although they still represent a small niche market, despite growth in some developing countries like China and India.[89] Those handsets are interesting for those who want to combine work and personal phones and they are very much adapted to international travellers.

NRAs, consumer protection authorities or manufacturers should inform consumers about the possibility of purchasing a dual SIM-card handset, which may be useful for frequent roamers. Uptake of these handsets by consumers may face similar challenges as those for uptake of substitutes: many operators base their business models on handset subsidy and SIM-lock, which prevents the insertion of another SIM-card in the handset. This has proved to be a commercial strategy greatly appreciated by consumers, since it allows them to enjoy new handsets without purchasing them directly, and it helps to stimulate the handset industry as well.

Possible Outcomes and Impacts

According to some stakeholders, roaming regulation would have some important impacts on other services, namely price increases in response to regulated price caps for roaming. This is known as waterbed effects. That means that, at least where price cuts are not compensated by increased traffic volumes, operators may try to recover lost profits by increasing the price of other services, or not decreasing prices as much as they would have otherwise. The affected services may be those included in the mobile services bundle, or other services such as non-regulated wholesale roaming prices (*e.g.* wholesale prices faced by extra-EU operators). The issue of waterbed effects has been addressed by

academic literature and has been a constant claim of some industry players who argue that lost profits would be recovered elsewhere anyway.

Some data coming from the ERG reports will be presented, trying to shed some light on demand elasticity of roaming services. This issue has indeed been addressed in the discussions at the European level, where some estimates have been made to evaluate welfare losses and gains resulting from regulating roaming prices. As demand elasticity is a key issue to draw these estimates, some data have been provided in the Annex below.

Finally, another potential effect caused by roaming regulation would be that the loss of benefits involved would undermine investment by operators, in that they would no longer find incentives to invest if potential profits are cut by regulation. However, there is no evidence that this has occurred, or whether profits made from a non-competitive market would lead to efficient investment in the long run. Any potential profit loss by operators might discourage investments, if significant enough, although it is clear that a possible price regulation is not the only factor for investment decisions.

ANNEX I – WATERBED EFFECTS, ELASTICITY AND IMPACT ON INVESTMENTS

Waterbed Effects and/or Tariff Rebalancing

Waterbed effects or retail tariff rebalancing and their application to IMRS have always been a controversial issue when assessing the impact of price regulation. Since IMRS are sold in a bundle, it seems possible that prices rebalance across services, allowing operators to either maintain the current level of revenues, or experience reductions which were less than what would have been implied by reductions in the directly affected price in the mobile bundle. Waterbed effects have also been a constant argument used by operators to persuade authorities not to regulate IMRC.[90] Large operators have always argued that capping retail roaming services would force them to increase the price of domestic services, while others say that the retail price of domestic services is set by competitive forces, which would remain stable if roaming prices are capped. As an example, domestic MVNOs, which normally have little roaming revenues, would constrain domestic operators to keep their domestic prices down, thus putting competitive pressure on them.

There are several waterbed effects to be considered. Firstly, the impact on domestic prices of a decrease in mobile roaming revenues. Secondly, as Australian authorities have sometimes argued, regional water-bedding effects, that is, operators in a region, say, Europe, increase their wholesale rates to extra-regional operators, say Australian, in response to having their wholesale and retail roaming revenues capped for intra-European roaming, namely after the enforcement of the EU regulation. Again, a distinction should be made between different types of operators, since operators with small roaming revenues would suffer much smaller waterbed effects.

The main challenge in assessing waterbed effects is the lack of empirical evidence and of a counterfactual. No evidence can be found showing that price increases are due to this phenomenon, or that prices would have decreased instead of remaining stable or would have further decreased if waterbed effects were not present. This is why it cannot be assumed that there is no waterbed effect only by the fact there has been no price increase in other services of the mobile bundle.

Excluding the existence of waterbed effects may, to some extent, imply that any taxes levied on operators would have no effects on the competitive equilibrium and would not result in a price increase. In competitive equilibrium, economic profits (once a reasonable return is guaranteed) are zero, so any increase in costs that operators incur would result in a price increase and a change of the competitive equilibrium. Retail mobile markets (the market is defined as a bundle of calls, handset subsidy, SMS, roaming services, etc.) are considered generally competitive, although the extent to which they are competitive may differ across countries. Changes in profits caused by price regulation, discipline placed on profits as a result of the level of competition, as well as different demand price-elasticities of the mobile services within the bundle, potentially involve retail price rebalancing. However, if revenue lost by roaming regulations were to be easily recovered by an increase in domestic prices,[91] it is hard to understand the strong opposition to the EU regulation by mobile operators, apart from a principle-based objection to increased regulation of the sector and the associated regulatory burden.

Additionally, since roaming heavy-users are a minority in most countries, any potential waterbed effects are likely to be low, since the roaming market represents a low share of revenues (around 5-10%) although a potentially higher share of profits.

