

# Cost of Mobile Communications Study

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The impact of applying a comprehensive and representative benchmarking method on the ranking of the EU-28 countries

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## Executive summary

The aim of this Ovum research is to evaluate the prices of mobile services in Greece, in comparison with the European average, as well as the recent price comparison reports of the European Commission (EC).

This report will show that, generally speaking, the Greek mobile market is misrepresented in the benchmarking methodology of the EC studies for the following three main reasons:

- no consideration was given to out of bundle usage, add-on offers and special discounts in the Greek mobile market
- no consideration was given to different usage patterns in different countries
- not all customers were represented by the benchmarked baskets; the bundles of voice, SMS and data services that are sold by operators

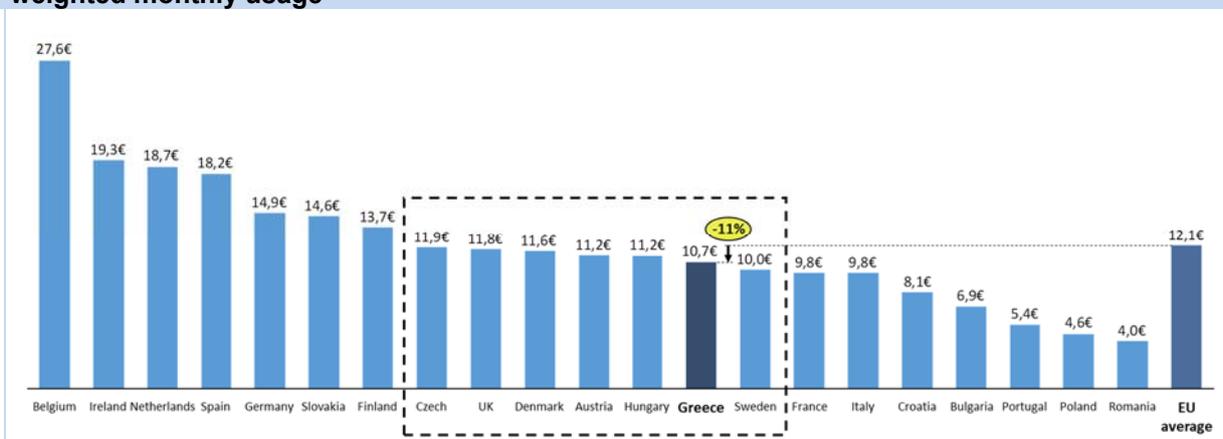
This Ovum study applies a new and more representative approach for mobile telecommunications services benchmarking in the EU-28 region.

The high-level findings of Ovum’s study based on the new approach, primarily focusing on the Greek mobile market, are outlined in this Executive Summary. A detailed examination of the methodology, sources, calculation and assumptions upon which this study is based can be found in the body of this report.

Taking Greece as the country of focus, the consumption of mobile telecommunication services by Greek consumers becomes the driver of pricing calculation. The mobile telecommunication services monthly consumption profile of an average Greek user is calculated as the total volume of services consumed over Greek networks divided by the number of active users.

The mobile telecommunication services monthly consumption profile of an average Greek user has then been applied to the pricing of each of the markets under study. The results are portrayed in Figure 1 below.

**Figure 1: Greece’s relative position in mobile pricing (tax-excluded) based on Greek weighted monthly usage**

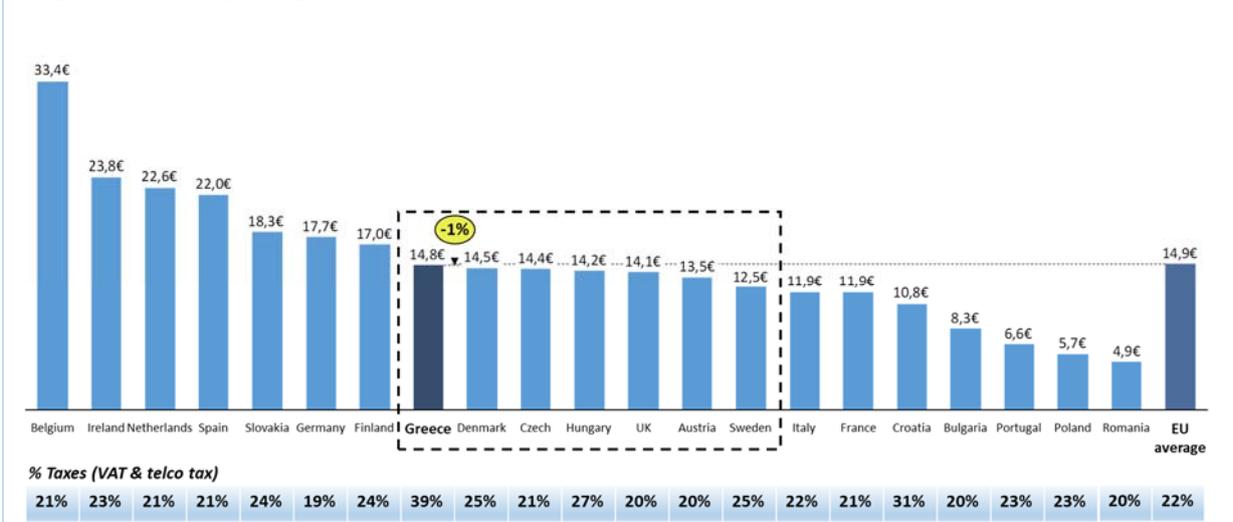


Source: European Regulatory Telecommunication Authorities / Ovum

In the case of before-tax prices, the Greek mobile market is clearly on the lower side of the middle-band of the European market, as indicated by the dotted box in Figure 1. Greece scores 11% less than the European average.

A similar calculation, but for the after-tax scenario, is indicated in Figure 2 below. Note that Greece has by far the highest VAT+ telecommunications tax in the whole of the EU.

**Figure 2: Greece’s relative position in mobile pricing (tax-included) based on Greek weighted monthly usage**



Source: European Regulatory Telecommunication Authorities / Ovum

In the case of after-tax prices, the Greek mobile market is on the high side of the middle band of the European market, as indicated by the dotted box in Figure 2, but still scores 1% less than the European average.

Figure 3 presents Greece’s position concerning voice, SMS and data services.

**Figure 3: Greece’s position among European peers regarding after tax unit price-per-service (voice-sms-data)**

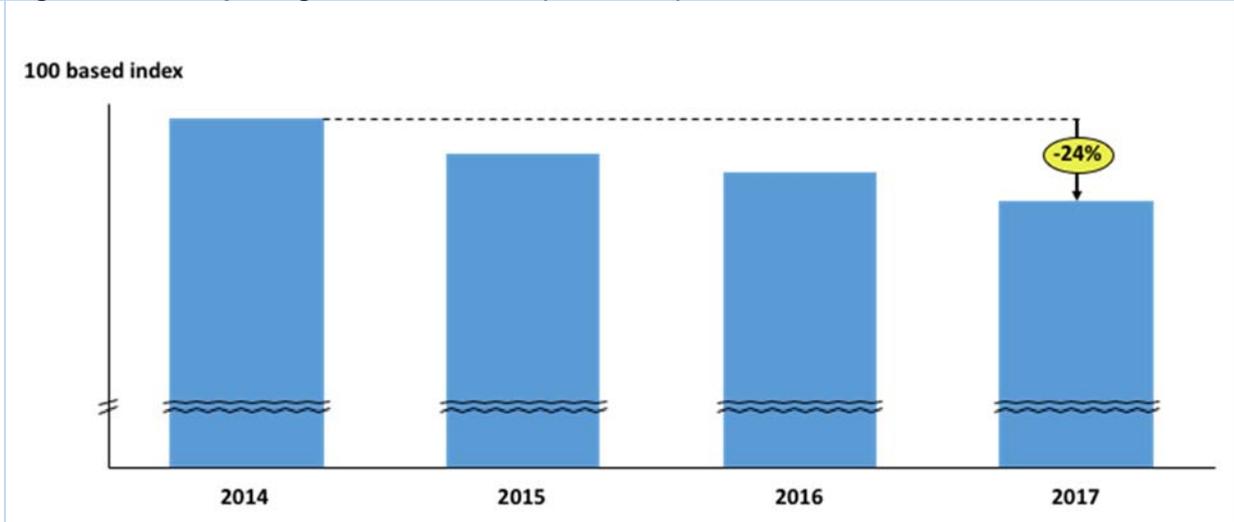


Source: Ovum

In all three services, Greece still ranks within the middle cluster of its European peers.

The following graph outlines the average price of all mobile telecommunications service in Greece between the years 2014 and 2017.

**Figure 4: Mobile pricing trends in Greece (2014-2017)**

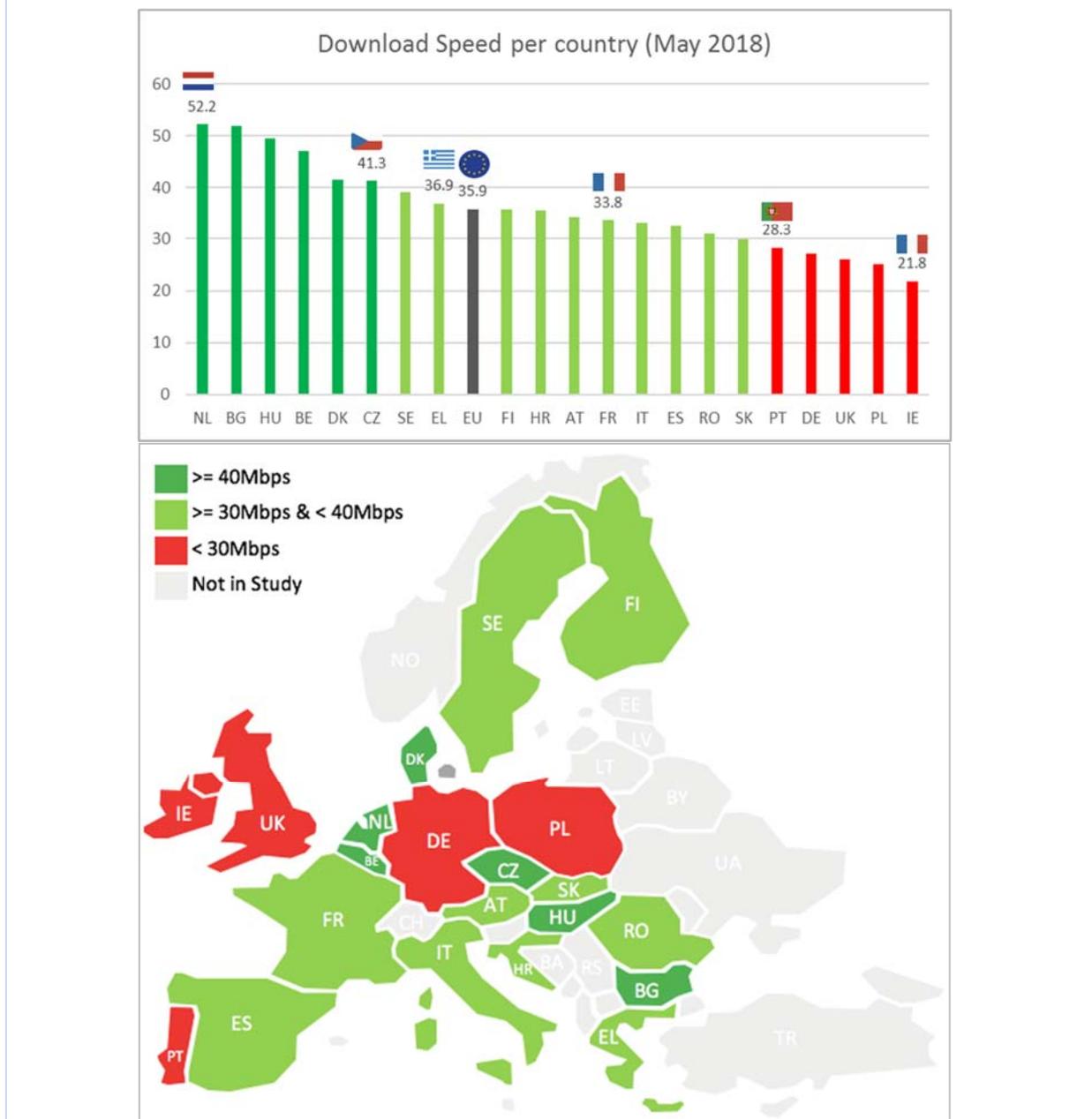


Source: Ovum

Greece's mobile pricing is consistently declining over time (down by 24% in the period 2014-2017).

The numbers in Figure 5 below are based on live tests of mobile broadband users in all European markets. The results of all tests coming from each market are averaged across the span of a month.

**Figure 5: Network quality benchmarking – download speeds across Europe**

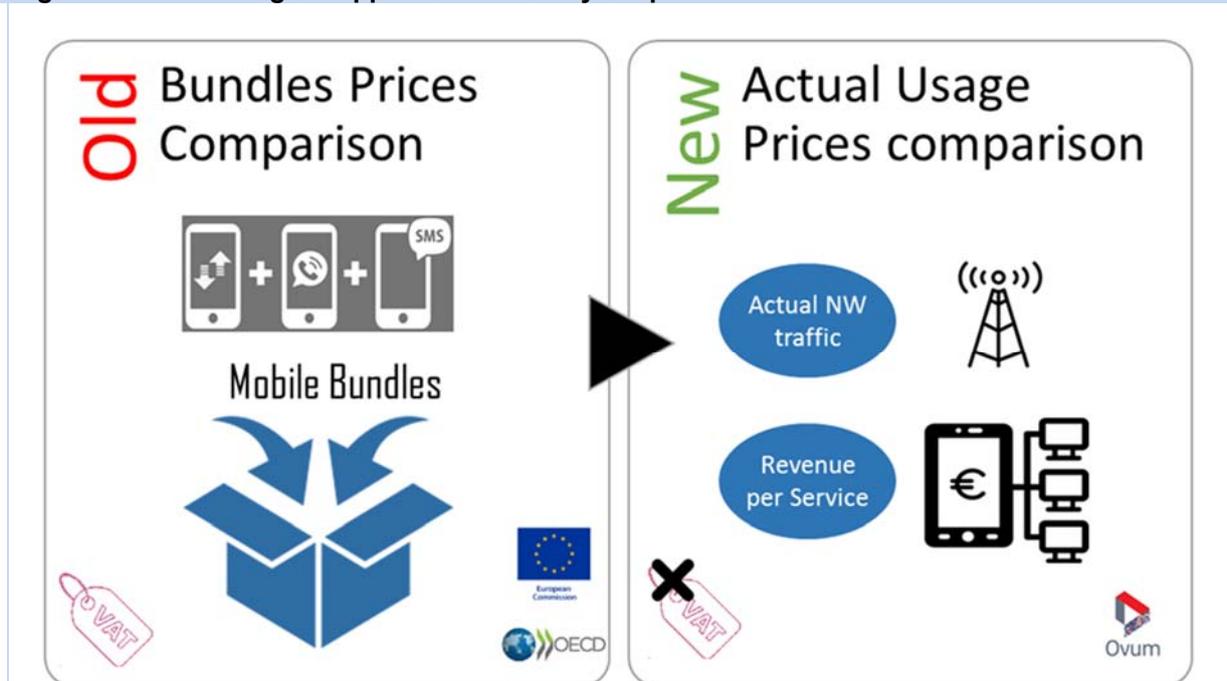


Source: Ookla (speedtest.net index) & Ovum

The actual download speeds of mobile broadband services in Greece are above most of the European peers on the back of enhanced network investments. Greece also scores above the European average in mobile network infrastructure despite the long financial crisis.

Finally, Figure 6 below depicts the difference between the methodologies used by the EC / OECD and Ovum, whereby the EC / OECD methodologies are based on what is offered by operators and the Ovum methodology is based on what is actually consumed by the customers in the European markets. Ovum believes that this is a more realistic approach which enables more precise conclusions.

**Figure 6: Methodological approach and Study scope**



Source: Ovum

The new approach followed by Ovum in this study is a comprehensive approach as it includes the full range of offers and tariff plans (postpaid and prepaid) offered by all mobile operators. Furthermore, the approach is based on actual usage and actual spending as it is more appropriate to assess the market from the demand viewpoint (i.e. the consumers) than the supply perspective (i.e. the operators).

The data used in this study has been sourced from Ovum, ITU and the national telecom regulators.

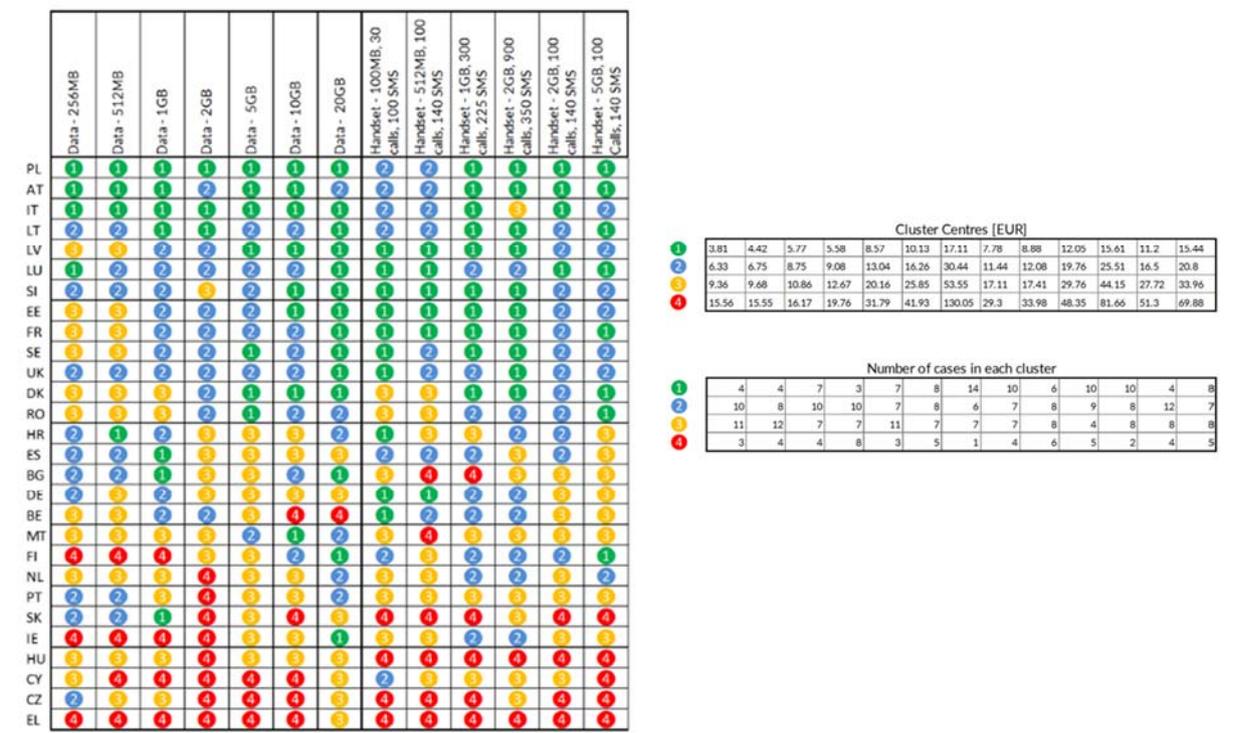
When a holistic view based on actual usage patterns drives the price benchmarking exercise of mobile telecommunication services in the EU, Greece fares as competitive and not expensive.

# Introduction

The mobile telecom market in Greece is perceived to be one of the most expensive in Europe. With challenging economic conditions and austerity measures in recent years, mobile telephony operators in Greece have experienced significant challenges and seen gross profits tumble.

The European Commission’s “Mobile Broadband Prices in Europe 2017” report, and its Digital Economy and Society Index (DESI) 2018, has placed Greece as the most expensive mobile telephony market according to the report “Mobile Broadband Prices in Europe 2017”. See Figure 7 below.

**Figure 7: Telecom Prices Comparison for EU Countries**



Source: European Commission, “Mobile Broadband Prices in EU 2017”

However, all the comparisons carried out in these studies were based on the comparison of bundles which contain pre-defined baskets of voice minutes, SMS and data in MB. Such comparisons do not take into consideration the add-on offers (minutes, SMS and data) that the Greek mobile operators provide over and above the provided bundles nor the special discounts offered. As such, the EC study and the DESI index are not representative of the total traffic going through the networks in Greece or any given country. Also, in some cases, the price comparisons include VAT+ telecom taxes which distort significantly the final conclusions, given that the VAT+ telecom tax in Greece is by far the highest in Europe (39% relative to an average of around 24% for the rest of Europe).

The basket methodology with listed pricing which is used by the European Commission is intrinsically subjective because it requires numerous judgements which can lead to distorted results. By comparison, the actual unit price methodology used in this study is more transparent and

representative as it is underpinned by dividing relevant retail revenues for each service with the associated volumes.

For Greece specifically, usage patterns selected for the Greek baskets are clearly not representative due to the substantial presence of freebies and add-one to the basic bundles. But most importantly, the pricing levels reported are misaligned with the real pricing levels that apply in Greece, which results in a distorted view. In fact, extremely affordable and popular prepaid offers are excluded from Greece's benchmark (unlike other markets), producing misleading results that do not take into consideration the relatively affordable prepaid offers that are adopted by a significant portion of the Greek market.

In this report, a detailed comparison of European mobile markets is provided based on the actual prices of minutes, SMS and data. This is achieved by carefully considering two main components: (Further details are provided in the Methodology section)

1. The actual revenue-per-country split into voice, SMS and data (Before tax)
2. The network recorded quantities of minutes, SMS and data-per-country

This methodology allows for a fair comparison of representative prices in the region by reflecting the real price that a consumer pays for mobile services, rather than comparing bundles which do not necessarily provide a fair comparison among different countries. This can be the case where operators provide extra free minutes and discounts based on pre-defined criteria.

Using this method to compare the 21 EU countries included in this study - which cover 98% of the EU-28 population - shows that Greece's mobile services prices are below the average European prices rather than among the most expensive ones. The robust methodology followed in this report covers all customers, based on the actual financial statements of the telecom providers, and compares actual usage for all subscribers. The Greek average basket at post-tax prices ranks 14<sup>th</sup> out of 21, however when removing the tax impact, the rank improves from 14<sup>th</sup> place to 9<sup>th</sup> which shows the huge impact of taxes on Greek users. It is therefore evident that comparisons on a pre-tax basis are more precise and therefore fairer.

### European Commission Findings Summary

"Averaging across all OECD usage baskets and distinguishing the four major clusters reveals the following:

- ❖ The inexpensive countries are: Poland, Austria, Italy, Lithuania, Latvia, Estonia, Slovenia, and Luxembourg, Sweden and France.
- ❖ The relatively inexpensive countries are: The United Kingdom, Denmark, Romania, Croatia, Spain, Bulgaria, and Germany
- ❖ The relatively expensive countries are: Belgium, Malta, Finland, the Netherlands, Portugal, Slovakia, and Ireland
- ❖ The most expensive countries are: Hungary, Cyprus, the Czech Republic and Greece"

## Methodology

Most of the comparison criteria followed in prior studies intended to compare prices of telecom services in European countries depended only on the price of bundles or predefined baskets. This does not allow a fair comparison of the actual price-per-minute, SMS or GB because it does not account for out-of-bundle usage. To achieve a more representative and accurate comparison, Ovum followed a structured approach taking into consideration actual revenue-per-service recorded in each country and the actual traffic passing through the network (quantity of minutes, SMS and data).

