



BEREC Report on mobile broadband prices: benchmarking methodology

September 2012

Abstract:

The Benchmarking EWG has collated mobile broadband tariffs in a selected group of six EU countries and examined them in order to identify the main differentiation dimensions encountered in the tariffs currently available. The aim of this work is to make recommendations on how to conduct the price benchmarking of mobile broadband subscriptions, given that tariffs for this service are complex, often bundled with other services and not directly comparable.

The present analysis compares the monthly (recurrent) price of different mobile BB subscriptions active in July 2012 in six EU countries. The main recommendation is to look at the following separate characteristics of subscriptions:

- 1- Residential and business: on average, business-oriented tariffs are higher and are correlated with clearly higher volume allowances than the tariffs for the residential sector.
- 2- Contracting modality: prepayment subscriptions are associated with less volume allowances, a lower degree of bundling and lower price levels.
- 3- Volume caps clearly have a bearing on price levels. The higher the volume allowed, the higher the price.
- 4- Higher nominal (downloading) speeds tend to be associated with higher volume caps (allowances) and also have a positive bearing on the level of (monthly) prices.
- 5- Need to make a distinction between devices for which the data subscriptions are geared: USB/dongle only subscriptions are associated with much higher volume allowances than smartphone subscriptions.
- 6- Focus on volume-capped tariffs (volume allowances): these represent more than 90% of all tariffs on offer in July 2012 for six EU countries.
- 7- Bundling is clearly relevant for price comparison exercises.

Some of the recommendations proposed here have already been discussed in different forums (OECD, ITU).

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1. Mobile BB price comparisons

One of the most salient features of mobile BB tariffs is the variety and structure of the tariffs encountered. There is a lot of price discrimination for this service and the basic factors involved in setting different tariffs are: the mode of contracting (prepaid/contract), the device to be used for the data connection (USB, smartphone, tablet, etc.), the control mechanism in place so that consumers are able to monitor the expenditure/usage of the connection (penalty once the volume allowance has been consumed, volume- or time-metered tariffs), the bundling of data consumption together with other services (particularly voice and SMS).

All these factors influence pricing in some way and their purpose is to fit around the expected usage by the consumer. In contrast to fixed BB connections, usage has a bearing on mobile BB subscriptions. Most offers/tariffs are limited in volume (GB) downloaded, or in time of usage. It is significant for both recurrent-fee as well and pay-as-you-go subscriptions.

Mobile BB services are differentiated. The main dimensions of differentiation are:

- connection speed,
 - connecting device (large, medium, and small screen),
 - type of tariff (flat rates, n-part tariffs, payments per time or per volume even per site of connection),
- or
- pricing schemes that allow customers to control expenditure, such as pre-payment, and those that do not,
 - volume and time allowances related to the types of penalties that apply once an allowance is exceeded by a consumer. These penalties can vary from disconnection, a reduction in MBB speed, or various types of monetary penalties,
 - bundled and unbundled services.

In what follows, the monthly (recurrent) prices of active mobile BB subscriptions will be collected and analysed in the context of the different dimensions of differentiation of mobile subscriptions, with the aim of identifying whether each component of the tariffs studied affects prices in a significant way.

The purpose of this analysis is to evaluate whether all services/products may be treated as a single category (and directly compare their tariffs/prices), or, on the contrary, whether some filtering or categorisation of products is needed in order to compare like with like. The final objective is to select only those dimensions observed in the tariffs that seem to be relevant for price levels.

2. Definition and selection of the subscriptions

First, it is necessary to review the types of products that include mobile broadband. Mobile BB is offered as a standalone service (in dongles/modems/laptops/etc.), as an add-on product (together with any 3G/4G

capable terminal), i.e., as an additional subscription on top of the voice subscriptions that allows data consumption, and as a bundled service. In this case the voice (and SMS) and the data consumption plan are bundled together in one subscription, usually at a flat rate.

The data source most frequently used in the following analysis is a specific collection of tariffs for mobile broadband subscriptions drawn up by the Benchmarking EWG in July 2012. The main parameters of the data collection are depicted in the next table.

Table 1: Source of information- data collection for six countries EU(6): Romania, Portugal, Spain, Italy, Germany, Netherlands.

Tariff collection July 2012, Benchmarking EWG, BEREC	N
All tariffs	459
Countries	6
Residential tariffs	370
Business	59
Contract (postpayment)	379
Prepayment	80
Device: USB	124
Device: Smartphone	314
Device: Tablet and other	12
Residential + Contract	298
Contract + Device: Smartphone	254
Residential + Device: Smartphone	233
Residential + Contract (postpayment) + Smartphone	181
Residential + Contract + USB	100

Some tables use evidence obtained from a larger sample, encompassing all 27 EU countries, for subscriptions active in 2010 and 2011. It will become apparent that conclusions obtained from those samples do not change significantly with respect to the analysis carried out for the July 2012 collection of tariffs.

The following four characteristics of mobile subscriptions are analysed:

- a- prepayment /contract modality
- b- Residential/ Business segments
- c- volume capped vs. time- metered tariffs
- d- USB/dongle only vs. smartphone subscriptions

a) contracting modality: postpayment (or contract) vs. prepayment subscriptions

The two modalities of contracting the final service for data consumption, prepayment and contract (or postpayment) subscription, yield very different volume caps and prices, reflecting different expected patterns of use by the final consumer.

Note that the prices collected in this study are based only on the recurrent subscription price. Any fixed fee (connection fee, modem fee) and any discount, promotion or only temporary valid price has been ignored.

As can be seen from the table below, prepayment subscriptions generally have much lower volume caps and prices than contract subscriptions; usually they differ by an order of two. It is convenient to separate both types of contract modalities when comparing prices or consumption volumes across tariffs.

Table 2: prepayment and contract modalities and their corresponding average prices (residential segment only). *Source:* Benchmarking EWG, July 2012.