One of the few empirical studies on the waterbed effect in mobile telephony was conducted by Genakos and Valletti (2009).[92] Although it is focused on studying waterbed effects as a result of a reduction of mobile termination rates, it advocates that this approach can be extrapolated to IMRS. The study analyses the impact of fixed-to-mobile termination rate regulation on prices and profit margins on a newly constructed dataset of mobile operators across more than 20 countries during the last decade. They find a high waterbed effect but not full. A stronger waterbed effect exists the more intense competition is in markets with high levels of market penetration and high termination rates. Although the issue is not examined, they agree that similar conclusions can be drawn for waterbed effects caused by IMRS price regulation.

Schiff[93] (2008) also acknowledges the existence of waterbed effects for a multi-product firm, and regulation of any one price will cause changes in the other price(s) set by the firm as a result of its profit-maximising behaviour. In his view, welfare analysis of any proposed regulation must take into account these effects. According to Schiff, if demands and costs of the regulated and unregulated products are independent (in that the price of the regulated product does not affect marginal revenues or marginal costs of the unregulated products) then rational firms will not typically change unregulated prices, no matter how severe the regulation is. The exception is if firms are not able to cover fixed costs and some firms leave the industry, reducing the intensity of competition and allowing unregulated prices to rise. The effect is also likely to exist with non-linear pricing, if there is a zero-profit constraint or a global price-cap and there is a common fixed cost.

In its 2007 Statement[94] and 2009 Consultation[95] on mobile call termination (MCT), the United Kingdom's regulator Ofcom considered the existence of the waterbed effect in its mobile market. MNOs had argued that any excess profit in MCT would be competed away at the retail level through lower retail subscription prices (*e.g.* lower subscription charges and larger handset subsidies). In the context of MCTs, Ofcom considered that a significant waterbed effect is likely, given that retail competition in mobile services is strong, but that it is unlikely to be complete. However, given the lack of conclusive evidence, Ofcom decided not to rely heavily on an assumption of an incomplete waterbed effect when determining what conditions should be imposed on MNOs to address the detriment arising from excessive MCT charges, absent regulation of mobile termination rates. It also considered that, even if the waterbed effect were fully effective and MNOs did not make excessive profits from setting excessive MCT charges, excessive MCT charges may give rise to other detriments such as distortions of consumer choice and potential competitive distortions.

The waterbed effect is dependent on the share of roaming profits relative to total mobile profits, competition conditions, mobile penetration, etc. Because of the relatively small size of roaming profits relative to total profits (despite the arguably high profitability of roaming services), it is likely that the waterbed effect resulting from lowering roaming charges would be minimal. In addition, empirical price data are difficult to analyse, since they are subject to a number of factors: demand changes, overall decreasing mobile prices, changes in competition conditions and/or regulatory constraints. Any attempt to regulate roaming prices must be aware of these effects and should bear in mind that they are likely to distort impact assessments.

Internationally, some say that the EU IMRC reduction may have lead European operators to increase wholesale roaming charges faced by non-European providers. However, no evidence has been found to draw a conclusion on the behaviour of European wholesale roaming providers. In some cases, operators include EU neighbouring countries such as Switzerland or Croatia in the EU-tariff zone. IOTs, as explained before, may increase over time. KPMG, in its report[96] commissioned by the Australian Government, cites recent expert reports[97] and media articles[98] that suggest that in response to retail price capping regulation implemented across EU countries, EU carriers have raised the wholesale roaming rates

they charge non-EU carriers, as a type of waterbed effect. The report concludes that it is likely that high relative costs of roaming to and from the EU can be attributed to EU carrier increases.

Finally, a distinction should also be made among net out-payers and net recipient roaming operators. Operators in tourist destinations may well be more touched by a regulatory cap on wholesale prices, but may not be so concerned by a retail cap. They may need to invest in building-up networks for occasional/seasonal use by tourists in order to serve roaming customers, and decreasing wholesale revenues are likely to reduce the incentive to do so or to make network upgrades in these areas. On the other hand, tourist-emitter countries will pay lower wholesale charges to recipient operators but would face lower retail revenues. The final outcome of these two opposite effects will depend on the wholesale-retail margin, customer price elasticity, etc.

Elasticity-Volume Increases

As pointed out in the previous OECD report "International Mobile Roaming Charges in the OECD area", price-elasticity of roaming services is not easy to assess. The European Commission estimated an elasticity range from -0.50 to -1.2 when evaluating welfare impacts of the roaming regulation, whereas the European Parliament's commissioned study[99] estimated it to be between -0.35 and -0.44. No clear evidence of elasticity was found by the ERG benchmark data report[100] regarding the period April 2007 to September 2008: *"A direct comparison of the developments in the volumes of regulated voice services and unregulated SMS services (for which prices have remained static) reveals a very similar trend. It is not clear how to interpret this and ERG is reluctant to draw definitive conclusions at this stage. It could imply that the assumption that some had made that price reductions would stimulate large increases in volumes does not hold water. On the other hand, the rise in SMS roaming volumes could also be seen as a natural consequence of the still increasing domestic SMS volumes in many member states"*. In spring 2010, the ERG will publish a more detailed report, meant to serve as an empirical reference for the Commission to produce an interim report on the EU Roaming Regulation by June 2010, which will include a demand elasticity assessment.