### Countries included in the study

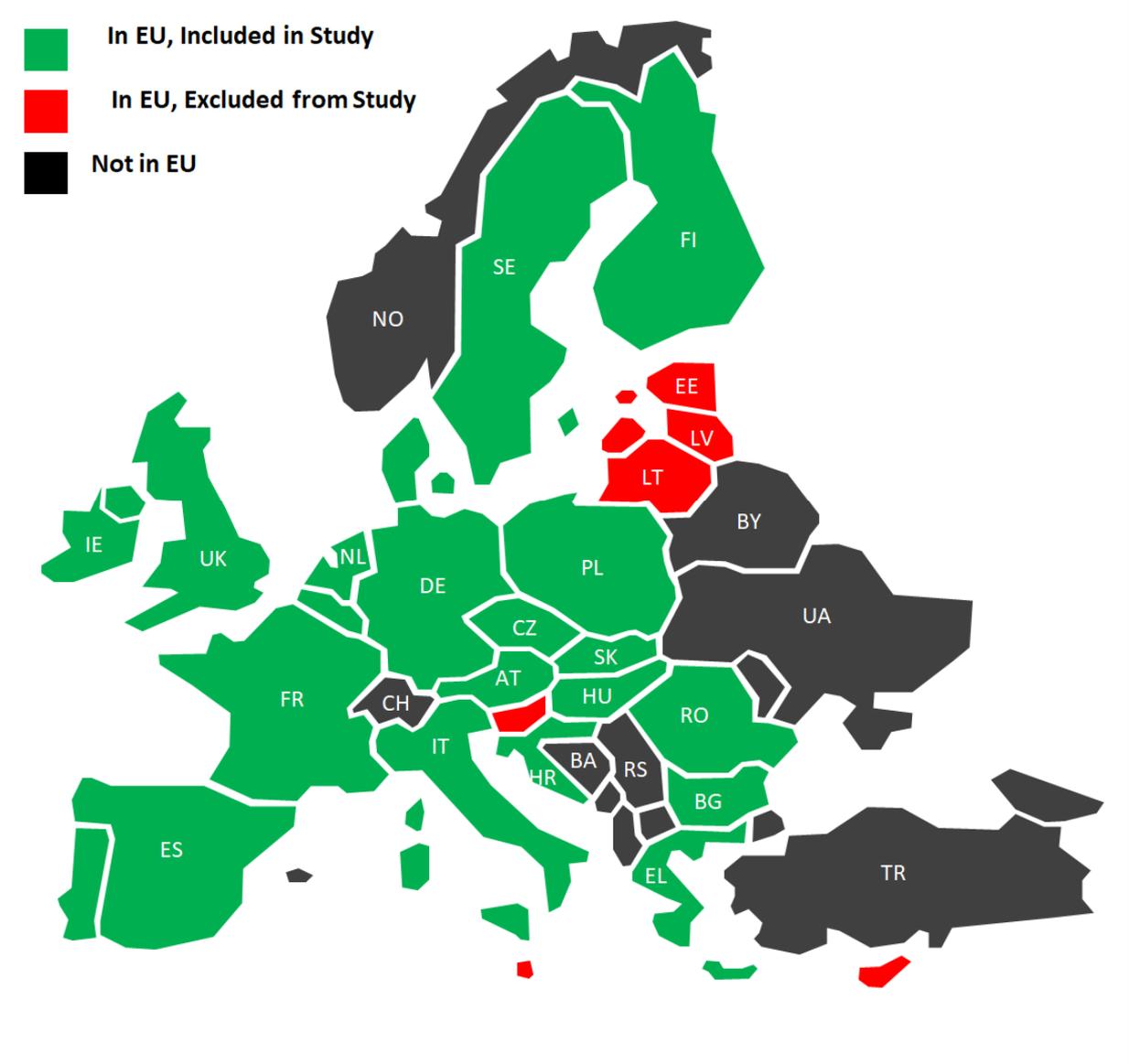
The comparison includes 21 countries out of the 28 EU countries. Countries which were not included in the report due to the absence of needed data were: Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta & Slovenia.

As such, countries that are included are: (highlighted in green in Figure 8 below)

1. Austria
2. Belgium
3. Bulgaria
4. Czech
5. Croatia
6. Denmark
7. Finland
8. France
9. Germany
10. Greece
11. Hungary
12. Ireland
13. Italy
14. Netherlands
15. Poland
16. Portugal
17. Romania
18. Slovakia
19. Spain
20. Sweden
21. United Kingdom

The period included in this report is **2014 to 2017** inclusive. Note that, for countries that do not have the Euro as their currency, Ovum has used the rate at the end of 2017 across the period of the study (2014-2017).

**Figure 8: EU countries covered in this study**



Source: Ovum

## European Commission Methodology<sup>1</sup>

The European Commission’s 2017 price comparison study followed the OECD methodology which is based on a defined set of mobile broadband pricing baskets with a distinct usage pattern of mobile broadband and telephony. The key reference for collecting, validating and presenting data on offer prices is a 2012 publication by the OECD, which details the construction of wireless broadband price baskets.

EC’s methodology is based on a price basket approach, such that each OECD basket relates to a distinct consumption pattern or type of user. Given a consumption or usage pattern, the prices of corresponding services from a provider can be used to calculate the resulting cost for that type of user. The baskets are reviewed and revised periodically, e.g. for telecommunication services in 2000, 2002, 2005 and 2009 / 2010.

The consumption patterns set for baskets are based on traffic and consumption data collected by the OECD from operators and regulators. In 2012, the OECD first published a report which sets a methodology, key to the approach taken in the EC’s study, for the price monitoring of wireless broadband across countries and across operators within a country. The approach defines a number of service price baskets for mobile broadband.

Such an approach which compares pre-defined bundles that do not take into consideration the actual price-per-service (minute, SMS, MB) that a consumer pays, ignores the added free minutes that operators provide to customers and the special discounts they offer.

## Ovum’s Price-per-Minute Methodology

To calculate the actual price-per-minute for telecom voice services in each of the 21 EU countries in scope, the revenue (before tax) generated from voice services is divided by the number of minutes recorded at that country as per the following formula:

$$\text{Price per minute (Country)} = \frac{\text{Revenue Generated from voice services (€)}}{\text{Number of minutes recorded in network (min)}}$$

For example, if the voice revenue generated from a certain country is €1,000,000 for a specific year, and the number of voice minutes during the same period is 4,000,000 minutes, then the price-per-minute for that country during the specified period is  $\frac{€1,000,000}{40,000,000 \text{ mins}} = €0.025/\text{min}$

The numerator of the formula (voice revenue) for each country is calculated based on Ovum’s [insert specific name] forecast model as explained in detail in the section “Revenue Forecast Mode”. The denominator (number of outgoing minutes) is based on ITU numbers. Note that interconnection fees

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<sup>1</sup> Source: <https://ec.europa.eu/digital-single-market/en/news/mobile-broadband-prices-europe-2017>

and “roaming in”<sup>2</sup> revenues are taken out from the voice revenue numbers; whilst “roaming out”<sup>3</sup> revenue is included in the numerator and roaming out minutes are included in the denominator.

## Ovum’s Price-per-SMS Methodology

To calculate the actual price-per-SMS for telecom SMS services in each of the 21 EU countries, the revenue (before tax) generated from SMS services is divided by the number of SMS recorded at that country as per the following formula:

$$\text{Price per SMS (Country)} = \frac{\text{Revenue Generated from SMS services (€)}}{\text{Number of SMSs recorded in network (Nb)}}$$

For example, if the SMS revenue generated from a certain country is €500,000 for a specific year, and the number of SMSs during the same period is 5,000,000 SMSs, then the price-per-SMS for that country during the specified period is  $\frac{€500,000}{5,000,000 \text{ SMSs}} = €0.01 \text{ per SMS}$

The numerator of the formula (SMS revenue) for each country is calculated based on Ovum’s [insert name] forecast model as explained in detail the section “Revenue Forecast Model” and it includes revenue generated through A2P and P2P messaging. The denominator (number of SMSs) is based on ITU numbers. Note that interconnection fees and “roaming in” revenues are taken out from the SMS revenue numbers, where “roaming out” revenue is included in the numerator and roaming out minutes are included in the denominator.

## Ovum’s Price-per-Gigabyte (GB) Methodology

To calculate the actual price-per-GB for telecom data services in each of the 21 EU countries in scope, the revenue (before tax) generated from data services is divided by the number of GBs recorded at that country as per the following formula:

$$\text{Price per GB (Country)} = \frac{\text{Revenue Generated from data services (€)}}{\text{Number of GBs recorded in network (Nb)}}$$

For example, if the data revenue generated from a certain country is €12,000,000 for a specific year, and the number of GBs during the same period is 6,000,000 GBs, then the price-per-GB for that country during the specified period is  $\frac{€12,000,000}{6,000,000 \text{ GBs}} = €2 \text{ per GB}$

The numerator of the formula (data revenue) for each country is calculated based on Ovum’s [insert name] forecast model as explained in detail in the section “Revenue Forecast Model” and it includes revenue generated through the use of VAS, mobile broadband access, and other miscellaneous

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<sup>2</sup> “Roaming In” of country X represents the revenue or minutes that visitors from other countries spend using their home mobile line inside country X

<sup>3</sup> “Roaming Out” of country X represents the revenue or minutes spent by home subscribers of country X on other networks outside country X

nonvoice services such as 2G data access. The denominator (number of GBs) is based on ITU numbers.

## Ovum’s Price of Average Basket Comparison

An average basket is the combination of average number of minutes, SMSs and GBs that are consumed monthly per active subscriber in a certain market.

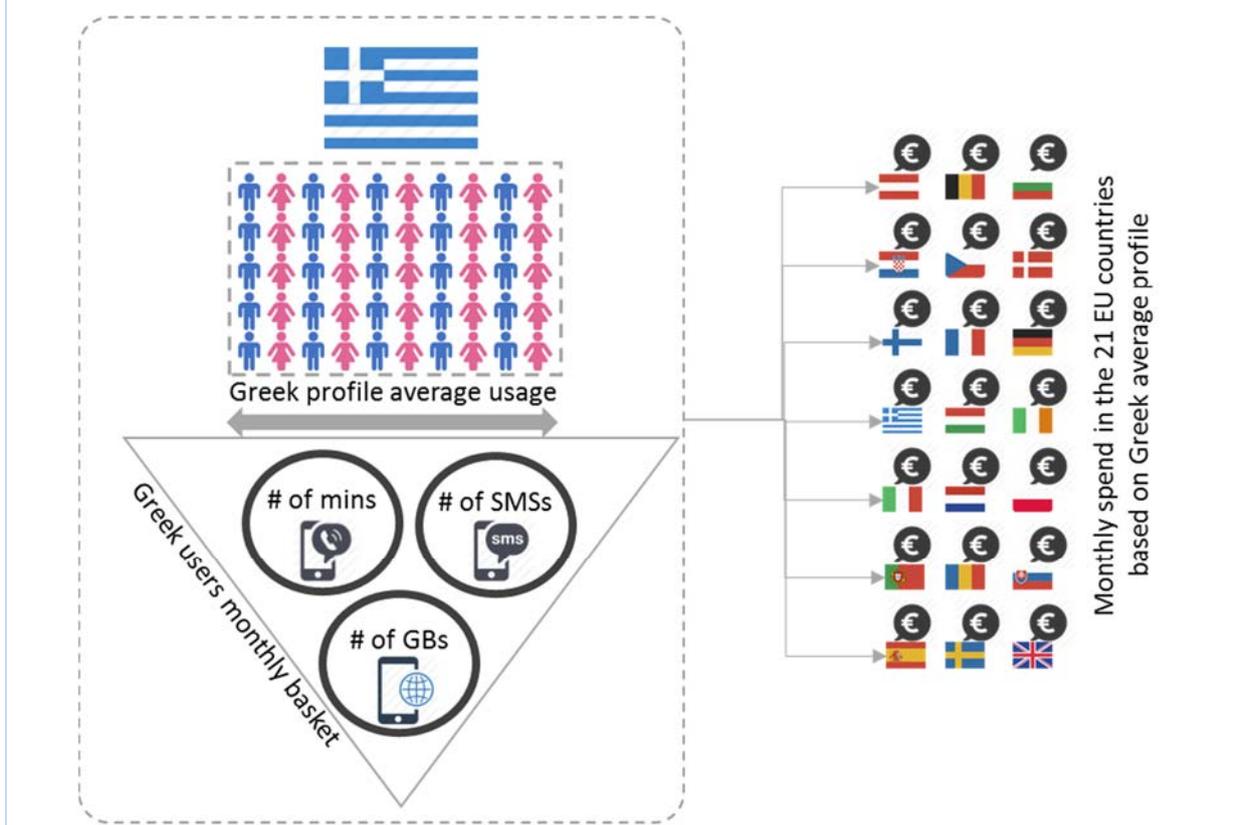
A basket of mobile telecom services represents the usage profile (minutes, SMS, GBs) of an average subscriber to a network. Therefore, the price-per-average basket represents the cost in Euros that a subscriber spends monthly in a certain country for the usage of the average basket.

There will be two types of comparison in this section

- Greek basket profile: Based on the average Greek usage profile, the cost of this profile will be compared with each of the 21 EU countries. This will help in comparing an average Greek user profile with what the same profile would cost in other EU markets (Figure 9)
- EU basket profile: Based on the average usage profile across the 21 EU countries, the cost of this profile will be compared among these countries. This will help in determining the cost of an average user profile in each of the 21 EU countries (Figure 10)

### Greek user profile

**Figure 9: Basket Comparison based on Greek average profile**



Source: Ovum

The average Greek basket is the combination of average number of minutes, SMSs and GBs that are consumed monthly per active subscriber in Greece. For example, the average number of minutes consumed per active subscriber monthly in Greece is the total number of outgoing minutes passing through the Greek mobile telecom networks divided by the number of active mobile subscribers in Greece then by 12 to get the monthly figure. Similarly, for SMSs and GBs.

- Average user profile in Greece (Monthly):

$$\text{Mins average user profile (Greece)} = \left[ \frac{\text{Total number of mins in Greece}}{\text{Number of active subscribers in Greece}} \right] \div 12$$

$$\text{SMSs average user profile (Greece)} = \left[ \frac{\text{Total number of SMSs in Greece}}{\text{Number of active subscribers in Greece}} \right] \div 12$$

$$\text{GBs average user profile (Greece)} = \left[ \frac{\text{Total number of GBs in Greece}}{\text{Number of active subscribers in Greece}} \right] \div 12$$

The average EU basket is the combination of average number of minutes, SMSs and GBs that are consumed monthly per active subscriber in EU. For example, the average number of minutes consumed per active subscriber monthly in EU is the total number of outgoing minutes passing through the EU mobile telecom networks divided by the number of active mobile subscribers in EU then by 12 to get the monthly figure. Similarly, for SMSs and GBs.

- Average user profile in EU countries (Monthly):

$$\text{Mins average user profile (EU)} = \left[ \frac{\text{Total number of minutes in EU}}{\text{Number of active subscribers in EU}} \right] \div 12$$

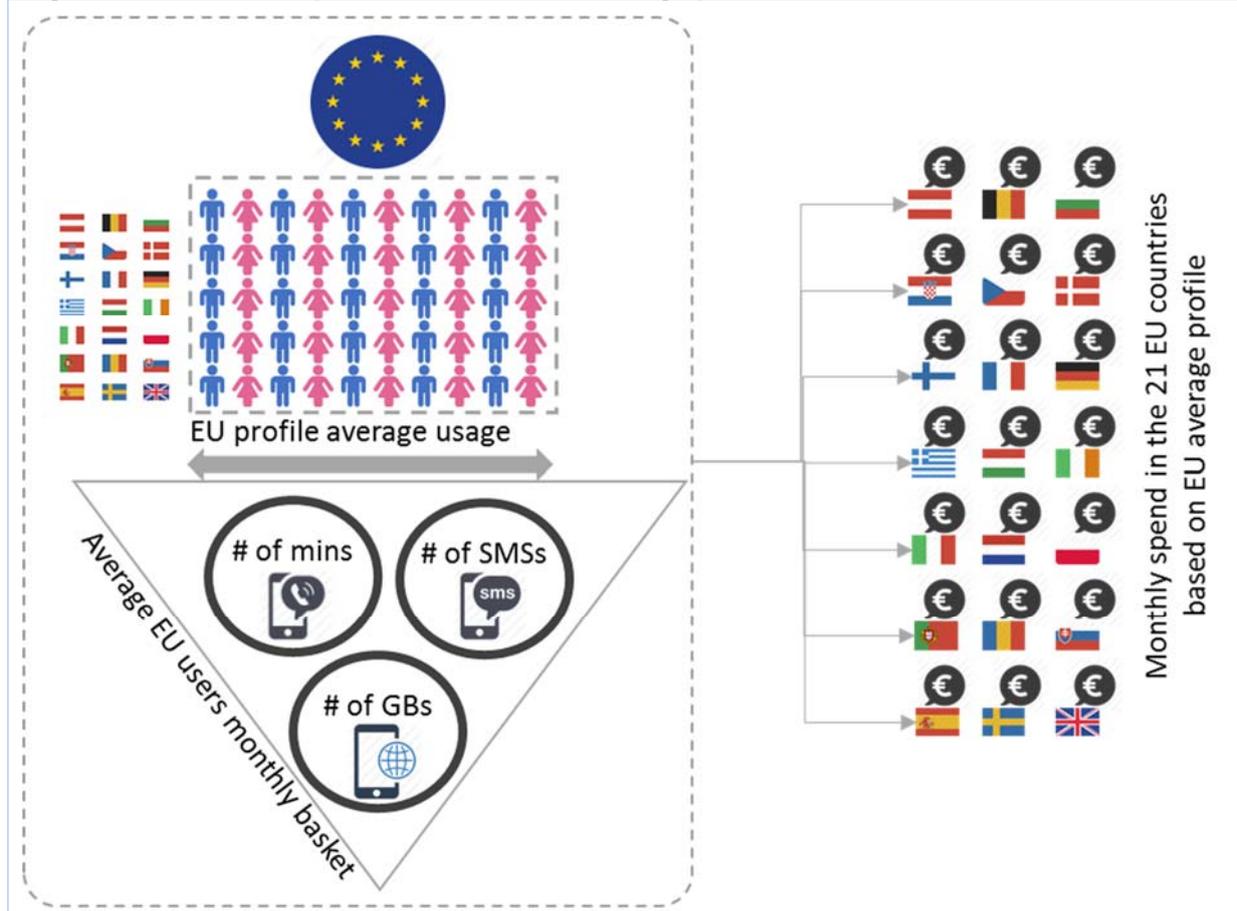
$$\text{SMSs average user profile (EU)} = \left[ \frac{\text{Total number of SMSs in EU}}{\text{Number of active subscribers in EU}} \right] \div 12$$

$$\text{GBs average user profile (EU)} = \left[ \frac{\text{Total number of GBs in EU}}{\text{Number of active subscribers in EU}} \right] \div 12$$

The final price-per-basket is the sum product of the usage profile multiplied by the price-per-service as per the following formula:

$$\begin{aligned} & \text{Average Monthly price per basket (€) of country} \\ & = \text{Mins average user profile} \times \text{price per minute (country } x) \\ & + \text{SMS average user profile} \times \text{price per SMS (country } x) \\ & + \text{GBs average user profile} \times \text{price per GB (country } x) \end{aligned}$$

**Figure 10: Basket Comparison based on EU average profile**



Source: Ovum

## Mobile Broadband Speed Indicators

Comparing the speed of mobile broadband of all the EU-28 countries provides an indication of mobile data quality in those countries. This indicator shows that Greece is providing good data throughput for its subscribers.

To achieve a fair comparison using a unified source, speedtest.net provided by OOKLA is used. The Speedtest Global Index is based on a huge number of samples from real users during different circumstances which allow an independent and trusted comparison.

Two indicators will be used to compare the quality of mobile broadband quality of experience (QoE):

1. Download speed: the speed at which an item (such as text, video, audio...) is transferred from the network to the user's device
2. Upload speed: the speed at which an item (such as text, video, audio...) is transferred from the user's device to the network

## Ovum’s Mobile Subscription and Revenue Forecast Model

The mobile subscriptions forecast model is prepared as part of a collaborative, integrated process involving both quantitative and qualitative analysis. The forecasts are the result of a rigorous process of scoping, market-mapping, data collection, statistical modeling and validation.

Country level revenue numbers-per-service (Voice, SMS and data) act as the numerator of the formula used to calculate price-per-minute, SMS and GB. But how are these service revenue numbers calculated or sourced?

### Regulator data

As a first step, Ovum conducts research on all of the regulators for the 21 markets in question in order to obtain mobile retail service revenues, as well as the breakdown of revenues between voice, SMS and data. If available, for the purposes of this particular study, regulator information is given a priority over the forecast model and adopted into the price-per-service model calculations. Any unavailable figures were then sourced from Ovum’s Mobile Subscription and Revenue Forecast: 2017–22 (March 2018).

Mobile network operator service revenues comprise all revenues attributed to the provision of subscriber voice and nonvoice services, including roaming charges and net interconnection revenue. They also include revenues from M2M and the revenues that MNOs earn from leasing capacity to MVNOs, as well as nonretail enterprise operations such as IT and managed services. It excludes equipment revenues from selling mobile handsets, portable devices, and other retail hardware. It also excludes retail MVNO revenues collected by MVNO service providers from subscribers. These revenues are accounted for separately in Ovum’s MVNO revenue forecast.

On an ongoing basis, Ovum collects the following data from operator quarterly reports and cross-correlates it with regulator reports where applicable:



Operator-reported total service revenues are tracked in Ovum's World Cellular Information Service (WCIS). M2M revenues, IT, managed services, and other enterprise solutions are then deducted to leave retail connectivity revenues to be analyzed and examined for forecasting purposes. A top-down and bottom-up approach has been used to build the model and provide a rigorous methodology and view of the market from multiple perspectives, designed using a range of time series (e.g., extrapolation, weighted average, and logistic curves) and causal techniques (e.g., multiple regression).

Voice and data splits are forecasted using an approach that incorporates the following:



The revenue forecasts include enterprise, consumer, and wholesale subscriber revenues generated across services including messaging, mobile broadband, and premium content. Separate forecasts detailing messaging, mobile broadband, MVNO, premium content, and enterprise revenues are also

available. The forecast model considers the fact that operators often bundle individual services under an umbrella subscription for a core network service (e.g., an HSPA monthly subscription that includes data). Our model attempts to quantify revenue for each segment based on usage, rather than dividing revenues among the individual elements of the bundle separately.

An adaptive expectations approach is also utilized, by considering how reported voice, SMS, and non-SMS splits have changed compared to our previous forecast, to determine the long-term trend. The resulting output is then assessed on a regional and market level by our team of regionally focused analysts, who amend the model outputs to more accurately reflect the unique nature of each market. The resulting regional analysis is then compiled at a global level, where growth rates are compared and adjustments made, to ensure global consistency.

### Interconnection Fees Exclusion Methodology

Interconnection fees (also known as termination rates) are the charges which one telecommunications operator charges another for terminating calls on its network. In many countries, Interconnection fees are set by the telecom regulator.

As per the example in Figure 11, a customer of Operator A wishes to call a friend who is a customer of Operator B. Operator A will charge the customer a fee-per-minute (the retail charge) for this call. Operator B will charge Operator A a fee for terminating the call on its network. This termination rate therefore forms part of Operator A's cost of providing the call to its customer.

**Figure 11: Termination Rates Illustration**



Source: Ovum

Excluding termination rates from the price-per-minute or SMS supports a more meaningful comparison of the real cost of a minute or SMS, as interconnection fees vary significantly among countries and depend on multiple factors. For example, in Germany, the mobile termination rate is 1.66€/min, whereas in France it is 0.74€/min.

To achieve this view, Ovum's estimation model (please see below) was used to remove the interconnection fees. The model inputs are: total number of minutes and market share of operators within a country. The model output is % of off-net traffic per each country.

Two assumptions are made in that model:

- 1) Assumption 1: The traffic share among operators within a country is assumed to be the same as the market share since a higher share would lead to higher traffic

2) Assumption 2: The probability to call off-net is equal to  $\{100\% - \text{Market share}\}$ <sup>4</sup>

The total off-net percentage on a country level is the {sum product} of probability multiplied by the market share.

Example, assume a country with three operators having the following market share per operator: Operator A: 50%, Operator B: 30%, Operator C: 20%. The probability for operator A customers to call off-net is 50%, for operator B is 70% and for operator C is 80%. The country off-net percentage is  $(50\% \times 50\%) + (30\% \times 70\%) + (20\% \times 80\%) = 62\%$ .

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<sup>4</sup> Example: In a country of 3 operators, if market share of operator A is 30%, the forecasted off-net percentage of operator A is  $\{100\% - 30\%\} = 70\%$

## Price Comparison Analysis (Pre-Tax)

Based on the explanation in the *Methodology* section, 21 EU countries were compared based on 4 dimensions:

- Price-per-minute (Voice)
- Price-per-SMS
- Price-per-GB (Data)
- Average monthly telecom expenditure, for a Greek user profile and another pan-European user profile, taking in each of the 21 markets under study

### Comparison Criteria

The 21 EU countries were placed into three categories depending on the rank of the country scores as per the following:

Category	Color Code	Description
Least expensive		7 least expensive countries
Middle range		7 countries that fall in the middle
Most expensive		7 most expensive countries

The comparison criteria for the price-per-unit (minute, SMS, GB) is based on rebasing the actual price relatively to the EU average. The method is applied by setting EU average for the years 2014-2017 to 100, and then rebasing the price-per-unit for each country relatively to that number.