		Price (euros)	Volume cap (MB)
Prepayment	all tariffs (72)	14.5	1530
	decile 25	7	150
	decile 50	14.4	500
	decile 75	18.6	1000
Contract (postpayment)	all tariffs (298)	30.6	2085
	decile 25	15	400
	decile 50	25	900
	decile 75	40	2000

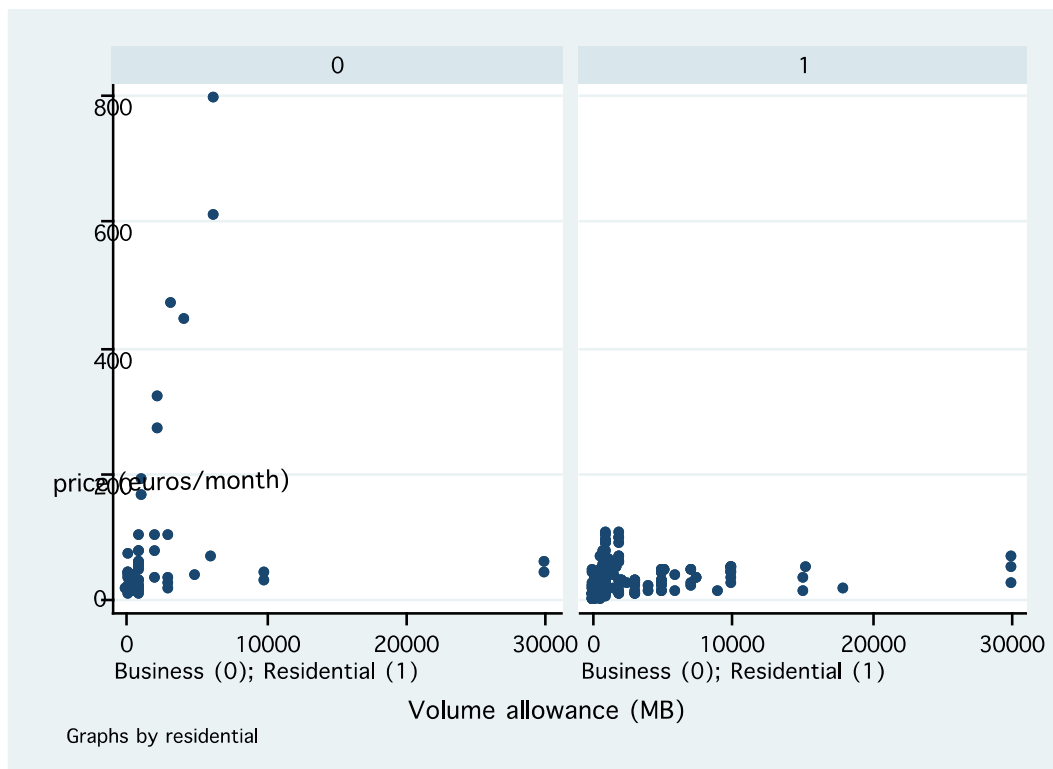
b) Residential/business segments

One factor that may lead to different price levels in subscriptions may be the market segment the offer is aimed at, i.e. residential or business. It is clear that consumers may acquire any type of offer, oriented to either of the two segments, and use it for whatever use they choose. This distinction reflects a segmentation designed by the operators and may be accompanied by different quality standards regarding downloading/uploading speed levels and guarantees. In the collection of subscriptions, the majority of tariffs were advertised by the operators with the relevant segment defined, and this information is the one used here, i.e. the information provided, when available, by the operators themselves.

From the sample analysed, business subscriptions offer greater volume allowances and slightly higher prices than residential-oriented subscriptions.

The average price of a contract (postpayment) subscription for the residential segment was EUR 30.6/month with an average volume allowance of 2085 MB. The business segment had both a much higher average price and a higher allowance (2694 MB). It is worth mentioning that in the list of prices collected business tariffs differed much more than residential subscriptions. If we restrict the comparison to USB/modem/dongle-only data subscriptions, the difference is not really significant, whilst the volume allowance difference was clearly bigger for the business segment (11000 MB) compared with the residential one (4103 MB).

Graph 1: distribution of (monthly) prices and volume allowances for the residential and business segments (contract subscriptions only). *Source:* Benchmarking EWG, July 2012.



c) volume caps vs. time metered tariffs

Data subscriptions are usually capped either in GB to be downloaded (volume allowance) or in a limited number of hours to be used (time-metered). In a baskets approach, where different consumption intensities of data is to be assumed, both types of subscriptions, volume capped or time metered, are 'normalised' so that a homogeneous consumption is obtained. Once the allowance has been consumed, either a monetary payment applies (per additional GB or additional hour of consumption), or a speed reduction (throttling) is introduced, whereby the connection speed is reduced drastically, usually to GPRS speed.

As can be seen from table 3, it was found that the majority of tariffs, 83.1%, had a volume cap attached, while only 8.4 % of the postpaid and USB/modem tariffs had a time limitation or time metered allowance as of 2012 in six EU countries.

Table 3: tariffs (Eur/month) only for post-paid subscriptions to mobile BB via USB/modem/ dongles only in the EU. *Source:* T- Connect (Teligen, 2010 and 2011) and Benchmarking EWG, July 2012.

USB-only	price(2010)	price(2011)	price(2012)	proportion
volume capped offers with money penalty	29.6	25	26.8	14.00%
volume capped offers with speed reduction	31.5	30.7	31	69.10%
time metered offers			27.8	8.40%
unlimited and other offers				8.40%
all volume metered				83.10%

The figures for smartphone subscriptions are similar: 94.8% of the tariffs collected for July 2012 were volume capped, the majority of them (63.8% of the total) with a money penalty once the allowance has been reached. The time metered tariffs accounted only for 5.1% of all the residential and contract subscriptions collected for six countries.

