The impact of recent cuts in mobile termination rates across Europe

A REPORT PREPARED FOR VODAFONE GROUP

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Executive Summary

Mobile termination rates across Europe have been falling considerably for several years. This is partly reflective of a general downward trend in underlying unit costs, but also the European Commission's recommendation in 2009 to move to 'pure LRIC' based termination rates.

At the time, the Commission justified the accelerated cuts in mobile termination rates through expected benefits to consumers, in particular significant reductions in mobile prices and increases in mobile traffic. It predicted also that lower MTRs would help smaller operators to compete, as they would find it easier to offer off-net prices that are comparable to the on-net prices of larger competitors. The impact on mobile penetration rates and the fixed telephony market were expected to be limited.

Although pure LRIC based termination rates are yet to be fully implemented in all Member States, there is, since 2009, evidence about the impact of accelerating mobile termination rate cuts on the performance of the mobile market and upon its consumers. This report analyses this evidence.

Our approach

The main focus of the report is to examine the available evidence to date to evaluate the extent to which the Commission's recommendation has had the expected impact on mobile prices and usage. We also consider whether the MTR reductions have made it easier for smaller operators to compete. We then consider whether there has been any effect on fixed-to-mobile usage, fixed operators' investment, mobile penetration rates and mobile operators' investment.

We analyse the impact since 2009, as well as the longer-term relationship between mobile termination rates and consumer outcomes.[1]

- **Policy-shift impact**. We consider whether there has been a structural break in the trends for usage and prices given the acceleration in mobile termination rate reductions since 2009, after the adoption of the Commission's Recommendation. We also use correlation analysis to look at the impact of MTR reductions in individual countries.

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1 As mobile termination rates will still need to fall much further before they reach the level implied by pure LRIC, this report should be considered as an initial assessment of the Commission's recommendation.

- **Longer-term relationship**. We use a longer time series and statistical techniques to examine the link between mobile termination rate cuts and consumer outcomes.

The analysis uses data for countries in the European Union.[2]

Main findings

Mobile termination rates have fallen at a much faster rate since 2009. If countries continue to move towards pure LRIC based mobile termination rates, as appears likely, then this trend is likely to continue going forward.

Our main findings on the link between accelerated mobile termination rate reductions and consumer outcomes are as follows.

- **No link to usage and prices.** Although usage has increased and prices have fallen, there is no evidence that these trends have been related to the acceleration in the reduction in mobile termination rates. Despite a tripling in the rate of termination rate cuts since the introduction of the Commission's recommendations, we have not found evidence at the EU level of an acceleration in the rate of mobile price reductions or the rate of usage increase. Correlation analysis and econometric analysis confirms these findings.

- **No evidence of a link between MTR reductions and the market position of smaller players**. There appears to be no evidence of a positive link between the market share of smaller operators and the acceleration in MTR reductions since 2009.

- **Potential risk of lower take-up and investment**. It is too early to draw conclusions on the impact of accelerated mobile termination rate cuts on penetration rates and investment levels - there is a risk that they could have a detrimental impact.

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2 We have excluded Cyprus, Luxembourg and Malta due to data limitations. We have also omitted Greece, as it can be considered as an outlier due to its recent financial and economic crises. Although including Greece would not have impacted any of our conclusions.

1 Introduction and background

Mobile operators charge other operators for connecting calls to their network. These are known as mobile termination rates (MTRs). Both mobile-to-mobile (M2M) and fixed-to-mobile (F2M) calls incur MTRs.

Operators are considered to have significant market power (SMP) when providing call termination services on their network. As such, regulators typically require MTRs to be regulated and, generally, cost reflective.

The level of MTRs across Europe has been falling at a considerable rate for several years. This has been driven by two factors.

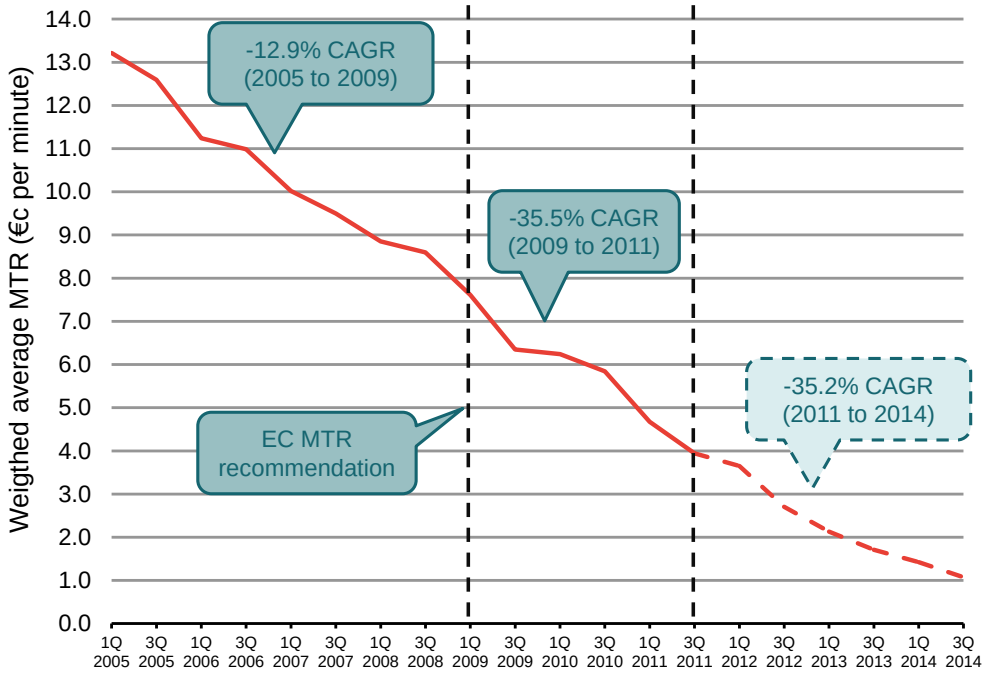
1. A general downward trend in the underlying unit costs of delivering these services (as a result of both expanded output and technological developments).