The EU average price-per-minute for each service for the period 2014-2017 is as follows:

- EU average (Price-per-minute): 5.33 €/min
- Price-per-SMS: 4.99 €/SMS
- Price-per-GB (Data): 6.20 €/GB

The basket prices based on the Greek user profile and the EU user profile were compared using actual prices in Euros.

## Price-per-minute analysis

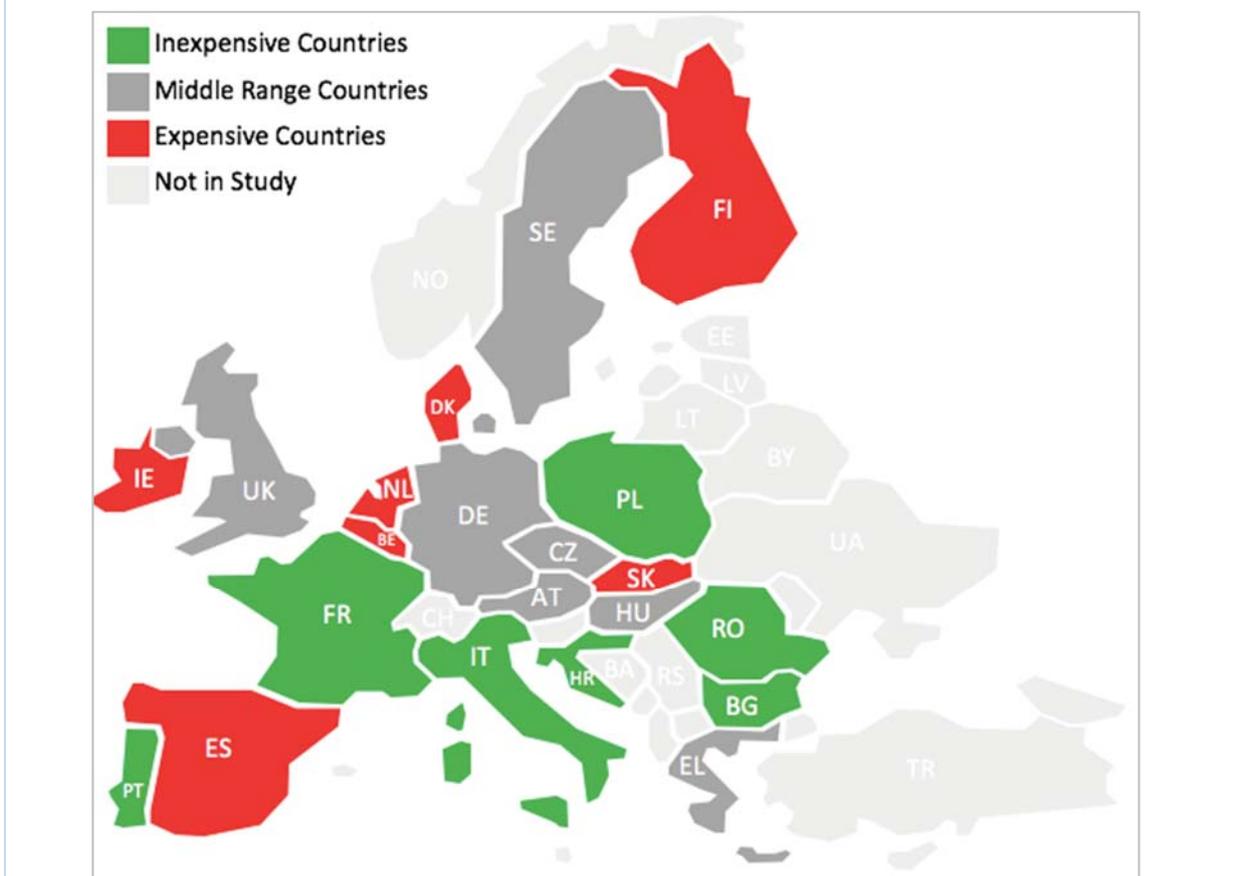
The average price-per-minute for EU countries included in this study was 5.33 €/min for the period of 2014 to 2017. The figure (5.33 €/min) was set to 100 and the values for all other countries were restated relative to this value.

**Figure 12: Price-per-minute 2014-2017 rebased to European average**

Country	Rebased Price-per-minute (2014-2017)	Rank
Portugal	30.94	1
Romania	32.87	2
Poland	44.63	3
Bulgaria	58.08	4
Croatia	66.60	5
Italy	74.14	6
France	81.27	7
Hungary	82.83	8
Greece	84.95	9
Sweden	93.24	10
Czech	96.50	11
Germany	96.77	12
Austria	97.22	13
EU Average	100	
UK	100.64	14
Denmark	111.18	15
Slovakia	114.01	16
Finland	119.53	17
Spain	126.19	18
Netherlands	160.30	19
Ireland	195.18	20
Belgium	232.95	21

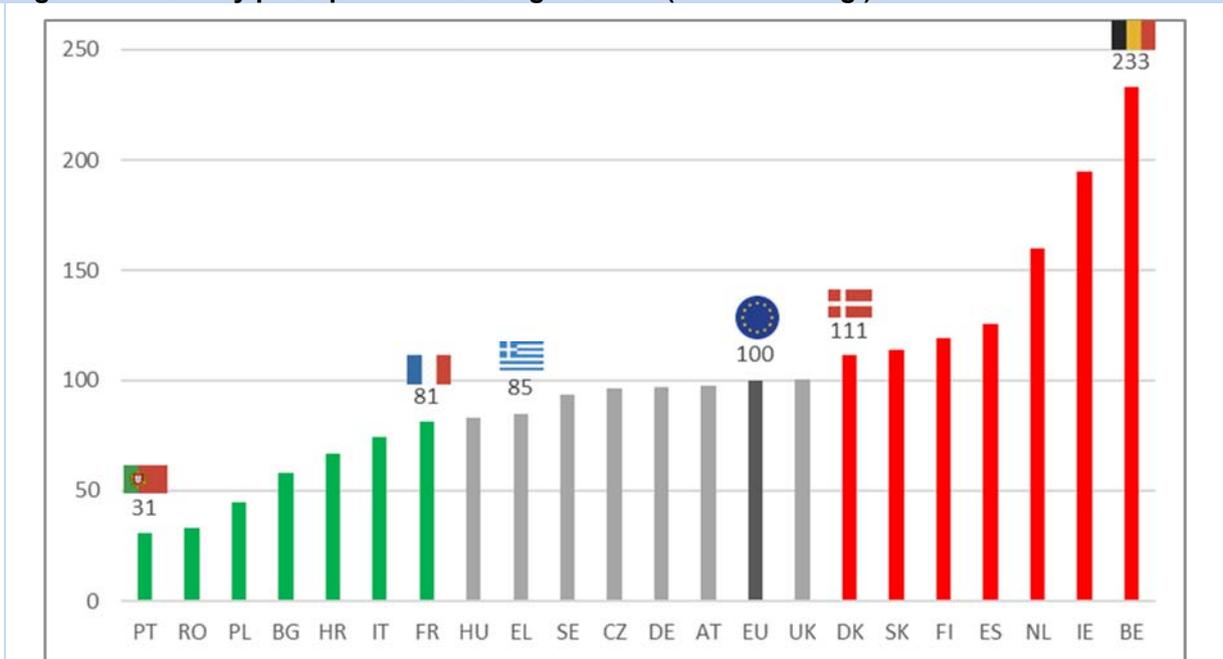
Source: Ovum

**Figure 13: Country price-per-minute categorisation (2014-2017 avg.)**



Source: Ovum

**Figure 14: Country price-per-minute categorisation (2014-2017 avg.)**



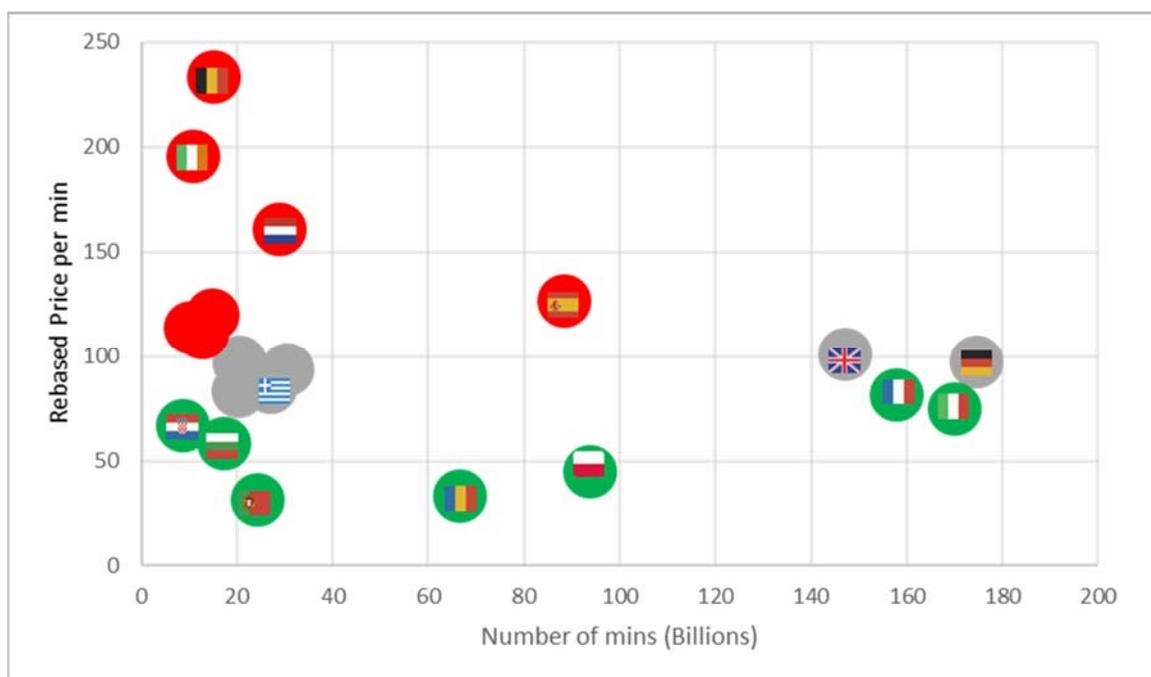
Source: Ovum

Figures 12, 13 and 14 support the following conclusions from Ovum’s price-per-minute analysis:

- The average price-per-minute for the 21 EU countries included in this study is 5.33 €/min. This number is set to 100, whereas all other figures are rebased relatively to it.
- In Greece the price-per-minute is cheaper relative to the EU average. Greece ranks 9<sup>th</sup> out of 21 EU countries and its price is 15% below the EU average.
- The **least expensive** country is Portugal; its price is 69% below the EU average. The 7 least expensive countries are: Portugal, Romania, Poland, Bulgaria, Croatia, Italy and France. The average price-per-minute of the **green** category is **44.5%** below EU average.
- The **grey category** of middle-range countries are: Hungary, Greece, Sweden, Czech, Germany, Austria and United Kingdom. The average price-per-minute of the **grey** category is **6.8%** below the EU average.
- The **most expensive** country is Belgium with a price-per-minute 133% above the EU average. The 7 most expensive countries are (ranked from most expensive): Belgium, Ireland, Netherlands, Spain, Finland, Slovakia and Denmark. The average price-per-minute of the **red** category is **51.3%** above the EU average.

The figure below shows the correlation between the price-per-minute and the total number of minutes in each country.

**Figure 15: Correlation of price-per-minute and total number of minutes**



Source: Ovum

It should be noted that:

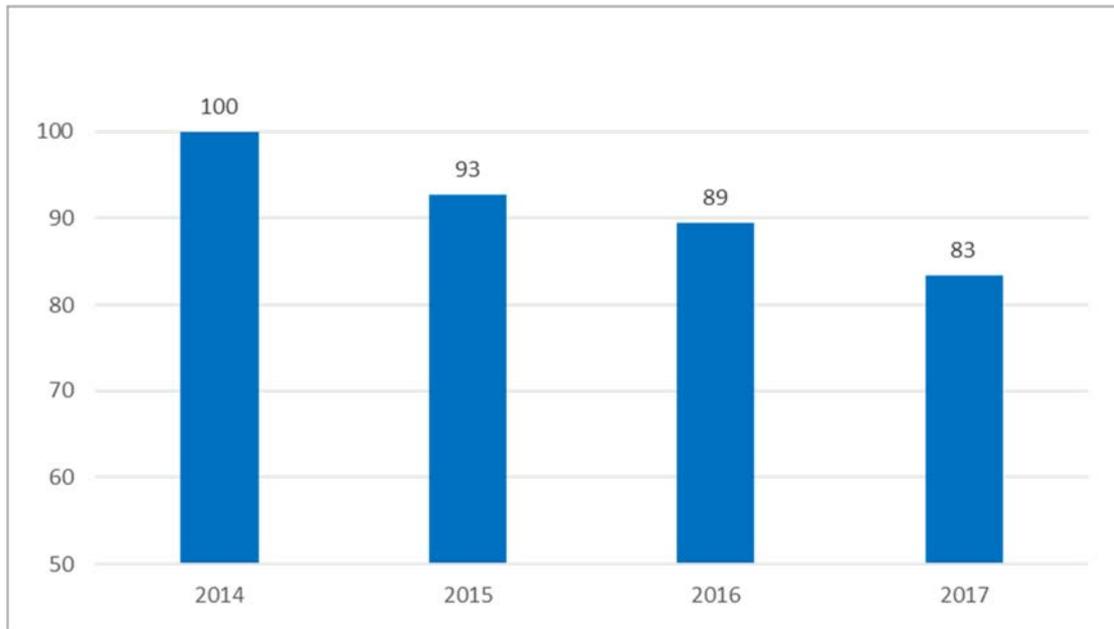
- The annual average number of minutes of the 21 EU countries is around 55.3 billion minutes (highest is Germany and lowest is Croatia)
- Countries with a high number of minutes have relatively low price-per-minute (Poland, Romania, France, Italy, Germany and United Kingdom)
- Countries with relatively low number of minutes (below 40 billion minutes annually) have high price-per-minute

### **Greece Price-Per-Minute Trend Analysis**

In this section, the rebased price-per-minute trend for Greece is shown on a yearly basis. The trend analysis is based on setting the 2014 price-per-minute to 100 and then rebasing the other yearly figures relative to the 2014 value.

The price-per-minute in Greece shows a significant decrease over the period of study; comparing the 2017 price-per-minute to 2014 shows a 17% decrease in prices.

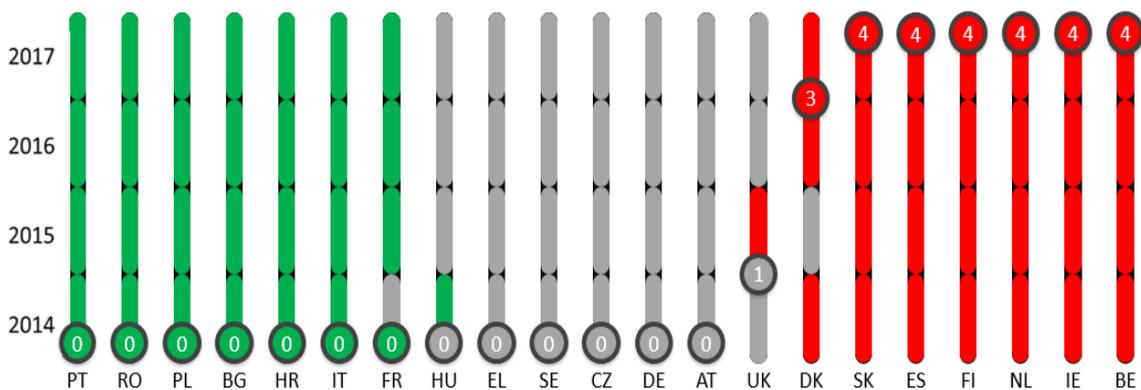
**Figure 16: Rebased Greece price-per-minute annual trend**



Source: Ovum

Figure 17 below shows the number of times each country falls into the red category (most expensive) for the 4 years covered by the study. If the value inside the circle is 0, it means that particular country has never fallen into the red category during the period 2014-2017. If the number is 3 for a certain country, it means that this country has been in the red category for 3 years out of the 4.

**Figure 17: Price-per-minute category distribution per country**



Source: Ovum

Figure 17 shows us that:

- 13 countries out of 21 have never fallen in the red category during the period 2014-2017: Portugal, Romania, Poland, Bulgaria, Croatia, Italy, France, Hungary, Greece, Sweden, Czech, Germany and Austria.

- United Kingdom fell into the red category for 1 year out of 4, whereas Denmark fell in the red category 3 times
- 6 countries fell into the red category in each of the 4 years of the study: Slovakia, Spain, Finland, Netherlands, Ireland and Belgium.

**Figure 18: Greece price-per-minute dashboard**



Source: Ovum

## Summary of the price-per-minute analysis

### Price per minute definition

- Voice revenue-per-country divided by # of minutes passing through the network
- Interconnection charges and VAT are excluded from revenue numbers

### 21 EU countries included in the study

- Countries included: Austria, Belgium, Bulgaria, Croatia, Czech, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom
- Countries Excluded: Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta, Slovenia

### 3 comparison categories

- Green Category: 7 least expensive countries
- Grey Category: 7 countries in the middle
- Red Category: 7 most expensive countries

### Overall average price-per-minute is 5.33 €/min set to 100

- Green Category: 44.5% of countries below EU average
- Grey Category: 6.8% of countries below EU average
- Red Category: 51.3% of countries above EU average

### Country distribution across the categories (2014-2017)

- Green Category: Portugal, Romania, Poland, Bulgaria, Croatia, Italy and France
- Grey Category: Hungary, Greece, Sweden, Czech, Germany, Austria and United Kingdom
- Red Category (Ranked from most expensive): Belgium, Ireland, Netherlands, Spain, Finland, Slovakia and Denmark

### Most and least expensive countries

- Least expensive: Portugal (69% below EU average)
- Most expensive: Belgium (133% above EU average)

### Greece insights

- Price per minute: 15% below EU average
- Ranks 9th out of 21 countries
- 17% price decrease when comparing 2017 to 2014

## Price-per-SMS analysis

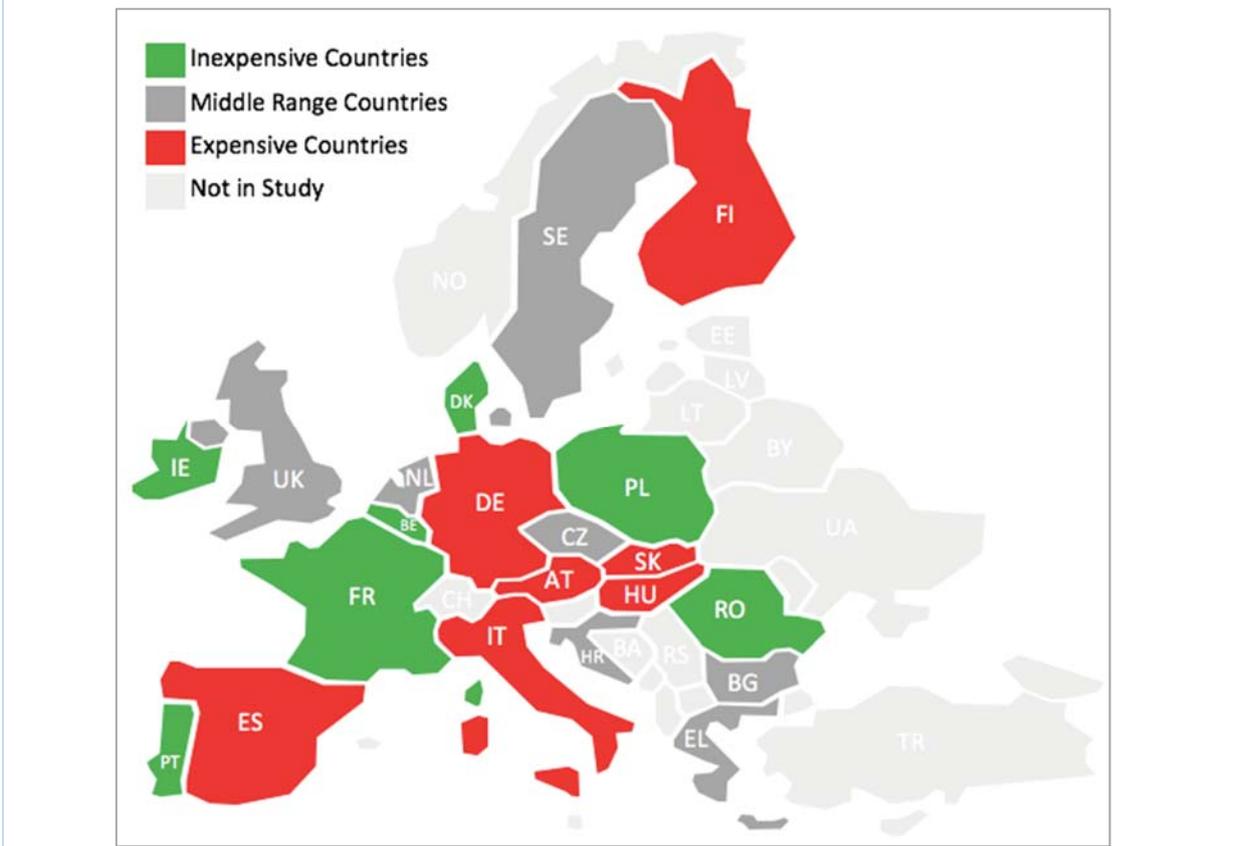
The average price-per-SMS for the EU countries included in this study is 4.99 €/SMS for the period 2014 to 2017. The figure (4.99 €/SMS) was set to 100 and the values for all other countries were restated relative to this value.