The most recently released ERG data benchmark report[101] (October 2008-March 2009) includes some data on the variations of volumes and prices for calls made and received and for SMS sent in the EU/EEA area after the enforcement of the roaming regulation. This report does not draw any conclusion as to whether roaming demand is elastic or not. It is difficult to make any estimates on the issue, since there aremany effects that may have an impact on the figures, such as seasonal demand, service substitution (*e.g.* calls received and made, calls made and SMS, etc.), and the wider economic situation (*e.g.* tourist numbers), and although the data are provided here, it is difficult to interpret them.

However, we include here some of the data provided by the ERG data benchmark report, referring to average data in the EU/EEA area.

Table 5 : Volumes/prices for calls made and sent and SMS sent, EU/EEA area

EU/EEA volumes (%) Price (EUR)	Q2 2007	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009
Calls made	0.698€	0.614€	100 0.458€	102.67 0.444€	0.449€	0.442€	102.05 0.421€	97.77 0.421€
Calls received	0.345€	0.309€	100 0.213€	106.15 0.208€	0.212€	0.210€	116.66 0.192€	111.04 0.187€
SMS sent			100	111.12	0.282€	0.277€	111.84 0.273€	109.16 0.274€

Source: ERG data benchmark report (October 2008-March 2009) and ERG Benchmark Data Report for October 2007-March 2008.

Impact on Investment

Another important point always argued by the industry to oppose any attempt to regulate prices is the effect on investment. If revenues are reduced, especially those that risky investments yield, there will be no incentive for further investments.[102] It is noteworthy that such statements are usually made by telecommunications providers in response to most of the regulatory interventions that may harm their profitability. Ideally, the higher the revenues made by operators, the higher the incentive for investments, regardless of impact on competition, consumer choice, etc. Telefonica recently announced that the impact of the new roaming and mobile termination rates regulation was around EUR 6 billion and EUR 34 billion respectively. That would mean an investment cut of EUR 6 billion.[103] These calculations start from the assumption of inelastic roaming demand.

Operators use a complex set of criteria when making their investment decision. Expected return is clearly one of the main important drivers of investment and any foreseen reduction in expected revenues will influence it. Regulatory intervention aiming at increasing competition or protecting consumers is very likely to have an impact on operators' revenues, especially on bigger players, and might cut down investments. Another issue to be discussed is whether these profits lead to efficient investment in the long run. However, the share of roaming revenues is a relatively small piece of the mobile telecommunications market, which will make any impact limited. Any regulatory decision involves a trade-off between consumer choice, competition evolution, investment, etc. All these factors should always be taken into account by regulators and policy makers.

As for investments in infrastructure to provide roaming services (network upgrades), they will be needed more in areas with a heavy affluence of foreign visitors (tourist resorts, airports, etc.), and net-recipient operators will be more affected by them. Clearly, high wholesale rates would help net-recipient operators pay-off their investments in network upgrades for foreign visitors, as has been pointed out before.

ANNEX II – WTO TELECOMMUNICATIONS REFERENCE PAPER

TELECOMMUNICATIONS SERVICES: REFERENCE PAPER
24 April 1996

Negotiating group on basic telecommunications

The following are definitions and principles on the regulatory framework for the basic telecommunications services.

Definitions

Users mean service consumers and service suppliers.
Essential facilities mean facilities of a public telecommunications transport network or service that

(a) are exclusively or predominantly provided by a single or limited number of suppliers; and

(b) cannot feasibly be economically or technically substituted in order to provide a service.

A major supplier is a supplier which has the ability to materially affect the terms of participation (having regard to price and supply) in the relevant market for basic telecommunications services as a result of:

(a) control over essential facilities; or

(b) use of its position in the market.

1. Competitive safeguards

1.1 Prevention of anti-competitive practices in telecommunications

Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices.

1.2 Safeguards

The anti-competitive practices referred to above shall include in particular:

(a) engaging in anti-competitive cross-subsidization;

(b) using information obtained from competitors with anti-competitive results; and

(c) not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services.

2. Interconnection

2.1 This section applies to linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments are undertaken.

2.2 Interconnection to be ensured

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided.

(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;

(b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and

(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

2.3 Public availability of the procedures for interconnection negotiations

The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of interconnection arrangements

It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: dispute settlement

A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time or

(b) after a reasonable period of time which has been made publicly known
to an independent domestic body, which may be a regulatory body as referred to in paragraph 5 below, to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a reasonable period of time, to the extent that these have not been established previously.

3. Universal service

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

4. Public availability of licensing criteria

Where a licence is required, the following will be made publicly available:

(a) all the licensing criteria and the period of time normally required to reach a decision concerning an application for a licence and

(b) the terms and conditions of individual licences.

The reasons for the denial of a licence will be made known to the applicant upon request.

5. Independent regulators

The regulatory body is separate from, and not accountable to, any supplier of basic telecommunications services. The decisions of and the procedures used by regulators shall be impartial with respect to all market participants.

6. Allocation and use of scarce resources

Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required.

