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INTERNATIONAL MOBILE DATA ROAMING

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FOREWORD

The Working Party on Communication Infrastructures and Services Policy discussed this paper at its meeting in December 2010. 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 2011.

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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MAIN POINTS

This report examines the pricing of international mobile data roaming. It continues the work undertaken on the pricing of voice and SMS international mobile roaming services. The report finds that data roaming prices are very high compared to domestic rates in the country of origin. Average prices per MB are between USD 6 and USD 10, if the average price in the country of origin of the traveller, across OECD countries, is considered. If the least expensive destination for a given country of origin is selected, the average price drops from USD 6 to USD 2.5, which is still several times more expensive than comparable domestic use.

Pricing data were collected across the OECD area. Sixty-eight operators were included in the survey, which gathered pricing data for handset and laptop use, and then mapped it to several usage patterns, namely 1 MB in one session, 5 MB use in one day and/or across a whole week and 20 MB use in one day and/or across a whole month. Prices for outgoing and incoming MMS have also been gathered. A sample 100 kB, picture MMS has also been used to compare prices.

Mobile operators advertise a headline or standard data roaming rate, which is generally the default rate available to customers. Standard rates can be as high as USD 40 per MB. Most operators also have optional data plans available. Daily, weekly and monthly plans are the most typical durations of advertised data roaming plans. Some 26% of operators do not offer any data plan in addition to the standard rate. Countries where operators do not advertise roaming data plans were ranked amongst the most expensive, especially for higher data volumes, as no discounts were provided.

Data roaming services are billed on the basis of the amount of data transferred, regardless of whether it corresponds to upload or download traffic. Operators categorise countries by zones, and then provide a single price for each zone, which facilitates the provision of information to users. The most common number of zones is two (28 operators), and three (17 operators). The categorisation of zones for MMS is typically different from that of regular data roaming, and blended pricing (uniform price across all countries) is more common.

Significant differences in pricing were found between the average of data roaming across all OECD countries, and roaming in the least expensive destination or zone. That means operators provide significant reductions for selected, or more common, roaming routes. Roaming in a particular (least expensive) country was typically half the average price of roaming in the OECD area. Data roaming services were generally available on all possible routes between OECD countries, with only a few exceptions. The affected roamers were from countries with relatively small populations roaming in destinations which are less frequented by their citizens, or there were technological factors. One CDMA operator, in Japan, only provided service in four (CDMA) OECD countries.

There is a strong case for the implementation of measures that seek to empower or protect consumers, as data roamers can be exposed to the phenomenon of so called "bill-shock". Measures such as data usage controls, consumption limits or flags which warn consumers if financial limits are reached, are increasingly used across the OECD area. Nonetheless, a sound cost-benefit assessment, in order to evaluate different options and ensure an effective implementation, should be undertaken. The measure most likely

to have success is to find ways to increase the effectiveness of competition in the market. Current pricing levels indicate that there is, in general terms, either insufficient retail or wholesale competition.

Wholesale data roaming charges have been regulated in the European Union and the European Economic Area, while retail roaming services have, so far, been exempted from price regulation but are subject to transparency and bill control measures. Both retail and wholesale prices have declined in Europe, with average wholesale rates around half of the regulated average cap. Nevertheless, the retail margin has widened, which highlights a possible lack of effective competition in this market.

INTERNATIONAL MOBILE DATA ROAMING

Introduction

The OECD has been undertaking work on international mobile roaming services during the last two years. Two reports have already been published, the first of which benchmarked retail and wholesale charges for voice roaming services and SMS.¹ It found their price level was unreasonably high, particularly in view of the underlying costs, and conducted a preliminary analysis of options available to policy makers in order to lower prices and increase transparency for end-users. The second report provided a deeper understanding of these options and put forward a set of recommendations that could be implemented by governments, should it be necessary, after assessing the specific situation in a given country.

While these reports have addressed issues surrounding international mobile roaming services in general, they have not dealt with the specific issues of data roaming services. Though sharing many common aspects with voice and SMS roaming services, data roaming services have several specific characteristics, such as potentially closer substitutes (as a customer's usual home number does not have to be transferred in order to provide full substitutability, especially for data-only services), and the possibility of delivering them over different end-user devices (notebooks, netbooks, tablets, smart-phones, and so forth).

This report primarily focuses on presenting the methodology and main findings of a pricing data collection exercise that covers data roaming services in the OECD area. It encompasses data roaming services with Internet access functionality, as well as pricing for incoming and outgoing Multimedia Messaging Services (MMS). Available data roaming prices for handset and laptop use have been collected, even though only handset-based prices have been used for comparison, except for one of the benchmarks.

The report addresses some specific issues related to regulatory approaches adopted for data roaming services. The available evidence on wholesale data roaming prices for the European Union is presented. This allows some consideration to be made on the adequacy, effectiveness and possible regulatory exit of the European Union's Roaming Regulation. An ambitious requirement of this legal provision is the obligation for data roaming operators to implement the so called "*cut-off limit*". It is a threshold that operators make available to consumers, beyond which the data roaming service ceases, if the customer does not explicitly accept its continuation. Bill-shock phenomena are a matter of concern for policy makers, especially for data roaming services. The implementation of this measure is one step towards protecting data roaming customers in a market where average prices are still not reasonably competitive.

Technology aspects

Different technological choices in OECD countries (e.g. GSM, CDMA) may be a factor constraining the ability of operators to negotiate wholesale roaming charges. This may lead to CDMA operators facing higher wholesale charges than their GSM/UMTS counterparts. While no information is publicly available on wholesale charges, paid by CDMA operators, some interpretations could be made in view of the existing data.

The Japanese operator KDDI AU only offers roaming services in some (CDMA) countries, namely in Israel, Mexico, Canada and the United States. In other countries that use CDMA technology (e.g. Mexico), the roamer's type of handset is one piece of information required to consult the roaming rate for a particular destination country on the operator's website. The price benchmark undertaken in this report used any compatible general-purpose handset to obtain the roaming rate in a given country. Nonetheless, data roaming services for a particular route may only be available for a very limited set of handset devices. When a roaming route is unavailable regardless of the customer's handset, it is indicated in the reported data.

Despite countries with CDMA networks being ranked among the most expensive in this report, it may not necessarily mean that this is the most important reason for these high prices. Some of them, such as Canada, Korea, and Mexico, have fewer nearby OECD neighbours or are less frequent destinations for the majority of the OECD countries, which may lead to higher charges for roaming within the OECD area.

Transparency issues

Previous OECD work on roaming services has been strongly in favour of promoting transparency of roaming prices and substitutes. Improved information on roaming charges is a step forward towards mitigating "*bill-shock*". Some measures used by OECD countries are the delivery of information by SMS on arrival in a foreign country, which describe roaming charges, or raise awareness on prices and how those may be compared by means of, for example, websites to benchmark prices. Moreover, raising awareness on roaming substitutes has been found crucial for consumers to make informed decisions. Potential substitutes include VoIP over WiFi, payphones, local SIM-cards and international calling cards.

There are a number of good practices that assist in increasing transparency for data roaming services. Operators, for example, can send SMS to users on arrival in a foreign country. This can include information on pricing. Data can also be made available on options for users that enable comparisons of data roaming prices. Increased awareness of substitutes is particularly relevant for data roaming services. As stated above, data roaming services do not need a telephone number be transferred for roaming purposes, in order to provide a seamless, full substitute service. As such, web browsing using a local WiFi hotspot or from another device, such as a computer in an Internet café abroad, may serve as a close substitute for a potential data roamer. There are less close substitutes for voice or SMS roaming services.

There are some transparency measures that are especially critical as regards the use of data roaming services. For example, inadvertent use of these services is much more frequent than for other roaming services, and its financial implications for the roamer are potentially more harmful. Automatic updates or large file downloads might occur without much user interaction, much more easily than inadvertent use of voice roaming services. The amended European Union Roaming Regulation provides that customers should be provided with tariff information on the charges that apply to data roaming services when they first connect to a visited network, and when they initiate a data session. It also requires that, where appropriate, operators inform customers, before the conclusion of a contract and on a regular basis, of the risk of automatic and uncontrolled data roaming connection and download, and clearly explain how to switch such connections off. The Regulation also put strong emphasis on other measures targeted at protecting consumers, such as the obligation of per-second billing for voice roaming services.

A more ambitious measure to protect consumers from bill-shock was also included in the European Union Roaming Regulation, recognising the problem and imposing an obligation on data roaming providers. Since March 2010, a "home provider" was required to make available one or more maximum financial limits ("*cut-off limit*") for specific periods of use. The default limit (other limits may be offered alongside) is not to be higher than USD 65 (EUR 50) per month, tax excluded, or the volume equivalent. Operators are also obliged to send a notification to the customer when the threshold of 80% of

this financial limit has been reached, and again when 100% of the limit is met, indicating the procedure to be followed if the customer wishes to continue provision of the service, and the associated cost. If the customer does not respond as prompted, the operator must immediately cease to provide and to charge the customer for data roaming services, unless and until the customer requests continued or renewed provision. From 1 July 2010, the default cut-off limit had to be automatically provided to all customers who had not already chosen another limit.

Opponents to this measure, especially from the mobile industry, have argued this obligation places an excessive burden and cost on operators. Further, they point out that the cost of implementing this measure is not negligible, and may take resources away from other innovations and investments. While these points may have merit, as the implementation of consumer protection measures is not cost free, the data roaming cut-off limit has been successful in providing protection against bill-shock. It will certainly assist in avoiding situations in which users incur a several-thousand dollar bill when returning from foreign travel.²

An evidence-based evaluation of the cost of implementing these measures needs to be undertaken. As gains for consumers are potentially very significant, benefits may very likely outweigh implementation costs. Moreover, according to the view of the Body of European Regulators for Electronic Communications (BEREC),³ it is not clear how effective market forces will be in further reducing prices. That makes measures addressing consumer concerns, bill-shock in particular, especially necessary until prices become more reasonable.

Wholesale regulation and pricing – the European Union

The European Union Roaming Regulation is the most widely known and most comprehensive example of regulatory intervention in international mobile roaming services. The 2007 Roaming Regulation, which did not apply price regulation to data or SMS roaming services, was amended and expanded in scope in 2009.⁴

The 2009 amendment targeting data roaming services, in Europe, included a number of new aspects. There were measures to increase transparency and prevent bill-shock. At the same time, wholesale price regulation was implemented but not retail price regulation. Prior to then, data roaming services were regarded, in European Union terminology, as an “*emerging market*”. This term is applied in Europe when markets are regarded as being new and fast-growing, and regulation is not warranted in part because they are extremely challenging to define and analyse, and because competition may still deliver the desired outcome.⁵ It is believed, in these cases, that premature regulation may prevent or delay development, thus harming competition, innovation and market expansion.

The foregoing were some reasons why the European Commission concluded that European data roaming services should not be subject to retail price regulation between 2009-2012. Wholesale price regulation was adopted by means of an average cap on wholesale data roaming services, calculated between any pair of operators over a 12 month period. Like voice roaming regulation, a glide-path was implemented. As a result, the average wholesale charge that the operator of a visited network may levy from the operator of the home network, for the provision of data roaming services, is not to be higher than a safeguard limit. This limit was established at USD 1.31 (EUR 1) on 1 July 2009, USD 1.05 (EUR 0.80) on 1 July 2010 and USD 0.65 (EUR 0.50) on 1 July 2011, per MB of data transmitted, until the expiry of the Regulation, in 30 June 2012. The 2009 European Union Roaming regulation was not adopted in the European Economic Area (EEA) until Q2 2010 (in Liechtenstein, Norway and Iceland).