**Figure 19: Price-per-SMS 2014-2017 rebased to European average**

Country	Rebased Price-per-SMS (2014-2017)	Rank
Portugal	10.83	1
Romania	11.17	2
France	16.38	3
Poland	17.39	4
Ireland	29.11	5
Belgium	38.96	6
Denmark	46.21	7
Netherlands	53.50	8
Croatia	55.31	9
Sweden	59.58	10
Bulgaria	73.69	11
UK	76.77	12
Greece	78.96	13
Czech	81.46	14
Slovakia	87.73	15
EU Average	100	
Austria	141.65	16
Italy	147.15	17
Hungary	159.88	18
Finland	208.49	19
Germany	302.66	20
Spain	403.12	21

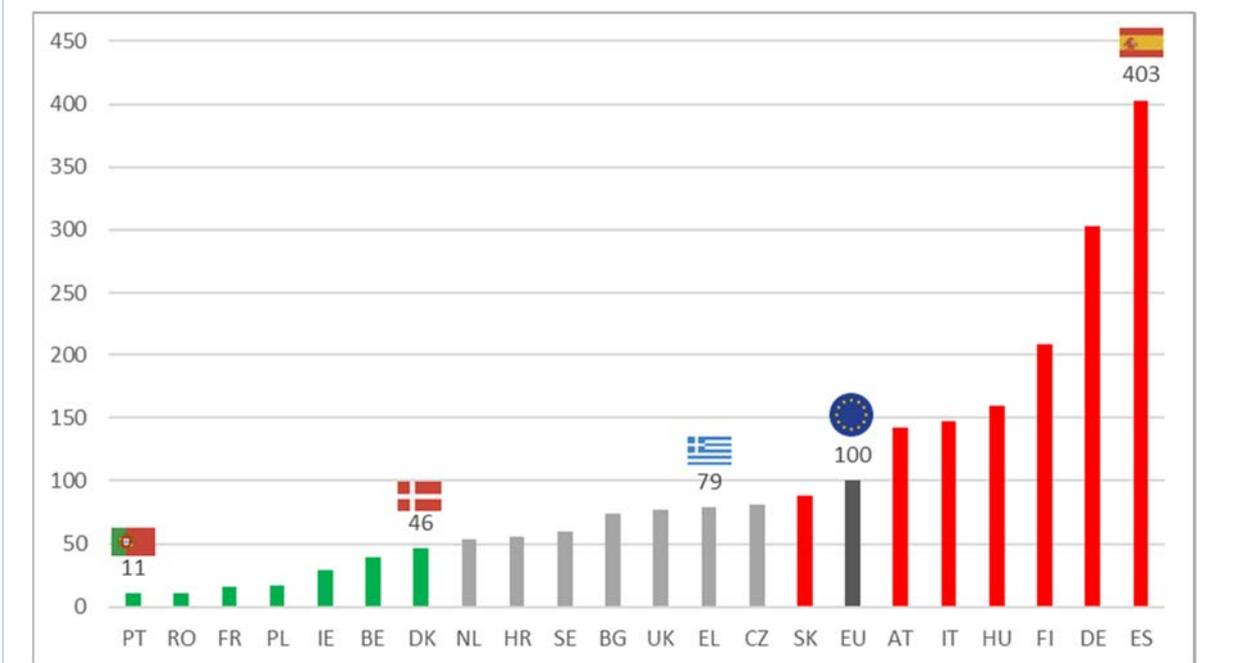
Source: Ovum

**Figure 20: Country price-per-SMS categorisation (2014-2017 avg.)**



Source: Ovum

**Figure 21: Relative price-per-SMS per country (rebased to EU average 2014-2017)**



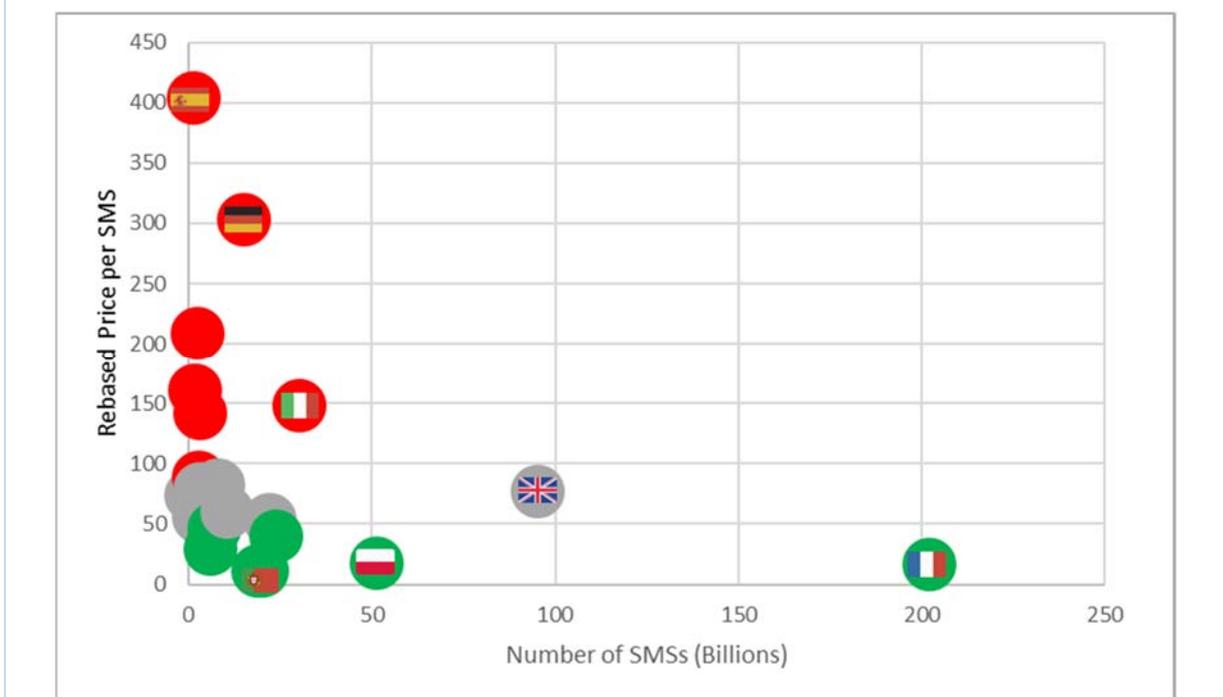
Source: Ovum

Figures 19, 20, and 21 support the following conclusions from Ovum's price-per-SMS analysis:

- The Average price-per-SMS for the 21 EU countries included in this study is 4.99 €/SMS. This number was set to 100, whereas all other figures were rebased relative to it.
- In Greece price-per-SMS is cheaper relative to the EU average. Greece ranks 13<sup>th</sup> out of 21 EU countries and its price is 21% below the EU average.
- The **least expensive** country is Portugal; its rebased price-per-SMS is 89% less than EU average. The 7 least expensive countries are: Portugal, Romania, France, Poland, Ireland, Belgium and Denmark. The average price-per-SMS for the **green** category is **76% less** than the EU average.
- The **grey category** of middle-range countries are: Netherlands, Croatia, Sweden, Bulgaria, United Kingdom, Greece and Czech. The average price-per-SMS for the **grey** category is **32% less** than the EU average.
- The **most expensive** country is Spain; its rebased price-per-SMS is 303% more than the EU average. The 7 most expensive countries are (ranked from most expensive): Spain, Germany, Finland, Hungary, Italy, Austria and Slovakia. The average price-per-SMS for the **red** category is **107% more** than the EU average

Figure 22 below shows the correlation between the price-per-SMS and the total number of SMSs in each country.

**Figure 22: Correlation of rebased price by SMS and total number of SMSs**



Source: Ovum

It should be noted that:

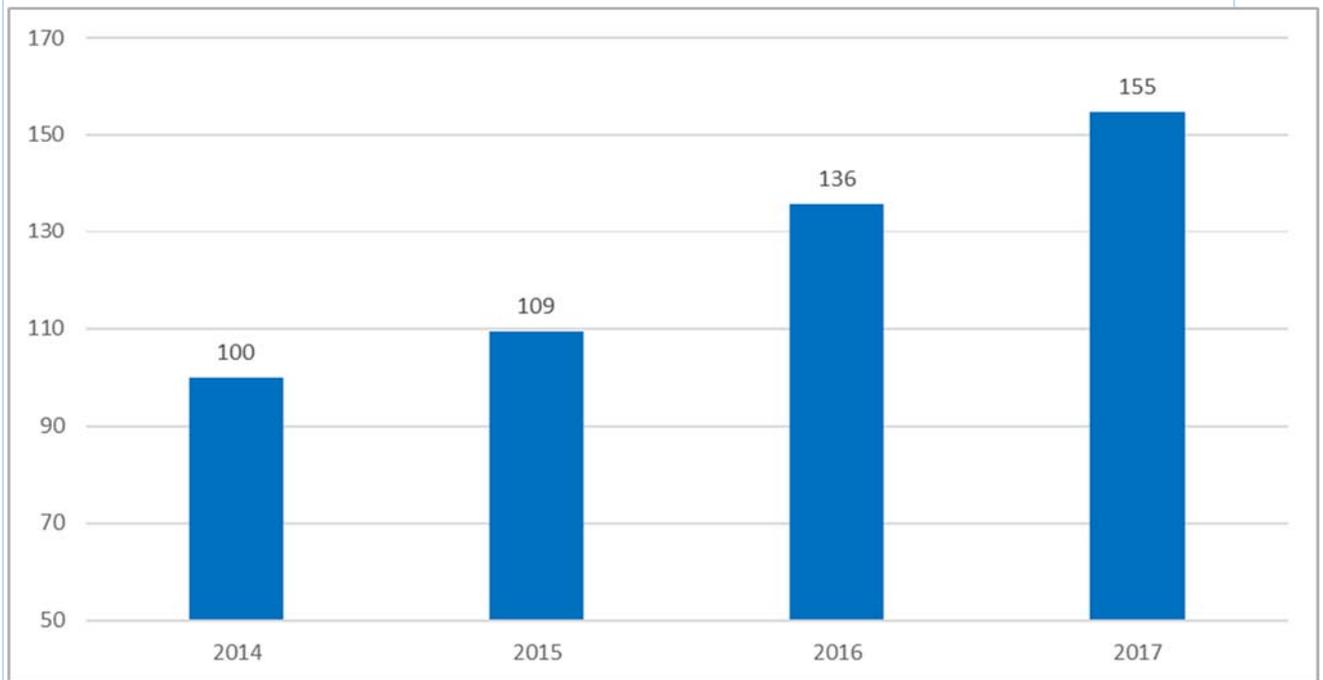
- The annual average number of SMSs of the 21 EU countries is around 25.3 billion SMSs (the highest is France and the lowest is Bulgaria).
- France has very high number of yearly SMSs with very low price-per-SMS. France represents around 38% of the total number of SMSs in the 21 EU countries across the period.
- The top 3 countries by number of SMSs (France, United Kingdom and Poland) all have a relatively low price-per-SMS and represent around 66% of total SMS usage in the 21 EU countries across the period.
- Countries that fall into the red category for the price-per-SMS have relatively very low number of SMSs.
- Greece falls in the group of countries with low number of SMSs, while being in the grey middle-range category for price-per-SMS.

### **Greece Price-Per-SMS Trend Analysis**

In this section, the rebased price-per-SMS trend for Greece is shown on a yearly basis. The trend analysis is based on setting the 2014 price-per-SMS to 100 and then rebasing the other yearly figures relative to the 2014 value.

As laid out in Figure 23 below, like almost all EU countries included in the study, price-per-SMS in Greece has increased across the period of study; comparing the 2017 price-per-SMS to 2014 shows a 55% increase in prices.

**Figure 23: Rebased Greece price-per-SMS annual trend**



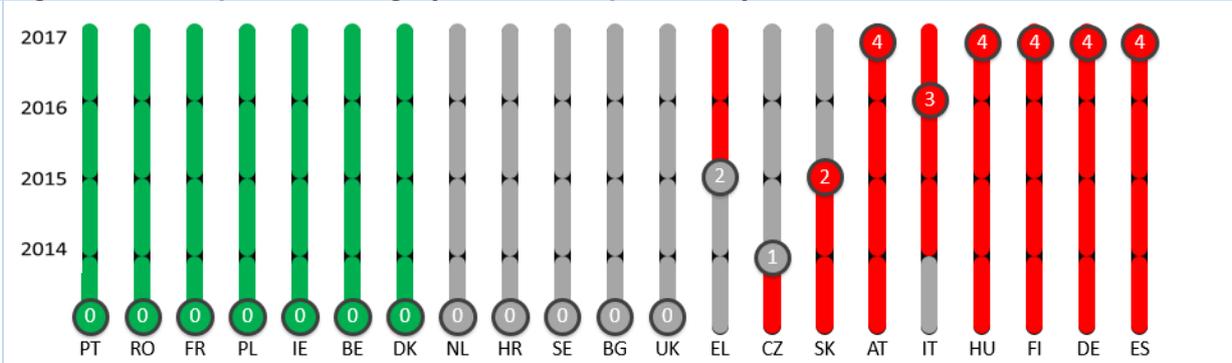
Source: Ovum

The increase in price-per-SMS can be justified in two ways:

- A significant year-over-year decrease in the number of SMSs as mobile data applications replaced the traditional short message service. Since operators still offer free SMSs in packages, the price-per-SMS eventually increases.
- As revenues decrease due to the fall in usage of SMS, operators tend to increase SMS price or reduce the number of free SMSs inside bundles, thus resulting in an increase of price-per-SMS

Figure 24 below shows the number of times that each country falls into the red category (most expensive) for the 4 years covered by the study. If the value inside the circle is 0, it means that particular country has never fallen into the red category during the period 2014-2017. If the number is 3 for a certain country, it means that this country has been in the red category for 3 years out of the 4.

**Figure 24: Price-per-SMS category distribution per country**



Source: Ovum

In conclusion, Figure 24 above shows that:

- 12 countries out of the 21 have never fallen into the red category during the period 2014-2017: Portugal, Romania, France, Poland, Ireland, Belgium, Denmark, Netherlands, Croatia, Sweden, Bulgaria and United Kingdom.
- Greece and Slovakia fell into the red category twice during the period of 2014-2017.
- 4 countries fell in the red category in each of the 4 years of the study: Spain, Germany, Finland, and Hungary.

**Figure 25: Greece dashboard (price-per-SMS)**



Source: Ovum

## **Summary of the price-per-SMS analysis**

### **Price-per-SMS definition**

- SMS revenue-per-country divided by # of SMSs passing through the network
- Interconnection charges and VAT are excluded from revenue numbers

### **21 EU countries included in the study**

- Countries included: Austria, Belgium, Bulgaria, Croatia, Czech, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom
- Countries Excluded: Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta, Slovenia

### **3 comparison categories**

- Green Category: 7 least expensive countries
- Grey Category: 7 countries in the middle
- Red Category: 7 most expensive countries

### **Overall average price per SMS is 4.99 €/SMS**

- Green Category: 75.7% of countries below EU average
- Grey Category: 31.5% of countries below EU average
- Red Category: 107.2% of countries above EU average

### **Country distribution across the categories (2014-2017)**

- Green Category: Portugal, Romania, France, Poland, Ireland, Belgium and Denmark
- Grey Category: Netherlands, Croatia, Sweden, Bulgaria, United Kingdom, Greece and Czech
- Red Category (Ranked from most expensive): Spain, Germany, Finland, Hungary, Italy, Austria and Slovakia

### **Most and least expensive countries**

- Least expensive: Portugal (89% below EU average)
- Most expensive: Spain (303% above EU average)

### **Greece insights**

- Price-per-SMS: 21% below EU average
- Ranks 13th out of 21 countries
- 55% price increase when 2017 is compared to 2014
- Price-per-SMS increase trend in all EU countries

## Price-per-Gigabyte (GB) analysis

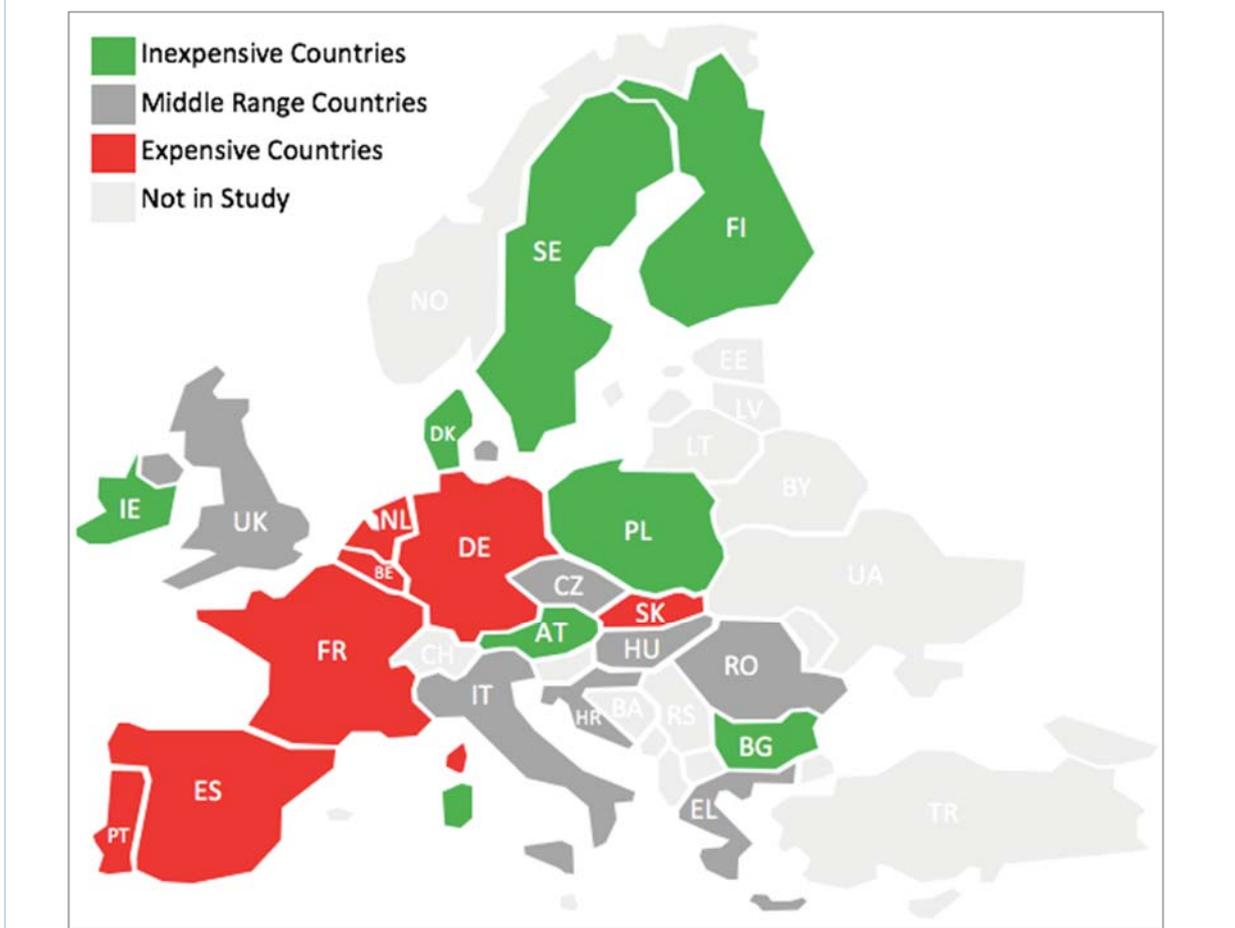
The average price-per-GB for the EU countries included in this study was 6.20 €/GB for the period 2014 to 2017. The figure (6.20 €/GB) was set to 100 and the values for all other countries were restated relative to this value.

**Figure 26: Price-per-GB 2014-2017 rebased to European average**

Country	Rebased Price-- per GB (2014-2017)	Rank
Finland	12.20	1
Poland	13.00	2
Sweden	35.14	3
Bulgaria	38.51	4
Denmark	39.65	5
Austria	43.29	6
Ireland	48.08	7
Romania	48.21	8
Italy	76.83	9
Croatia	79.22	10
UK	87.51	11
Hungary	92.87	12
<b>EU Average</b>	<b>100</b>	
Czech	121.54	13
Greece	122.80	14
Spain	133.53	15
France	134.56	16
Portugal	142.72	17
Slovakia	151.93	18
Germany	166.15	19
Netherlands	202.94	20
Belgium	318.89	21

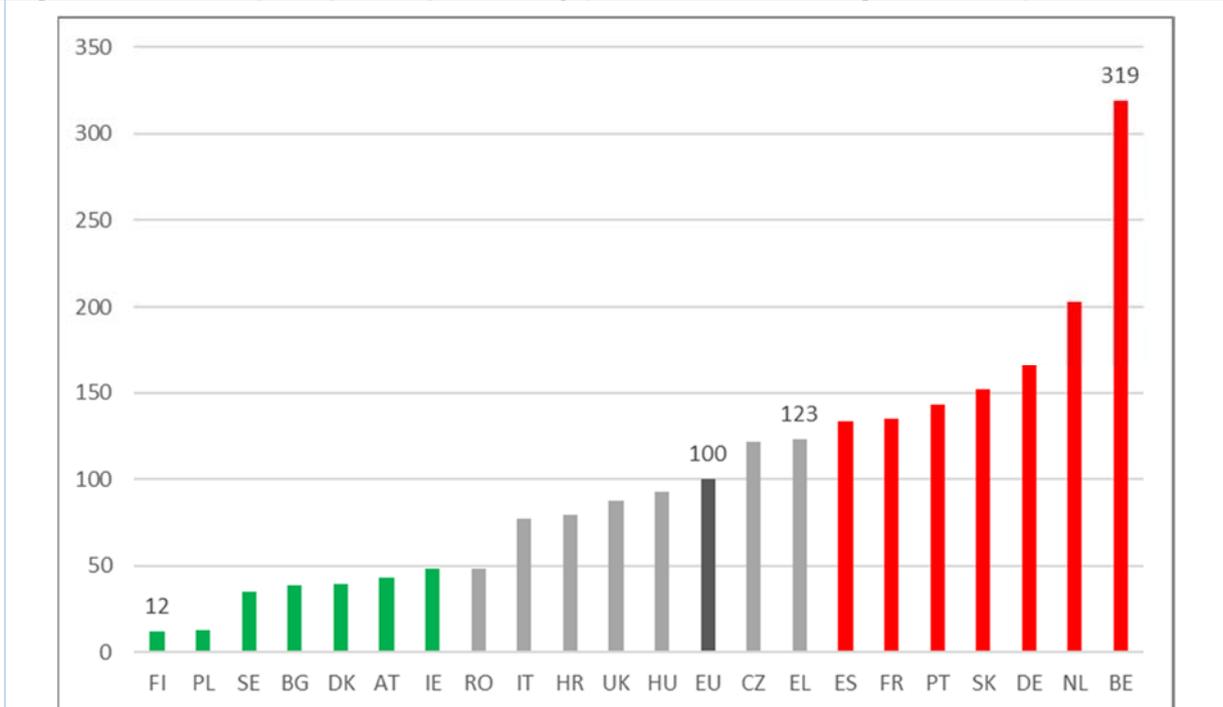
Source: Ovum

Figure 27: EU country price-per-GB categorisation (2014-2017 avg.)



Source: Ovum

**Figure 28: Relative price-per-GB per country (Rebased to EU average 2014-2017)**



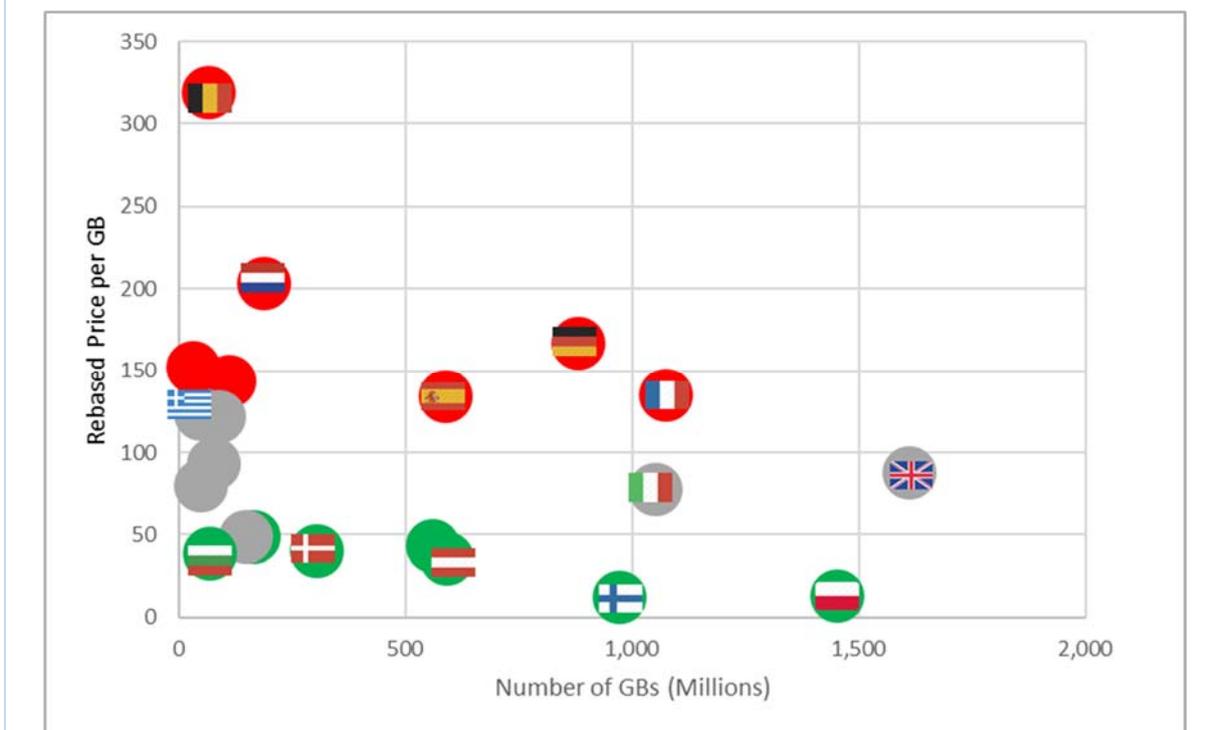
Source: Ovum

Figures 26, 27 and 28 support the following conclusions from Ovum’s price-per-GB analysis:

- The average price-per-GB for the 21 EU countries included in this study is 6.20 €/GB. This number was set to 100, whereas all other figures were rebased relative to it
- Greece falls in the **grey** middle-range category for price-per-GB. It ranks 14<sup>th</sup> out of 21 EU countries; its price is 23% above the EU average. Although higher than the EU average, Greece has experienced a significant decrease in price-per-GB, showing a 73% decline when 2017 is compared to 2014.
- The **least expensive** country is Finland; its price-per-GB is 88% below the EU average. The 7 least expensive countries are: Finland, Poland, Sweden, Bulgaria, Denmark, Austria and Ireland. The average price-per-GB for the **green** category is **67% below** the EU average.
- The **grey category** countries are: Romania, Italy, Croatia, United Kingdom, Hungary, Czech and Greece. The average price-per-GB for the **grey** category is **10% below** the EU average.
- The **most expensive** country is Belgium; its price-per-GB is 219% above the EU average. The 7 most expensive countries are (ranked from most expensive): Belgium, Netherlands, Germany, Slovakia, Portugal, France and Spain. The average price-per-GB for the **red** category is **79% above** the EU average.
- Although Greece’s price-per-GB exceeds the EU average, it is worth mentioning that Greek mobile internet network quality – as measured by download speed - is better than the average of the EU countries, reflecting more maturity in network infrastructure. Countries like Germany and France have higher price-per-GB than Greece, with lower download speeds.