Table 4: tariffs (Euros/month) for smartphone subscriptions for the residential segment (contract subscriptions) and type of penalty once the allowance has been reached. *Source:* Benchmarking EWG, July 2012.

Only smartphones (contract, residential)	price(2012)	proportion
volume capped offers with money penalty	28.8	64.70%
volume capped offers with speed reduction	35.8	30.10%
time metered offers		5.10%
all volume metered		94.80%

For the selection stage of representative tariffs, the most widely offered tariffs are the ones that offer a specific volume of GB to download, more than 90% of all the tariffs collected. Time- metered tariffs, on the other hand, were a minority. For smartphone as well as for USB/dongle-only subscriptions the relevance of volume capped tariffs are similar.

d) USB/dongle only subscriptions vs smartphone subscriptions

Another significant factor involved in tariff selection is the device the consumer uses to connect to the internet. Subscriptions that are to be used with the smartphone or solely with the PC/computer (the USB/ tablet modem/dongle subscriptions) are commonplace in the EU. A simple look at the tariffs available reveals a difference between USB-only subscriptions and smartphone-oriented subscriptions: the volumes for allowances are significantly higher for the

USB-only subscriptions. Similarly, the average price per GB downloaded also tends to be noticeably lower.

Table 5: average prices and volume caps for smartphone and for USB/dongle-only subscriptions for seven countries in the EU (residential segment and postpayment subscriptions). *Source:* Benchmarking EWG, July 2012.

Contract subscriptions, Residential segment, 2012

		USB/dongles	smartphones
price (Euros)		29.8	31.4
volume cap (MB)		4103	929
percentile 25%	price	16.2	14.9
	volume cap	500	300
percentile 50%	price	25	26
	volume cap	1228	525
percentile 75%	price	38.8	40
	volume cap	5120	1000

In the comparison of USB/modem/dongle-only subscriptions for the residential segment and for postpayment in 2012 for six countries, table 5 illustrates how the average prices are similar (average of EUR 30/month) but the USB subscriptions have much higher volume caps than for smartphones, and have a downloading volume capacity that is twice or three times higher.

USB/dongle-only subscriptions tend to have higher volume allowances than smartphone-oriented subscriptions (whether bundled or not), for any speed, contract modality and type of penalty applicable to the offer. The corresponding average price per GB consumed also tends to be lower for USB-only subscriptions.

3. Selection criteria for mobile broadband offers

In this section we shall analyze how some of the most salient elements of the tariff structures affect the level of prices observed. Prices are measured only in their variable component, i.e. the monthly (recurrent fee) is collected for all relevant mobile BB subscriptions in seven EU countries, and the fixed fees (connection fee, modem payment, etc.) are ignored. In the last part of this section, a simple regression analysis is given, where all factors are considered at once. The objective of this section is to analyse the various factors and evaluate whether they seem to affect significantly the level of prices. Hence it, would be advisable to make price comparisons in different categories.

The factors to be analysed are:

- bundling vs. standalone subscriptions
- type of penalty once allowance has been reached
- volume caps (allowances) and their effect on average prices
- nominal speed of the subscription and its effects on the price level

Other factors, such as the contract modality (prepayment vs. contract), the residential vs. business and the USB vs. smartphone subscriptions have already been reviewed in Section 1.

3.1. Bundled vs. standalone subscriptions

A relevant proportion of (contract) subscriptions are bundled, usually offering voice services and SMS together with the data service .

If the mobile BB connection offer in the contract/postpayment modality and residential segment is bundled together with voice services, the average price of the bundled offer (**EUR 32.3**), is higher than the (monthly) price for the single/standard mobile BB offer (**EUR 27.8/month**). This finding is valid for any subgroup of subscriptions. The price differential, on average EUR 3.5/month, reflects the minutes and SMS sold with the data connection in the bundled offer. Both types of offers are not directly comparable unless a consumption basket of minutes and SMS is introduced. The prices of each type of subscriptions reflect different combinations of services: while the standalone subscriptions have higher volume caps, the bundled offers, to be used in smartphones, provide minutes of voice and SMS in the flat rate as well as lower volumes of data consumption.

One interesting feature of bundled offers is the fact that the volume caps allowed are clearly smaller in comparison to the implied volumes of standalone BB subscriptions .

Table 6: average prices (Eur/month) and corresponding volume caps attached to standalone and bundled tariffs for residential and contract only subscriptions. *Source:* Benchmarking EWG collection (2012).

	Price (euros/month)	Volume cap (GB)
USB subscriptions	29.8	4103
Bundled	33.9	2195
Standalone subscription	26.8	5614
Smartphone subscriptions	31.4	929
Bundled	32	760
Standalone subscription	29.6	1486

USB subscriptions always offer higher volume allowances than smartphone subscriptions. For standalone data subscriptions, USB tariffs usually have a lower price (EUR 26.8) than smartphone-oriented tariffs (EUR 29.6). The following table also illustrates the average prices for two different samples: one based on a collection of tariffs for all EU countries (27) in 2011 and the collection made in July 2012 for six EU countries.

Table 7: average prices for two different samples: 2011 for EU(27) and 2012 sample for EU(6), residential subscriptions only. *Source:* for 2011, Teligen; for 2012, Benchmarking EWG collection.

		sample 2011 price (euros)	sample 2012 price (euros)
Standalone	all tariffs (n=112)	27.8	27.8
	decile 25	17.7	15
	decile 50	24.9	24.9
	decile 75	45	34.4
Bundled tariffs (voice+data)	all tariffs (n=186)	39.7	32.2
	decile 25	18	15
	decile 50	30.2	28.5
	decile 75	45	44.5

Bundled subscriptions imply a certain amount of minutes for voice and SMS that are free of additional charges, and unless a basket of consumption is assumed and the corresponding expenditures obtained, they cannot be directly comparable with standalone data connections.