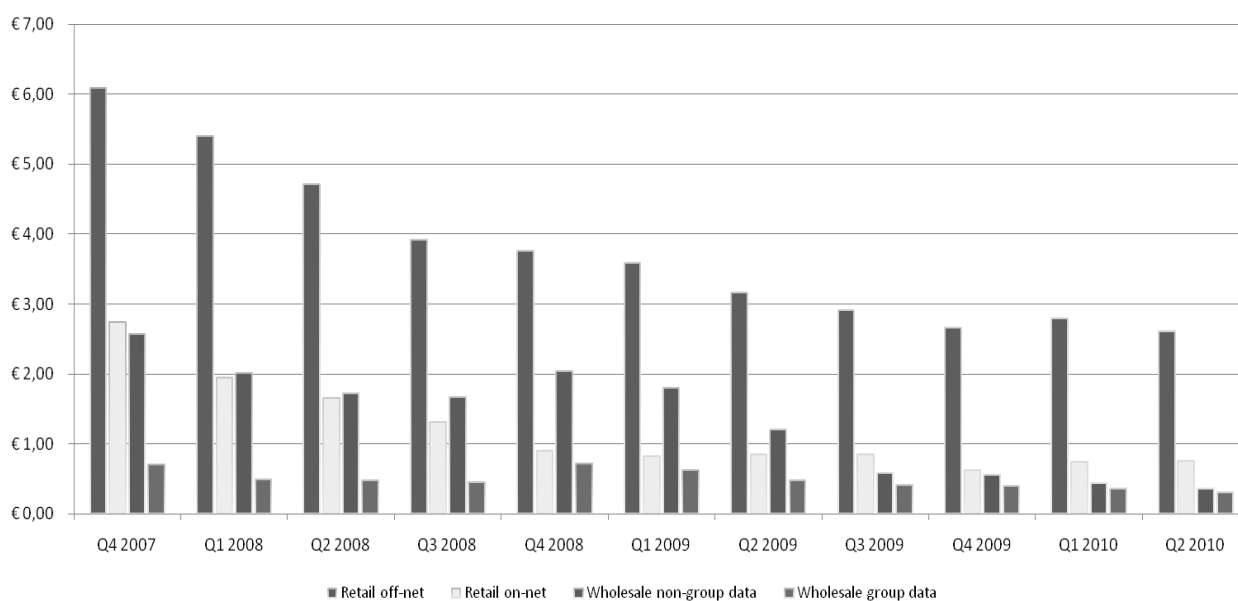
The European law makers agreed to the fact that there are competitive pressures in the data roaming market that are not present in voice, or SMS, roaming markets. As highlighted by previous OECD

work, there are closer substitutes to data roaming, than there are to voice or SMS roaming, as there is no need to retain the customer's usual phone number in order to provide the service. However, the legislators identified some high wholesale charges, especially those levied by operators other than the preferred networks, as a barrier preventing the launch of less expensive retail offers. Placing a safeguard average wholesale cap on average charges levied among providers was agreed to, as being a reasonable solution to decrease charges and promote competition.

BEREC provides data⁶ on retail and wholesale data roaming charges in the EU/EEA area. Retail charges, which are not directly affected by the Regulation, followed a downward trend, both off-net and on-net (Figure 1). In Q2 2010, average retail charges in the European Union area were USD 3.40/MB (EUR 2.60), down from USD 8/MB (EUR 6.13) in Q4 2007. The retail price for on-net data roaming (*i.e.* between operators owned by the same group) was much lower (around USD 1.1/MB, EUR 0.84).

Figure 1. EU/EEA average price per MB for retail and wholesale data (EU only for Q2 2009 onward) – EUR

1.



Source: BEREC

The evidence from Europe suggests that on-net, or intra-group, retail prices are between one-third and one fourth of off-net prices. At the wholesale level, however, differences are not as large. According to the above, wholesale group data prices are about 80% of wholesale non-group data prices, and about half the regulated cap. They were much higher before the implementation of the Regulation.

Comparisons between the European data and the results of the pricing benchmark exercise presented in this report should be made with caution. Data reported by BEREC are based on a larger sample of operators, and are average prices calculated using revenue and volume data provided by operators. The OECD benchmark is, in contrast, based on advertised offers from which customers may choose. That means the weight corresponding to data volumes across operators of tariffs has not been considered.

According to BEREC, wholesale charges also followed a downward trend in the EU/EEA. In Q2 2010, the average off-net wholesale charge was USD 0.49/MB –EUR 0.36) (below the regulated threshold of USD 1.31/MB). BEREC's observations on the existence of market forces at work were two-fold. Even though charges have fallen, there was still a significant remaining margin between average wholesale and retail prices (retail off-net prices are on average seven times more expensive than wholesale off-net prices).

In its interim report on the functioning of the Roaming Regulation,⁷ the European Commission doubted whether the reductions at the wholesale level were being passed through to retail prices in all cases. Sometimes, lower wholesale prices were originating greater margins (the average off-net European Union retail margin was around 140% in Q4 2007, in contrast with more than 600% in Q2 2010). This supports the view that the margin is widening, while the absolute prices are declining. Even in competitive settings, wholesale reductions may not be fully passed on to retail offers (*i.e.* the percentage fall may be different), but this evidence suggests that there may still be a considerable lack of competitive dynamics. While these figures referred to the aggregated retail and wholesale roaming market, in terms of revenue per MB, the European Commission further pointed out that standard retail rates remain as high as up to USD 6.86/MB or even above USD 9.60/MB. This confirms the findings of the pricing data collection included in this report. The Commission's 2011 review of the European Union Roaming Regulation will analyse whether further regulation of roaming services is warranted (the current Regulation expires in June 2012).

BEREC data reveals valuable information on wholesale and retail pricing trends in the EU/EEA area. Wholesale prices have fallen following introduction of the Regulation, more markedly than retail charges. The question remains as to whether retail charges will continue to fall or, as some fear, they will remain stable and high relative to wholesale charges. It could be posited that retail prices would have fallen anyway without the need for wholesale regulation, as there are some market forces at play. Others might point out this evolution is the result of both factors, the net effect of each one of which is very challenging to identify.

In Europe, retail prices remain high relative to wholesale charges, though they may no longer be viewed as a barrier preventing some operators from launching lower offers. The current retail price level in the European Union area (between USD 2.74 and USD 4.11 for off-net data roaming services) remains high, though prices for extra-European routes may be potentially higher, as the following section shows. If wholesale charges are no longer the main barrier and market forces do not bring about a more reasonable level of data roaming charges, additional policies may need to be explored in order to develop more effective competition in this market.

Data collection exercise

Methodology issues

The OECD data collection was conducted from the 7 September to 7 October 2010, addressing retail mobile data roaming offers (thus including 2G and 3G mobile data transmission technologies), that were advertised on the operators' websites. It covers data roaming prices of the two largest operators from each of the 34 countries of the OECD area which makes a total of 68 operators included in the data collection exercise. Prices for roaming on the least expensive visited network in a given country have been used for comparison. Only retail charges for post-paid subscribers have been collected. Cost elements that have been collected and considered include one-off charges, traffic charges, per-session fees, monthly charges, etc. Value added or other taxes, if applicable, have been included in comparisons. Only standard residential offers have been considered. Therefore, offers targeted at businesses or specific consumer groups, such as students, have also been excluded. These have also been expressed in USD PPP as well as USD, in order to provide additional comparability across countries. Exchange and PPP rates used for

conversion are listed at the end of the document (Table 10). Two operators per country have now been chosen in order to cover a higher share of the market, and intra-EU/EEA routes have also been included as retail prices are not subject to regulation, as happened to voice and SMS roaming services.

Some of these methodological issues represent improvements from the latest OECD pricing data collection on voice and SMS roaming services. For example, the number of surveyed operators per country has increased from one to two, in order to cover a greater share of the market in every country, and prices are expressed in USD PPP, in addition to USD (at exchange rates). PPP rates provide an additional perspective, and benchmark data roaming prices against the general consumer price level in a given country. This data collection has taken into account intra-EU/EEA routes due to a fundamental difference in the European regulation of data roaming services: international data roaming services are not subject, to date, to retail price regulation in Europe, unlike voice and SMS roaming services. As a result, there may be some changes in the final results, compared to those which would have been obtained without any of the mentioned methodology improvements.

This paper summarises data roaming prices across the OECD area by providing information based on the country of origin of the traveller. This aims at giving an overview of the average cost for a given OECD country's customer, of roaming in the OECD area. As statistics regarding roaming traffic patterns are not available, a simple average of the roaming costs across countries has been taken into account. However, the most travelled routes are believed to be more price-sensitive and therefore provide more competitive offers. Again, as statistics on roaming traffic are not fully available, the price for the least expensive route for a given country of origin has been chosen. While further investigation may confirm these assumptions, the destination with the least expensive roaming tariff is very likely to coincide with the most travelled route, as preliminary evidence shows.⁸ For example, European data roamers are more likely to travel to European countries, where charges are lower. The same applies to Australians (travelling to New Zealand) or the United States (to Canada and Mexico).

Several consumption patterns or "baskets" have been constructed in order to account for different data roaming uses. In any case, as an extensive data set has been collected, this provides for the possibility of constructing additional price comparisons, which represent different data usage patterns. As operators do not differentiate upload and download traffic for billing purposes, all data amounts quoted in this document refer to overall traffic, that is, both upload and download data transfers. Evidence on actual data roaming use is scarce, but points to very low data roaming traffic in relation to domestic mobile broadband use, which is explained by much higher data roaming prices, in line with the findings of this report of very high relative prices for these roaming services.

Prices have been collected for handset and laptop-based use. Handset use has only been considered if it enables access to the broader Internet, and is not constrained to a particular type of device. That means that e-mail only plans (*e.g.* Blackberry email-only use) or data plans associated with a particular device (data plans for iPhone) have not been considered. Data roaming charges have only been collected and reported for benchmarking when a general use was possible and it was not associated with a particular device. Data displayed in charts refer to handset-based use only, unless otherwise indicated.

As a result, the following usage patterns have been selected:

- 1 MB usage in one single session, during the same day.
- 5 MB usage in five different sessions, using 1 MB in each one of the session, also over different days, within an overall timeframe of one week (7 days).
- 5 MB usage in one single session during the same day.

- 20 MB usage in twenty different sessions, using 1 MB in each one of the sessions, also over different days, within a overall timeframe of one month (30 days)
- 20 MB usage in twenty different sessions, using 1 MB in each one of the sessions, also over different days, within a overall timeframe of one month (30 days), but targeting only laptop use.
- 20MB usage in one single session during the same day.

One chart (addressing 1 MB) excludes intra-EU/EEA routes, in order to provide a view of charging patterns, without the effect of the EU Roaming Regulation.

MMS prices have been collected for all types of MMS, though a picture MMS of 100kB size has been taken as reference for comparison purposes. The fact that many operators charge by the size of MMS has resulted in having to choose a specific size, 100kB being a balance amongst existing size limits or billing units for MMS in the marketplace. As some operators charge differently depending on the type of MMS (text, picture, video), a specific type (picture) had to be chosen for comparison.

Finally, it should be noted that some developments have occurred in data roaming markets after this survey was conducted. For example, significantly less expensive offers have been launched by Vodafone in Europe, Verizon in the United States and SKT and KT in Korea, among others.

Charging patterns

Data roaming providers typically advertise a headline (or standard) price, which is the default tariff if no other data roaming plan is selected. Data plans allow for significant price reductions in relation to headline prices. Frequently, a data plan (*e.g.* a daily plan) is the default tariff for the customer, such as Movistar and Vodafone in Spain or O2 in Ireland.

For operators included in the data collection exercise, roaming services are billed on the basis of the amount of data transferred, regardless of whether it corresponds to upload or download flows. Prices are quoted by MB, which provides for a better idea of the overall cost per MB, as billing units are varied by operator and tariff plan. Only one operator in this survey bills data roaming services by connection time (Proximus in Belgium), although it allows for traffic-based billing. No operator makes a distinction between different times of the day for billing purposes, even though those offering daily or weekly plans usually extend their validity until midnight only. If data usage continues beyond that time, an extra daily fee is charged accordingly.