Figure 29 below shows the correlation between the price-per-GB and the total number of GBs in each country.

**Figure 29: Correlation of price-per-GBs and total number of GBs**



Source: Ovum

It should be noted that:

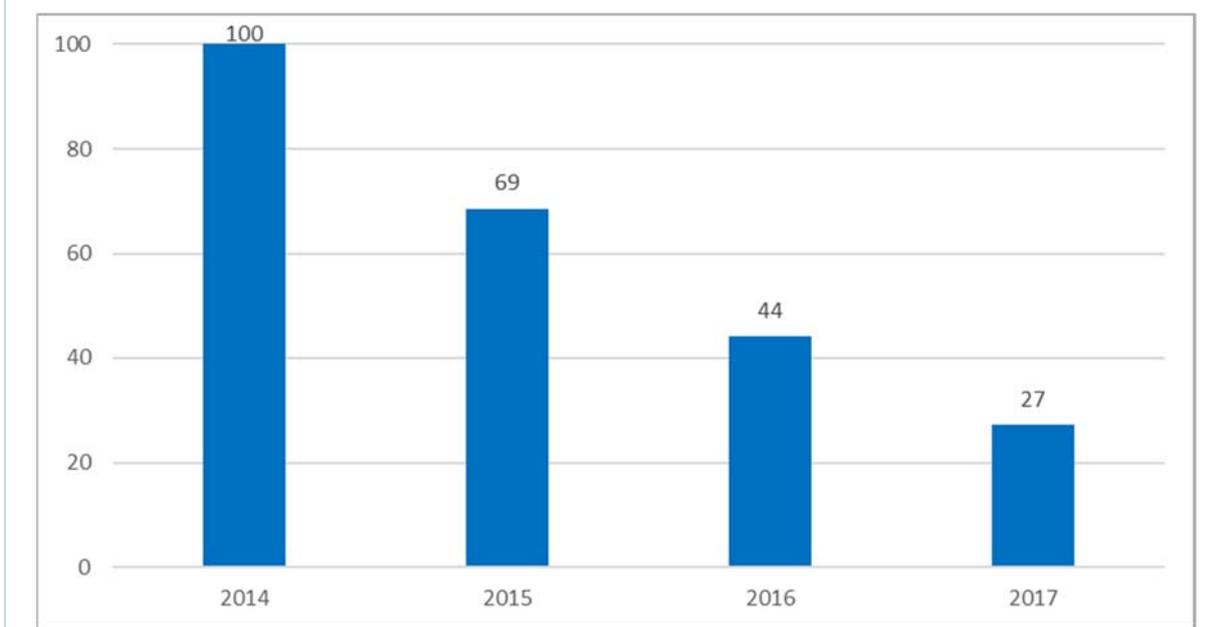
- The annual average number of GBs of the 21 EU countries is around 483 million GBs (highest is the United Kingdom and lowest is Slovakia).
- Countries that have high number of GBs have relatively low price-per-GB (except for France and Germany).
- Countries that fall in the red category for the most expensive by the price-per-GB have relatively very low number of GBs.
- Greece falls in the group of countries with low number of GBs, while being in the grey middle-range category regarding price-per-GB.

### **Greece Price-Per-GB Trend Analysis**

In this section, the rebased price-per-GB for Greece is shown as a yearly trend. The trend analysis is based on setting the 2014 price-per-GB to 100 and then rebasing the other yearly figures relative to the 2014 value.

As per Figure 30 below, the price-per-GB in Greece shows a significant decrease across the period of study; comparing the 2017 price-per-GB to 2014 shows a 73% decrease in prices, one of the highest decrease rates in the included EU countries.

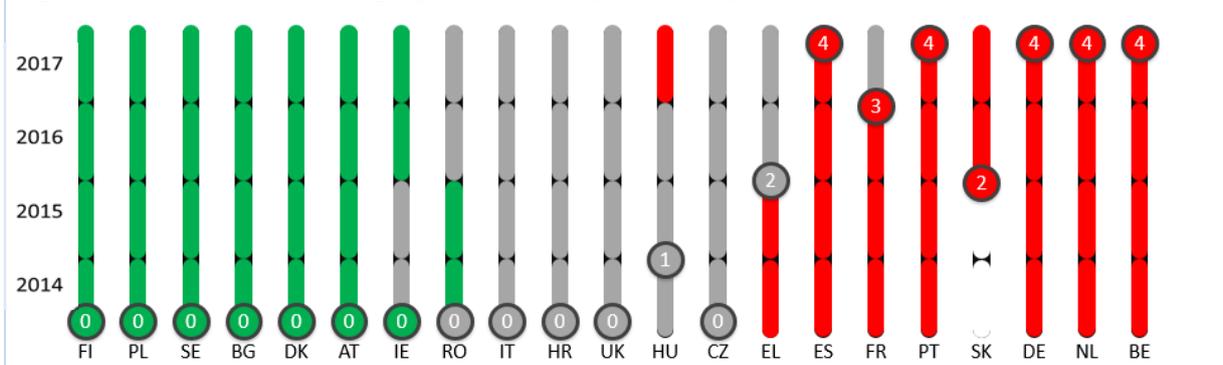
**Figure 30: Rebased price-per-GB annual trend (Greece)**



Source: Ovum

Figure 31 below shows the number of times that each country falls into the red category (most expensive) for the 4 years covered by the study. If the value inside the circle is 0, it means that the country has never fallen into the red category during the period 2014-2017. If the number is 3 for a certain country, it means that this country has been in the red category for 3 years out of the 4.

**Figure 31: Price-per-GB category distribution per country**



Source: Ovum

In conclusion for Figure 31:

- 12 countries out of 21 have never fallen into the red category during the period 2014-2017: Finland, Poland, Sweden, Bulgaria, Denmark, Austria, Ireland, Romania, Italy, Croatia, United Kingdom and Czech.
- Hungary fell into the red category once, whereas 2 countries fell into the red category twice (Greece and Slovakia) and France fell in red category three times.
- 5 countries fell into the red category in each of the 4 years of the study: Spain, Portugal, Germany, Netherlands and Belgium.

**Figure 32: Greece dashboard (price-per-GB)**



Source: Ovum

## **Summary of the price-per-GB analysis**

### **Price-per-GB definition**

- GB revenue-per-country divided by # of GBs passing through the network
- Interconnection charges and VAT are excluded from revenue numbers

### **21 EU countries included in the study**

- Countries included: Austria, Belgium, Bulgaria, Croatia, Czech, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom
- Countries Excluded: Cyprus, Estonia, Latvia, Lithuania, Luxembourg, Malta, Slovenia

### **3 Comparison Categories**

- Green Category: 7 least expensive countries
- Grey Category: 7 countries in the middle
- Red Category: 7 most expensive countries

### **Overall average price per GB is 6.20 €/GB set to 100**

- Green Category: 67% of countries below EU average
- Grey Category: 10% of countries below EU average
- Red Category: 79% of countries above EU average

### **Country distribution across the categories (2014-2017)**

- Green Category: Finland, Poland, Sweden, Bulgaria, Denmark, Austria and Ireland
- Grey Category: Romania, Italy, Croatia, United Kingdom, Hungary, Czech and Greece
- Red Category (From most expensive): Belgium, Netherlands, Germany, Slovakia, Portugal, France and Spain

### **Most and least expensive countries**

- Least expensive: Finland (88% below EU average)
- Most expensive: Belgium (219% above EU average)

### **Greece insights**

- Price per GB: 23% above EU average
- Ranks 14th out of 21 countries
- 73% price decrease when 2017 is compared to 2014
- Ranks 8th in terms of data network download speed

## Greek bundled price evolution over time

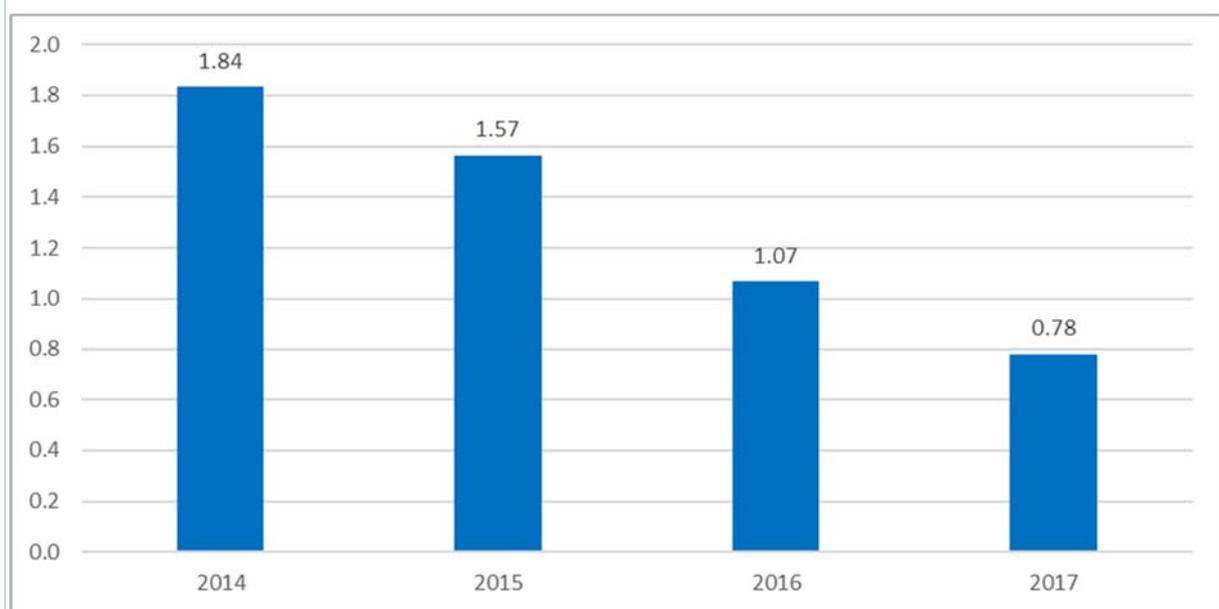
In this section, Greek unit prices (pre-tax) will be bundled and weighted by service revenue to show the evolution of the overall prices over time. This will help giving a like for likes comparison with the bundled basket approach used by the EC. *Quick reminder: that the EC's baskets are from the supply side and Ovum's are from the demand side and, as such, more representative.*

The weighted bundled price for Greece (pre-tax) were calculated as per the following

$$\frac{(price\ per\ min \times voice\ revenue) + (price\ per\ SMS \times SMS\ revenue) + (price\ per\ GB \times data\ revenue)}{(voice\ revenue + SMS\ revenue + data\ revenue)}$$

The prices were then rebased, with the first year in the study, 2014, representing 100 or full price.

**Figure 33: Greek bundled price evolution over time (Pre-tax)**



Source: Ovum

Greek bundled weighted prices show a significant decrease over time. A comparison of the 2017 figure to 2014 shows a 23.5% decrease in prices.

## Price-per-average basket analysis

As described in “Ovum’s Price of Average Basket Comparison”, the following equation is applied to calculate the average monthly price of a usage basket, for two user profiles (Greek user profile and EU user profile)

$$\begin{aligned}
 & \text{Average Monthly price per basket (€) of country} \\
 & = \text{Mins average user profile} \times \text{price per minute (country } x) \\
 & + \text{SMS average user profile} \times \text{price per SMS (country } x) \\
 & + \text{GBs average user profile} \times \text{price per GB (country } x)
 \end{aligned}$$

### Greek user profile

Based on the Greek user profile (total minutes, SMS and GBs that a Greek user spends in a month), the profile price was compared with the 21 EU countries to identify the cost for the same usage pattern in different countries.

What is the Greek profile?

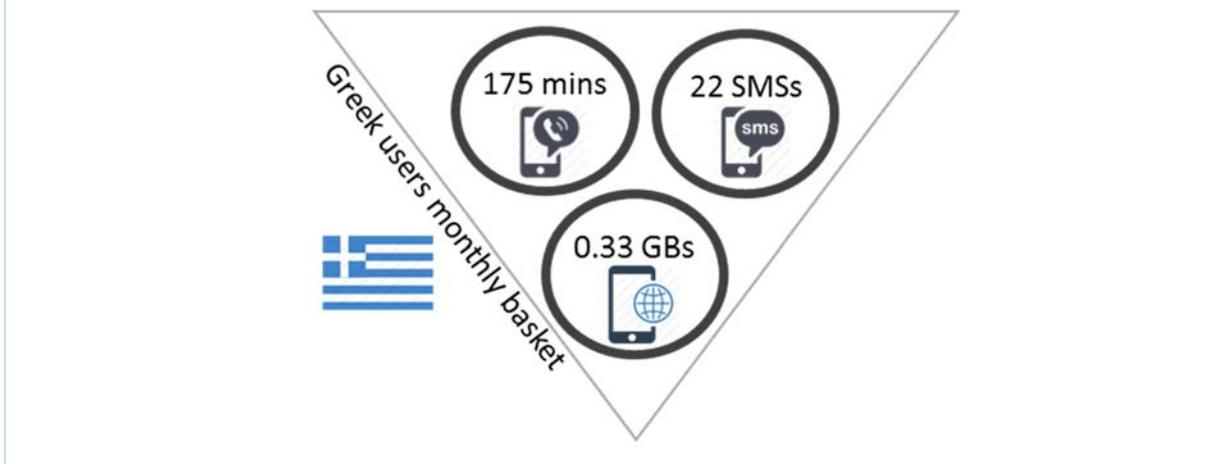
Figure 34 below shows the Greek monthly average profile on annual basis, for the period covered by this study. For example, the monthly average Greek user in 2017 used 172 voice minutes, 15 SMSs and 0.63 GBs.

**Figure 34: Greek average basket usage size across time**

Greece	2014	2015	2016	2017
# of mins	187	174	169	172
# of SMS	31	24	19	15
# GBs	0.13	0.22	0.33	0.63

In this analysis, the price of the average basket profile was compared with the 21 EU countries to analyze how much it would cost the average Greek users to maintain their same usage pattern in other countries.

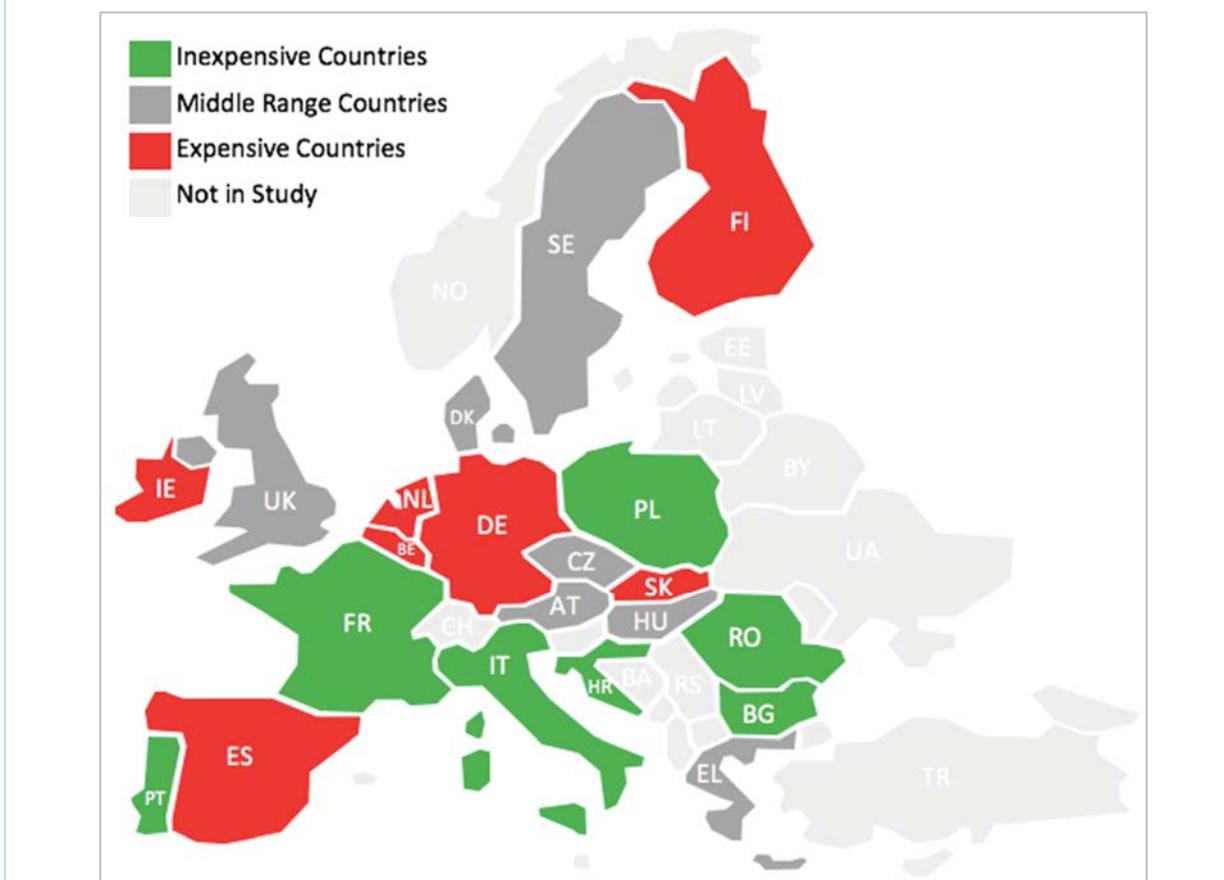
**Figure 35: Greek Monthly Average User Profile**



Source: Ovum

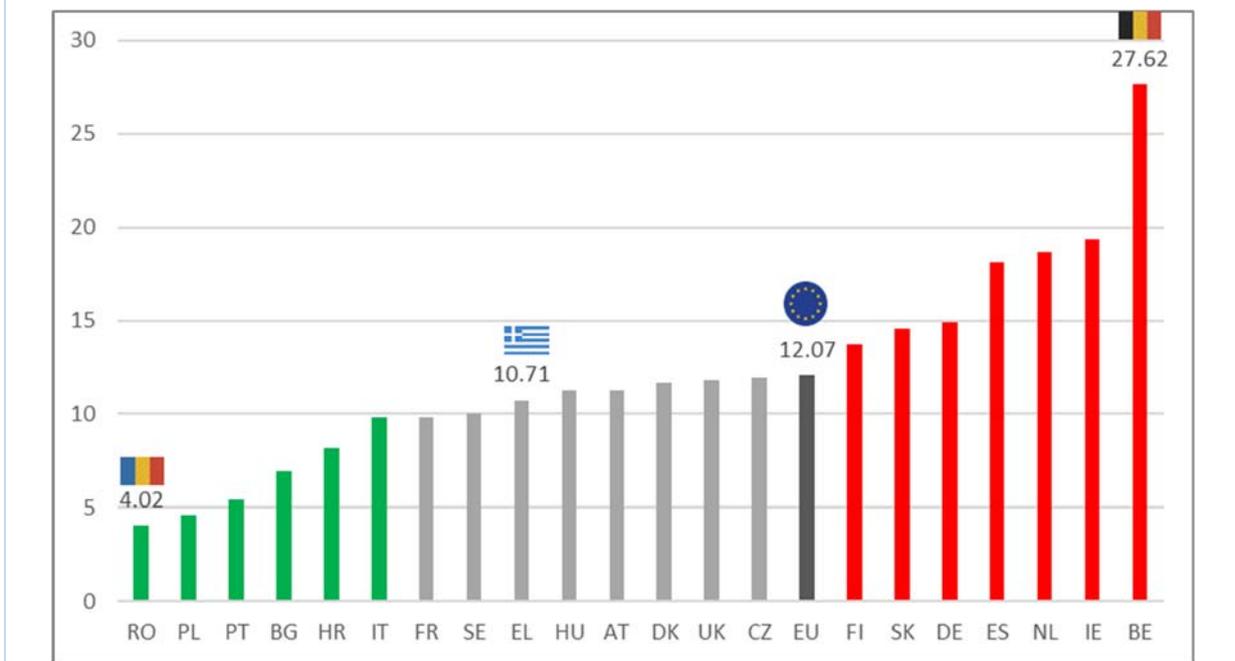
Over the years 2014 to 2017, the average monthly Greek profile consists of 175 voice minutes, 22 SMSs and 0.33 GBs. All of the comparisons in this section were based on absolute Euro figures.

**Figure 36: Cost for Greek User Profile in EU countries (2014-2017 avg.)**



Source: Ovum

**Figure 37: Monthly cost of Greek usage profile by pricing per country (2014-2017)**



Source: Ovum

**Figure 38: Monthly € cost of Greek usage profile by pricing per country (2014-2017)**

The Table is sorted from least expensive to most expensive based on the 2014-2017 average					
All numbers represent prices in €					
	Avg (2014-2017)	2014	2015	2016	2017
Romania	4.02	4.20	3.82	3.91	4.15
Poland	4.61	6.22	5.03	3.96	3.23
Portugal	5.39	6.75	5.64	4.74	4.45
Bulgaria	6.90	7.87	6.92	6.58	6.24
Croatia	8.14	9.83	7.82	7.60	7.30
Italy	9.77	11.03	9.59	9.22	9.25
France	9.79	12.16	10.18	8.84	7.97
Sweden	10.03	12.17	10.13	9.03	8.79
Greece	10.71	11.94	10.71	10.17	10.02
Hungary	11.20	12.73	11.45	10.48	10.16
Austria	11.25	12.79	11.60	10.77	9.82
Denmark	11.62	15.57	11.55	10.09	9.26
UK	11.77	14.24	13.00	10.12	9.72
Czech	11.89	13.81	12.56	10.92	10.27
<b>EU Average</b>	<b>12.07</b>	<b>14.17</b>	<b>12.27</b>	<b>11.14</b>	<b>10.69</b>
Finland	13.67	15.89	13.79	12.86	12.14
Slovakia	14.60			14.24	14.96
Germany	14.91	16.33	15.39	13.96	13.98
Spain	18.15	21.02	18.42	16.72	16.44
Netherlands	18.71	24.86	19.22	15.95	14.82
Ireland	19.35	22.74	19.29	17.75	17.60
Belgium	27.62	31.31	29.26	26.05	23.88

Figures 36, 37 and 38 support the following conclusions for Ovum's price comparison of the Greek user profile in the 21 EU countries:

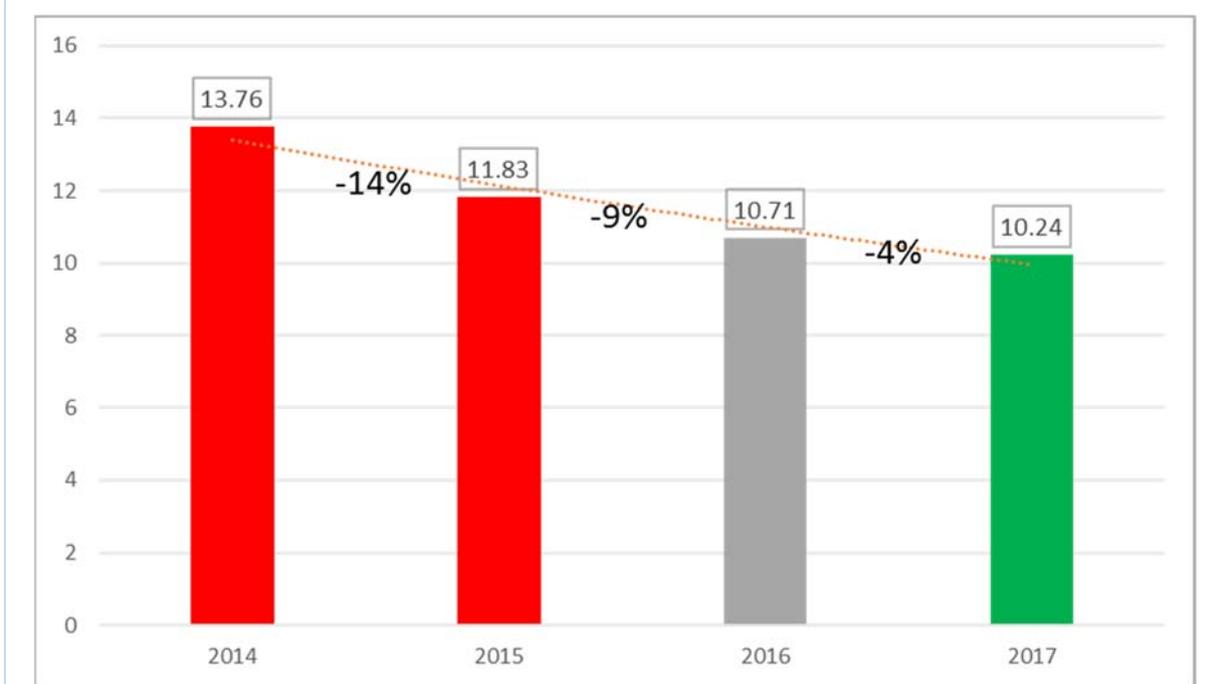
- The average price in the 21 EU countries included in this study is 12.07 €
- Greece falls in the **grey** category of middle-range countries with a price less than the average EU countries (10.71 €). It ranks 9<sup>th</sup> out of 21 countries.
- The **least expensive** country for the Greek user profile is Romania with a price of 4.02 €. The 7 least expensive countries are: Romania, Poland, Portugal, Bulgaria, Croatia, Italy and France. The average price for the **green** category is **6.95 €**
- The **grey category** countries are: Sweden, Greece, Hungary, Austria, Denmark, United Kingdom and Czech. The average price for the Greek user profile for the **grey** category countries is **11.21 €**

- The **most expensive** country is Belgium with a price of 27.62 €. The 7 most expensive countries are (ranked from most expensive): Belgium, Ireland, Netherlands, Spain, Germany, Slovakia and Finland. The average price for the **red** category is **18.15 €**

### **Greek User Profile Trend Analysis**

Greek profile prices across the 21 EU countries show a noticeable decrease across the period of study. A comparison of the 2017 prices with 2014 shows a 25% decrease in prices.