3.2. Does type of penalty affect prices?

The monthly (subscription) price of tariffs with a **marginal price** is lower for any percentile than the prices when **speed reduction** (for given caps) kicks in once the allowance has been reached. The tariffs selected in 2012 for the residential and contract modality show that the prices for smartphone-type subscriptions are generally higher than prices for USB/dongle-only use, and the offers for USB have higher volume allowances as well.

Table 8: average prices (EUR/month) of USB and smartphone subscriptions depending on the type of penalty once the allowance is reached (residential and contract subscriptions only), in EU(6). *Source:* Benchmarking EWG, July 2012.

	volume capped with money penalty	volume capped with speed reduction	time metered offers
Smartphone-price proportion	28.8	35.8	0.60%
USB/dongle-price proportion	67.80%	31.50%	14.40%
	26.8	31.1	
	14.40%	71.10%	

Looking at all the offers as a whole, average prices tend to be higher for tariffs with speed reduction, once the allowance has been reached. Tariffs with a marginal price attached to each additional MB downloaded after the allowance has been reached have practically the same pattern of volume allowances than the tariffs with speed reduction. The difference in the allowance comes from the type of terminal to be used with the subscription: USB and tablet-oriented tariffs have higher volume allowances than smartphone-oriented ones.

3.3. Do higher volume caps correlate with higher (average) prices?

Subscriptions for any modality of contracting have different volume allowances. In general, it is observed that the higher the volume allowance, the higher the price, although this relationship may not be direct. It has also been found that subscriptions that offer higher speeds also imply higher volume allowances. Subscriptions for only USB/dongle devices also have, on average, higher volume allowances.

We define the following downloading volumes for the index variables (allowance):

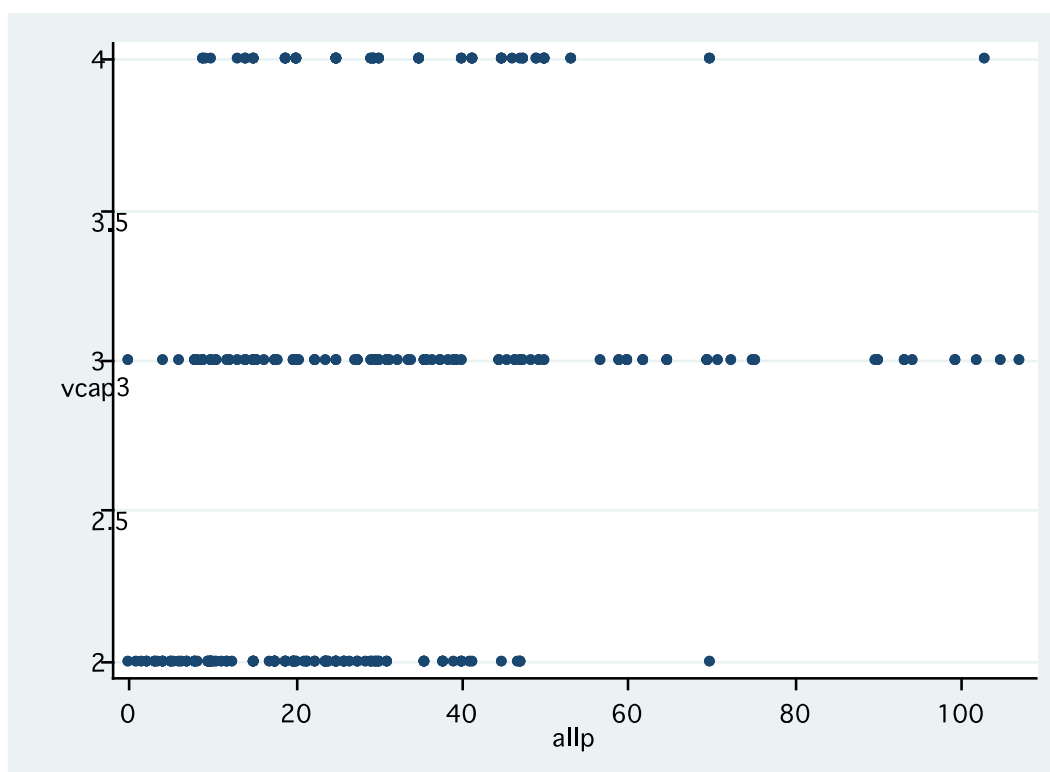
vcap=2 if cap ≤ 0.5 GB
vcap=3 if cap >0.5 GB and ≤ 4 GB
vcap=4 if cap > 4 GB

The number of subscriptions that allow for downloads of more than 8 Gb or 10 GB is very low. This set of tariffs has been included in the > 4 GB interval.

Table 9: average prices for different volume caps in the residential segment and contract subscriptions. *Source:* Benchmarking EWG, BEREC, July 2012.

	price (euros/month)	Number of tariffs
Volume cap ≤ 0.5 GB	21.2	116
Volume cap > 0.5 GB - <= 4 GB	37.9	123
Volume cap > 4 GB	36.1	39
All offers	30.6	298

Graph 2: level of prices and volume caps for mobile BB subscriptions in the residential segment and contract modality. *Source:* Benchmarking EWG, BEREC, July 2012.