ANNEX III - WTO ANNEX ON TELECOMMUNICATIONS

Annex on Telecommunications

1. Objectives

Recognizing the specificities of the telecommunications services sector and, in particular, its dual role as a distinct sector of economic activity and as the underlying transport means for other economic activities, the Members have agreed to the following Annex with the objective of elaborating upon the provisions of the Agreement with respect to measures affecting access to and use of public telecommunications transport networks and services. Accordingly, this Annex provides notes and supplementary provisions to the Agreement.

2. Scope

(a) This Annex shall apply to all measures of a Member that affect access to and use of public telecommunications transport networks and services.

(b) This Annex shall not apply to measures affecting the cable or broadcast distribution of radio or television programming.

(c) Nothing in this Annex shall be construed:

(i) to require a Member to authorize a service supplier of any other Member to establish, construct, acquire, lease, operate, or supply telecommunications transport networks or services, other than as provided for in its Schedule; or

(ii) to require a Member (or to require a Member to oblige service suppliers under its jurisdiction) to establish, construct, acquire, lease, operate or supply telecommunications transport networks or services not offered to the public generally.

3. Definitions

For the purposes of this Annex:

a) "Telecommunications" means the transmission and reception of signals by any electromagnetic means.

b) "Public telecommunications transport service" means any telecommunications transport service required, explicitly or in effect, by a Member to be offered to the public generally. Such services may include, *inter alia*, telegraph, telephone, telex, and data transmission typically involving the real-time transmission of customer-supplied information between two or more points without any end-to-end change in the form or content of the customer's information.

c) "Public telecommunications transport network" means the public telecommunications infrastructure which permits telecommunications between and among defined network termination points.

d) "Intra-corporate communications" means telecommunications through which a company communicates within the company or with or among its subsidiaries, branches and, subject to a Member's domestic laws and regulations, affiliates. For these purposes, "subsidiaries", "branches" and, where applicable, "affiliates" shall be as defined by each Member. "Intra-corporate communications" in this Annex excludes commercial or non-commercial services that are supplied to companies that are not related subsidiaries, branches or affiliates, or that are offered to customers or potential customers.

e) Any reference to a paragraph or subparagraph of this Annex includes all subdivisions thereof.

4. Transparency

In the application of Article III of the Agreement, each Member shall ensure that relevant information on conditions affecting access to and use of public telecommunications transport networks and services is publicly available, including: tariffs and other terms and conditions of service; specifications of technical interfaces with such networks and services; information on bodies responsible for the preparation and adoption of standards affecting such access and use; conditions applying to attachment of terminal or other equipment; and notifications, registration or licensing requirements, if any.

5. Access to and use of Public Telecommunications Transport Networks and Services

a) Each Member shall ensure that any service supplier of any other Member is accorded access to and use of public telecommunications transport networks and services on reasonable and non-discriminatory terms and conditions, for the supply of a service included in its Schedule. This obligation shall be applied, *inter alia*, through paragraphs (b) through (f).

b) Each Member shall ensure that service suppliers of any other Member have access to and use of any public telecommunications transport network or service offered within or across the border of that Member, including private leased circuits, and to this end shall ensure, subject to paragraphs (e) and (f), that such suppliers are permitted:

(i) to purchase or lease and attach terminal or other equipment which interfaces with the network and which is necessary to supply a supplier's services;

(ii) to interconnect private leased or owned circuits with public telecommunications transport networks and services or with circuits leased or owned by another service supplier; and

(iii) to use operating protocols of the service supplier's choice in the supply of any service, other than as necessary to ensure the availability of telecommunications transport networks and services to the public generally.

c) Each Member shall ensure that service suppliers of any other Member may use public telecommunications transport networks and services for the movement of information within and across borders, including for intra-corporate communications of such service suppliers, and for access to information contained in data bases or otherwise stored in machine-readable form in the territory of any Member. Any new or amended measures of a Member significantly affecting

such use shall be notified and shall be subject to consultation, in accordance with relevant provisions of the Agreement.

d) Notwithstanding the preceding paragraph, a Member may take such measures as are necessary to ensure the security and confidentiality of messages, subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade in services.

e) Each Member shall ensure that no condition is imposed on access to and use of public telecommunications transport networks and services other than as necessary:

(i) to safeguard the public service responsibilities of suppliers of public telecommunications transport networks and services, in particular their ability to make their networks or services available to the public generally;

(ii) to protect the technical integrity of public telecommunications transport networks or services; or

(iii) to ensure that service suppliers of any other Member do not supply services unless permitted pursuant to commitments in the Member's Schedule.

f) Provided that they satisfy the criteria set out in paragraph (e), conditions for access to and use of public telecommunications transport networks and services may include:

(i) restrictions on resale or shared use of such services;

(ii) a requirement to use specified technical interfaces, including interface protocols, for inter-connection with such networks and services;

(iii) requirements, where necessary, for the inter-operability of such services and to encourage the achievement of the goals set out in paragraph 7(a);

(iv) type approval of terminal or other equipment which interfaces with the network and technical requirements relating to the attachment of such equipment to such networks;

(v) restrictions on inter-connection of private leased or owned circuits with such networks or services or with circuits leased or owned by another service supplier; or

(vi) notification, registration and licensing.

g) Notwithstanding the preceding paragraphs of this section, a developing country Member may, consistent with its level of development, place reasonable conditions on access to and use of public telecommunications transport networks and services necessary to strengthen its domestic telecommunications infrastructure and service capacity and to increase its participation in international trade in telecommunications services. Such conditions shall be specified in the Member's Schedule.