2. The European Commission's recommendation in 2009[3] stated that MTRs should be set on a 'pure LRIC' basis (i.e. they should only reflect the long run incremental cost exclusive of any fixed and common costs) and that in exceptional circumstances where a national regulator cannot develop a cost model in time, then it must set interim prices that are consistent with the Recommendation.

Whilst the Commission envisaged that the recommended move to pure LRIC based MTRs would take several years, MTRs have been falling at a much faster rate since 2009 (see **Figure 1**). The Commission envisaged in 2009 that 'pure LRIC' MTRs would be between 1.5 cents and 3 cents by the end of 2012. In the event, based on current trends, MTRs in Europe by late 2014 could be expected to fall to approximately 1 cent

[3] Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU – Implications for Industry, Competition and Consumers (07/05/2009).

Figure 1. Trends in actual and projected weighted average MTRs since 2005



Source: Frontier analysis based on BEREC information & published MTR glide paths

The Commission justified accelerated MTR cuts by arguing that they would improve consumer outcomes. In particular, it forecasted that as a result of a move to pure LRIC, mobile prices would fall almost twice as fast and mobile traffic would increase at almost double the rate. This is shown in **Figure 2** below.[4]

The Commission acknowledged that there could be a 'waterbed' effect, such that average mobile prices could increase as F2M mobile revenues fell, partially offsetting falls in mobile-to-mobile prices, resulting also from the MTR reductions. But unlike Valleti and Genakos (2008)[5] and our previous report[6], the

4 The baseline scenario reflects the Commission's expected consumer outcomes if MTRs fall in line with reductions in underlying costs, but without a move to pure LRIC. The recommended approach shows the Commission's predicted consumer outcomes if MTRs fall in line with costs and MTRs are set based on a pure LRIC approach.

5 Genakos and Valletti (2008): "Testing the 'Waterbed' Effect in Mobile Telephony", CEIS TOR Vergata, Research Paper Series, Vol.6, Issue 2, No. 110.

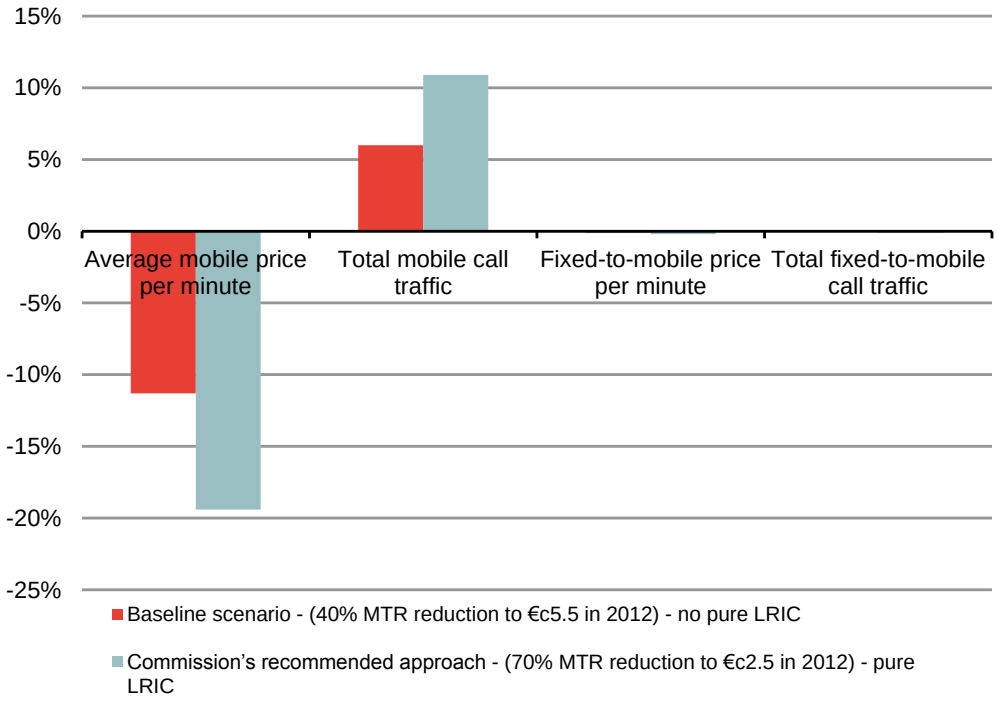
6 Frontier Economics, 'Assessing the impact of lowering mobile termination rates', July 2008.