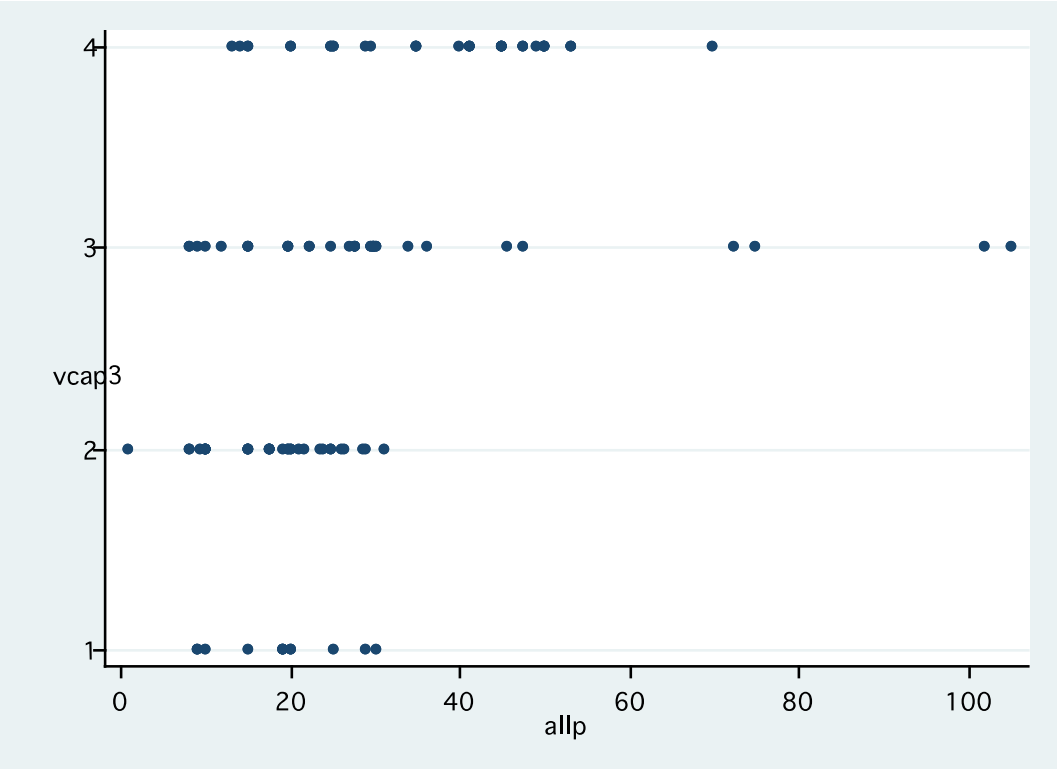


The relationship between volume allowance and level of prices is the same, irrespective of whether the penalty is monetary or involves speed reduction, but it varies somewhat if the offers are bundled together with voice services. The next table provides the basic statistics for residential, contract and non-bundled offers only, where the relationship between volume allowances and monthly prices is more clearly positive. In the table, however, note that sample size is not large once the filtering of subscriptions by type of contract is introduced: total observations for standalone offers are 112, but each volume allowance amounted to only 33 in the worst case. The number of subscriptions included in the bundled offers case was 186, but not enough samples were obtained for the highest allowance interval (vcap=4, or caps > 4 GB).

Table 10: average prices by the volume allowance of subscriptions, by type of service. *Source:* Benchmarking EWG, BEREC, July 2012.

	Standalone Service		Bundled Offer	
	price (euros)	volume cap (MB)	price (euros)	volume cap (MB)
Volume cap <= 0.5 GB	17.7	319	22.6	311
Volume cap > 0.5 GB - <= 2 GB	31.9	1560	40.2	1261
Volume cap > 2 GB	37	9513		
All offers	27.8	3775	32.3	1135

Graph 3: volume allowances (indexed 2- 4) and average prices (euros/month) for a selected group of countries in the EU(7). *Source:* Benchmarking EWG, BEREC, July 2012.



3.4. Does nominal speed (download) affect the level of prices?

Downloading (nominal) speed reflects the state of deployment of 3G/HSPA/LTE networks. Across countries it has been found that speed levels tend to concentrate around two or three values depending on the deployment stage in each country.

Table 11: nominal speeds, average prices (EUR/month) and volume allowances implied in the tariffs collected for six EU countries for contract and prepayment modalities, July 2012. *Source:* Benchmarking EWG, BEREC, 2012.

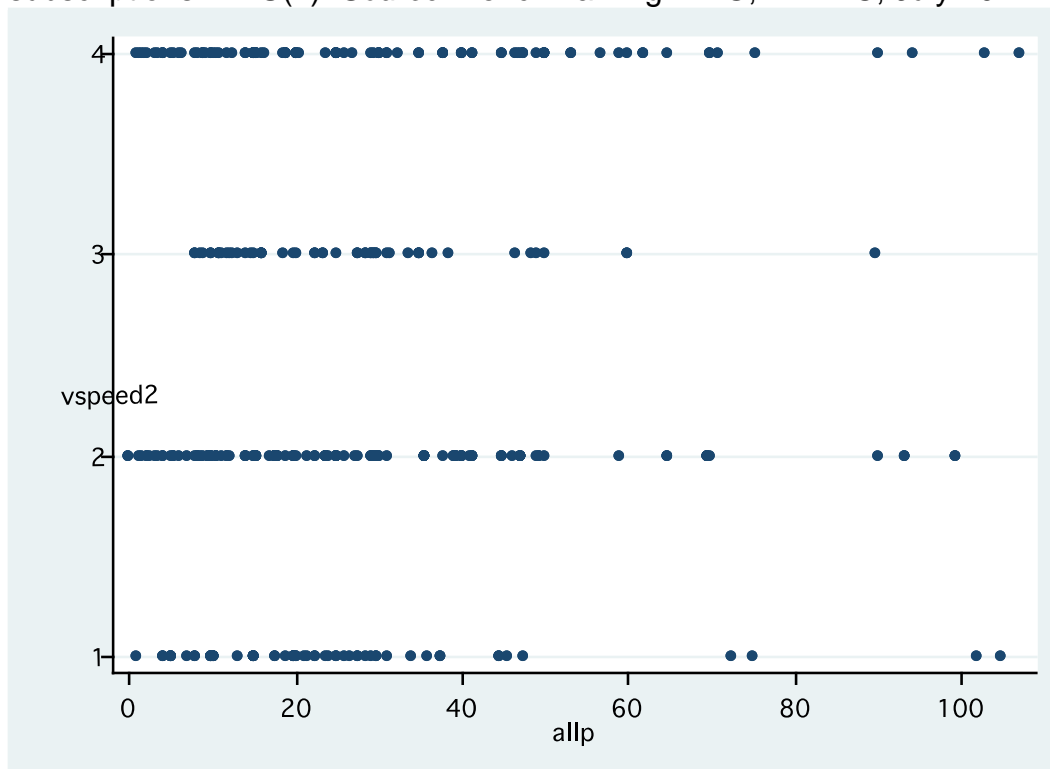
		price (euros/month)	volume cap (MB)
speed < 4 Mbps	all (n=55)	26.9	509
	decile 25	14.9	250
	decile 50	21.5	500
	decile 75	29.9	800
speed > 4 and <= 10 Mbps	all (n=120)	30.3	1087
	decile 25	16.1	300
	decile 50	24.9	500
	decile 75	39.9	1024
speed > 10 and <= 25 Mbps	all (n=36)	30.2	3230
	decile 25	17.4	1000
	decile 50	29.2	2000
	decile 75	35.7	3500
speed > 25 Mbps	all (n=87)	33.5	4592
	decile 25	15	500
	decile 50	30	1000
	decile 75	47.5	7000
All speeds (n=381)		30.6	2085