6. Technical Cooperation

a) Members recognize that an efficient, advanced telecommunications infrastructure in countries, particularly developing countries, is essential to the expansion of their trade in services. To this end, Members endorse and encourage the participation, to the fullest extent practicable, of developed and developing countries and their suppliers of public telecommunications transport networks and services and other entities in the development programmes of international and regional organizations, including the International Telecommunication Union, the United Nations Development Programme, and the International Bank for Reconstruction and Development.

b) Members shall encourage and support telecommunications cooperation among developing countries at the international, regional and sub-regional levels.

c) In cooperation with relevant international organizations, Members shall make available, where practicable, to developing countries information with respect to telecommunications services and developments in telecommunications and information technology to assist in strengthening their domestic telecommunications services sector.

d) Members shall give special consideration to opportunities for the least-developed countries to encourage foreign suppliers of telecommunications services to assist in the transfer of technology, training and other activities that support the development of their telecommunications infrastructure and expansion of their telecommunications services trade.

7. Relation to International Organizations and Agreements

a) Members recognize the importance of international standards for global compatibility and inter-operability of telecommunication networks and services and undertake to promote such standards through the work of relevant international bodies, including the International Telecommunication Union and the International Organization for Standardization.

b) Members recognize the role played by intergovernmental and non-governmental organizations and agreements in ensuring the efficient operation of domestic and global telecommunications services, in particular the International Telecommunication Union. Members shall make appropriate arrangements, where relevant, for consultation with such organizations on matters arising from the implementation of this Annex.

NOTES

[1] OECD (2009), "International Mobile Roaming Charging in the OECD Area", DSTI/ICCP/CISP(2009)8/FINAL, Directorate for Science, Technology and Industry, OECD, Paris, http://www.oecd.org/dataoecd/41/40/44381810.pdf

[2] High firm concentrations in a given market may not translate to market power. Even in markets where only one or a few firms can efficiently operate (for example due to economies of scale), it is possible for competition to work. In perfectly contestable markets there are no barriers to entry or exit. With free entry into and exit from the market, the threat of potential entry will constrain the behaviour of incumbent firms. Should an incumbent firm increase prices above the normal level of profits, then new firms will enter the market and force prices down again. http://www.ictregulationtoolkit.org/en/Section.1675.html

[3] Ewan Sutherland, "International Mobile Roaming in the Caribbean", http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1501245

[4] http://www.digicelgroup.com/en/media-center/press-releases/products-services/digicel-first-to-offer-prepaid-roaming-in-the-caribbean

[5] "Zain Subscribers Reach 63 Million After Introduction of One Network, 9 March 2009", http://allafrica.com/stories/200903110077.html

[6] Ewan Sutherland, "International Mobile Roaming in Africa", *The Southern African Journal of Information and Communication* (forthcoming), http://link.wits.ac.za/journal/journal.html

[7] Ouida Taaffe (2005), "Breaking up is easy to do" *Telecommunications International* Oct 2005, pp 20.

[8] Case M.1795 Vodafone Airtouch/Mannesmann.
http://ec.europa.eu/competition/mergers/cases/decisions/m1795_en.pdf

[9] Ewan Sutherland, http://www.3wan.net/talks/2006/ES_2006_11_lse.pdf

[10] http://www.vodafone.com/static/annual_report/exec_summary/global_operations/index.html
http://www.telefonica.com/en/annual_report/pdf/telefonica_ia_2008_en.pdf
http://www.francetelecom.com/en_EN/group/global_footprint/ ,
http://www.annualreport2008.telekom.de/en/kf/deutsche-telekom-weltweit/index.php
http://202.66.146.82/listco/hk/hutchison/annual/2008/telecom.pdf

[11] In some countries market share is relatively low, as deployment is its early stages.

[12] Joint-venture.

[13] Orange stake in capital: 47.5 %.

[14] http://www.accc.gov.au/content/item.phtml?itemId=708242&nodeId=8704f59d82052c729e45e7408ecec91d&fn=Final%20report%E2%80%94international%20inter-carrier%20roaming%20service%20(September%202005).pdf

15 http://www.aph.gov.au/house/committee/coms/mobileroaming/report/fullreport.pdf

16 EU Roaming Regulation (Regulation 717/2007), recitals 6 and 13. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:171:0032:0040:EN:PDF)

17 In Spain, since MVNOs were launched in 2007, no dispute has been brought to the regulator. http://www.eleconomista.es/empresas-finanzas/noticias/1008621/02/09/La-CMT-dejara-huerfano-de-regulacion-el-mercado-de-los-moviles-virtuales.html

18 Sympac (KPN's subsidiary) might be an example for this, even though it appears to be focused on the corporate market. http://zakelijk.kpn.com/business/Sympac-2.htm