Commission did not expect the waterbed effect to be strong. It predicted that an increase in competition would offset any waterbed effect[7]:

"Increased competitive pressure resulting from the creation of a more level playing field for the provision of mobile calls will help ensure a continued downward momentum for overall retail prices, thereby off-setting any potential short-term waterbed effects."

It also anticipated a limited impact on mobile penetration rates and the fixed telephony market.

Figure 2. Cumulative impacts predicted by the Commission from faster MTR cuts (2007-12)



Source: Commission's Final Impact Assessment of its 2009 MTR recommendation

The relationship between MTRs and consumer outcomes continues to be hotly debated, both from theoretical and empirical perspectives. The UK Competition Commission recently concluded that:

"…., we are not persuaded that setting MTRs at LRIC would reduce mobile retail prices overall, and it is not clear that doing so will increase mobile usage."[8]

7 Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU – Implications for Industry, Competition and Consumers (07/05/2009).

8 Competition Commission – Final determination on MTRs (09 February 2012).

Although the Commission's recommendation has yet to be fully implemented in all Member States, there is a significant body of evidence about the impact of accelerating MTR cuts on the performance of the mobile market and upon its consumers, since 2009. This report analyses that data.

1.1 Our approach

The main focus of the report is to examine the available evidence to date to evaluate the extent to which the Commission's Recommendation has had the expected impact on mobile prices and usage. We further consider whether there has been any effect on fixed-to-mobile usage, fixed operators' investment, mobile penetration rates and mobile operators' investment.

Member States started to implement an MTR policy that is consistent with the Commission's Recommendation since 2009.[9] As shown by **Figure 1**, MTRs started to fall at a much faster rate after this point. As MTRs will still need to fall significantly further before they reach the level implied by pure LRIC, this report should be considered as an initial assessment of the Commission's recommendation.[10] We analyse the impact since 2009, as well as the longer-term relationship between MTRs and consumer outcomes.

- **Policy-shift impact**. We consider whether there has been a structural break in the trends for usage and prices given the acceleration in mobile termination rate reductions since 2009, after the adoption of the Commission's Recommendation. We also consider whether the MTR reductions have made it easier for smaller operators to compete. We then use correlation analysis to look at the impact of MTR reductions in individual countries.

- **Longer-term relationship**. We use a longer time series and statistical techniques to examine the link between mobile termination rate cuts and consumer outcomes.

The analysis uses data for countries in the European Union. We have excluded Cyprus, Luxembourg and Malta due to data limitations. We have also omitted

9 Member states have responded to the Commission's Recommendation at different rates. Countries such as Spain, the UK and Italy have already set glidepaths to pure LRIC. However, other countries have been less quick to respond to the Commission's recommendations. The Commission has recently expressed concern about potentially high MTRs in France, Estonia, Spain and Latvia (see for example "Digital Agenda: Commission queries French regulator's proposal to set higher wholesale prices for Free Mobile, Lycamobile & Oméa Telécom; starts investigation").

10 It should be noted that MTRs have not yet fallen as far as the Commission recommended. As of 2011Q3, the weighted average MTR in Member States was €c3.9, whereas the Commission recommended that MTRs should fall to €c2.5 by 2012.

Greece, as it can be considered as an outlier due to the recent financial and economic crises.[11]

We measure mobile prices as average revenue per minute (ARPM) [12], as this is consistent with what the Commission used for its prediction on mobile prices. For usage, we use data on outgoing minutes of use per active subscriber. Measuring usage on a per subscriber basis allows us to control for changes in the number of subscribers. Where possible we use data from Analysys Mason's Telecoms Market Matrix for mobile usage, mobile prices and F2M usage (see Annex for a more detailed description of the variables that we have used and the data sources).

1.2 Structure of the report

The remainder of this report examines the available evidence on each of the main consumer impacts from MTR cuts expected by the Commission.

- Section 2 examines the link between MTR cuts and mobile prices.
- Section 3 focusses on the relationship between MTR cuts and mobile usage.
- Section 4 examines whether the European mobile markets are converging towards a US-style environment.
- Section 5 looks at whether there has been an impact on competition from the MTR reductions.
- Section 6 examines the impact of MTR cuts on the fixed market.
- Section 7 presents the impact of the accelerated MTR cuts on mobile penetration rates and mobile investment levels.
- Section 8 summarises our key findings.

11 Including Greece would not however had any significant impact on our conclusions.

12 The ARPM is calculated as Voice retail revenue (excluding interconnection payments) divided by outgoing mobile minutes.

2 There is no evidence that faster MTR cuts have led to lower mobile prices

The Commission expected MTR cuts to lead to lower mobile prices for two reasons:

- First, lower MTRs would reduce the marginal cost of mobile to mobile calls and so be expected to lead to lower retail average mobile-to-mobile call prices; and
- lower MTRs would assist smaller operators and so increase the intensity of retail competition in mobile markets.