For any of the subgroup average prices, we cannot reject the hypotheses of an equal price of EUR 27.3/month (which is the average of all residential tariffs). Note in any case, that higher nominal downloading speeds are associated with higher downloading allowance (volume caps, MB).

In the next graph the (monthly) prices are depicted on the horizontal axis and an index constructed for the speed intervals on the vertical axis. The indicator variable for (nominal downloading) speed responds to the following categorisation:

- speed= 1 if speed < 4 Mbps
- speed= 2 if speed > 4 Mbps and <= 10 Mbps
- speed= 3 if speed > 10 Mbps and < 25 Mbps
- speed= 4 if speed > 25 Mbps

Graph 4: average monthly prices and nominal speed intervals (4) for mobile BB subscriptions in EU(7). *Source:* Benchmarking EWG, BEREC, July 2012.



3.5. A simple regression analysis

The various factors so far analysed seem to be correlated to different degrees with the level of prices: while volume caps allowances, modality of contracting, and the device for which the subscription is oriented seem to be factors clearly associated with higher price levels, others (speed, penalty once allowance has been reached, among others) do not seem to be very clearly related to the prices. It may be that some factors apparently correlate to the level of final prices, but in reality it is the cross effect- via some other variable- that is relevant when filtering tariffs with the objective of comparing similar tariff components.

Table 12: regression analysis for the tariff levels of mobile broadband offers in seven EU countries, July 2012. *Source:* Benchmarking EWG, 2012.

Dependent variable: Log(price)	Parameter (t statistic)
Constant	2.9 (6.7)
Penalty: marginal price per MB (reference case: no penalty)	-1.06 (-3.76)
Residential (reference case: Business)	-0.04 (-0.33)
Speed: >4, <=10 Mbps (reference	0.50 (2.53)

case: speed < 4 Mbps)	
Speed: >10, <=25 Mbps	0.56 (2.76)
Speed: >25 Mbps	0.53 (2.41)
Country	1.05 (4.35)
Volume cap: <2 GB (reference case: <0.5 GB)	0.70 (5.07)
Volume cap: < 6 GB	0.55 (2.37)
Volume cap: < 20 GB	1.11 (4.25)
Volume cap: > 20 GB	1.32 (3.43)
Device: USB (reference case: smartphone)	-0.31 (-1.33)
Device: tablet	0.02 (0.05)
Speed reduction penalty (reference case: no reduction)	-0.54 (-2.02)
Contract (reference case: prepayment)	-0.08 (-0.48)
Bundle (reference case: stand alone offer)	0.36 (1.53)
R square (adjusted)= 0.56	
N= 151	
F (15, 135)= 13.8	

One way of viewing the effects of all variables analysed all at once is to carry out a simple regression analysis, where the dependent variable is the logarithm of the monthly tariff (the variable part only, ignoring fixed fees) and the independent variables are the list of factors set out in this paper. A set of indicator variables (categorical) has been constructed so as to capture speed, volume and time allowances, type of penalties, type of device and other factors included in the subscriptions.

The results of this exercise yield the following conclusions:

- 1-** Volume caps (allowances) matter clearly for the price level of the tariff: the higher the allowance, the higher the resulting price on average. This positive relationship is significant for the three levels of allowances introduced (up to 6 GB, between 6 and 20 GB and 20 GB or higher volumes of data downloaded).
- 2-** The distinction between residential- and business-oriented tariffs: once other factors have been taken into account (allowances, speeds, bundling) residential-oriented subscriptions have a smaller price on average than business-oriented tariffs, although this effect is of little significance.
- 3-** The bundling of the data connection with other services (voice and SMS), as can be expected, has a clear and positive impact on the final price.
- 4-** Subscriptions with monetary penalty once the allowance has been reached are associated, for given allowances, with lower prices than subscriptions with a speed reduction penalty. In any case, both types of subscriptions are, on average, cheaper than the subscriptions with no penalty attached (or subscriptions with no limited allowance).
- 5-** Speed does seem to have a positive impact on the level of the tariffs. Higher speed is associated with higher tariffs in the sample of seven EU countries

collected for July 2012. The estimated coefficient is not large, but positive in any case for the three levels of speed intervals defined (the reference case being the low speed interval of up to 4 Mbps).

6- The device for which the tariff is applied does not seem to have a clear estimated effect on the tariff rate. There was clearly a positive relationship between the allowance (volume cap) and the device (higher for USB and tablets than for smartphone tariffs), but the direct effect of the device on the level of the prices is not significant.

7- Technology, an index constructed to collect whether the network providing the service was 3G, HSPA, HSDPA or LTE, does not seem to have any significant effect on the resulting tariff levels. In any case, the effect of this variable depends on the stage of development of, for example, LTE networks. In some countries an additional amount may be charged in order to have access to very high speed mobile data services.