Only two operators charge session-based fees: Telstra in Australia charges a per-session fee, and also bills by the amount of traffic, whilst SFR in France includes a data allowance associated with the per-session charge (up to 2 MB).

Data roaming providers usually group different countries by zones, and then charge depending on which zone the subscriber is roaming in. These zones are typically fewer than those used for voice roaming services. The least expensive zones are normally associated with destinations which get most of the roaming data traffic for a given home country's traffic. Less expensive tariffs may also be linked to the enforcement of some sort of regulation (*e.g.* wholesale data roaming regulation in force in the European Union and the European Economic Area).

Thirteen operators in nine countries offer the same blended price for any possible roaming destination. The majority of data roaming service providers break down their tariffs into only two (twenty-eight operators) or three zones (seventeen operators). Only eight operators group destination countries in four or

more zones, whereas the two operators in Israel offer a different price for any destination country. Icelandic operators offer a blended rate for the EU/EEA area, while having a different price for each of the remaining countries where they offer data roaming services. Zone breakdown for MMS is typically different from data roaming zone breakdown and blended offers across different countries are more frequent.

Data roaming services are normally available for any roaming route within the OECD area, with a few exceptions, normally associated with subscribers from countries with small populations roaming in destinations, which are less frequented by their citizens. Examples are roamers from Estonia and Iceland, for whom roaming in New Zealand is not available. Icelandic subscribers cannot use data roaming services in Korea either. Regarding MMS, Movistar subscribers in Mexico do not have this service available, as Movistar has not yet signed the necessary agreements to provide MMS roaming services in that country. One CDMA-only Japanese operator (KDDI au) only provides data roaming services in Canada, Mexico, Israel and the United States, that is, where compatible CDMA networks are available.

Data plans

Most operators offer data roaming plans as an alternative to standard charges. Namely, twenty-three operators offer a daily plan, ten operators a weekly plan, while thirty-five operators provide different types of monthly plans. A day, a week and a month are the most typical validity durations of advertised data roaming plans but some operators exceptionally advertise offers with different validity periods. As such, in Korea SK Telecom and KTF respectively have a ten-day and a fifteen-day valid data plan. Vodafone New Zealand advertises a 3MB data bundle to be used over three days.

Eighteen operators (26%) do not offer any data plan in addition to the standard rate. Estonia, Iceland, New Zealand, Poland and Sweden (15% of the countries) do not have any of the two largest operators offering a different rate than the default (headline) price, which prevents frequent users from benefiting from discounts.

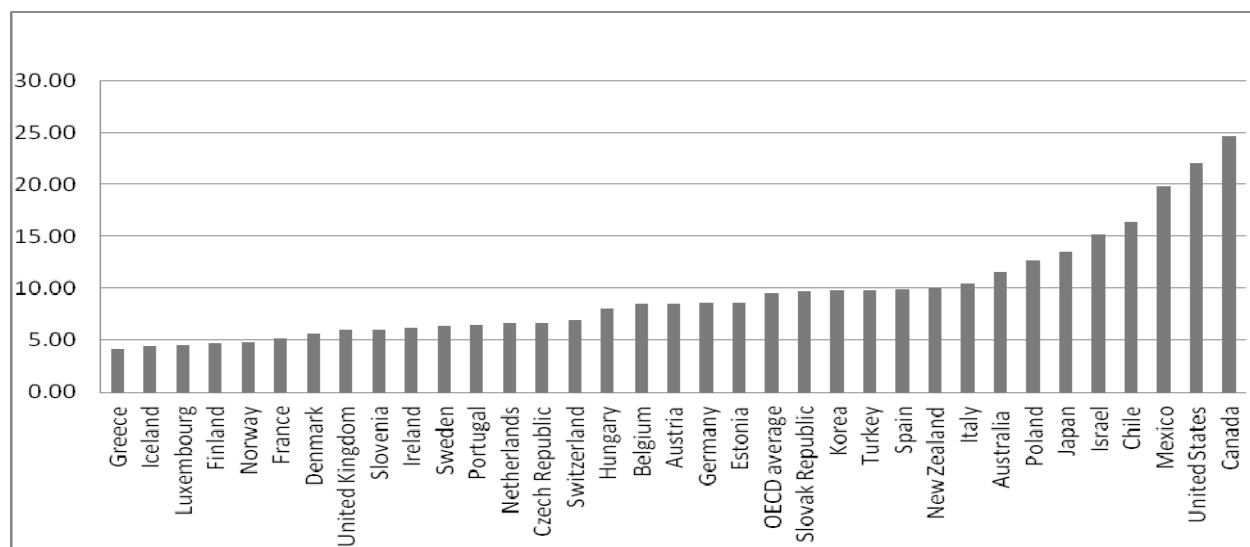
In some cases, a domestic mobile broadband plan is needed in order to benefit from discounted data roaming rates. This is the case for Rogers (Canada), NTT Docomo in Japan and Polkomtel in Poland (where roaming in zone 2 countries is charged as the cheaper zone 1 if a user purchases a domestic data plan), Movistar in Spain (daily tariff for 10 MB is priced at USD 7 instead of USD 14), or Netcom in Norway. Other advertised data plans require a minimum commitment period, such Rogers's add-ons in Canada (3 month commitment), T-Mobile in Austria (6-month commitment period for the World Class Data Premium offer) or Verizon's Global Access Connect (1-year commitment).

As noted above, only handset-based prices have been used for comparison though prices for laptop use have been collected as well. As many as eighteen (26.5%) operators offer handset-based plans which are not available for laptop used (via dongles, modems, USB 3G keys, etc.). Seventeen (25%) operators advertise plans for laptop use only, which are therefore not available for handset users.

One MB data usage

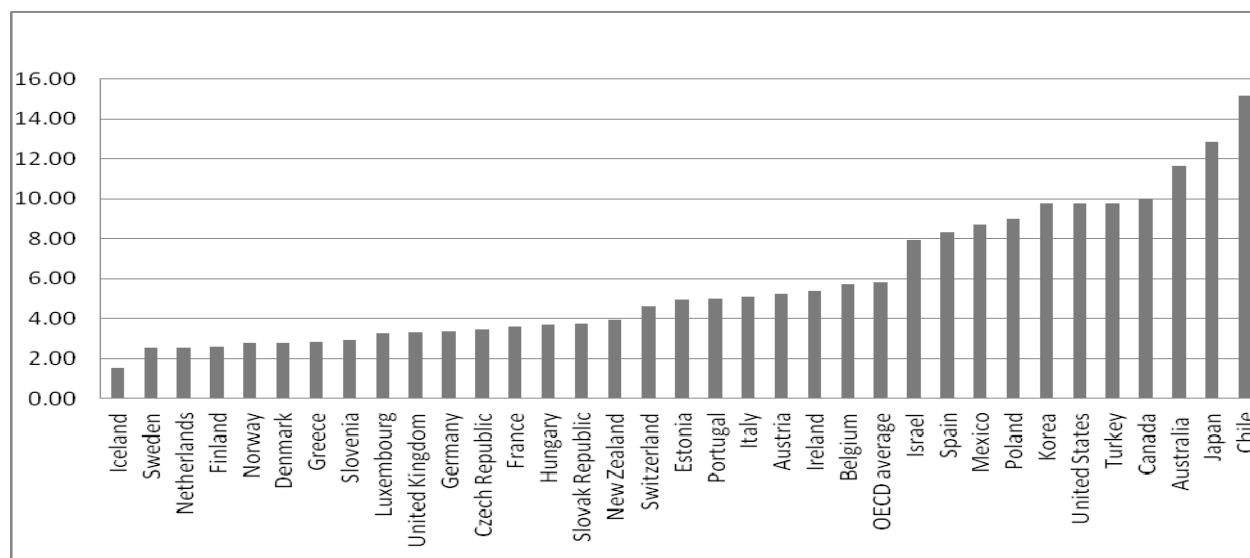
The first basket addresses a 1 MB traffic usage in one session. The least costly option among the available rates provided by operators was chosen, including when a domestic data plan was necessary to sign-up for a particular roaming rate. Therefore, daily tariffs which allowed for the lowest cost for 1 MB traffic exchange were selected as representative of this consumption pattern, which intends to benchmark an occasional use of data roaming services. Figure 2 charts the average price across all OECD countries by country of origin. A simple average of the prices of the two surveyed operators by country was calculated for comparison.

Figure 2. 1 MB in one session – average price by country of origin of the traveller – USD PPP



As roaming prices are usually lower in countries with a higher share of data roaming traffic, Figure 3 displays the cost of 1MB data roaming usage for the least expensive destination, charted again by country of origin and taking into account the average of the two selected operators in every country. As such, if we take as an example a home subscriber in New Zealand, Figure 2 charts the average costs of 1 MB data roaming traffic for this subscriber across the OECD area (except for New Zealand), while Figure 3 shows the cost of roaming in the least expensive destination, that is, Australia.

Figure 3; 1 MB in one session – least expensive destination by country of origin of the traveller – USD PPP



The average price by country across the OECD is USD 9.48 PPP. The most expensive countries as home networks were Canada (USD 24.61), the United States (USD 22.06) and Mexico (19.85). The least expensive home countries for this usage pattern are Greece (USD 4.17), Iceland (USD 4.42) and Luxembourg (USD 4.46). It is noteworthy that even for the least costly home countries, the average of 1 MB roaming data is almost USD 5. If the price of roaming on the least expensive country for comparison is chosen (see Figure 2), the average price still remains as high as USD 5.84 PPP. Prices were highest in

Chile (USD 15.13) and Japan (USD 12.86), and lowest in Iceland (USD 1.57), Sweden (USD 2.55) and the Netherlands (USD 2.57), as country of origin.

Figure 4. 1 MB in one session – average price by country of origin of the traveller – extra EU/EEA only – USD PPP

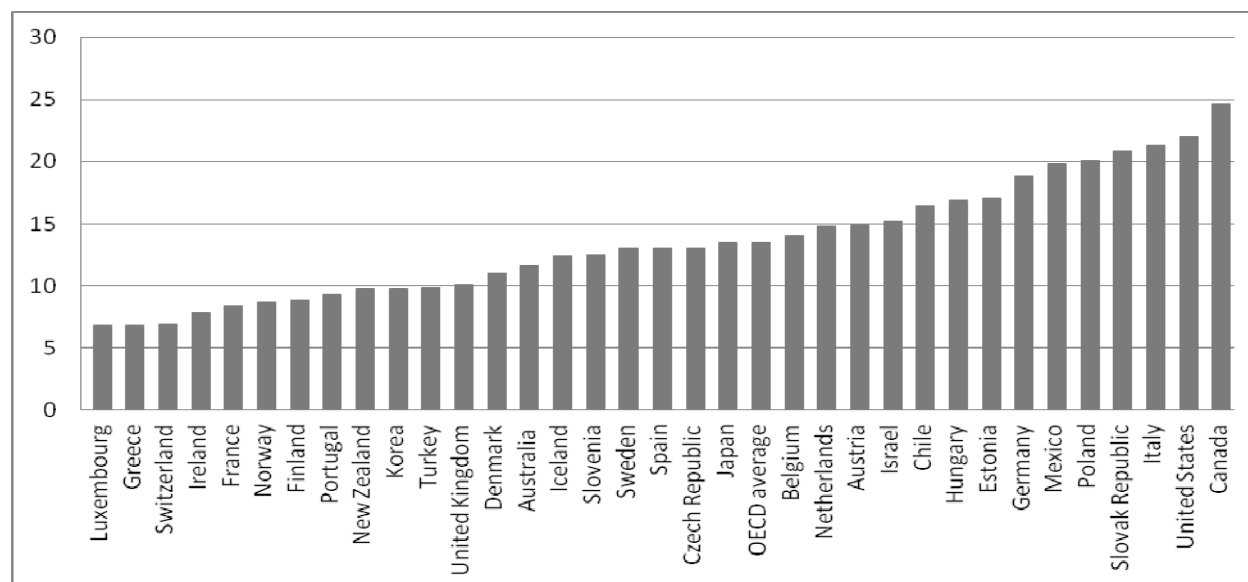


Figure 4 displays data for a 1 MB data roaming session, excluding intra-European Union and European Economic Area routes.⁹ The OECD average price by country of origin is USD 13.52, that is, roughly USD 4 higher than including intra-European Union routes. Of course, this difference may not be the only reason for lower rates if intra-European Union routes are included. The European countries, in the OECD area, are generally smaller than non-European and international travelling within Europe is higher than in other regions of the world, which is an incentive for operators to offer lower data roaming rates (wholesale and retail).