The impact of MTR cuts on mobile prices is, however, potentially complex, as the tariff structure in the mobile sector includes call prices (including mobile to mobile calls), connection charges, handset subsidies and monthly rentals. In this context, whilst reductions in MTRs could lead to lower mobile to mobile call prices, they can also be expected to increase other tariffs, such as subscription charges. The reason for this is that reductions in termination rates will also lead to reductions in fixed-to-mobile termination revenues, which could be expected, absent any other change, to lead to mobile operators' revenues failing to recover their costs, unless some other retail prices are raised. This concept is known as the 'waterbed effect'.

The 'waterbed effect', has been tested and confirmed empirically. For example, Genakos and Valletti (2008)[13] tested it in a set of 24 countries, all European with the exception of New Zealand, Australia, Japan and Turkey. The results have shown that a reduction in MTRs by 11% lead to an overall increase in mobile outgoing prices of 13.3%. The Commission recognised the waterbed effect in 2009 but believed that lower MTRs would assist smaller mobile operators and thereby increase the competitive intensity of the mobile market, preventing significant increases in prices.

We find that although mobile prices in Europe have indeed been falling rather than rising, there is no support for the view that this has been driven by MTR cuts.

This is supported by the following pieces of evidence.

- **Policy-shift impact**. Although MTR cuts have accelerated since 2009, the fall in mobile prices has in fact slowed down. Correlation analysis reveals

13 Genakos and Valletti (2008): "Testing the 'Waterbed' Effect in Mobile Telephony", CEIS TOR Vergata, Research Paper Series, Vol.6, Issue 2, No. 110.

that the countries with the largest MTR cuts have not had the largest falls in prices.

- **Longer-term relationship**. Econometric analysis also shows that the acceleration of MTR cuts has not impacted prices.

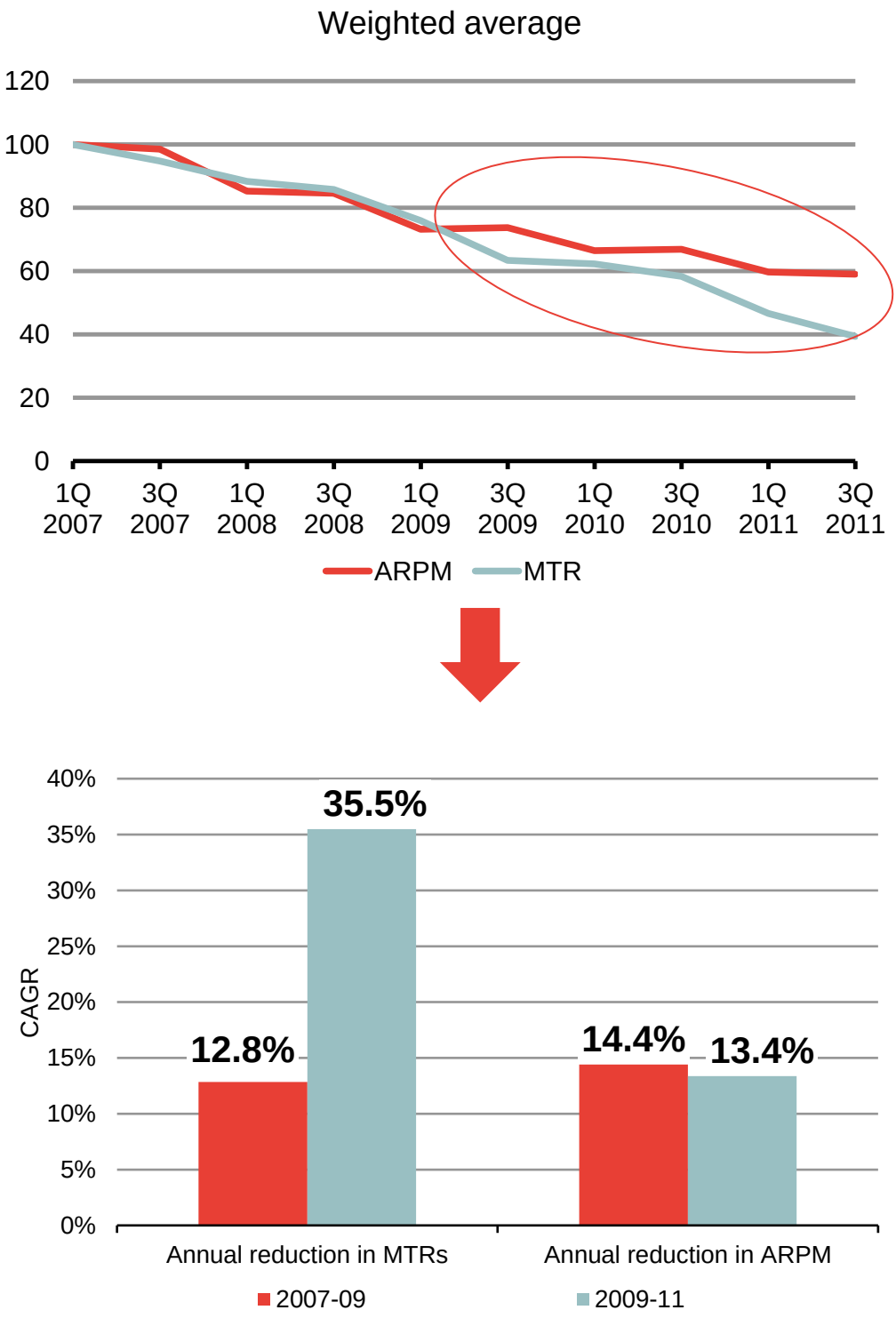
2.1 Prices have declined at a slower rate despite the accelerated fall in MTRs