19 http://www.wto.org/english/docs_e/legal_e/04-wto.pdf

20 http://www.wto.org/english/docs_e/legal_e/26-gats.pdf

21 http://www.wto.org/english/tratop_e/serv_e/telecom_e/tel23_e.htm

22 http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_commit_exempt_list_e.htm

23 http://www.wto.org/english/docs_e/legal_e/26-gats_02_e.htm#anntel

24 The rationale of "collective dominance" is used in the EU regulatory framework. However, in other competition regimes, such as in the United States, this concept is not used. A basic task of defining a market and determining whether there are dominant players in that market that are anti-competitively exercising market power, is a common exercise undertaken by all OECD members in their competition regimes. If there is collusion among market players, that would also be ground for regulation.

25 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:344:0065:0069:EN:PDF, Explanatory Memorandum: http://ec.europa.eu/information_society/policy/ecomm/doc/implementation_enforcement/article_7/sec_2007_1483_2.pdf

26 See Reference 24 above.

27 Market power could be seen as "The ability of a firm to raise prices above competitive levels, without promptly losing a substantial portion of its business to existing rivals or firms that become rivals as a result of the price increase". For IMRS, visited operators would have (joint) market power if they are able to sell wholesale roaming services well above competitive levels. "New Definitions of Relevant Market and the Assault on Antitrust", *Columbia Law Review,* 90(7), 1990.

According to the EU regulatory framework, an undertaking shall be deemed to have significant market power if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers. Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002, on a common regulatory framework for electronic communications networks and services (Framework Directive), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:108:0033:0050:EN:PDF

28 Ewan Sutherland, Executive Director, INTUG, Speech prepared for a joint meeting of ITRE and IMCO, of the European Parliament on 16 March 2005, http://www.europarl.europa.eu/comparl/imco/public_hearings/050316_sutherland_speech_en.pdf

29 http://www.atug.com.au/Focus/Fs010409.pdf

[30] Lee Tuthill (1996) "Users' rights? The multilateral rules on access to telecommunications" *Telecommunications Policy* 20 (2) 89-99.

[31] http://www.wto.org/english/docs_e/legal_e/26-gats_02_e.htm#articleXXVIII

[32] "Guidelines for the scheduling of specific commitments under the general agreement on trade in services (GATS)", http://www.wto.org/english/tratop_e/serv_e/sl92.doc

[33] Gaëtan Verhoosel (2002), *National treatment and WTO Dispute Settlement*. Portland: Hart Publishing.

[34] http://www.wto.org/english/tratop_e/serv_e/telecom_e/telecom_coverage_e.htm

[35] Cross-border supply is defined to cover services flows from the territory of one Member into the territory of another Member. Consumption abroad refers to situations where a service consumer moves into another Member's territory to obtain a service, http://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm

[36] "*Roaming is allowed but cross-border access permitted only via network of duopoly major licence operator",* http://www.wto.org/english/tratop_e/serv_e/telecom_e/sc89s1r1.doc

[37] For example, see the GSMA's response to the 2nd phase of the consultation on the EU roaming regulation. http://ec.europa.eu/information_society/activities/roaming/docs/phase2/gsm_association.pdf

[38] http://erg.ec.europa.eu/doc/publications/2009/erg_09_31_international_roaming_report_090722.pdf

[39] Although not regulated by the EU roaming regulation, wholesale roaming rates for incoming calls are fixed by the MTR (mobile termination rates) framework of each EU country.

[40] http://www.europarl.europa.eu/comparl/imco/studies/0702_roaming_en.pdf

[41] A.T. Kerney, however, later issued a reply correcting some of the calculations that Copenhagen Economics had made on its behalf, namely the roaming specific costs, which it estimated to be around EUR 0.06-0.07, and whether return should be calculated over retail costs or over retail plus wholesale costs and the mark-up size. Nonetheless, although A.T. Kerney's remarks would make the cost substantially increase, Copenhagen Economics kept its estimates as they were.
http://www.copenhageneconomics.com/Publications/Impact-Assesment.aspx?M=News&PID=542&NewsID=86

[42] http://www.europarl.europa.eu/comparl/itre/pe382177_en.pdf

[43] http://ec.europa.eu/information_society/activities/roaming/docs/regulation/impact_en.pdf

[44] OECD interpretation. ERG data do not intend to assess the level of competition.

[45] As a percentage of the wholesale cap.

[46] http://www.erg.eu.int/doc/publications/erg_09_24_final_roaming_regulation_erg_guidelines.pdf

[47] http://en.itst.dk/interconnection-and-consumer-protection/filarkiv-international-roaming/Analyse%20af%20priser%20og%20omkostninger%20for%20brug%20af%20mobile%20datatjenester%20i%20udlandet.pdf

[48] According to NITA, SMS originations cost when roaming should be slightly less than the costs of sending a national SMS, since the SMSC (SMS centre) will not be engaged in originating an international roaming SMS.

[49] http://erg.eu.int/doc/publications/erg_08_35rev1_resp_intern_roaming_cons_080729.pdf

[50] LRAIC: Long Run Average Incremental Cost.