4. Existing benchmarking methodologies: a review and some criticisms (OECD and ITU)

4.a. OECD methodology

In June 2012 the working party on Communications Infrastructure and Services Policy (CISP) presented a proposal for mobile broadband baskets in order to extend their current baskets on fixed broadband services. Mobile broadband should be intended as fully internet access under 3G or 4G coverage, while reduced functionality (e.g. walled gardens) or different wireless access (e.g. WiFi, hotspots) are excluded. The fifteen proposed baskets, divided into three different categories (laptop-, tablet, and handset-based), are illustrated in **Table 1**. Among these new mobile broadband baskets, the handset-based ones are currently partially determined by OECD Mobile Voice. The highly different usage patterns between these categories are considered to justify such discrimination.

Table 13 – OECD Mobile broadband basket

Laptop use (data volumes)	Tablet use (data volumes)	Handset use (data volumes + voice/SMS basket)
500 MB	250 MB	100 MB + 30 calls basket
1 GB	500 MB	500 MB + 100 calls basket
2 GB	1 GB	1 GB + 300 calls basket
5 GB	2 GB	2 GB + 100 calls basket

10 GB	5 GB	2 GB + 900 calls basket
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A range of price packages in every country (per operator) is considered and in the end the lowest cost package is selected. Only offers, both residential and business, provided by the operator on the web are considered (related brands of MNOs are only considered when clearly linked to the MNO's website and brand). At least two of the largest operators are considered (the number of selected operators is three in the event that the first two do not reach 70% of the market share).

Prepaid and postpaid offers are included for handset-based, tablet-based and laptop-based proposals. For tablet-based and laptop-based baskets, business offers are excluded. Non-recurring prices are depreciated over three years. The baskets take into account forecasts of operators and are associated with one existing mobile basket in the case of handhels.

The basket includes the connection charge, the monthly rental charge, the usage allowance and the overage charges. Data volumes include upload and download. Excess usage is included. Fees for provisioning are excluded, whereas additional prices for a dongle are included.

Time-based subscriptions and speed are not monitored. Many operators do not mention the speed. For LTE and offers with a theoretical speed over 20Mbps a flag is included.

According to OECD, some issues could be discussed.

Tablet basket:

CON: Tablet and laptop baskets adopt similar patterns.

PRO: To be more future proof, differentiation is considered justified. It could be relevant if new services (for example, voice capabilities) are developed for tablets and not for laptops.

Handset baskets:

PRO: the handset baskets allow for different intensities of consumption in voice services.

CON: the baskets are based on the assumption that data consumption is positively correlated with voice consumption with the exception of the second last basket. There is no information on SMS consumption.

Subsidies:

CON: Handset subsidies are excluded, while additional prices for a dongle are included.

PRO: The reduction of the administrative burden. Sufficient sim-only offers seem to be available.

Time restrictions:

CON: Time-limited offers are excluded.

PRO: They represent a minority of the plans available and exclusion will diminish the complexity of the baskets. There are also no explicit or obvious rules of conversion between volume and time as long as speed is unavailable.

Business offers:

CON: Business offers are excluded in laptop-based and tablet-based baskets, but will be included in handset-based baskets.

PRO: For the handset-based baskets, there is compatibility with the mobile voice baskets.

Bundles:

CON: A standalone basket for handsets is not considered.

CON2: Volume of voice calls included in the handsets baskets too high for European consumer profiles.

CON3 : The methodology does not take into account the possibility to use the handset as a modem for a laptop. In this configuration, offers including voice and SMS services can provide broadband services for a laptop.

PRO: For the handset-based baskets, there is compatibility with the mobile voice baskets.

Number of operators:

CON: Three operators per country are considered for laptop-based and tablet-based offers, but only two operators per country are considered for handset-based offers. This is insufficient for representing customers from each country. In Europe, for example, customers of the smallest operators represent 33% of all customers¹. Moreover, the less important operators often propose offers with lower prices in order to get more customers.

PRO: For the handset-based baskets, there is compatibility with the mobile voice baskets.

4.b. ITU methodology

In December 2011, the EGTI (Expert Group on Telecom-ICT Indicators) of the ITU agreed a methodology for the first collection of data on mobile broadband tariffs, due to take place in 2012.

This methodology consists in collecting the tariffs corresponding to the cheapest prepaid mobile broadband offer of 1 GB of monthly data volume from the

¹ Data from European Commission's scoreboard

largest mobile broadband operator. All characteristics of the ITU methodology are summarised below:

1. Collect data for broadband technologies: UMTS, HSDPA+/HSDPA, CDMA2000, IEEE 802.16e, LTE. Exclude WiFi and hotspots.
2. Exclude promotional offers/limited discounts.
3. Only residential, single user tariffs.
4. Largest mobile-broadband operator (subscriptions) OR mobile-cellular operator.
5. Cheapest plan for 1 GB of monthly data volume (upload & download volumes)
6. Exclude prices for 'hours of use'.
7. Collect data separately for: a) standard mobile-broadband subscription and b) dedicated subscriptions (USB modem/dongle).
8. Collect prepaid tariffs (and postpaid, if prepaid is not available).
9. Collect tariffs for connection charge, monthly subscription charge (if postpaid), usage allowance (volume) and charges above cap.
10. Specify speed and choose the minimum broadband speed if several are available.
11. Include any information on limits of data volumes for 'unlimited' plans.
12. Choose unbundled packages if cheaper; include information on bundles in a note.
13. Exclude tariffs charged per day unless they are the only ones available, or if they are the cheapest per month.