Despite the step-change in the rate of MTR declines since 2009, the fall in prices has actually slowed slightly, as shown by **Figure 3** below. This casts doubt on the Commission's prediction that faster MTR cuts would lead to greater falls in prices (measured as average revenue per minute, ARPM[14]).

[14] Calculated as voice retail revenue generated by mobile services on a given network (excludes interconnection payments) divided by outgoing mobile minutes in a given period.

There is no evidence that faster MTR cuts have led to lower mobile prices

Figure 3. Trends in weighted average MTRs and mobile prices since 2007



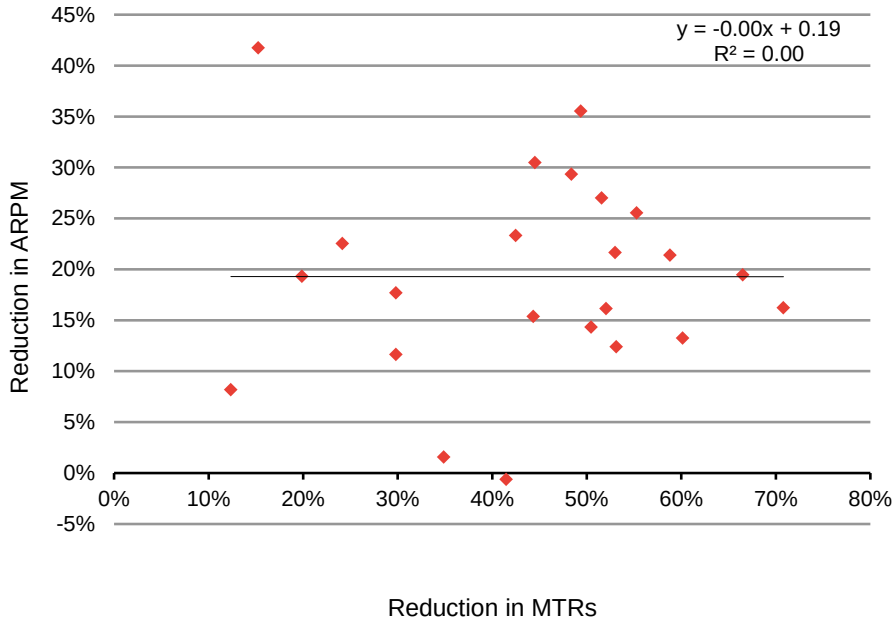
Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data on ARPM.

There is no evidence that faster MTR cuts have led to lower mobile prices

2.2 Correlation analysis shows no link between MTR cuts and prices

There is also no evidence to suggest that those countries with higher MTR cuts have had higher falls in mobile prices. Simple correlation analysis shows that there is no relationship between MTR cuts and changes in ARPM since 2009 (**Figure 4**). This could be explained by the waterbed effect, whereby any MTR driven fall in average mobile-to-mobile call prices is being partially or fully offset by higher fixed charges or lower handset subsidies. Our result is not sensitive to the chosen time period, as we reach the same conclusion when looking at the MTR cuts and changes in ARPM since 2007 (see **Figure 5**).

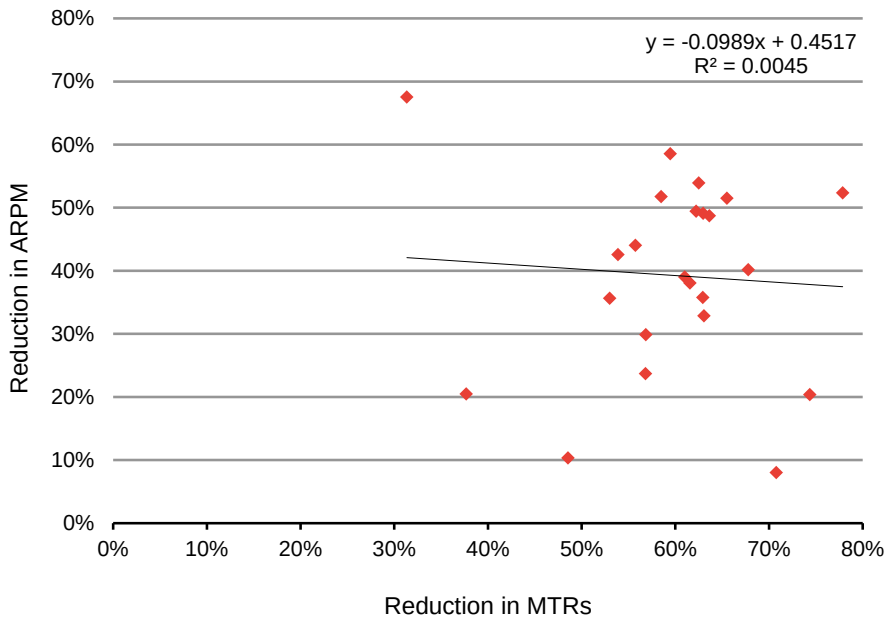
Figure 4. Correlation analysis of MTR cuts and prices (2009Q1 to 2011Q3)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