Outside the EU/EEA area, the least expensive country of origin in this chart is New Zealand (the 9th least expensive in this chart, the 25th least expensive in Figure 2). Canada and the United States remain the most expensive origin and Italy, the Slovak Republic and Poland have increased, to the most expensive countries, as a result of having removed intra-European Union routes.

In short, removing intra-European Union routes has a clear effect on the overall price level and on the ranking of the countries. At this stage, however, it is not possible to separate the net effect due to the enforcement of the European Union Roaming Regulation, the effect caused by the mobility of European citizens across Europe and the relatively small size of many European countries, potentially increasing travel across borders, which may lower the average price of data roaming services.

five MB data usage

The following data amount that has been used for comparison is 5 MB. However, charging patterns greatly vary depending on whether this data is used on a single day (for which daily plans are especially well suited) or over different days. This is why two different usage patterns have been considered. Figures 5 and 6 compare the usage of 5 MB across five 1 MB sessions in different days, whereas Figures 7 and 8 capture usage on the same day. The days where this data may be used can be

randomly distributed across a seven-day interval (a week), which should capture offers based on weekly plans, that is, those targeted to roamers travelling for a one-week period.

Therefore, Figure 5 considers the average price, ranked by country of origin, of roaming across the OECD area, using 1 MB of traffic over five different days during a week interval, resulting in an OECD average of USD 37.15. Chile (USD 75.14), the United States (USD 69.91), and Japan (USD 65.42) are found to be amongst the most expensive home countries for customers to roam across the OECD area, whereas France (USD 10.73), Luxembourg (USD 12.00) and Greece (USD 13.58) are the least expensive ones, considering the use of 5 MB across five different days over a week period.

If the least expensive country to roam in is chosen instead (Figure 6), Chile, Japan and Turkey become the most expensive countries, and Luxembourg, Slovenia and France are the least expensive ones. The price difference between the most and the least expensive home countries is as high as twelve times, if considering only the least expensive country to roam in. Not surprisingly, operators in those countries referred to as the most expensive ones generally offer very limited discounts for weekly data plans, or rather keep headline rates, as proves the fact that only three out of six operators in those countries offer a plan different from the standard rate. The average price across the OECD for roaming in the cheapest destination country is USD 21.88 which means a significant discount for a given country compared to the average of roaming across the OECD area.

Figure 5: 5 MB in 5 sessions in different days – average by origin country of the traveller – USD PPP

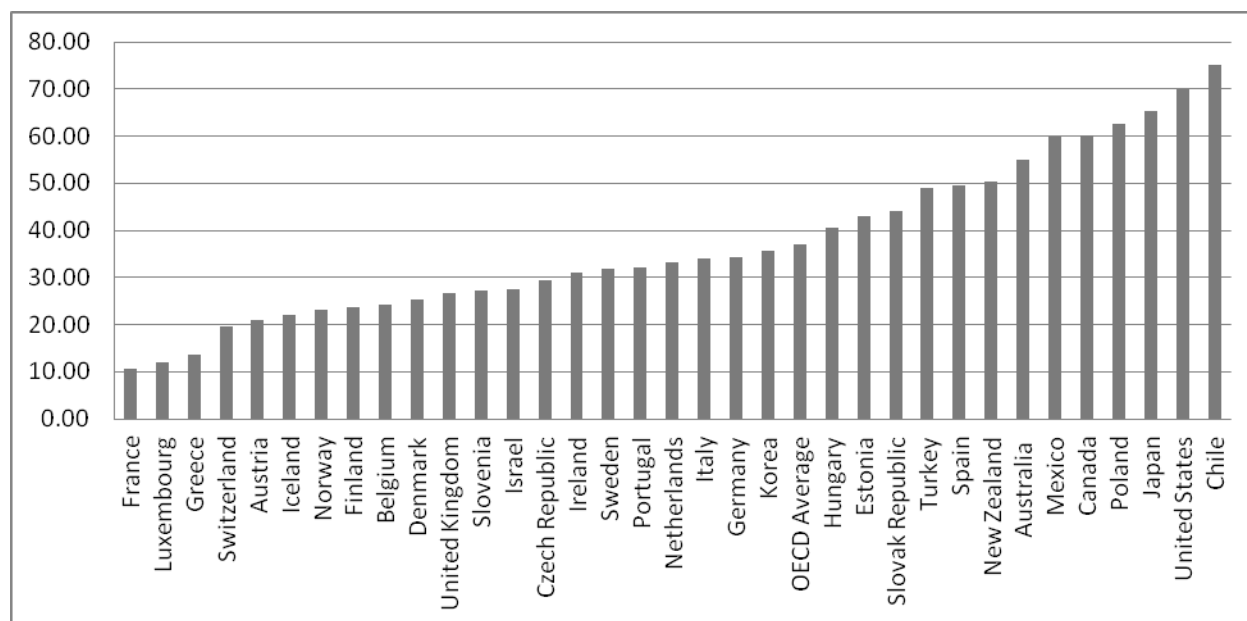
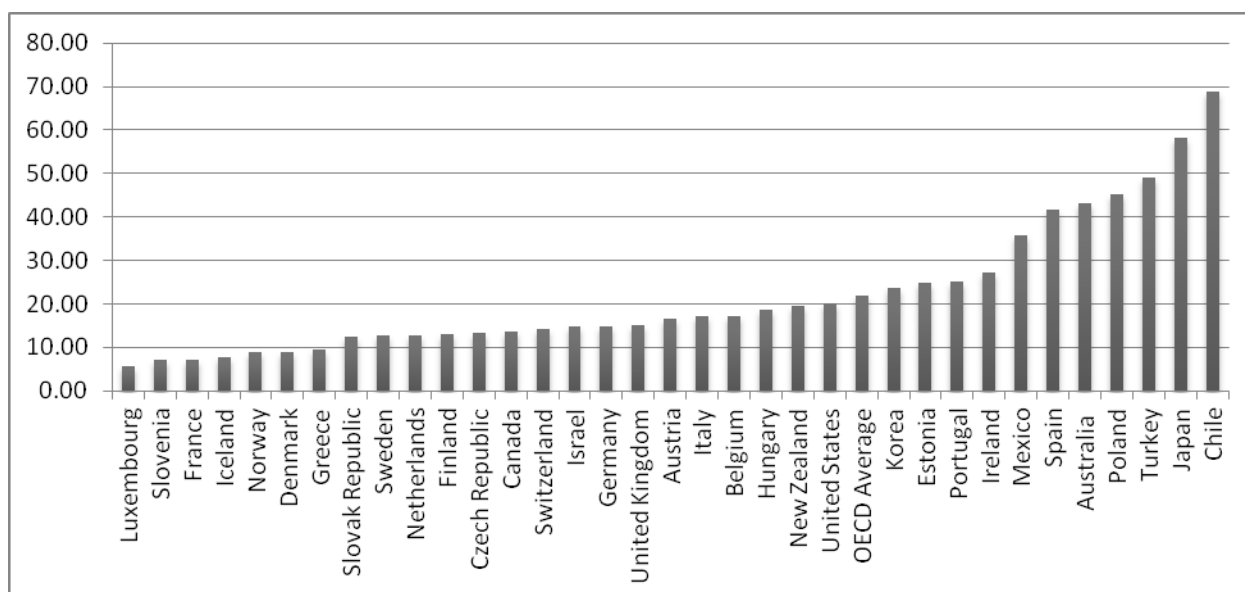
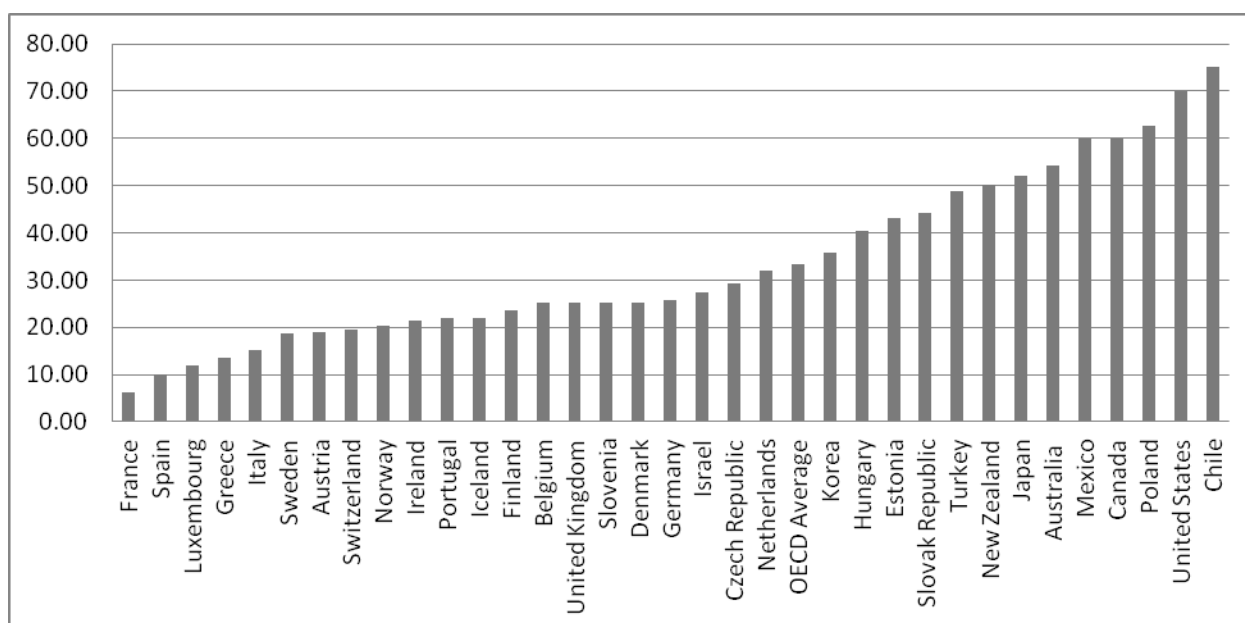


Figure 6. 5 MB in 5 sessions over a week – price of the least expensive destination by country of origin of the traveller – USD PPP



Figures 7 and 8 consider the use of the same amount of data (5MB), but on a single session over a single day. This consumption pattern should be able to be captured by daily plans. Like previous graphs, Figure 7 considers the average of roaming across the OECD by country of origin, whereas Figure 8 only takes into account the least expensive destination for roamers from a given OECD country. The average price for both usage patterns is only slightly lower than the usage of 5MB traffic across different days (USD 33.40 versus USD 37.15 for the average across countries, and USD 17.75 versus USD 21.88 if the least expensive destination is chosen).