**Figure 39: Greek user monthly profile annual trend (average across the 21 EU countries)**

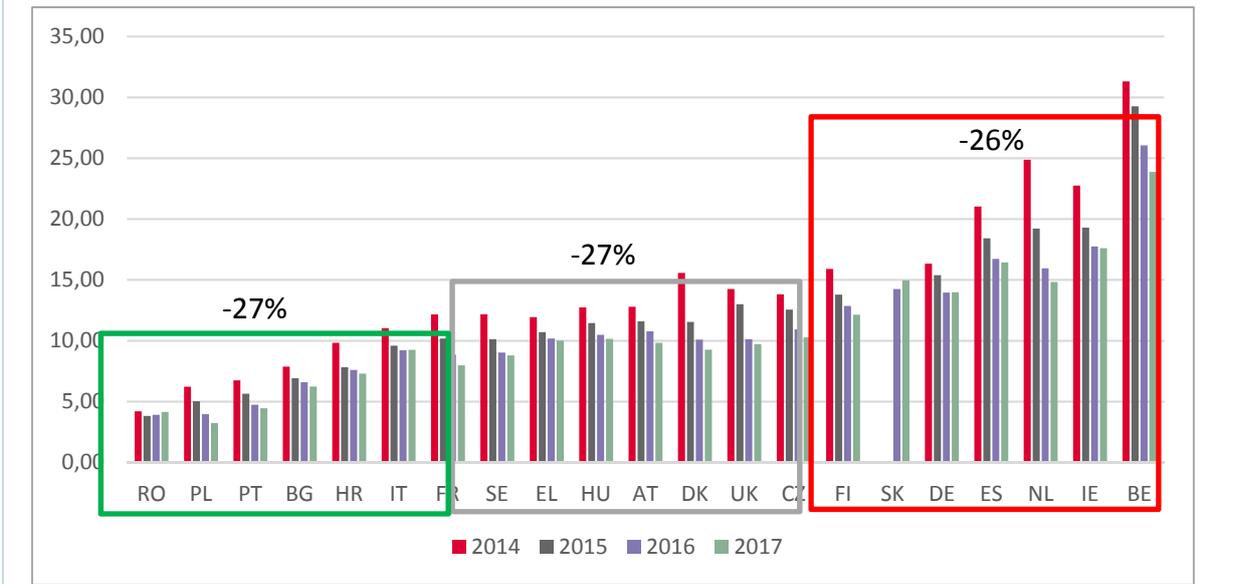


Source: Ovum

All other countries followed a decreasing trend in the price of the Greek average profile. Poland shows the highest decrease in 2017 compared to 2014 with 48% decrease, followed by Netherlands (40% decrease) and Denmark (40% decrease)

Grey and green category countries showed the highest price decrease with a rate of 27%. Red category countries show a decreasing trend at a rate of 26%.

**Figure 40: Greek monthly profile annual trend per country**



Source: Ovum

**Figure 41: Greece dashboard (price-per-basket for Greek user profile)**



Source: Ovum

### EU user profile

Based on the EU user profile (total minutes, SMS and GBs that EU users spend on average in a month), the profile price was compared with the 21 EU countries to demonstrate the cost for the same usage in different countries.

What is the average EU user profile?

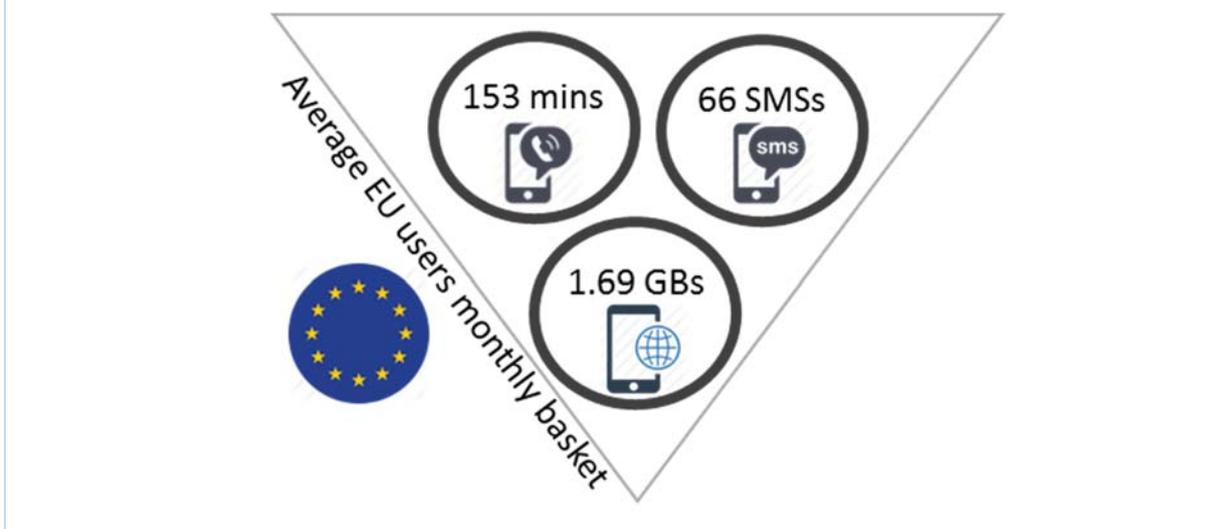
Figure 42 below shows the EU monthly average profile on an annual basis. For example, the average monthly EU user in 2017 used 161 voice minutes, 57 SMSs and 2.93 GBs.

**Figure 42: European average basket usage size across time**

EU Average	2014	2015	2016	2017
# of mins	145	150	154	161
# of SMS	74	69	62	57
# GBs	0.74	1.20	1.89	2.93

In this section, the average of the below average basket profile was compared among the 21 EU countries in order to analyze what would cost an average EU user if he used the same basket across EU countries.

**Figure 43: EU monthly average user profile**



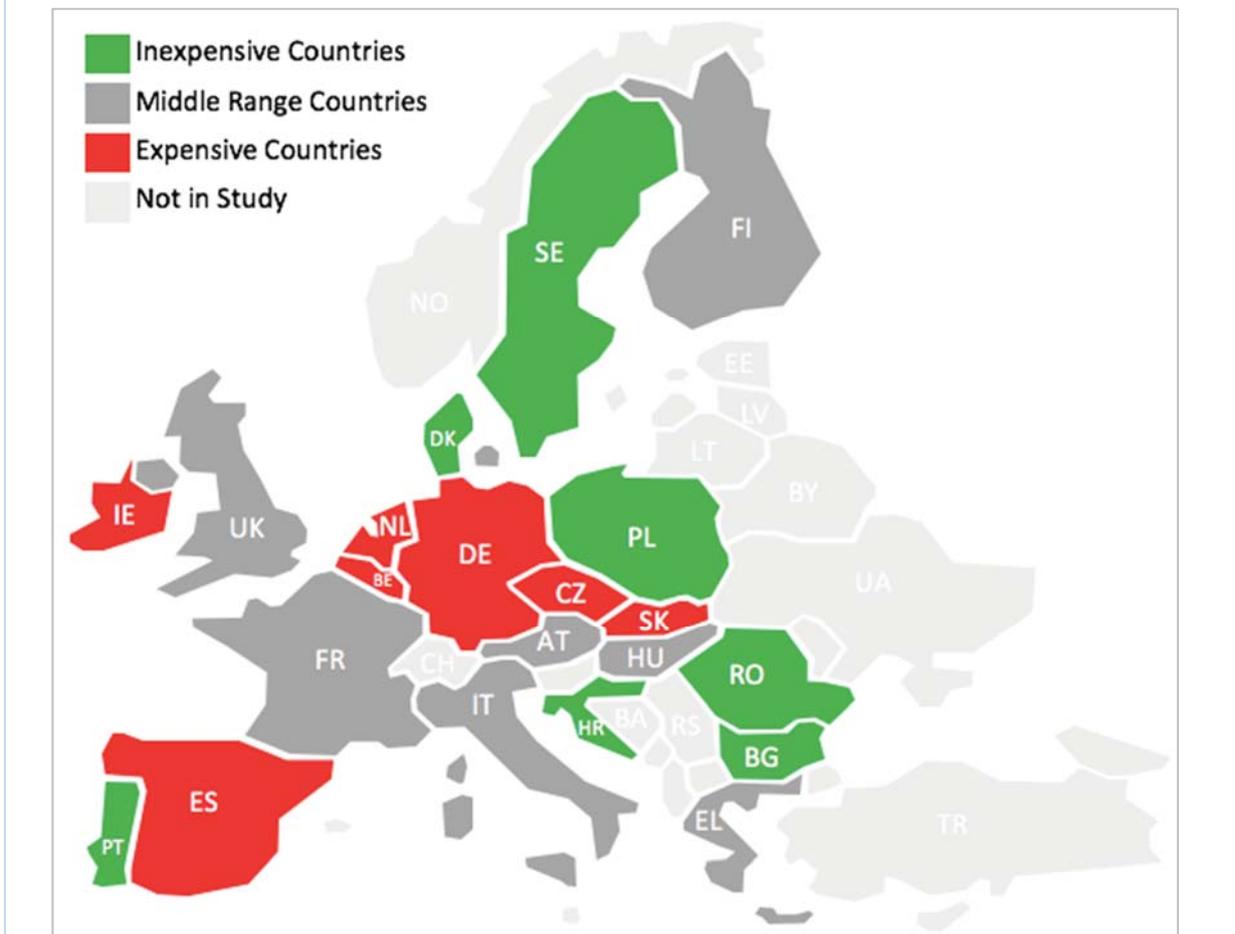
Source: Ovum

As previously demonstrated, over the years 2014 to 2017, the average monthly Greek profile consists of 175 voice minutes, 22 SMSs and 0.33 GBs. A comparison of the Greek profile to the average EU profile reveals that the Greek profile:

- has 23 more voice minutes monthly
- has 44 less SMSs monthly
- has 1.36 less GBs monthly

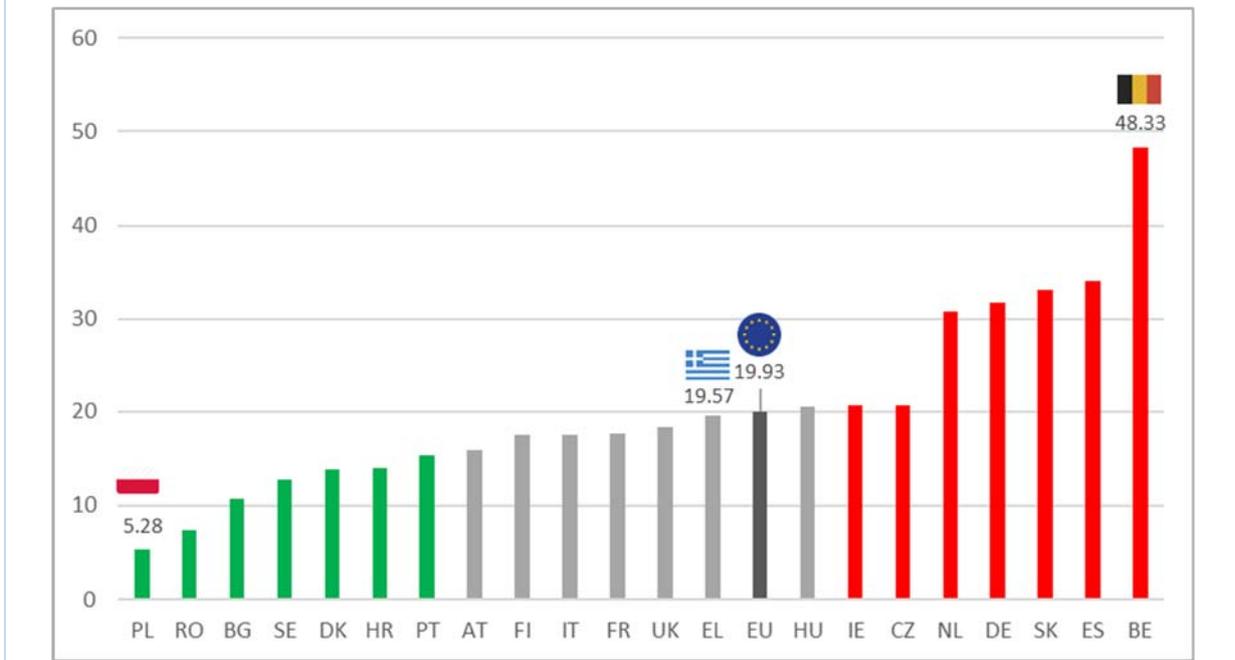
All comparisons in this section are based on absolute Euro figures.

**Figure 44: EU user profile price in EU countries (2014-2017 avg)**



Source: Ovum

**Figure 45: Monthly cost of average EU usage profile by pricing per country (2014-2017)**



Source: Ovum

**Figure 46: Monthly € cost of average EU usage profile by pricing per country (2014-2017)**

The Table is sorted from least expensive to most expensive based on the 2014-2017 average					
All numbers represent prices in €					
	Avg (2014-2017)	2014	2015	2016	2017
Poland	5.28	6.10	5.70	4.96	4.34
Romania	7.34	6.48	6.54	7.57	8.79
Bulgaria	10.62	9.33	10.28	11.24	11.63
Sweden	12.78	12.35	12.38	12.78	13.60
Denmark	13.86	15.78	13.57	12.94	13.17
Croatia	13.94	13.90	13.63	14.44	13.78
Portugal	15.26	13.51	16.19	16.08	15.25
Austria	15.80	15.88	16.05	15.95	15.35
Finland	17.51	17.96	17.16	17.21	17.73
Italy	17.57	15.04	16.34	18.24	20.66
France	17.63	19.79	18.63	17.60	14.51
UK	18.27	18.29	19.85	17.40	17.52
Greece	19.57	18.95	19.69	20.07	19.56
<b>EU Average</b>	<b>19.93</b>	<b>19.16</b>	<b>19.73</b>	<b>20.38</b>	<b>20.44</b>
Hungary	20.56	18.62	20.72	21.15	21.76
Ireland	20.65	21.63	20.61	20.25	20.10
Czech	20.68	20.43	22.15	20.48	19.65
Netherlands	30.74	35.53	32.04	27.32	28.06
Germany	31.74	28.04	30.59	32.41	35.90
Slovakia	33.05			32.18	33.92
Spain	34.12	32.63	33.33	33.90	36.60
Belgium	48.33	42.91	49.13	53.84	47.42

Source: Ovum

Figures 44, 45 and 46 support the following conclusions from Ovum's price comparison of the EU user profile in the 21 EU:

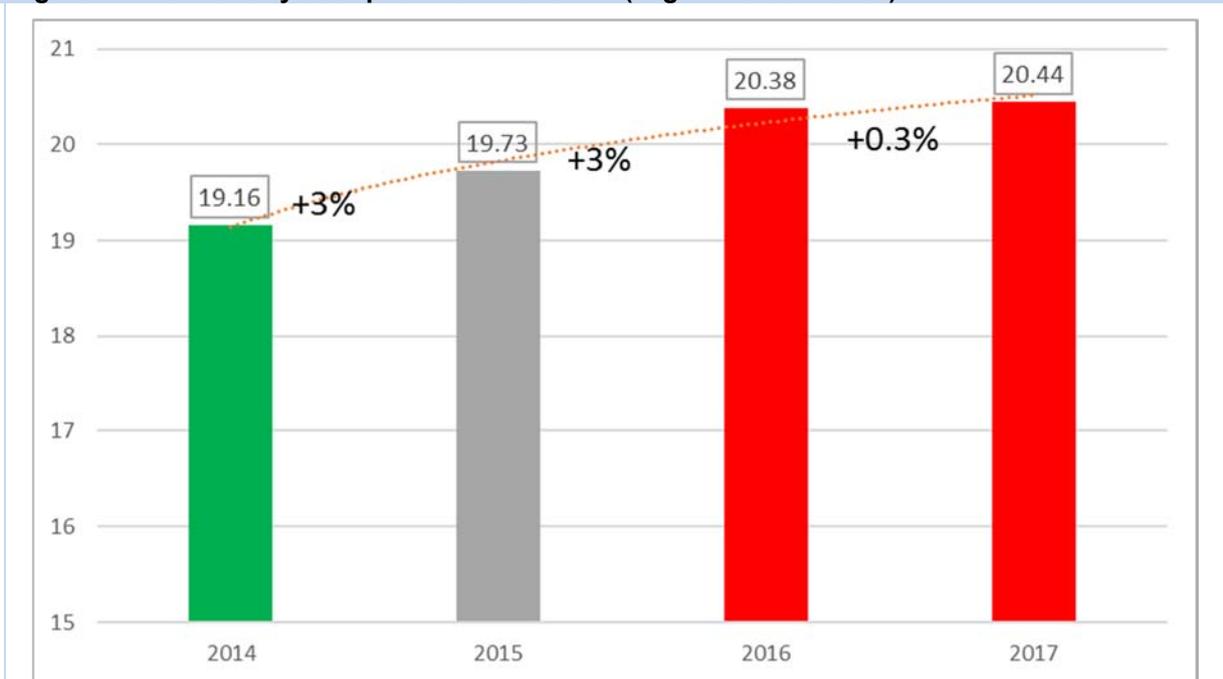
- The average price in the 21 EU countries included in this study is 19.93 €
- Greece falls in the **grey category** of middle-range countries with a price less than the EU average (19.57 €). It ranks 13<sup>th</sup> out of 21 countries.

- The **least expensive** country for the EU user profile is Poland with price of 5.28 €. The 7 least expensive countries are: Poland, Romania, Bulgaria, Sweden, Denmark, Croatia and Portugal. The average price for the EU user profile for the **green** category countries is **11.30 €**
- The **grey category** countries are: Austria, Finland, Italy, France, United Kingdom, Greece and Hungary. The average price for the EU user profile for the **grey** category countries is **18.13 €**
- The **most expensive** country is Belgium with a price of 48.33 €. The 7 most expensive countries are (ranked from most expensive to least): Belgium, Spain, Slovakia, Germany, Netherlands, Czech and Ireland. The average price for the EU user profile for the **red** category countries is **31.33 €**

### EU User Profile Trend Analysis

EU user profile prices across the 21 EU countries show a slight increase across the period of study. A comparison of the 2017 price-per-basket with 2014 shows a 7% increase in prices for the EU user profile.

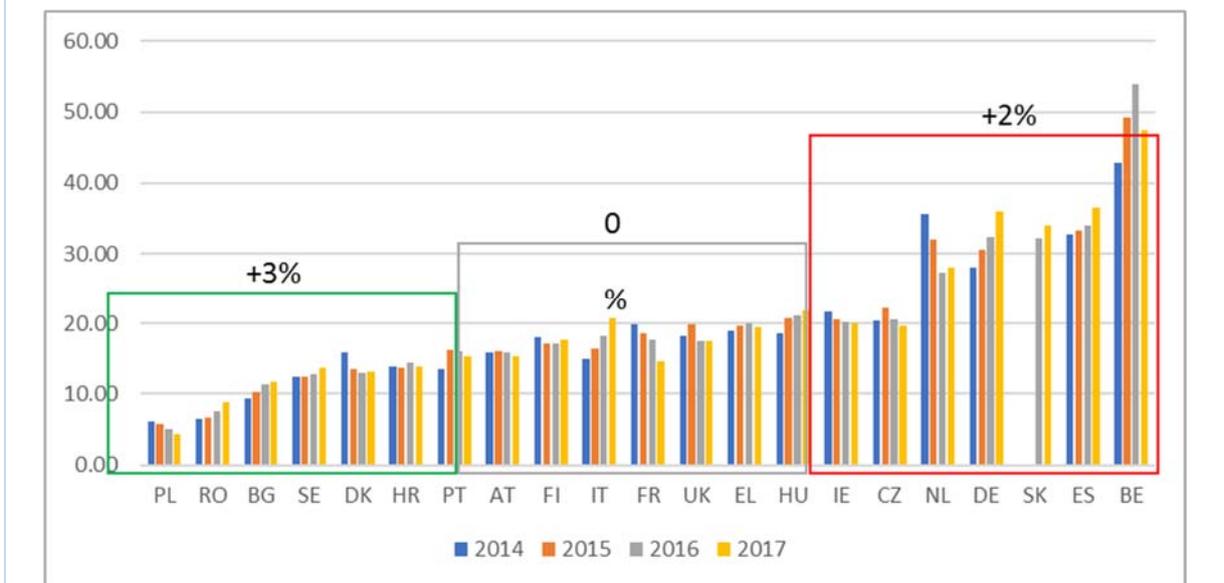
**Figure 47: EU monthly user profile annual trend (avg 21 EU countries)**



Source: Ovum

The main reason behind the increase in price-per-average basket of the EU profile is that this profile has a relatively high number of SMSs-per-user. Comparing the Greek profile to the EU profile shows 200% more SMSs in the EU profile. The SMS prices trend in EU countries shows a noticeable year-over-year increase as explained in the section “Price-per-SMS analysis”.