[51] The Arab Regulators Network (AREGNET) prepared this MoU, which aims to establish a framework to protect users from high mobile roaming tariffs when travelling among Arab countries, setting caps for wholesale and retail charges. Arab MoU on the regulation of the International Mobile Roaming, http://www.tra.org.bh/en/pdf/Roaming-MOU-Final.pdf

[52] http:/www.tra.org.bh/en/pdf/ConsultationRoamingEnglish1.pdf

[53] FCC 07-143, "Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers", http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-07-143A1.pdf

[54] Specifically, in the 2007 Report and Order, the FCC clarified that automatic roaming is a common carrier obligation for CMRS carriers, requiring them to provide roaming services to other carriers upon reasonable request on a just, reasonable, and non-discriminatory basis pursuant to Sections 201 and 202 of the Communications Act (*Report and Order, 22 FCC Rcd at 15818¶1*). The FCC found that, if a CMRS carrier receives a reasonable request for automatic roaming, pursuant to Section 332(c)(1)(B) and Section 201(a), it serves the public interest for that CMRS carrier to provide automatic roaming service to the requesting carrier on reasonable and non-discriminatory request and conditions (*Report and Order, 22 FCC Rcd at 15827¶26*).

[55] Id at 15831¶*33.* The FCC also codified this automatic roaming obligation in section 20.12(d) of its rules. See *Report and Order, 22 FCC Rcd at 15840¶63; 47 C.F.R. §§ 20.3, 20.12(d)*

[56] *Report and Order, 22 FCC Rcd at 15835¶48*

[57] Under the current home market exclusion, the automatic roaming requirement only applies in areas where the requesting carrier does not have spectrum. It does not matter, if the requesting carrier has built out a network. If the requesting carrier has spectrum in the area, then the automatic roaming rule does not apply regardless of whether it has built out a network.

[58] "*Terminating traffic is usually routed from the home network via an (international) transit operator to the visited network, for which the visited network charges the (international) transit operator the usual mobile termination tariff. As such, the visited network generally does not charge the home network any roaming tariffs for terminating traffic"*, ERG Common Position on the coordinated analysis of the markets for wholesale international roaming, ERG (05)20 *http://erg.ec.europa.eu/doc/publications/consult_wholesale_intl_roaming/erg_05_20_wir_common_position_p.doc*

[59] Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF , ERG's Common Position on symmetry of fixed call termination rates and symmetry of mobile call termination rates, ERG(07)83 final, http://www.erg.eu.int/doc/publications/erg_07_83_mtr_ftr_cp_12_03_08.pdf

[60] *"For the sake of clarity, the Commission notes that it does not intend the service description of the domestic MTAS to include services that are supplied pursuant to international or domestic roaming agreements. The service description set out in Appendix A applies to voice calls that are received by end-users (B-parties) that are directly connected to the digital mobile network of an Australian terminating carrier (the access provider)*. Australian Competition and Consumer Commission, "Mobile Services Review Mobile Terminating Access Service, Final Decision on whether or not the Commission should extend, vary or revoke its existing declaration of the mobile terminating access service", June 2004.

http://www.accc.gov.au/content/item.phtml?itemId=784498&nodeId=869923e2dc6450fb03830deb9aca5c19&fn=11.%20MTAS%20Final%20Decision.pdf

61 The question for the ECJ is whether Article 4 of Regulation 717/2007 is invalid on the grounds that the imposition of a price ceiling in respect of retail roaming charges infringes the principle of proportionality and/or subsidiarity, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:107:0017:0017:EN:PDF. See also "The EU roaming regulation and its non-compliance with Article 95 EC". http://www.wirtschaftsrecht.uni-halle.de/Heft_79.pdf

62 http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=EN&Submit=Submit&numaff=C-58/08

63 http://www.copenhageneconomics.com/Publications/Competition---Regulation.aspx?M=News&PID=534&NewsID=84

64 Although some enable incoming calls' diversion to a national number. The same may be applicable for some of the following categories (*e.g.*: purchasing a local SIM-card, dual SIM-card handsets, etc.)

65 VoIP services (either fixed or over mobile) generally allow Internet-based incoming calls, while some also enable incoming calls to a fixed or mobile network number including the customer's usual number by using call forwarding (e.g. SkypeIn).

66 VoIP enabled phone or laptop with WiFi connectivity, avoiding operator locking or surcharges for VoIP.

67 Incoming calls may be in place although at relatively expensive rates for the caller.

68 "EU looks into blocking Internet calls" ,http://www.nytimes.com/2008/11/11/business/worldbusiness/11iht-mobile.4.17725175.html

69 "Truphone attacks Vodafone over VoIP ban", 2 May 2007, http://news.zdnet.co.uk/communications/0,1000000085,39286936,00.htm

70 "Operators disable VoIP functionality on N95", 23 April 2007 http://www.cbronline.com/news/operators_disable_voip_functionality_on_n95

71 "T-Mobile replaces Skype ban with surcharge", 2 June 2009, http://www.totaltele.com/view.aspx?ID=446079