There is no evidence that faster MTR cuts have led to lower mobile prices

Figure 5. Correlation analysis of MTR cuts and prices (2007Q1 to 2011Q3)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

2.3 Additional statistical analysis also shows no evidence that faster MTR cuts have led to lower prices

Mobile prices are likely to be affected by several factors, most notably costs. In competitive markets, lower costs should be passed through to lower prices.

The Commission's Recommendation will lead to lower MTRs but will not have had any impact on the total costs of providing mobile services. In this sense, the Recommendation simply represents a different way of recovering the same total costs. The relationship between MTRs and prices will depend on what is causing the fall in MTRs.

Econometric analysis allows us to seek to distinguish between the effect on prices of a) falling costs of providing mobile services and b) the Commission's Recommendation. This is achieved by interacting MTRs with a time dummy that takes on a value of 1 from 2009 onwards, which is when the Commission made its Recommendation. This interaction term can be expected to capture the effect

There is no evidence that faster MTR cuts have led to lower mobile prices

of the Recommendation on prices. We use annual data from 2005 to 2011 covering 23 countries (further details of the data used are contained in an annex).

We ran a regression of prices (ARPM) on MTRs, MTRs interacted with a time dummy and GDP per capita.[15] We found that the co-efficient on the MTR interaction term is not significant (see **Table 1**). More sophisticated statistical techniques therefore suggest that there does not appear to be a positive relationship between accelerated MTR cuts (the policy shift) and ARPMs.

Our finding that there is no link between MTRs and prices is also consistent with work by Veronese and Pesendorfer (2009)[16] who stated that *"our overall conclusion is that the evidence does not robustly show that the level of MTRs affects the (average) level of retail prices."*

Table 1. Regression results on the link between MTRs and prices

Variable	Coefficient	P-value[17]
Constant	12.751	0.002
MTRs – cost trend	0.208	0.082
MTRs – policy impact	0.008	0.691
GDP per capita	-1.434	0.001

Source: Frontier analysis

15 We use fixed effects on a panel data set of 23 countries between 2005-2011. Our preferred specification is $Log(ARPM_{it})=\beta_0+\beta_1 Log(MTR_{it})+ \beta_2 D_{2009\text{-}2011} *Log(MTR_{it})+\beta_3 Log(GDPcap_{it})+u_i+\varepsilon_{it}$

16 Wholesale Termination Regime, Termination Charge Levels and Mobile Industry Performance – A study undertaken for Ofcom (Veronese and Pesendorfer 2009).

17 The P-value reflects the probability that the co-efficient is equal to zero. Typically, if the p-value is below 0.05, you would conclude that the co-efficient is significantly different to zero.

There is no evidence that faster MTR cuts have led to lower mobile prices

3 There is no evidence that MTR cuts are increasing usage

The Commission expected that steeper MTR cuts would lead to a faster increase in usage. The following evidence shows that this prediction has not occurred so far.

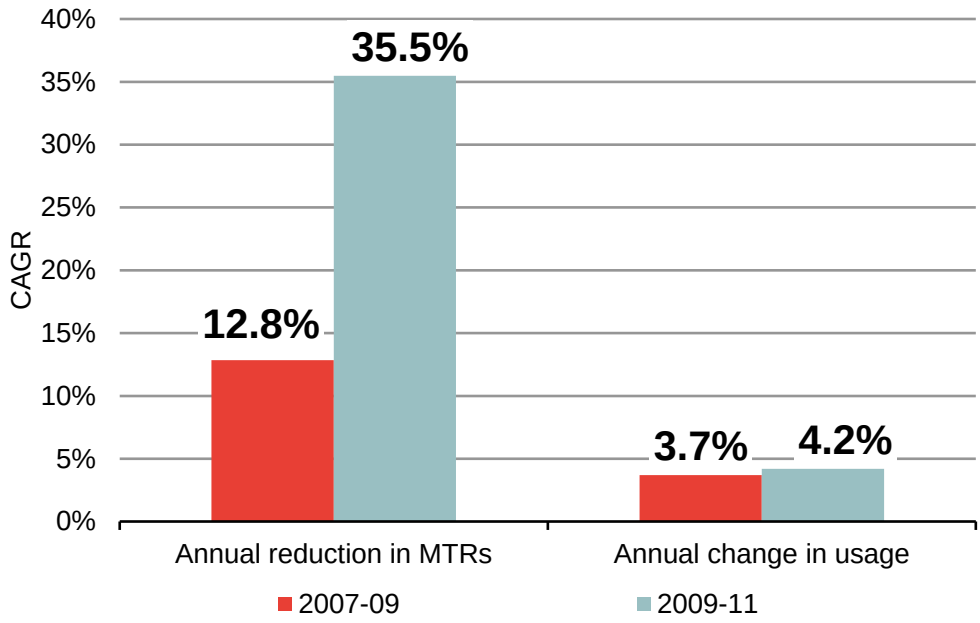
- **Policy-shift impact**. Despite the structural break in MTR reductions since 2009, there is no evidence that usage has increased at an accelerated rate. Correlation analysis shows that the countries with the largest MTR cuts have not had the largest increases in usage.