**Figure 48: EU user monthly profile annual trend per country**



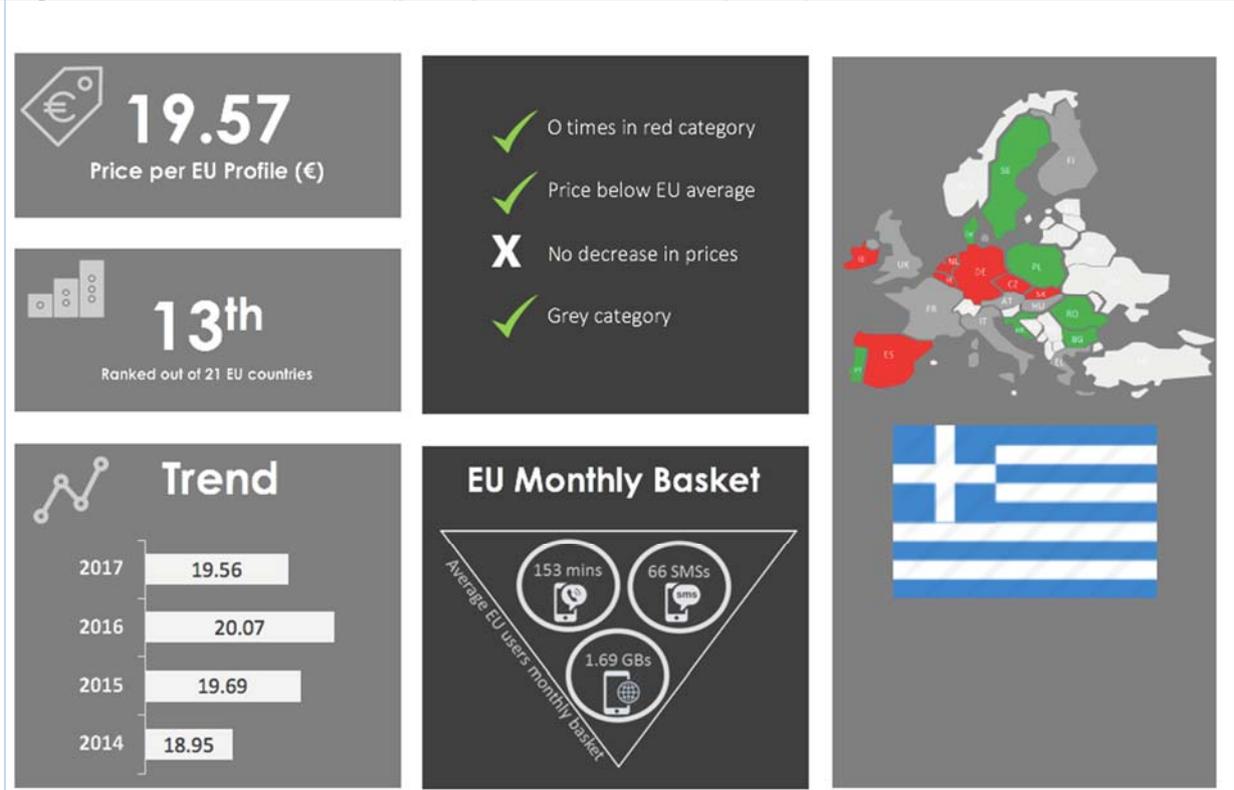
Source: Ovum

The highest price decrease when 2017 is compared to 2014 is seen in Poland (29% decrease) and France (27% decrease), followed by the Netherlands (21% decrease).

On the other hand, some countries show an increase in the price of average basket. Highest increase is in Italy (37% increase), followed by Romania (36% increase) and then Germany (28% increase).

Green category countries in Figure 48 above showed a price increase of 4%. Grey category countries showed a price decrease of 2%, while red category countries show a price increase of 5%.

**Figure 49: Greece dashboard (price-per-basket EU user profile)**



Source: Ovum

## Post-tax insights

This section shows the result of a comparison of the prices of the 21 EU countries with tax included to examine the effect of tax on overall prices to the end customer. The comparison was based on the rank change of each country after tax for each of the three services: voice, SMS and mobile broadband (GB), as well as for the average basket prices for both the Greek profile and the EU average profile.

### Price-per-minute

Figure 50 below shows a comparison of the price-per-minute before and after tax, with a comparison on the rank of each country. It is to be noted that there is no change in the price category for any of the 21 EU countries, however Greece's rank declines by 4 places after tax is added. This clearly reflects the unfairness of comparing bundles without removing the tax which has a significant impact on Greece's mobile prices, and as happens in the EC's [insert report name]. The rebased price-per-minute for Greece is 15% below the EU average for pre-tax prices and 5% below the EU average for post-tax prices.

**Figure 50: Post-Tax price-per-minute 2014-2017 rebased to European average**

Country	Rebased Price-per-minute (Pre-Tax)	Pre-Tax Rank	Rebased Price-per-minute (Post-Tax)	Post-Tax Rank	Rank Change
Portugal	30.94	1	30.89	1	0
Romania	32.87	2	32.50	2	0
Poland	44.63	3	44.56	3	0
Bulgaria	58.08	4	56.57	4	0
Croatia	66.6	5	71.63	5	0
Italy	74.14	6	73.42	6	0
France	81.27	7	80.19	7	0
Hungary	82.83	8	85.39	8	0
Greece	84.95	9	95.26	13	+4
Sweden	93.24	10	94.61	10	0
Czech	96.5	11	94.78	12	1
Germany	96.77	12	93.48	9	-3
Austria	97.22	13	94.70	11	-2
<b>EU Average</b>	<b>100</b>		<b>100</b>		
UK	100.64	14	98.12	14	0
Denmark	111.18	15	112.81	15	0
Slovakia	114.01	16	115.72	16	0
Finland	119.53	17	120.31	17	0
Spain	126.19	18	123.95	18	0
Netherlands	160.3	19	157.44	19	0
Ireland	195.18	20	194.87	20	0
Belgium	232.95	21	228.81	21	0

Source: Ovum

## Price-per-SMS

Figure 51 below shows a comparison of the price-per-SMS before and after tax, with a comparison on the rank of each country. It is to be noted that there is no change in the price category for any of the 21 EU countries, however Greece's rank falls by 1 place after tax is added. The rebased price-per-SMS for Greece is 19% below the EU average for pre-tax prices and 11% below the EU average for post-tax prices.

**Figure 51: Post-Tax price-per-SMS 2014-2017 rebased to European average**

Country	Rebased Price-per-SMS (Pre-Tax)	Pre-Tax Rank	Rebased Price-per-SMS (Post-Tax)	Post-Tax Rank	Rank Change
Portugal	10.83	1	10.85	1	0
Romania	11.17	2	11.06	2	0
France	16.38	3	16.21	3	0
Poland	17.39	4	17.42	4	0
Ireland	29.11	5	29.17	5	0
Belgium	38.96	6	38.39	6	0
Denmark	46.21	7	47.05	7	0
Netherlands	53.50	8	52.73	8	0
Croatia	55.31	9	59.68	9	0
Sweden	59.58	10	60.65	10	0
Bulgaria	73.69	11	72.02	11	0
UK	76.77	12	75.09	12	0
Greece	78.96	13	88.91	14	+1
Czech	81.46	14	80.28	13	-1
Slovakia	87.73	15	89.34	15	0
EU Average	100		100		
Austria	141.65	16	138.44	16	0
Italy	147.15	17	146.21	17	0
Hungary	159.88	18	165.37	18	0
Finland	208.49	19	210.55	19	0
Germany	302.66	20	293.33	20	0
Spain	403.12	21	397.26	21	0

Source: Ovum

## Price-per-GB

Figure 52 below shows a comparison of the price-per-GB before and after tax, with a comparison on the rank of each country. Ireland moves from the green category (least expensive) of the pre-tax price-per GB to the grey middle-range category for post-tax price. Greece's rank declines by 2 places after tax is added which moves Greece into the red category (most expensive) in the post-tax price-per-GB. As before, this clearly reflects the unfairness of comparing bundles in EU reports without removing the tax which has a significant impact on Greece's mobile prices. The rebased price-per-GB for Greece is 23% above the EU average for pre-tax prices and 40% above the EU average for post-tax prices.

**Figure 52: Post-Tax price-per-GB 2014-2017 rebased to European average**

Country	Rebased Price-per-GB (Pre-Tax)	Pre-Tax Rank	Rebased Price-per-GB (Post-Tax)	Post-Tax Rank	Rank Change
Finland	12.20	1	12.51	1	0
Poland	13.00	2	13.22	2	0
Sweden	35.14	3	36.32	3	0
Bulgaria	38.51	4	38.22	4	0
Denmark	39.65	5	40.98	5	0
Austria	43.29	6	42.96	6	0
Ireland	48.08	7	48.91	8	1
Romania	48.21	8	48.79	7	-1
Italy	76.83	9	77.51	9	0
Croatia	79.22	10	86.80	10	0
UK	87.51	11	86.92	11	0
Hungary	92.87	12	97.53	12	0
<b>EU Average</b>	<b>100</b>		<b>100</b>		<b>0</b>
Czech	121.54	13	121.62	13	0
Greece	122.80	14	140.13	16	2
Spain	133.53	15	133.61	14	-1
France	134.56	16	135.27	15	-1
Portugal	142.72	17	145.17	17	0
Slovakia	151.93	18	157.10	18	0
Germany	166.15	19	163.50	19	0
Netherlands	202.94	20	203.06	20	0
Belgium	318.89	21	319.09	21	0

Source: Ovum

## Greek bundled price evolution over time

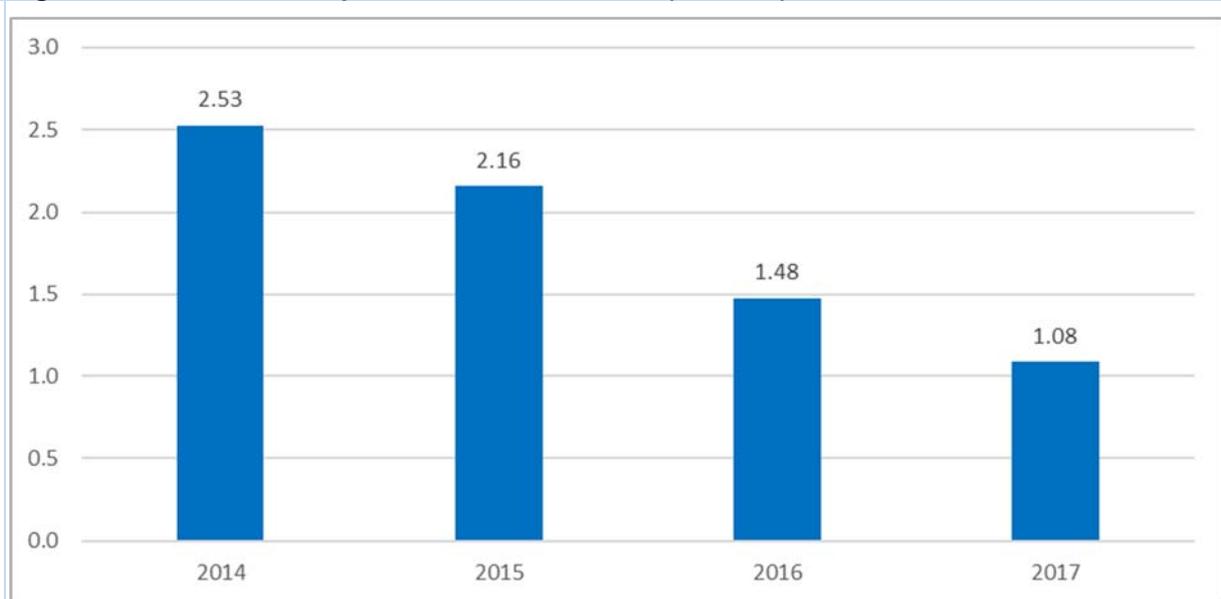
Greek unit prices (post-tax) were bundled and weighted by service revenue, to show the evolution of the overall prices over time.

The weighted bundled price for Greece (post-tax) is calculated as per the following

$$\frac{(price\ per\ min \times voice\ revenue) + (price\ per\ SMS \times SMS\ revenue) + (price\ per\ GB \times data\ revenue)}{(voice\ revenue + SMS\ revenue + data\ revenue)}$$

The prices were then rebased using the first year of the study, 2014, as the base year representing 100 or full price.

**Figure 53: Greek bundled price evolution over time (Post-tax)**



Source: Ovum

Greek bundled weighted prices show a significant decrease over time. The comparison of the 2017 and 2014 figures shows a 22.8% decrease in prices over this period.

## Price-per-average basket (Greek user profile)

Figure 54 below shows a comparison of the average basket price (Greek user profile) before and after tax, with a comparison on the rank of each country. It should be noted that there are 10 countries with a rank change, with Greece showing the biggest rank decline, dropping 5 places (from 9<sup>th</sup> to 14<sup>th</sup>) after tax is added. Once again, this clearly reflects the unfairness of comparing bundles, as happens in the EC's [insert report name], without removing the tax which has a significant impact on Greece's mobile prices.

**Figure 54: Monthly post-tax € cost of Greek usage profile by pricing per country (2014-2017)**

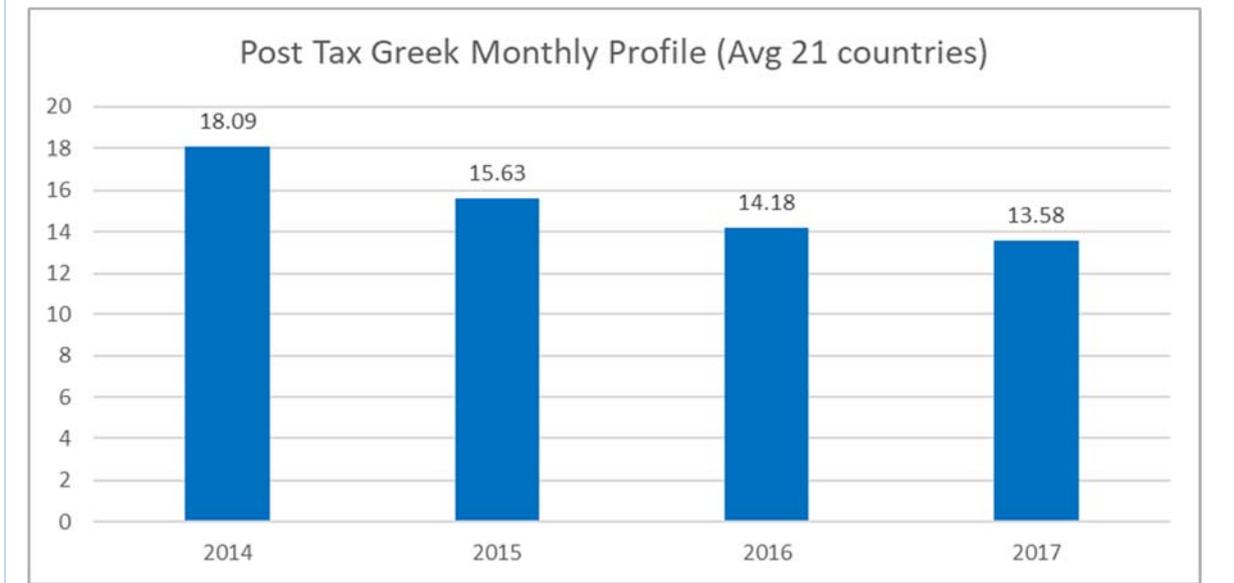
	Average user basket (Greek user profile) Unit price: €				
	Pre-Tax Avg (2014-2017)	Post-Tax Avg (2014-2017)	Pre-Tax Rank	Post-Tax Rank	Rank Change
Romania	4.02	4.89	1	1	0
Poland	4.61	5.67	2	2	0
Portugal	5.39	6.64	3	3	0
Bulgaria	6.90	8.28	4	4	0
Croatia	8.14	10.78	5	5	0
Italy	9.77	11.92	6	7	+1
France	9.79	11.90	7	6	-1
Sweden	10.03	12.54	8	8	0
Greece	10.71	14.80	9	14	+5
Hungary	11.20	14.23	10	11	+1
Austria	11.25	13.50	11	9	-2
Denmark	11.62	14.52	12	13	+1
UK	11.77	14.14	13	10	-3
Czech	11.89	14.39	14	12	-2
<b>EU Average</b>	<b>12.07</b>	<b>14.90</b>			
Finland	13.67	16.95	15	15	0
Slovakia	14.60	18.25	16	17	+1
Germany	14.91	17.75	17	16	-1
Spain	18.15	21.96	18	18	0
Netherlands	18.71	22.64	19	19	0
Ireland	19.35	23.80	20	20	0
Belgium	27.62	33.43	21	21	0

Source: Ovum

### **Post-Tax Greek User Profile Trend Analysis**

The Greek user profile price (post-tax) across the 21 EU countries shows a noticeable decrease over the period of study. A comparison of the 2017 price to 2014 shows a 25% decrease in prices over the period.

**Figure 55: Post-Tax Greek user monthly profile annual trend based on the average of prices on the 21 EU countries of the study**



Source: Ovum

Greece post-tax basket prices, not shown in graph, (based on the Greek user profile) also saw a noticeable decrease in prices, with a 15% decrease when 2017 is compared to 2014.

## Price-per-average basket (EU user profile)

Figure 56 below shows a comparison of the average basket price (EU profile) before and after tax, with a comparison on the rank of each country. It can be noticed that there are 8 countries with a rank change, with Greece showing the biggest fall in rank (3 places) after tax is added. This clearly reflects the unfairness of comparing bundles in EU reports without removing the tax which has a significant impact on Greece's mobile prices. Greece's rank declined from 13<sup>th</sup> to 16<sup>th</sup> and thus moved from the grey category (pre-tax) to the red category (post-tax).

**Figure 56: Post-Tax monthly € cost of average EU usage profile by pricing per country (2014-2017)**

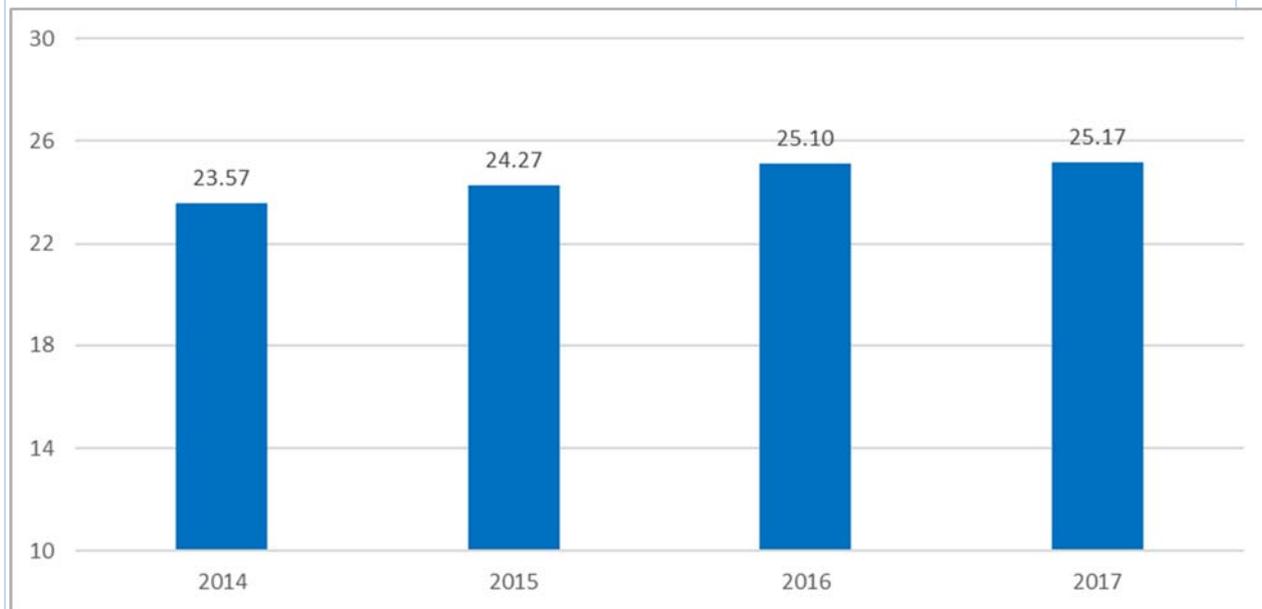
	Average user basket (EU user profile)				
	Unit price: €				
	Pre-Tax Avg (2014-2017)	Post-Tax Avg (2014-2017)	Pre-Tax Rank	Post-Tax Rank	Rank Change
Poland	5.28	6.49	1	1	0
Romania	7.34	8.92	2	2	0
Bulgaria	10.62	12.74	3	3	0
Sweden	12.78	15.97	4	4	0
Denmark	13.86	17.33	5	5	0
Croatia	13.94	18.47	6	6	0
Portugal	15.26	18.76	7	7	0
Austria	15.80	18.97	8	8	0
Finland	17.51	21.72	9	11	+2
Italy	17.57	21.43	10	10	0
France	17.63	21.43	11	9	-2
UK	18.27	21.94	12	12	0
Greece	19.57	27.04	13	16	+3
<b>EU Average<sup>5</sup></b>	<b>19.93</b>	<b>24.53</b>			
Hungary	20.56	26.11	14	15	+1
Ireland	20.65	25.40	15	14	-1
Czech	20.68	25.02	16	13	-3
Netherlands	30.74	37.19	17	17	0
Germany	31.74	37.77	18	18	0
Slovakia	33.05	41.32	19	20	+1
Spain	34.12	41.28	20	19	-1
Belgium	48.33	58.47	21	21	0

Source: Ovum

**Post-Tax EU User Profile Trend Analysis**

EU profile prices (post-tax) across the 21 EU countries shows slight increase across the period of study. Comparing 2017 price with 2014 shows 7% increase in prices.

**Figure 57: Post-Tax EU user monthly profile annual trend based on the average of prices on the 21 EU countries of the study**



Source: Ovum

The main reason behind the increase in price-per-average basket of the EU profile is that this profile has a relatively high number of SMSs-per-user. A comparison of the Greek profile to the EU profile shows 200% more SMSs in the EU profile. The SMS prices trend in the EU countries show a noticeable year over year increase as explained in section “Price-per-SMS analysis”.

Greece’s post tax basket prices, not shown in graph, (based on EU users profile) also saw a slight 4% increase in prices in 2017 compared to 2014.

## Mobile broadband quality assessment

This section shows a comparison of mobile data quality in the 21 countries based on two indicators: Download speed and Upload speed

The source for the data used in the comparison is speedtest.net provided by OOKLA.

To compare download and upload speeds, the following categories were used:

**Figure 58: Benchmark to compare download and upload speeds against**

Download Speed ↓		Upload Speed ↑	
Category	Range	Category	Range
Very high speed	>= 40Mbps	Very high speed	>= 15Mbps
Relatively high speed	>=30Mbps & <40Mbps	Relatively high speed	>=10Mbps & <15Mbps
Slow speed	<30Mbps	Slow speed	<10Mbps

Source: speedtest.com / Ookla

According to a report published by speedtest in December 2017 (*The World's Internet Speeds Increased More than 30% in 2017. Are You Keeping Up?*), the world's mobile download speed increased by 30.1% in 2017 and mobile upload speeds increased by 38.9%.

In November 2017, 119 countries boasted a faster mobile download speed than the global average while 134 countries had a slower. Among the EU countries, Cyprus showed the highest increase (90.2%).

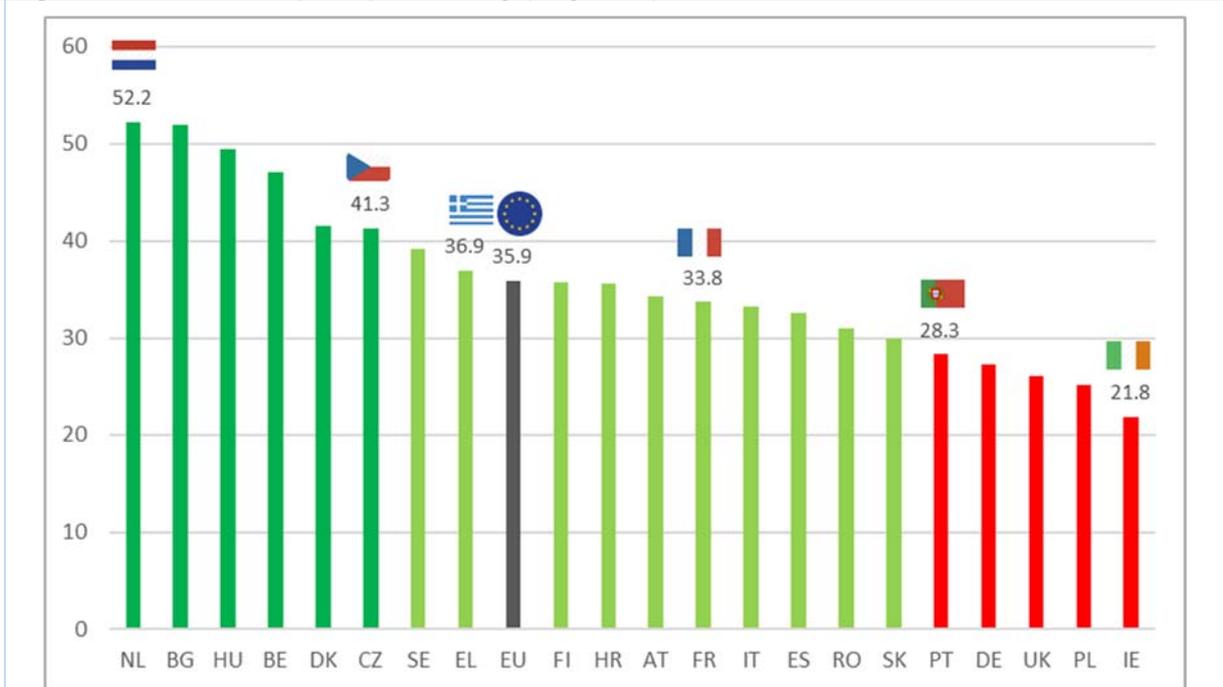
The speed comparisons provided in this chapter were based on data collected for the month of May 2018 for the 21 EU countries included in this study.