72 http://www.fiercewireless.com/europe/story/o2-germany-opens-network-voip/2009-08-19

73 In 2006, before the EU regulation entered into force, 43% of respondents said that they were confused as to the prices they pay for making and receiving calls abroad http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1515&format=HTML&aged=0&language=EN&guiLanguage=en

74 http://www.dbcde.gov.au/__data/assets/pdf_file/0009/119673/Government_response_to_the_Parliamentary_inquiry_report_on_international_mobile_roaming.pdf

75 Asia-Pacific Economic Cooperation.

76 http://aimp.apec.org/Documents/2009/TEL/TEL39-LSG-WKSP2/09_tel39_lsg_wksp2_002rev2.pdf

77 http://aimp.apec.org/Documents/2009/TEL/TEL39-LSG-WKSP2/09_tel39_lsg_wksp2_summary.doc

78 http://www.iirsa.org/BancoConocimiento/R/roaming_suramericano/roaming_suramericano_ENG.asp?CodIdioma=ENG

79 Draft conclusions, http://www.iirsa.org/BancoMedios/Documentos%20PDF/tir_cusco09_conclusiones_eng.pdf

80 http://www.roaming.gsmeurope.org/

81 http://www.aph.gov.au/house/committee/coms/mobileroaming/report/fullreport.pdf

82 http://www.dbcde.gov.au/__data/assets/pdf_file/0009/119673/Government_response_to_the_Parliamentary_inquiry_report_on_international_mobile_roaming.pdf

83 http://ec.europa.eu/information_society/doc/factsheets/tr4-consumerprotection.pdf

84 http://ec.europa.eu/information_society/policy/ecomm/library/communications_reports/annualreports/14th/index_en.htm

85 http://ec.europa.eu/information_society/policy/ecomm/library/proposals/index_en.htm

86 http://www.acma.gov.au/WEB/STANDARD/pc=PC_1715.

87 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2007:199:0023:0023:EN:PDF, http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=EN&Submit=Rechercher$docrequire=alldocs&numaff=C-299/07&datefs=&datefe=&nomusuel=&domaine=&mots=&resmax=100

88 http://news.cnet.com/8301-17938_105-10219559-1.html

89 http://www.business-standard.com/india/news/dual-sim-card-handsets-set-to-grow-manifold/11/39/344316/

90 GSMA response to the consultation on the EU roaming regulation, http://ec.europa.eu/information_society/activities/roaming/docs/phase2/gsm_association.pdf, Vodafone Group's response, http://ec.europa.eu/information_society/activities/roaming/docs/phase2/vodafone.pdf

91 A full waterbed effect would enable operators to recover profits lost by roaming price regulation. If incomplete, they would lose revenues overall (*i.e*. the reduction would not be fully compensated by increases elsewhere). Hence, the opposition may stem from the fact that they deem the waterbed effect to be incomplete.

92 Genakos, C. and Valletti, T. "Testing the waterbed effect in mobile telephony", http://pinje.cbs.dk/content/download/122543/1665636/file/Tommaso%20Valetti.pdf, January 2009.

93 Schiff, A. « The Waterbed Effect and price regulation", *Review of Network Economics*, vol. 7, issue 3 – September 2008, http://www.rnejournal.com/artman2/uploads/1/schiff_RNE_sept08.pdf

94 See paragraphs 7.33 et seq, *http://www.ofcom.org.uk/consult/condocs/mobile_call_term/statement/statement.pdf*]

95 http://www.ofcom.org.uk/consult/condocs/mobilecallterm/summary/

96 http://www.dbcde.gov.au/__data/assets/pdf_file/0005/86369/KPMG_Report_of_findings_on_International_Mobile_roaming_charges.pdf

97 KPMG cites the Informa Report "Global Mobile Roaming – Forecasts to 2013", which can be purchased at http://www.telecomsmarketresearch.com/research/TMAAAQCY-Global-Mobile-Roaming--Operator-Strategies-and-Market-Trends---3rd-edition.shtml, of which a presentation is available on http://www.bloobble.com/broadband-presentations/presentations?itemid=1639

98 *The Economist*, 3 May 2007: 'When in roam'. This article basically quotes the Informa Report and other consultancy sources.

99 http://www.europarl.europa.eu/activities/committees/studies/download.do?file=23471

100 http://www.erg.eu.int/doc/publications/2009/erg_09_01_intern_roaming_rep3_090112.pdf

101 http://www.erg.eu.int/doc/publications/2009/erg_09_31_international_roaming_report_090722.pdf, some data have been extracted from the ERG Benchmark Data Report for October 2007-March 2008, http://www.erg.eu.int/doc/publications/erg_08_36_intern_roam_rep_080812.pdf

102 As an example of this position, the GSMA response to the 2008 EU roaming consultation (page 11), touches on the risk of operators reducing investment. http://ec.europa.eu/information_society/activities/roaming/docs/contributions08/gsma.pdf

103 Julio Linares, Telefonica's COO, 31 August 2009 http://www.reuters.com/article/rbssIntegratedTelecommunicationsServices/idUSLV27909520090831