- **Longer-term relationship**. Using more sophisticated statistical analysis further supports our conclusions that MTR cuts haven't increased usage.

3.1 Despite the faster falls in MTRs usage has not increased at an accelerated rate

As indicated earlier, MTRs have fallen at a much faster rate since the Commission's Recommendation in 2009. Usage (average minutes per active subscriber) on the other hand, has continued to increase at broadly the same rate, as shown by **Figure 6**. This is consistent with accelerated MTR cuts not translating into increases in usage.

Figure 6. Annual reductions in MTRs and usage (2007-09 vs. 2009-11)



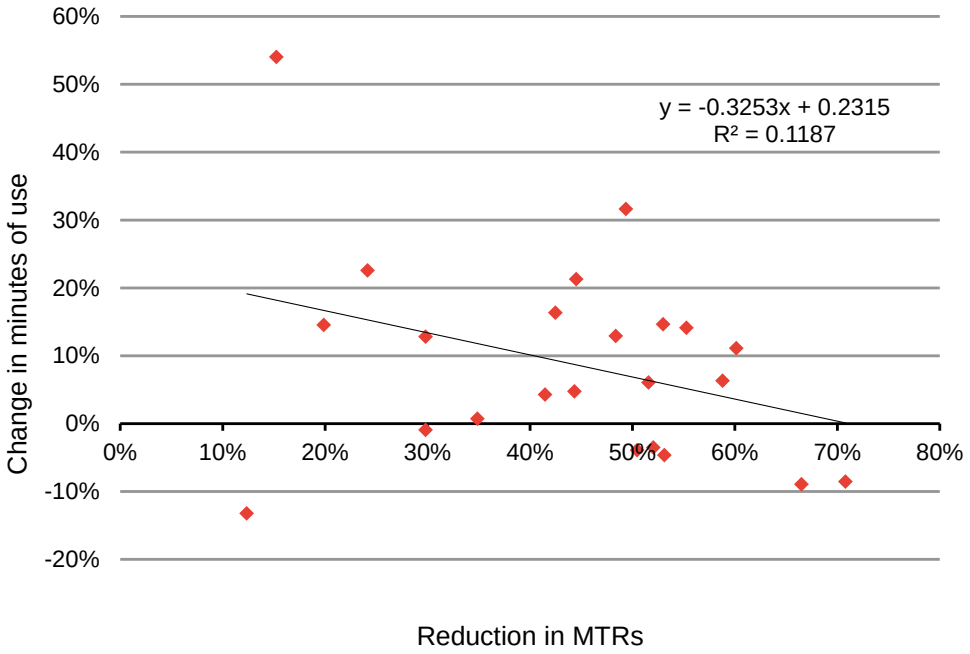
Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data

3.2 Correlation analysis shows no evidence that MTR cuts have led to higher usage

There is no evidence that the countries with the highest MTR cuts have had the largest increases in usage. In fact, correlation analysis actually shows the reverse, as countries with the largest MTR cuts have tended to have the smallest increases in usage since 2009 (see **Figure 7**). This suggests that although the trend has been for usage to rise, there is no evidence of a relation to faster MTR cuts. We reach the same conclusion when looking at the changes in MTRs and usage since 2007 (see **Figure 8**).