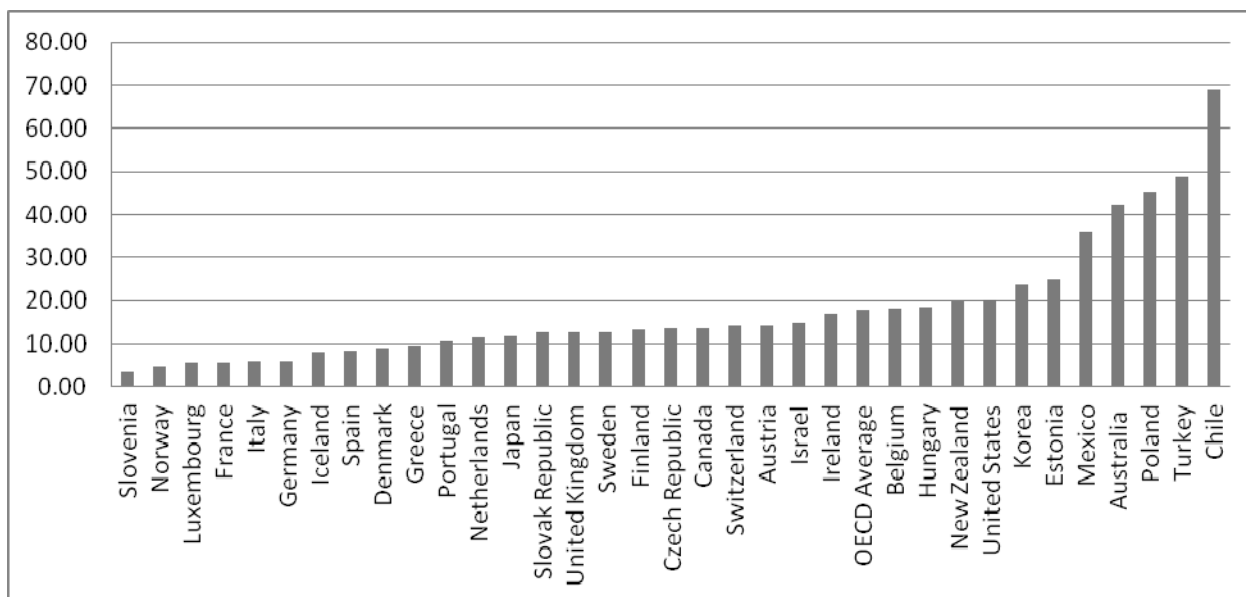
Figure 7: 5 MB in 1 session – average by country of origin of the traveller – USD PPP



Chile and the United States remain the most expensive home countries (see Figure 7), with France, Spain and Luxembourg the least expensive. If the cheapest destination for a given country's home

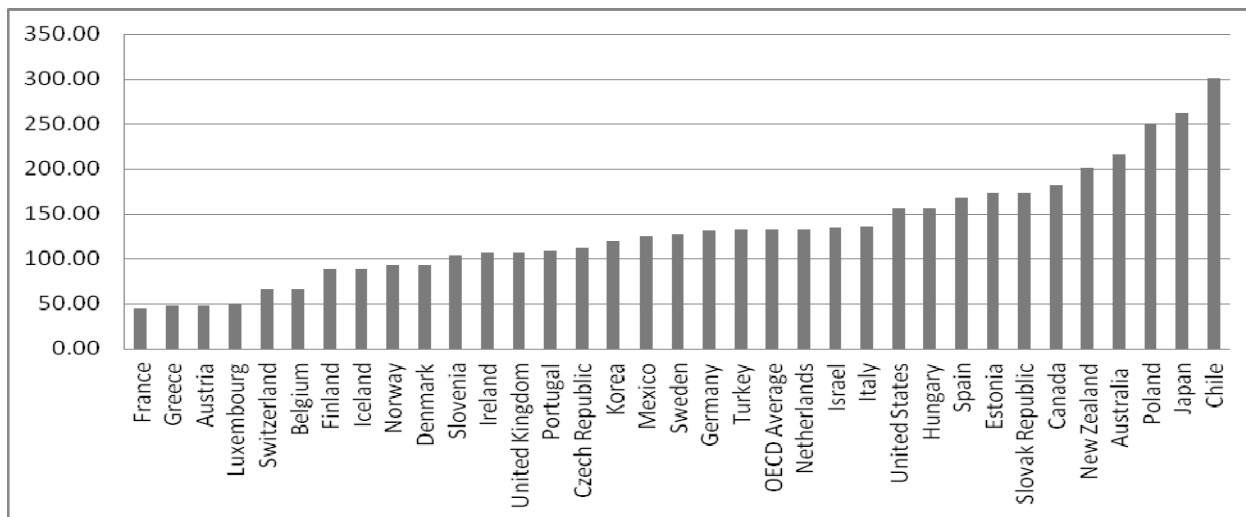
subscriber is used for comparison, Slovenia (USD 3.30), Norway (USD 4.58) and Luxembourg (USD 5.62) provide the cheapest prices by origin, while Turkey and Chile remain the most expensive.

Figure 8. 5 MB in one session – price of the least expensive destination by country of origin of the traveller – USD PPP



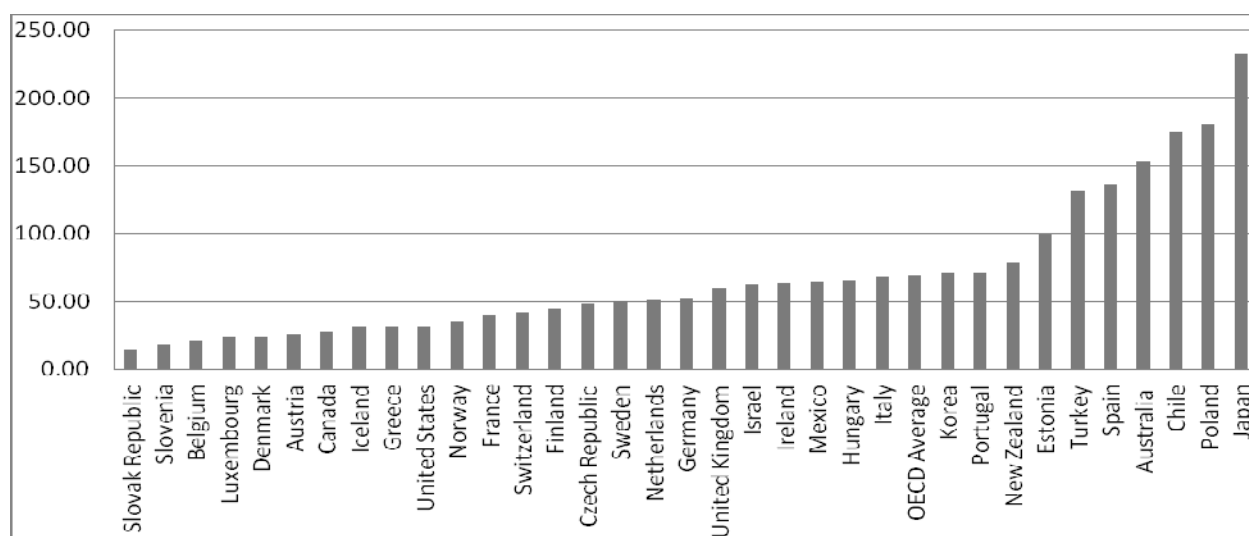
Twenty MB data usage

Figure 9. 20 MB in 20 sessions over a month – average price by country of origin of the traveller – USD PPP



Figures 9 and 10 capture the usage of 20 MB across twenty different 1MB sessions over one month. As for previous comparisons, Figure 9 addresses average prices when roaming across all OECD countries, ranked by country of origin, while Figure 10 only captures the price for the least costly destination available to a roamer. This consumption pattern should be able to capture monthly plans, as data usage may take place at any time during the month.

Figure 10. 20 MB in 20 sessions over a month – price of the least expensive destination by country of origin of the traveller – USD PPP



The average price across the OECD area was USD 132.20, down to USD 68.50 if only the least expensive destination is chosen. France, Greece and Austria are the least expensive countries of origin from which to roam across the OECD area (all below USD 50 for 20 MB traffic), whereas Chile, Poland and Japan advertise prices higher than USD 250. If only the cheapest destination is chosen, as many as fifteen countries offer prices under USD 50 for 20 MB traffic of this type, the most economical being the Slovak Republic (USD 14.50), Slovenia (USD 18.14) and Belgium (USD 20.77). Japan (USD 232.30), Poland (180.75) and Chile (USD 175.00) are all over USD 170 and are the most expensive countries on the basis of this consumption pattern.

Lastly, the usage of 20 MB in a single session on a single day has been benchmarked. This again should allow for capturing daily plans with higher data allowances. Not surprisingly, operators offering daily plans which allow for a daily consumption of 20MB are well ranked. Ireland, Spain and France offer deals below USD 30 on average across the OECD area. On the other hand, prices for Chile (USD 301.00), Poland (USD 250.69) and Australia (USD 212.42) remain extremely high. The OECD average is USD 119.60. If only the least expensive destination is taken into account for benchmarking purposes, the OECD average price by country of origin drops down to USD 52.63, with some countries having prices as low as USD 11.61 (Japan), USD 12.22 (Norway), USD 14.50 (Slovak Republic) and USD 16.86 (Ireland). Poland, Chile and Australia have prices higher than USD 150 for the same data roaming usage.

Figure 11: 20 MB in one session – average price by country of origin of the traveller – USD PPP