PROS:

- technology neutral (all mobile broadband technologies included: UMTS, HSDPA+/HSDPA, CDMA2000, IEEE 802.16e, LTE)
- excluding prices for 'hours of use': packages including a limited number of hours of use could be regarded as being similar to walled garden access, so it is quite fair to exclude them from comparisons; in any case, they do not seem to be so common in the EU.
- collecting data separately for: a) standard mobile-broadband subscription and b) dedicated subscriptions (USB modem/dongle): given the actual consumption of these two categories of handsets and the design of the commercial offers, it is recommended that a distinction be made between them. Introducing a third category, tablets, however, could also be analysed, even though operators usually consider tablets to be similar to USB modem/dongle and there are very few offers specially designed for tablets.
- only residential, single-user tariffs: in most cases, the commercial offers for residential and SME tariffs are identical, so collecting data also for SMEs does not bring added value to the comparison.
- collecting tariffs for connection charge, monthly subscription charge (if postpaid), usage allowance (volume) and charges above cap: the design of the commercial offers includes several tariffs, some fixed and some variable, and all of them should be taken into account when making comparisons.
- specifying speed and choose the minimum broadband speed if several are available: in the case of LTE traffic some operators are charging their users extra for benefiting from very high speeds.
- including any information on limits of data volumes for 'unlimited' plans: there are many offers on the market with theoretically unlimited traffic, but specifying

a 'reasonable' amount of traffic to be consumed, after which the maximum speed is reduced drastically or users are able to buy extra traffic packages to be consumed at the same maximum speeds as the initial amount of 'reasonable' traffic included.

- choosing unbundled packages if cheaper; include information on bundles in a note: normally, the tariffs for unbundled services are supposed to be cheaper than those of the bundled services, but there are cases when mobile broadband may only be bought as part of a bundle or as a tied service (usually standard mobile-broadband subscriptions may only be bought together with mobile voice), in which case the total tariff should be taken into account when making comparisons.

- excluding tariffs charged per day unless they are the only ones available, or if they are the cheapest per month: taking into account the design of the commercial offers, the most relevant comparison is to be made between monthly offers. In the case of roaming offers other periods of time could be relevant (for example one day or one week).

CONS:

- excluding promotional offers/limited discounts: some operators are offering tariffs as promotions, but these are actually offered for unlimited periods of time

- collecting data from the largest mobile-broadband operator only (subscriptions) OR mobile-cellular operator: in some countries, it may be the case that the largest mobile-broadband operator accounts for only 25-30% of the market, which cannot be regarded as sufficient when trying to assess the tariffs in one specific national market. A more meaningful threshold for summed market shares of the main operators could be, for example, in the 70-80% range

- cheapest plan for 1GB of monthly data volume (upload & download volumes): while for dedicated subscriptions (USB modem/dongle) this value is at the lowest limit of traffic interval included (the range is 1-30 GB of traffic), but for standard mobile-broadband subscriptions this value is at the highest limit of the traffic interval included (the range is 1 MB-1 GB of traffic, while most offers concentrate on the range of 250-500 MB of traffic), so, taking into account that there is a distinction between these two categories, we can argue that this 1 GB of traffic represents low usage in the case of dedicated subscriptions (USB modem/dongle) and at the same time stands for high usage in the case of standard mobile-broadband subscription

- collecting prepaid tariffs (and postpaid, if prepaid is not available): at least in the EU, most users of standard mobile-broadband subscriptions and dedicated subscriptions (USB modem/dongle) are using postpaid tariffs, and this is reflected in the number of commercial offers for postpaid (considerably higher than the number of prepaid offers)

Other unclear aspects:

- walled garden: not specified if included or not

5. Recommendations

A. in relation to the benchmarking of prices and the separate comparisons to be made across subscriptions

When comparing mobile BB prices it is recommended to look at the following separate characteristics of subscriptions:

- 1- Residential and Business: the prices of the business-oriented tariff seem to be higher and correlated with clearly higher volume allowances than the tariffs oriented to the residential segment.
- 2- Contract modality: even though prices may not differ too much among either, prepayment is associated clearly with less volume allowances, a lower degree of bundling and lower price levels.
- 3- Volume caps clearly matter for the level of prices. This is the main discrimination dimension used by operators when setting prices. The higher the volume allowed, the higher the price. If a basket approach has to be used, as does the OECD, it is very important to define different baskets with different volumes of consumption of data.
- 4- Higher speeds tend to be associated with higher volume caps (allowances), and once this factor has been taken into account when comparing tariffs, speed may be less relevant as a filtering device.
- 5- It is also relevant for distinguishing among devices for which the data subscriptions are oriented. The main reason is that USB/dongle-only subscriptions are associated with much higher volume allowances than, for example, smartphone subscriptions.
- 6- Focus on volume-capped tariffs (volume allowances). These represent more than 90% of all tariffs on offer in July 2012 for seven EU countries, and similar proportions when all 27 EU countries are taken into account. Time-metered tariffs are a minority of all offers (7.5%) and they may bias the price comparison exercise if combined with volume allowance subscriptions.
- 7- Bundling clearly matters for price comparison exercises. The premium attached to any bundled tariff is clear, reflecting the higher number of services included in the flat rate. If comparisons are to be made, bundled offers should clearly be filtered and used in a different comparison than data subscriptions as a standalone service.
- 8- Speed reduction subscriptions are associated with higher prices than money penalty tariffs (or subscriptions with a marginal price for each additional MB downloaded after the allowance has been consumed).
- 9- Comparison parameters: the average of any price or volume allowance collection yields very informative evidence; but other parameters (percentiles) are also important when characterising subscriptions active in the market.

B. in relation to the baskets of consumptions assumed

In the EU countries more evidence is needed on the different intensities of real usage of data, voice and SMS with various types of devices. In any case, given some initial evidence available, the intensities of voice consumption assumed by the OECD in the proposed baskets is high and probably not representative of the average consumption in the EU, especially for the medium to high consumption baskets.

C. in relation to the number of operators taken into account

It is necessary to take into account at least three operators for all the defined baskets (handsets as well as mobile voice baskets). In addition, in order to be totally representative of customers, it would be better to take into account operators with a market share of at least 10%.