It is worth mentioning that worldwide, the highest download speed in May 2018 was recorded in Norway (62.7 Mbps) and the lowest was in Libya (4.31 Mbps).

Greece ranked 22<sup>nd</sup> worldwide for the download speed indicating a fast-mobile download speed network which reflects the big investment mobile operators in Greece are undertaking on a continuous basis to provide the best possible network quality with highly competitive prices relative to other European countries. A comparison of May 2017 download speeds with May 2018 download speed shows that Greece had an improvement of around 22%.

Figures 59 and 60 compare the download and upload speeds of the 21 EU countries included in this study by applying the category distribution shown in Figure 58.

**Figure 59: Download speed-per-country (May 2018)**

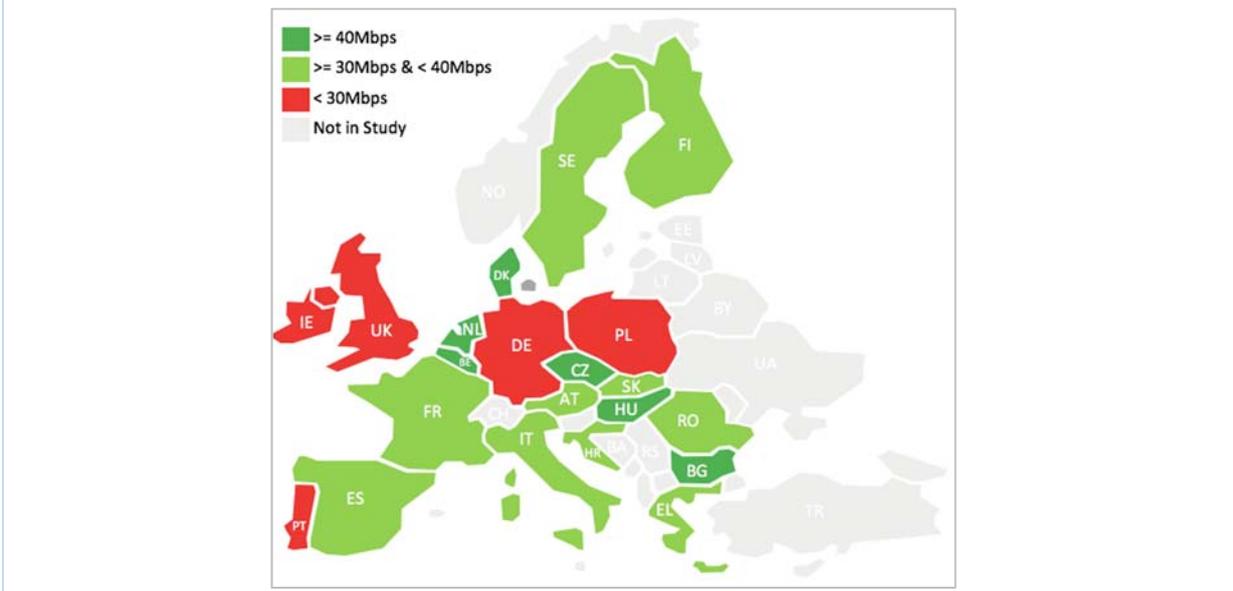


Source: Ovum & speedtest.com

Figure 59 above shows us that:

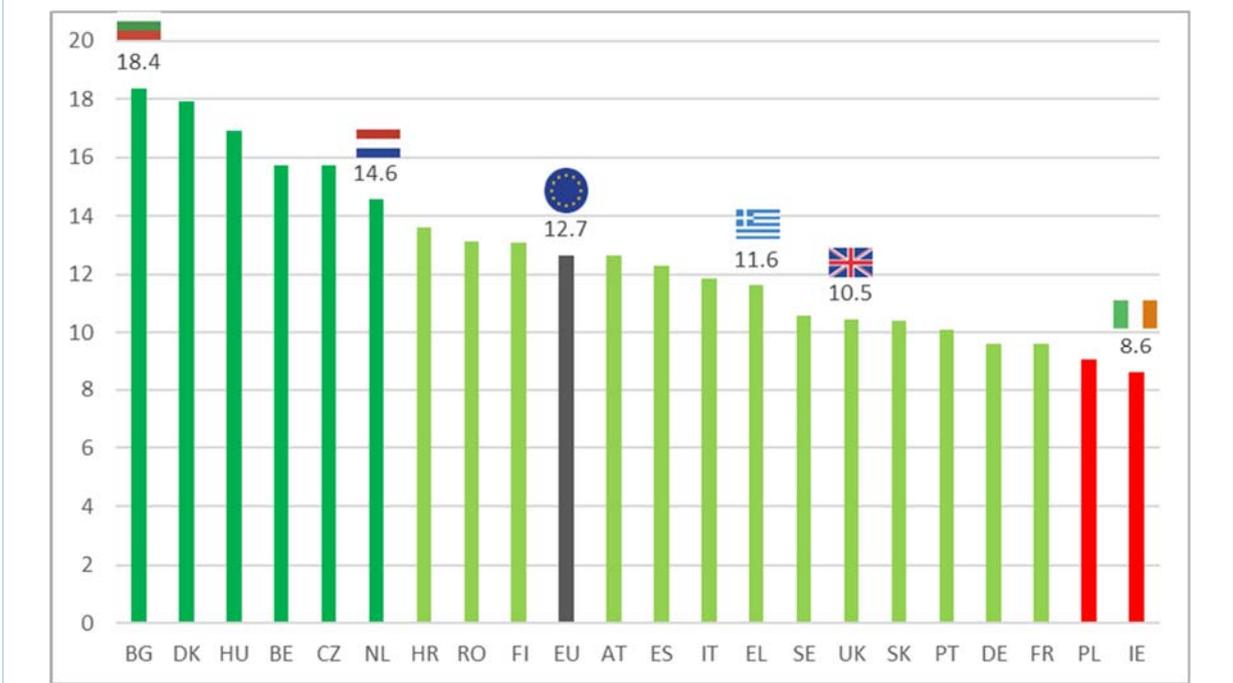
- The average download speed for the 21 EU countries included in this study is 35.9 Mbps.
- Greece’s download speed is relatively high (36.9 Mbps) and faster than the EU average. It ranks 8<sup>th</sup> in terms of download speed out of the 21 EU countries.
- The **fastest** country in download speed is the Netherlands with a speed of 52.2 Mbps. The fastest countries belonging to the “very high speed” dark green category are: Netherlands, Bulgaria, Hungary, Belgium, Denmark and Czech. The average download speed of the **dark green** category is **47.2 Mbps**.
- The “relatively high speed” **light green** countries are: Sweden, Greece, Finland, Croatia, Austria, France, Italy, Spain and Romania. The average download speed of the **light green** category is **32.6 Mbps**.
- The **slowest** country in terms of download speed is Ireland with a speed of 21.78 Mbps. The slowest countries which fall into the “slow speed” **red** category are (ranked from slow to faster): Ireland, Poland, United Kingdom, Germany and Portugal. The average download speed of the **red** category is **25.7 Mbps**.

**Figure 60: Download speed category per country**



Source: Ovum

**Figure 61: Upload speed per country (May 2018)**

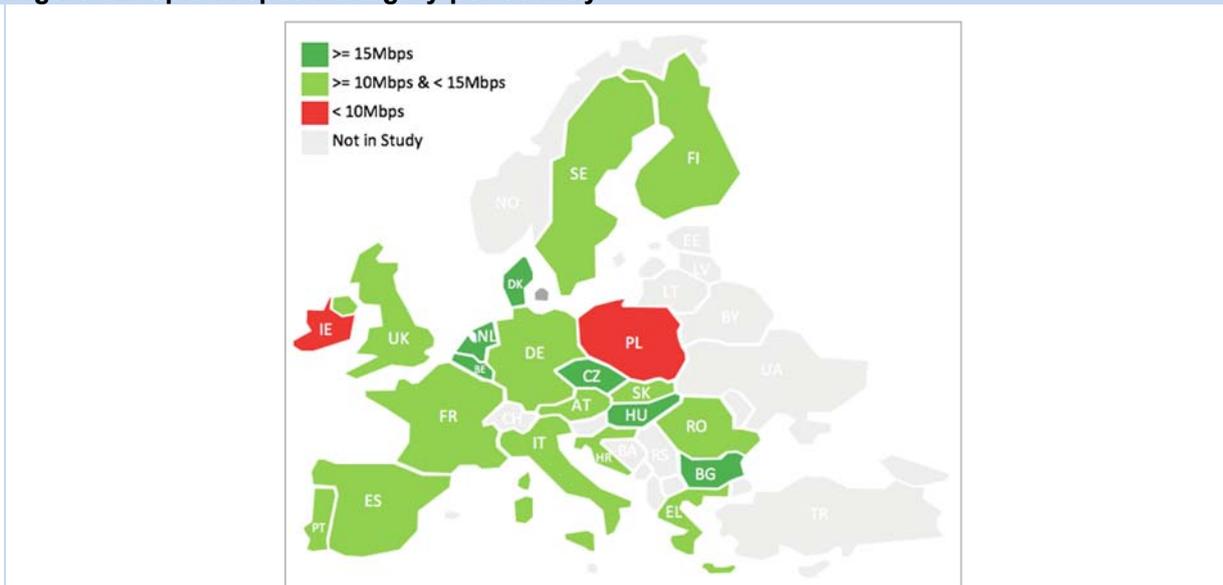


Source: Ovum

Analysis of Figure 60 and Figure 61 above demonstrates that:

- The average upload speed for the 21 EU countries included in this study is 12.7 Mbps
- Greece's upload speed is relatively high (11.6 Mbps) but slower than the EU average. It ranks 13<sup>th</sup> in terms of upload speed out of 21 EU countries.
- The **fastest** country in Upload speed is Bulgaria with a speed of 18.4 Mbps. The fastest countries belonging to the “very high speed” dark green category are: Bulgaria, Denmark, Hungary, Belgium, Czech and Netherlands. The average upload speed of the **dark green** category is **16.5 Mbps**.
- The “relatively high speed” **light green** countries are: Croatia, Romania, Finland, Austria, Spain, Italy, Greece, Sweden, UK, Slovakia, Portugal, Germany and France. The average upload speed of the **light green** category is **11.5 Mbps**.
- The **slowest** country in terms of upload speed is Ireland with a speed of 8.6 Mbps. The slowest countries which fall in the red category are (ranked from slow to faster): Ireland and Poland. The average upload speed of the **red** category is **8.8 Mbps**.

**Figure 62: Upload speed category-per-country**



Source: Ovum

## Conclusion

Greece was perceived to have expensive mobile prices due to a study performed by the European Commission mainly because the country comparisons of that study were based on bundles which contained pre-defined baskets of voice minutes, SMS and data in MB. Such comparisons do not take into consideration out of bundle usage, add-on offers (minutes, SMS, and data) that operators provide over and above the provided bundles and also ignore the special discounts offered depending on usage. As such, the calculations on which the comparisons were based do not represent the total traffic going through the networks in a given country.

In this Ovum report, a detailed comparison of the European mobile markets is provided based on the actual prices of minutes, SMS and data. This is achieved by carefully considering two main components: (Details provided in the Methodology section)

1. The actual revenue-per-country split into voice, SMS and data
2. The network recorded quantities of minutes, SMS and data-per-country

Such a methodology allows for a fair comparison of representative prices in the region by reflecting the real price that a consumer pays for consumed mobile services rather than comparing bundles which do not necessarily provides a fair comparison based on actual usage patterns. This can be the case where operators provide extra free allowances and discounts based on pre-defined criteria.

Therefore, the comparisons carried out in this study are based on the price of actual consumption and not on what is sold. Specifically, a consumer might use less than what they buy (i.e. what is sold to them) and not consume the whole bundle, whereas another consumer might consume more than what is in the bundle (freebies, bolt-ons and out of bundle usage). Such cases demonstrate that price comparisons which are based on what is sold rather than what is actually consumed are highly distorted.

Moreover, the methodology utilized in this study is universal and agnostic of prepaid/postpaid bundles which are sample based in essence. Therefore, the study is representative of all types of customer segments while providing the actual average pricing based on consumed services.

A summary of the advantages of the methodology followed in this study for comparing prices relative to the European Commission study includes:

- Integrated approach, covers all customers and all services and measures the actual prices paid
- Use of the actual financial statements of the providers as reported to the European regulatory authorities for the period 2014-2017
- Aggregation of all services in a basket that is based on the actual usage of the average Greek consumer
- Comparison with the EC study on mobile prices. The EC study is based on specific baskets that are neither inclusive of all customers nor representative of the usage pattern of the Greek consumer, while it compares prices from websites that do not include all discounts and offers as per the commercial policy available to consumers.

The 21 EU countries included in this study were divided into three categories based on their rank of price-per-unit according to the following table:

Category	Color Code	Description
Least expensive		7 least expensive countries
Middle range		7 countries that fall in the middle
Most expensive		7 most expensive countries

The comparisons made in this study reveal that Greece always falls in the grey category (Middle range countries) for all the services: voice, SMS, data and average basket. The table below shows the exact rank of Greece out of the 21 countries regarding 5 types of comparisons for each of both pre-tax and post-tax cases.

The comparison criteria for the price-per-unit (minute, SMS, GB) is based on rebasing the actual price relatively to the EU average. The method applied is by setting the EU average of the years 2014-2017 to 100, and then rebasing the price-per-unit for each country relative to that number. For the comparisons of the basket profiles, absolute figures are used.

Unit Comparison	Rank (Out of 21)	Greece Price	EU Average
Voice	Pre-Tax: 9 <sup>th</sup> Post-Tax: 13 <sup>th</sup>	Rebased Pre-Tax: 84 Rebased Post-Tax: 95	Rebased Pre-Tax: 100 Rebased Post-Tax: 100
SMS	Pre-Tax: 13 <sup>th</sup> Post-Tax: 14 <sup>th</sup>	Rebased Pre-Tax: 79 Rebased Post-Tax: 89	Rebased Pre-Tax: 100 Rebased Post-Tax: 100
Mobile Data	Pre-Tax: 14 <sup>th</sup> Post-Tax: 16 <sup>th</sup>	Rebased Pre-Tax: 122 Rebased Post-Tax: 140	Rebased Pre-Tax: 100 Rebased Post-Tax: 100
Average Basket (Greek Profile)	Pre-Tax: 9 <sup>th</sup> Post-Tax: 14 <sup>th</sup>	Pre-Tax: 10.71 € Post-Tax: 14.80 €	Pre-Tax: 12.07 € Post-Tax: 14.90 €

The post-tax analysis shows clearly the impact of taxes in Greece on mobile usage prices. Therefore, comparisons on the basis of post-tax only (as per the EC methodology) result in distorted conclusions as they do not take into account the high taxes imposed by the Greek government due to the negative financial and economic environments which have had a significant impact on all industries in the country, not only the telecom sector.

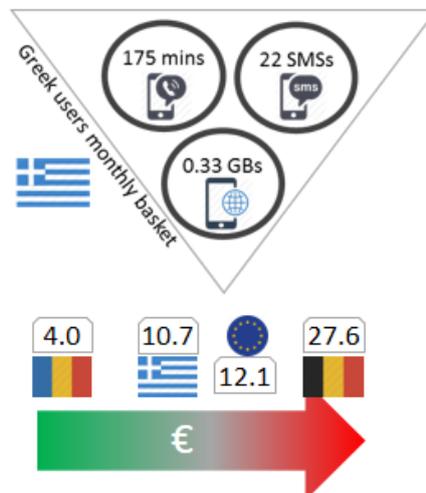
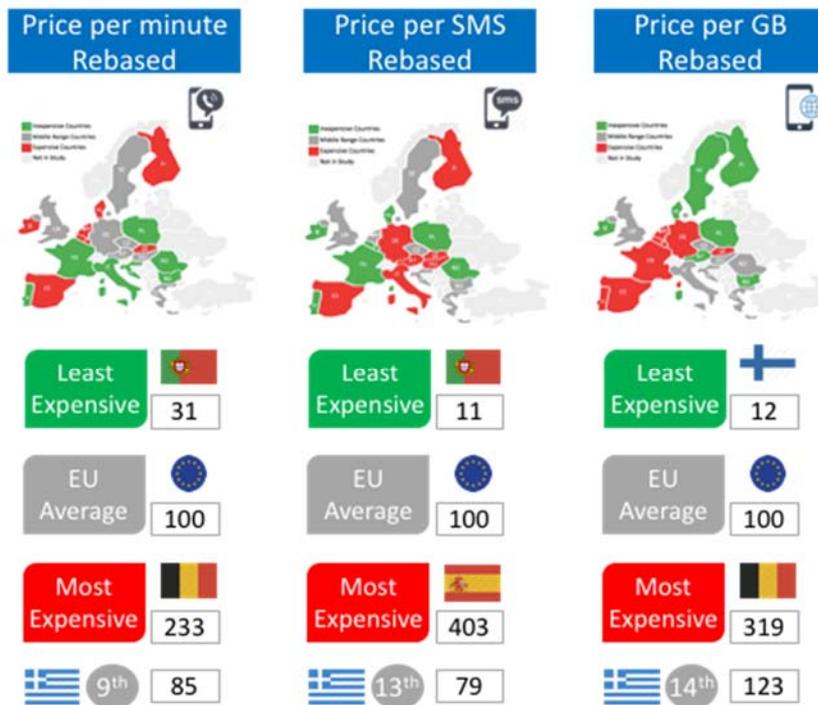
In terms of network quality, mobile data speeds are the best indicators for a fair comparison among the 21 markets of this study. In an era where call complete rates, population coverage by technology and network uptime rates are nearly identical in all markets at the high 90%, actual data speeds become the differentiator and Greece is doing particularly well in this respect. Specifically, Greece is right at the European average (ranked 8<sup>th</sup> out of 21 countries) in terms of download speeds and 4

countries below the average (13<sup>th</sup> out of 21) in terms of upload speeds. This comes despite a decade of austerity measures by the Greek government and is a clear indication that despite economic hardship the industry has been successful in investing in networks and in giving its customers value for their money.

## Appendix

Summary of report findings in infographic-format

### 21 EU Countries Pre-Tax



# 21 EU Countries

Post-Tax



### Price per minute Rebased



Least Expensive		31
EU Average		100
Most Expensive		229
		13 <sup>th</sup> 95

### Price per SMS Rebased

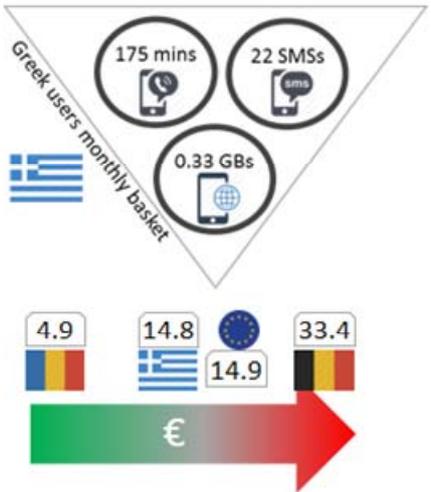


Least Expensive		11
EU Average		100
Most Expensive		397
		14 <sup>th</sup> 89

### Price per GB Rebased



Least Expensive		13
EU Average		100
Most Expensive		319
		16 <sup>th</sup> 140



## Price-per-service (in absolute values)

- Price-per-minute

The Table is sorted from least expensive to most expensive based on the 2014-2017 average					
All numbers represent price-per-minute in €/min					
	Avg (2014-2017)	2014	2015	2016	2017
Portugal	1.65	2.63	1.81	1.31	0.85
Romania	1.75	1.83	1.76	1.78	1.64
Poland	2.38	3.08	2.65	2.13	1.65
Bulgaria	3.10	3.58	3.18	3.01	2.62
Croatia	3.55	4.27	3.43	3.40	3.10
Italy	3.95	4.70	4.07	3.78	3.25
France	4.33	5.23	4.57	4.01	3.53
Hungary	4.42	4.95	4.58	4.31	3.83
Greece	4.53	4.96	4.60	4.43	4.13
Sweden	4.97	5.93	5.19	4.57	4.19
Czech	5.15	5.82	5.50	4.93	4.33
Germany	5.16	5.97	5.69	4.89	4.09
Austria	5.18	5.58	5.42	5.17	4.56
EU Average	5.33	6.24	5.60	5.03	4.45
UK	5.37	6.35	6.08	4.77	4.27
Denmark	5.93	7.68	6.03	5.37	4.63
Slovakia	6.08	6.65	6.33	5.81	5.52
Finland	6.37	6.81	6.55	6.34	5.79
Spain	6.73	7.87	7.00	6.41	5.64
Netherlands	8.55	11.20	8.94	7.70	6.35
Ireland	10.41	11.57	10.51	9.91	9.63
Belgium	12.42	14.45	13.74	11.55	9.95

- Price-per-SMS

The Table is sorted from least expensive to most expensive based on the 2014-2017 average All numbers represent price-per-SMS in €/SMS					
	Avg (2014-2017)	2014	2015	2016	2017
Portugal	0.54	0.51	0.50	0.56	0.59
Romania	0.56	0.50	0.51	0.59	0.63
France	0.82	1.09	0.91	0.68	0.58
Poland	0.87	0.91	0.90	0.85	0.82
Ireland	1.45	1.20	1.31	1.60	1.69
Belgium	1.94	1.91	1.94	2.03	1.89
Denmark	2.30	2.05	2.15	2.41	2.60
Netherlands	2.67	2.49	2.66	2.69	2.84
Croatia	2.76	2.60	2.75	2.89	2.79
Sweden	2.97	2.25	2.39	3.63	3.61
Bulgaria	3.67	2.42	3.38	4.09	4.81
UK	3.83	4.17	4.24	3.59	3.31
Greece	3.94	3.15	3.45	4.28	4.87
Czech	4.06	4.33	4.11	3.93	3.87
Slovakia	4.37	5.34	4.66	4.00	3.49
EU	4.99	4.09	4.59	5.17	6.10
Austria	7.06	5.40	6.30	7.78	8.77
Italy	7.34	4.27	5.66	7.92	11.50
Hungary	7.97	8.05	8.40	7.88	7.57
Finland	10.40	9.66	9.20	10.33	12.39
Germany	15.09	9.56	12.79	16.19	21.82
Spain	20.10	14.07	18.08	20.55	27.71

- Price-per-GB

The Table is sorted from least expensive to most expensive based on the 2014-2017 average					
All numbers represent Price-per-GB €/GB					
	Avg (2014-2017)	2014	2015	2016	2017
Finland	0.76	1.21	0.80	0.56	0.45
Poland	0.81	1.28	0.91	0.61	0.42
Sweden	2.18	2.78	2.45	1.85	1.63
Bulgaria	2.39	3.15	2.65	2.16	1.59
Denmark	2.46	4.18	2.52	1.68	1.44
Austria	2.68	5.07	2.96	1.68	1.02
Ireland	2.98	5.30	3.26	2.12	1.24
Romania	2.99	4.66	2.96	2.36	1.97
Italy	4.76	6.77	5.28	3.98	3.01
Croatia	4.91	7.77	5.50	3.92	2.45
UK	5.42	8.05	6.51	4.15	2.99
Hungary	5.76	7.35	6.73	5.10	3.84
<b>EU Average</b>	<b>6.20</b>	<b>9.60</b>	<b>6.86</b>	<b>5.00</b>	<b>3.33</b>
Czech	7.53	11.80	9.23	5.53	3.57
Greece	7.61	12.68	8.70	5.60	3.45
Spain	8.27	14.48	8.65	6.00	3.98
France	8.34	15.33	9.31	5.82	2.90
Portugal	8.84	12.53	10.98	7.25	4.62
Slovakia	9.42			10.98	7.85
Germany	10.30	16.54	11.05	7.87	5.74
Netherlands	12.58	23.46	14.02	7.30	5.53
Belgium	19.76	27.62	22.69	18.39	10.35

## Author

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