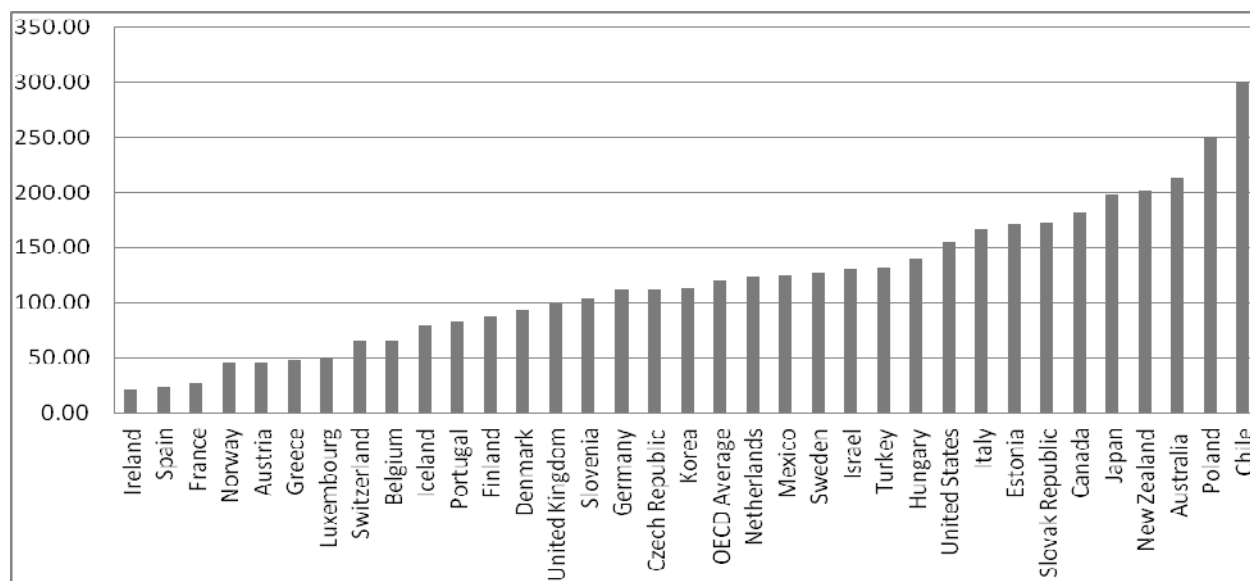
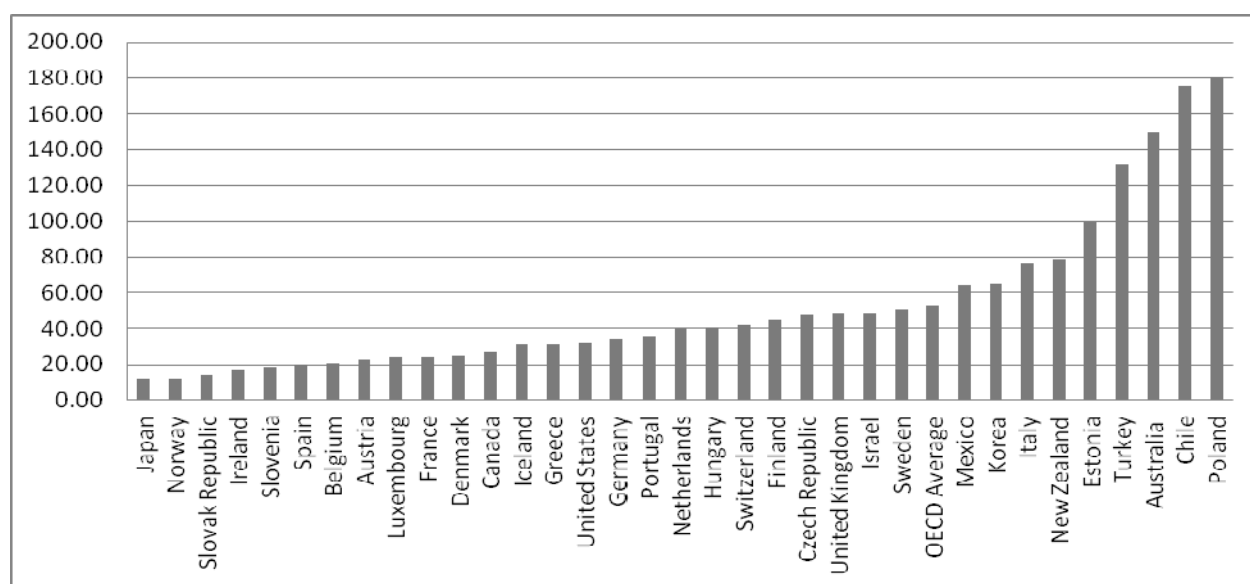
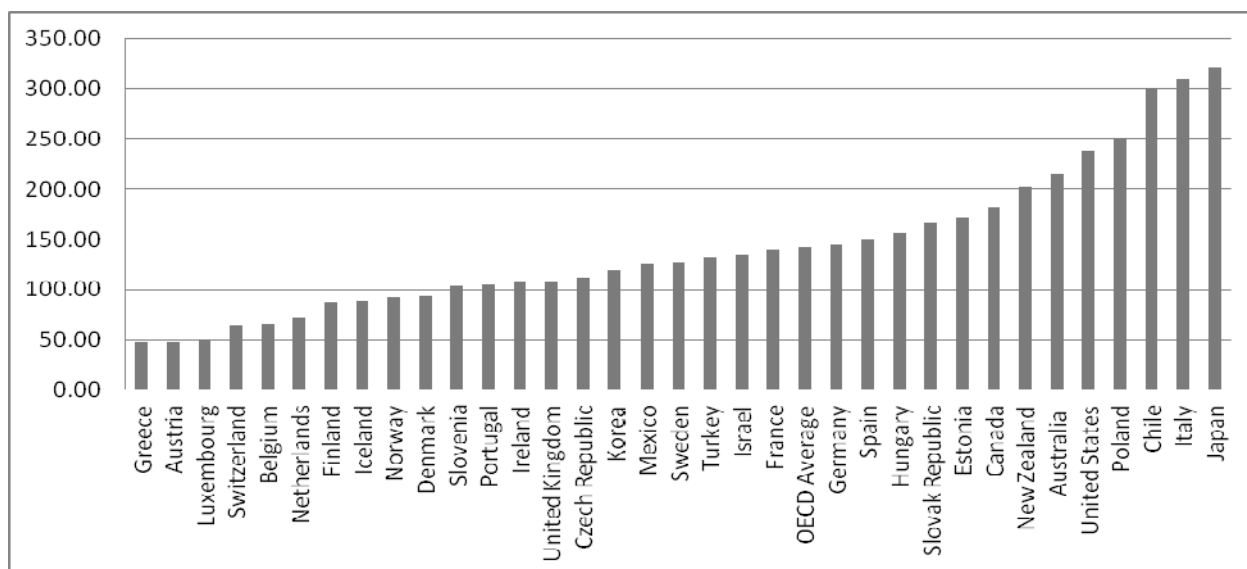
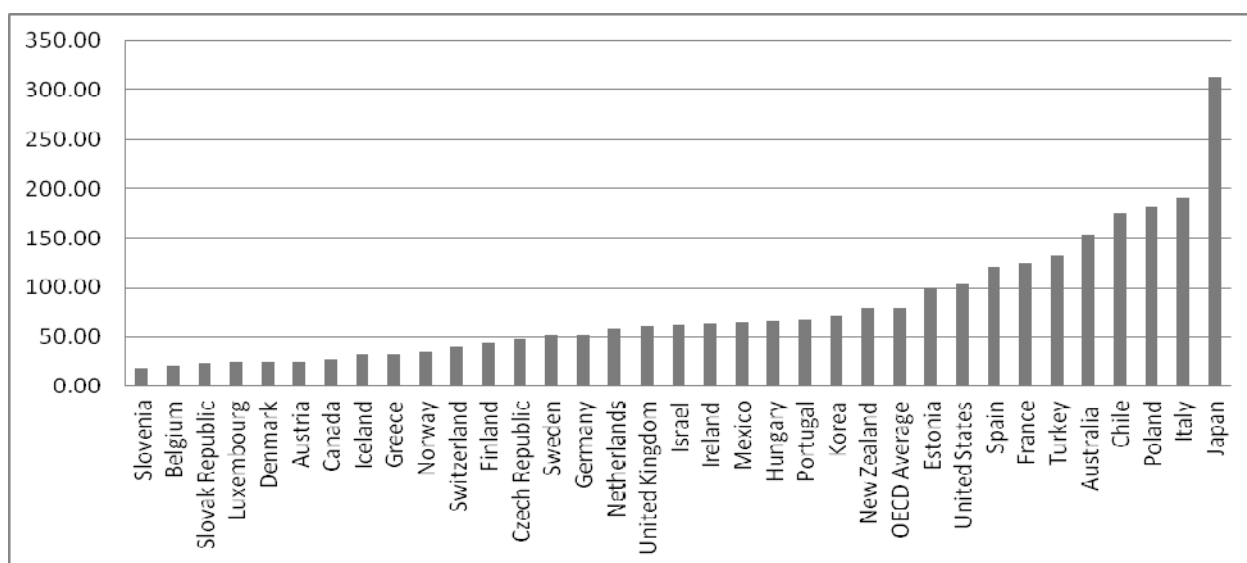


Figure 12: 20 MB in one session – price of the least expensive destination by country of origin of the traveller – USD PPP



It is striking that Japan, which generally ranks as one of the most expensive origin countries for data roaming services, has the cheapest available price for this 20MB, single session usage across the OECD area. Provided that an NTT Docomo subscriber has a domestic data plan, the “Global Pake-hodai Special” rate is available for selected networks in the United States, Korea, Australia and some European countries, which allows for unlimited data roaming use within a single day, for a daily charge of JPY1 480 (USD 11.61 PPP). By way of contrast, no other data plan is available, which penalises a non-intensive, but regular use of data roaming services. A similar conclusion may be drawn for Ireland, France or Spain. As a further example, O2 in Ireland offers up to 50MB daily traffic for USD 28 in certain countries.

*Laptop use***Figure 13. 20 MB in 20 sessions over a month - average price by country of origin of the traveller - laptop use only - USD PPP****Figure 14. 20 MB in 20 sessions over a month - price of the least expensive destination by country of origin of the traveller - laptop use only - USD PPP**

Figures 13 and Figure 14 show prices for the same consumption pattern as Figures 9 and 10, but include laptop use only. Prices are not cheaper than for handset use, but sometimes they are higher. That is due to two reasons: first, only a minority of operators advertised special plans for laptop use. Second, when they do, they normally target users with higher consumption patterns. That means that only customers using higher amounts of data may benefit from significant discounts. For example, SFR in France offers significant discounts in daily and weekly plans for laptop use, but data volumes are as high as 50, 75 or 150 MB, which means no significant discount if the data amount is only 20 MB. The average OECD price for this graph is USD 142.12, if the average price by origin is considered, USD 78.89 if it is the least expensive destination by country. That is higher than equivalent use with a laptop. Not only are there no

discounts for laptop use following this pattern, but handset deals are slightly less expensive in this case. However, laptop-only plans are likely to be less expensive than their handset counterparts if higher data amounts are considered, at least for some countries.

158.87

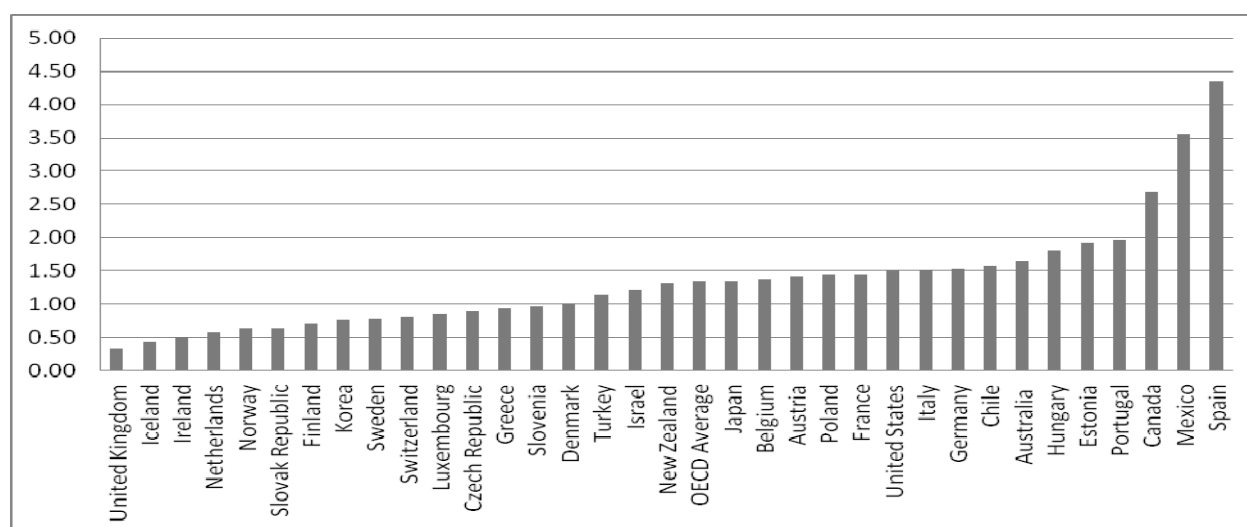
Multimedia Messaging Service (MMS)

Operators typically market Multimedia Messaging Services as a differentiated service from general data roaming services, although data roaming transmission is inherent to this service. Mobile service providers usually break down countries into zones following a different arrangement from traditional data roaming services. In fact, blended pricing for sending SMS is more widespread than for data roaming services. As such, 30 out of 68 operators have a blended price for sending MMS, no matter where the roamer is sending it from. Many other operators (nineteen) only apply standard data roaming charges to MMS, thus charging a different price depending on the size of the MMS. It is also very common to charge different prices according to different size intervals. For example, TIM in Italy charges different prices for MMS up to 100kB, and over 100kB. Moreover, some operators pay attention to the type of MMS (either text, picture or video), and charge different prices accordingly (*e.g.* Telstra in Australia).

Regarding the reception of MMS, operators that charge data roaming charges for sending MMS, also charge the same roaming charges for receiving them. Sending MMS typically has a premium cost over the standard data roaming price of the traffic exchanged. As an example, Telenor in Denmark charges the standard data roaming price both for received and sent MMS, with an additional USD 0.40 (DKK 2.50) on top, per MMS sent. For benchmarking purposes, a standard 100kB picture MMS has been chosen and benchmarked across countries, both for sending and receiving. Seventeen operators do not charge for receiving MMS.

The average price for sending a 100 kB picture back home when roaming abroad is USD 1.34, though some countries charge fees as high as nearly USD 3.5 (Mexico) or USD 4.5 (Spain). Charges for receiving MMS, according to the previous paragraphs, are significantly lower, as many operators do not charge or charge significantly less for receiving MMS. The average price for the reception of a similar MMS is USD 0.67, which is half the price for sending it.

Figure 15. 100 kB picture MMS sent – average price by country of origin of the traveller – USD PPP



Spain is the most expensive country for sending MMS while roaming, charging over USD 4 per message. Prices in Spain and Mexico also remain high for receiving MMS (the average of the two Spanish operators is higher than USD 3 per MMS received). Telcel charges USD 3 on average for receiving an MMS. Spain's Movistar charges USD 6.5 for sending and USD 4 for receiving an MMS up to 300 kB. On the other hand, in seven OECD countries none of the two largest operators charge for receiving MMS, while in two countries, Iceland and the United Kingdom, the price charged for sending an MMS while roaming is below USD 0.50.

Figure 16. 100 kB picture MMS received – average price by country of origin of the traveller – USD PPP

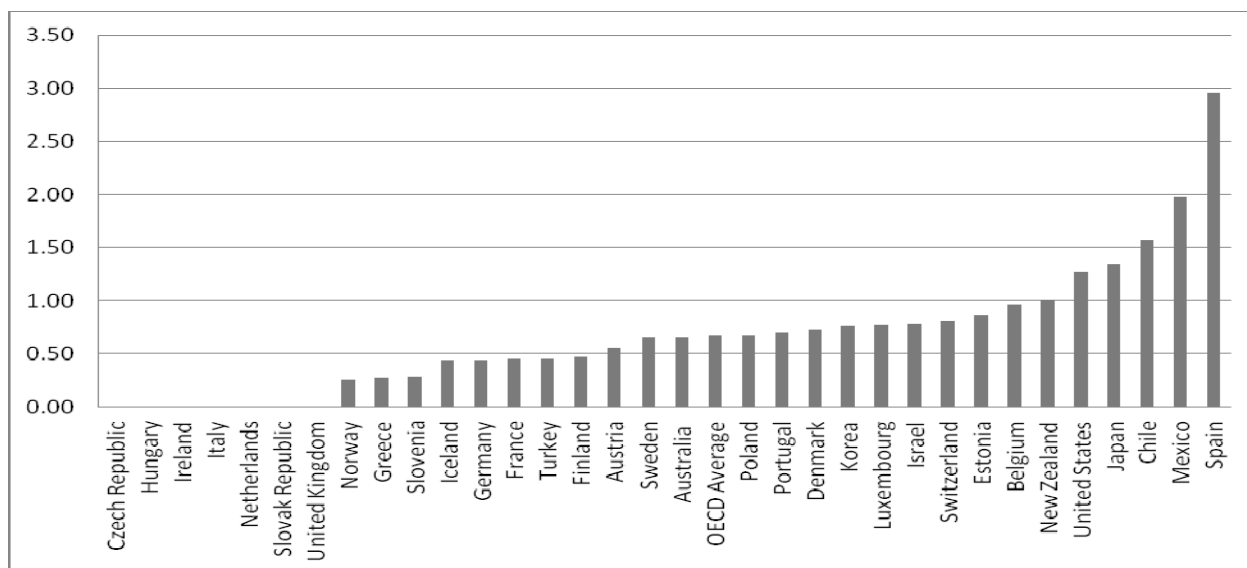


Table 1. 1 MB in one session - average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	16.60	11.62	16.60	11.62
Austria	9.51	8.49	5.88	5.25
Belgium	10.01	8.48	6.73	5.70
Canada	29.27	24.61	11.93	10.02
Chile	12.47	16.41	11.50	15.13
Czech Republic	5.50	6.70	2.88	3.52
Denmark	8.87	5.54	4.49	2.81
Estonia	7.92	8.61	4.59	4.99
Finland	6.37	4.68	3.54	2.60
France	6.08	5.24	4.25	3.66
Germany	9.48	8.54	3.78	3.41
Greece	4.37	4.17	2.99	2.85
Hungary	5.99	8.09	2.75	3.72
Iceland	5.26	4.42	1.87	1.57
Ireland	8.29	6.23	7.21	5.42
Israel	18.63	15.15	9.74	7.92
Italy	12.08	10.50	5.88	5.11
Japan	20.30	13.44	19.42	12.86
Korea	7.80	9.75	7.80	9.75
Luxembourg	5.57	4.46	4.13	3.30
Mexico	13.10	19.85	5.76	8.72
Netherlands	7.51	6.64	2.91	2.57
New Zealand	12.07	10.06	4.72	3.93
Norway	7.70	4.75	4.54	2.80
Poland	9.27	12.70	6.60	9.04
Portugal	6.00	6.45	4.68	5.02
Slovak Republic	7.89	9.73	3.02	3.73
Slovenia	5.98	6.04	2.94	2.97
Spain	10.10	9.90	8.48	8.32
Sweden	8.38	6.35	3.36	2.55
Switzerland	11.90	6.92	7.99	4.65
Turkey	8.71	9.79	8.71	9.79
United Kingdom	6.27	6.02	3.50	3.37
United States	22.06	22.06	9.78	9.78
OECD average	10.22	9.48	6.32	5.84

Table 2. 1 MB in one session - average price by country of origin of the traveller - intra EU/EEA routes excluded

	Av.-USD	Av-USD PPP
Australia	16.60	11.62
Austria	16.67	14.88
Belgium	16.57	14.04
Canada	29.27	24.61
Chile	12.47	16.41
Czech Republic	10.72	13.08
Denmark	17.61	11.01
Estonia	15.68	17.04
Finland	12.04	8.85
France	9.75	8.40
Germany	20.86	18.80
Greece	7.15	6.81
Hungary	12.46	16.84
Iceland	14.82	12.45
Ireland	10.46	7.86
Israel	18.63	15.15
Italy	24.48	21.28
Japan	20.30	13.44
Korea	7.80	9.75
Luxembourg	8.47	6.77
Mexico	13.10	19.85
Netherlands	16.71	14.78
New Zealand	11.66	9.72
Norway	14.03	8.66
Poland	14.62	20.03
Portugal	8.66	9.31
Slovak Republic	16.92	20.88
Slovenia	12.39	12.50
Spain	13.32	13.07
Sweden	17.20	13.03
Switzerland	11.90	6.92
Turkey	8.71	9.79
United Kingdom	10.51	10.10
United States	22.06	22.06
OECD average	14.55	13.52

Table 3. 5 MB in 5 sessions over a week – average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	78.46	54.89	61.51	43.03
Austria	23.63	21.09	18.63	16.63
Belgium	28.70	24.31	20.38	17.26
Canada	71.46	60.06	16.26	13.67
Chile	57.10	75.14	52.26	68.76
Czech Republic	24.12	29.42	11.06	13.48
Denmark	40.43	25.27	14.36	8.97
Estonia	39.60	43.05	22.95	24.95
Finland	32.06	23.56	17.93	13.18
France	12.46	10.73	8.43	7.26
Germany	38.05	34.28	16.31	14.69
Greece	14.25	13.58	9.93	9.46
Hungary	29.95	40.47	13.76	18.59
Iceland	26.30	22.10	9.33	7.84
Ireland	41.46	31.16	36.05	27.09
Israel	33.66	27.37	18.06	14.68
Italy	39.12	34.00	19.61	17.05
Japan	98.79	65.42	87.69	58.07
Korea	28.55	35.69	18.92	23.65
Luxembourg	15.00	12.00	7.03	5.62
Mexico	39.60	60.01	23.68	35.87
Netherlands	37.54	33.20	14.54	12.86
New Zealand	60.36	50.32	23.58	19.66
Norway	37.50	23.15	14.44	8.91
Poland	45.74	62.67	32.98	45.19
Portugal	30.02	32.26	23.38	25.12
Slovak Republic	35.79	44.16	10.10	12.46
Slovenia	27.07	27.32	7.19	7.26
Spain	50.48	49.51	42.42	41.60
Sweden	41.92	31.76	16.81	12.74
Switzerland	33.62	19.54	24.50	14.24
Turkey	43.57	48.95	43.57	48.95
United Kingdom	27.85	26.76	15.58	14.97
United States	69.91	69.91	20.12	20.12
OECD average	39.83	37.15	23.33	21.88

Table 4. 5 MB in one session, average price by country of origin of the traveller, price of the least expensive destination by country of origin of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	77.52	54.24	60.57	42.38
Austria	21.41	19.11	16.01	14.29
Belgium	29.73	25.19	21.32	18.06
Canada	71.46	60.06	16.26	13.67
Chile	57.10	75.14	52.26	68.76
Czech Republic	24.12	29.42	11.06	13.48
Denmark	40.43	25.27	14.36	8.97
Estonia	39.60	43.05	22.95	24.95
Finland	32.06	23.56	17.93	13.18
France	7.33	6.31	6.54	5.63
Germany	28.68	25.85	6.50	5.86
Greece	14.33	13.65	10.03	9.55
Hungary	29.95	40.47	13.76	18.59
Iceland	26.30	22.10	9.33	7.84
Ireland	28.40	21.34	22.43	16.86
Israel	33.66	27.37	18.06	14.68
Italy	17.33	15.07	6.54	5.68
Japan	78.59	52.05	17.54	11.61
Korea	28.55	35.69	18.92	23.65
Luxembourg	15.00	12.00	7.03	5.62
Mexico	39.60	60.01	23.68	35.87
Netherlands	36.21	32.02	12.91	11.42
New Zealand	60.36	50.32	23.58	19.66
Norway	32.83	20.26	7.43	4.58
Poland	45.74	62.67	32.98	45.19
Portugal	20.38	21.89	9.90	10.64
Slovak Republic	35.79	44.16	10.10	12.46
Slovenia	24.98	25.21	3.27	3.30
Spain	10.10	9.90	8.48	8.32
Sweden	24.70	18.71	16.81	12.74
Switzerland	33.62	19.54	24.50	14.24
Turkey	43.57	48.95	43.57	48.95
United Kingdom	26.22	25.20	13.24	12.72
United States	69.91	69.91	20.12	20.12
OECD average	35.46	33.40	18.23	17.75

Table 5. 20 MB in 20 sessions over a month, average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	308.08	215.53	218.90	153.14
Austria	54.08	48.27	28.43	25.38
Belgium	77.43	65.60	24.52	20.77
Canada	216.52	181.99	32.53	27.34
Chile	228.76	301.00	133.00	175.00
Czech Republic	91.89	112.06	39.63	48.33
Denmark	149.28	93.31	39.01	24.39
Estonia	158.42	172.20	91.80	99.78
Finland	119.45	87.78	61.02	44.84
France	50.74	43.71	45.75	39.41
Germany	145.61	131.20	58.14	52.39
Greece	50.25	47.87	32.95	31.39
Hungary	115.36	155.89	48.61	65.69
Iceland	105.19	88.40	37.32	31.36
Ireland	142.11	106.79	84.87	63.78
Israel	165.11	134.26	77.31	62.87
Italy	156.47	136.02	78.43	68.18
Japan	395.16	261.69	350.77	232.30
Korea	95.44	119.29	56.75	70.94
Luxembourg	62.30	49.86	29.87	23.90
Mexico	82.49	124.99	42.50	64.40
Netherlands	150.17	132.81	58.17	51.45
New Zealand	241.46	201.29	94.34	78.64
Norway	150.02	92.60	57.76	35.65
Poland	182.98	250.69	131.93	180.75
Portugal	101.08	108.60	66.50	71.45
Slovak Republic	139.92	172.64	11.75	14.50
Slovenia	102.85	103.80	17.97	18.14
Spain	171.08	167.79	138.82	136.15
Sweden	167.66	127.02	67.24	50.94
Switzerland	112.11	65.16	72.85	42.34
Turkey	117.29	131.78	117.29	131.78
United Kingdom	111.39	107.06	62.31	59.88
United States	155.71	155.71	31.61	31.61
OECD average	143.35	132.20	74.73	68.50

Table 6. 20 MB in one session, average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	303.63	212.42	214.45	150.03
Austria	51.86	46.29	25.82	23.05
Belgium	77.43	65.60	24.52	20.77
Canada	216.52	181.99	32.53	27.34
Chile	228.76	301.00	133.00	175.00
Czech Republic	91.89	112.06	39.63	48.33
Denmark	149.28	93.31	39.01	24.39
Estonia	158.42	172.20	91.80	99.78
Finland	119.45	87.78	61.02	44.84
France	31.57	27.20	28.10	24.21
Germany	123.76	111.52	38.53	34.72
Greece	50.33	47.95	33.05	31.48
Hungary	103.32	139.61	30.55	41.28
Iceland	95.49	80.25	37.32	31.36
Ireland	28.40	21.34	22.43	16.86
Israel	160.37	130.40	59.93	48.73
Italy	191.82	166.75	88.24	76.70
Japan	299.23	198.16	17.54	11.61
Korea	90.56	113.20	52.02	65.03
Luxembourg	62.30	49.86	29.87	23.90
Mexico	82.49	124.99	42.50	64.40
Netherlands	139.47	123.35	45.10	39.88
New Zealand	241.46	201.29	94.34	78.64
Norway	73.99	45.67	19.80	12.22
Poland	182.98	250.69	131.93	180.75
Portugal	76.83	82.55	33.17	35.64
Slovak Republic	139.92	172.64	11.75	14.50
Slovenia	102.85	103.80	17.97	18.14
Spain	24.05	23.59	20.82	20.42
Sweden	167.66	127.02	67.24	50.94
Switzerland	112.11	65.16	72.85	42.34
Turkey	117.29	131.78	117.29	131.78
United Kingdom	103.25	99.23	50.62	48.65
United States	155.71	155.71	31.61	31.61
OECD average	128.07	119.60	54.60	52.63

Table 7. 20 MB in 20 sessions over a month - laptop use only, average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	308.08	215.53	218.90	153.14
Austria	54.08	48.27	28.43	25.38
Belgium	77.43	65.60	24.52	20.77
Canada	216.52	181.99	32.53	27.34
Chile	228.76	301.00	133.00	175.00
Czech Republic	91.89	112.06	39.63	48.33
Denmark	149.28	93.31	39.01	24.39
Estonia	158.42	172.20	91.80	99.78
Finland	119.45	87.78	61.02	44.84
France	161.62	139.23	143.79	123.87
Germany	161.27	145.31	57.39	51.71
Greece	50.25	47.87	32.95	31.39
Hungary	115.36	155.89	48.61	65.69
Iceland	105.19	88.40	37.32	31.36
Ireland	142.11	106.79	84.87	63.78
Israel	165.11	134.26	77.31	62.87
Italy	357.14	310.47	219.61	190.91
Japan	486.47	322.17	474.02	313.92
Korea	95.44	119.29	56.75	70.94
Luxembourg	62.30	49.86	29.87	23.90
Mexico	82.49	124.99	42.50	64.40
Netherlands	81.67	72.23	66.11	58.47
New Zealand	241.46	201.29	94.34	78.64
Norway	150.02	92.60	57.76	35.65
Poland	182.98	250.69	131.93	180.75
Portugal	97.69	104.96	62.58	67.24
Slovak Republic	135.04	166.62	18.29	22.57
Slovenia	102.85	103.80	17.97	18.14
Spain	152.89	149.95	123.40	121.03
Sweden	167.66	127.02	67.24	50.94
Switzerland	109.21	63.47	68.86	40.02
Turkey	117.29	131.78	117.29	131.78
United Kingdom	111.39	107.06	62.31	59.88
United States	238.22	238.22	103.50	103.50
OECD average	155.21	142.12	87.22	78.89

Table 8. MMS sent, average price by country of origin the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	2.36	1.65	2.36	1.65
Austria	1.60	1.43	1.56	1.39
Belgium	1.63	1.38	1.63	1.38
Canada	3.19	2.68	1.19	1.00
Chile	1.19	1.57	1.00	1.32
Czech Republic	0.73	0.89	0.57	0.69
Denmark	1.61	1.01	1.33	0.83
Estonia	1.77	1.93	1.01	1.10
Finland	0.97	0.71	0.69	0.51
France	1.67	1.44	1.67	1.44
Germany	1.70	1.53	1.49	1.34
Greece	0.98	0.93	0.81	0.77
Hungary	1.34	1.80	1.23	1.67
Iceland	0.53	0.44	0.19	0.16
Ireland	0.68	0.51	0.68	0.51
Israel	1.49	1.21	1.14	0.92
Italy	1.75	1.52	1.44	1.25
Japan	2.03	1.34	1.94	1.29
Korea	0.62	0.77	0.62	0.77
Luxembourg	1.05	0.84	0.75	0.60
Mexico	2.35	3.56	1.62	2.45
Netherlands	0.65	0.57	0.65	0.57
New Zealand	1.57	1.31	0.83	0.70
Norway	1.03	0.63	1.03	0.63
Poland	1.05	1.44	1.02	1.40
Portugal	1.83	1.96	1.70	1.83
Slovak Republic	0.52	0.64	0.52	0.64
Slovenia	0.95	0.96	0.65	0.66
Spain	4.44	4.36	4.24	4.16
Sweden	1.05	0.79	0.60	0.46
Switzerland	1.40	0.81	1.40	0.81
Turkey	1.01	1.14	1.01	1.14
United Kingdom	0.35	0.34	0.35	0.34
United States	1.50	1.50	0.86	0.86
OECD average	1.43	1.34	1.17	1.10

Table 9. MMS received, average price by country of origin of the traveller, price of the least expensive destination of the traveller

	Av.-USD	Av-USD PPP	Least exp. - USD	Least exp - USD PPP
Australia	0.94	0.65	0.94	0.65
Austria	0.62	0.55	0.58	0.52
Belgium	1.14	0.97	1.14	0.97
Canada				
Chile	1.19	1.57	1.00	1.32
Czech Republic	0.00	0.00	0.00	0.00
Denmark	1.16	0.73	0.89	0.55
Estonia	0.79	0.86	0.46	0.50
Finland	0.64	0.47	0.35	0.26
France	0.52	0.45	0.52	0.45
Germany	0.49	0.44	0.25	0.23
Greece	0.29	0.27	0.24	0.22
Hungary	0.00	0.00	0.00	0.00
Iceland	0.53	0.44	0.19	0.16
Ireland	0.00	0.00	0.00	0.00
Israel	0.96	0.78	0.60	0.49
Italy	0.00	0.00	0.00	0.00
Japan	2.03	1.34	1.94	1.29
Korea	0.61	0.76	0.40	0.50
Luxembourg	0.96	0.77	0.21	0.17
Mexico	1.30	1.97	0.45	0.68
Netherlands	0.00	0.00	0.00	0.00
New Zealand	1.21	1.01	0.47	0.39
Norway	0.41	0.25	0.41	0.25
Poland	0.49	0.68	0.49	0.68
Portugal	0.65	0.70	0.65	0.70
Slovak Republic	0.00	0.00	0.00	0.00
Slovenia	0.29	0.29	0.00	0.00
Spain	3.01	2.96	2.70	2.65
Sweden	0.86	0.65	0.42	0.32
Switzerland	1.40	0.81	1.40	0.81
Turkey	0.40	0.45	0.40	0.45
United Kingdom	0.00	0.00	0.00	0.00
United States	1.27	1.27	0.29	0.29
OECD average	0.73	0.67	0.53	0.47

Table 10. Exchange rate and PPP rate utilised for calculations

	Exchange rate USD (September 2010)	PPP rate (September 2010)
Australia	1.069	1.528
Austria	0.765	0.857
Belgium	0.765	0.903
Canada	1.033	1.229
Chile	493.93	375.39
Czech Republic	18.901	15.499
Denmark	5.703	9.124
Estonia	11.983	11.024
Finland	0.765	1.041
France	0.765	0.888
Germany	0.765	0.849
Greece	0.765	0.803
Hungary	216.22	160.003
Iceland	116.791	138.981
Ireland	0.765	1.018
Israel	3.738	4.597
Italy	0.765	0.880
Japan	84.385	127.422
Korea	1,163	930.352
Luxembourg	0.765	0.956
Mexico	12.861	8.488
Netherlands	0.765	0.865
New Zealand	1.378	1.653
Norway	6.06	9.817
Poland	3.032	2.213
Portugal	0.765	0.712
Slovak Republic	0.765	0.620
Slovenia	0.765	0.758
Spain	0.765	0.780
Sweden	7.064	9.324
Switzerland	1.002	1.724
Turkey	1.492	1.328
United Kingdom	0.642	0.668
United States	1	1

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>.
- OECD (2009a), “*International Mobile Roaming Services: Analysis and Policy Recommendations*”, DSTI/ICCP/CISP(2009)12/FINAL, Directorate for Science, Technology and Industry, OECD, Paris, [http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=dsti/iccp/cisp\(2009\)12/final&doclanguage=en](http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=dsti/iccp/cisp(2009)12/final&doclanguage=en)
- ² <http://www.nbr.co.nz/article/telecom-faced-with-med-investigation-unveils-1mb-aussie-roaming-deal-132939>, <http://www.guardian.co.uk/money/2010/feb/21/broadband-dongle-roaming-bill-shock>
- ³ BEREC Benchmark Data Report for January-June 2010, http://www.erg.eu.int/doc/berec/bor_10_50.pdf
- ⁴ “Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community”
- <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:171:0032:0040:EN:PDF> .
- “Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 amending Regulation (EC) No 717/2007 on roaming on public mobile telephone networks within the Community and Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services”
- <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:167:0012:0023:EN:PDF>
- ⁵ “ Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to ex-ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services”,
- http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_344/l_34420071228en00650069.pdf
- ⁶ BEREC Benchmark Data Report for January-June 2010, http://www.erg.eu.int/doc/berec/bor_10_50.pdf
- ⁷ COM(2010)356 FINAL, “Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, on the interim report on the state of development of roaming services within the European Union”, http://ec.europa.eu/information_society/activities/roaming/docs/interim_report2010.pdf
- ⁸ According to available evidence provided by some governments:
- More than 80% of international outbound travel of European citizens is to European destinations.
 - The top three destinations for Japanese visitors were China (3.3 million), South Korea (3 million) and the

United States (2.9 million).

- Australia's top outbound destinations in 2009 were New Zealand (1 033 300 departures), the United States (567 000 departures) and Indonesia (548 000 departures)
- The top three destinations for U.S. residents travelling abroad in 2009 (outbound) were Mexico (19.452 million), Canada (11.667 million) and the United Kingdom (2.727 million).
http://www.tinet.ita.doc.gov/outreachpages/download_data_table/2009_US_Travel_Abroad.pdf

⁹ The EU Roaming Regulation has been enforced in the EEA countries (Liechtenstein, Norway and Iceland) as of Q2 2010. As this data collection took place in September 2010, intra-EEA and EEA-EU routes have been excluded from these graphs.