There is no evidence that MTR cuts are increasing usage

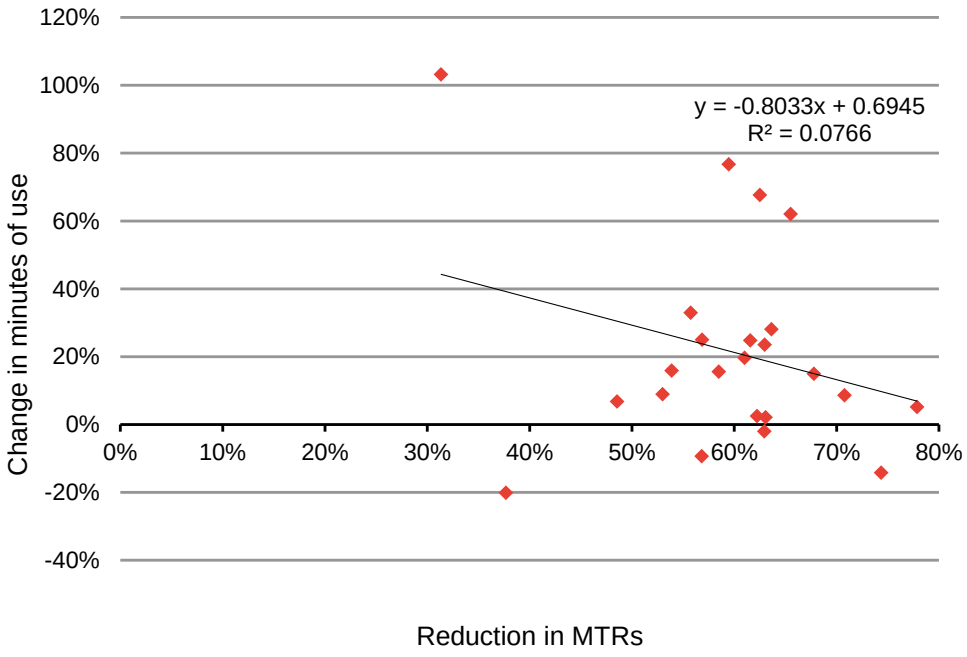
Figure 7. Correlation analysis of MTR cuts and changes in usage (2009Q1 to 2011Q3)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

There is no evidence that MTR cuts are increasing usage

Figure 8. Correlation analysis of MTR cuts and changes in usage (2007Q1 to 2011Q3)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

3.3 More sophisticated statistical analysis also shows no evidence that MTR cuts have led to higher usage

Usage (average minutes per subscriber) is likely to be influenced by a range of factors other than just MTRs. GDP per capita is likely to boost usage, as higher GDP per capita is likely to increase consumers' disposable incomes. Penetration rates are also likely to have a positive impact on average usage, as there will be more potential people to call for a given subscriber. Using econometrics allows us to control for these other factors that might help explain usage. This makes it easier to isolate any effect of MTRs on usage.

We run a regression of usage on MTRs, penetration rates and GDP per capita.[18] The co-efficient on MTRs is positive (this is the *opposite* result to what the

[18] We use fixed effects on a panel data set of 23 countries between 2005-2011. Our preferred specification is $Log(Minutes_{it})=\beta_0+\beta_1 Log(MTR_{it})+\beta_2 Log(Penetration_{it})+\beta_3 Log(GDPcap_{it})+u_i+\varepsilon_{it}$

There is no evidence that MTR cuts are increasing usage

Commission projected) although not statistically significant (see **Table 2**). In other words, the statistical analysis does not find any robust statistical evidence that faster MTR cuts lead to higher usage. This result is robust to a range of specifications.[19] Our result that MTRs do not impact usage is also consistent with previous work by Veronese and Pesendorfer (2009)[20] who "*did not find robust statistical evidence on the relationship between usage and level of MTRs*".

Table 2. Regression results on the link between MTRs and usage

Variable	Coefficient	P-value[21]
Constant	-3.281	0.125
MTR	0.095	0.119
Mobile penetration	0.375	0.100
GDP per capita	0.816	0.001

Source: Frontier analysis

We also tried controlling for the impact of the economic slowdown. We did this by including the change in the growth rate in GDP per capita. This should, to some extent, be a proxy for changes in consumer and business confidence. Including this variable does not change our conclusion that the co-efficient on MTRs is positive and statistically insignificant (see **Table 3**).

19 We tried using levels rather logs; using random effects; transforming all of the variables into first differences; restricting our sample to the EU15 countries; including a lag of MTRs.

20 Wholesale Termination Regime, Termination Charge Levels and Mobile Industry Performance – A study undertaken for Ofcom (Veronese and Pesendorfer 2009).

21 The P-value reflects the probability that the co-efficient is equal to zero. Typically, if the p-value is below 0.05, you would conclude that the co-efficient is significantly different to zero.

There is no evidence that MTR cuts are increasing usage

Table 3. Regression results on the link between MTRs and usage when accounting for the economic slowdown

Variable	Coefficient	P-value[22]
Constant	-4.027	0.076
MTR	0.067	0.251
Mobile penetration	0.293	0.202
GDP per capita	0.884	0.001
Change in growth of GDP per capita	0.983	0.010

Source: Frontier analysis

[22] The P-value reflects the probability that the co-efficient is equal to zero. Typically, if the p-value is below 0.05, you would conclude that the co-efficient is significantly different to zero.

There is no evidence that MTR cuts are increasing usage

4 A lack of convergence to a US style market

In its final impact assessment[23], the Commission stated that *"in countries with low termination rates, retail prices are frequently lower and consumption levels higher than countries with higher termination rates."* The Commission then specifically refer to the US as an example of a country with low ARPM.

4.1 Comparison of Europe and US

To assess whether EU countries have become more like countries with low MTRs since the Commission's recommendation, we use the US as a benchmark.[24] The US is an obvious benchmark as it has a 'Bill and Keep' interconnection regime amongst mobile operators, meaning that mobile operators do not pay for the interconnection of calls between them. The US market is characterised by high usage and low implied average retail prices compared to Europe.

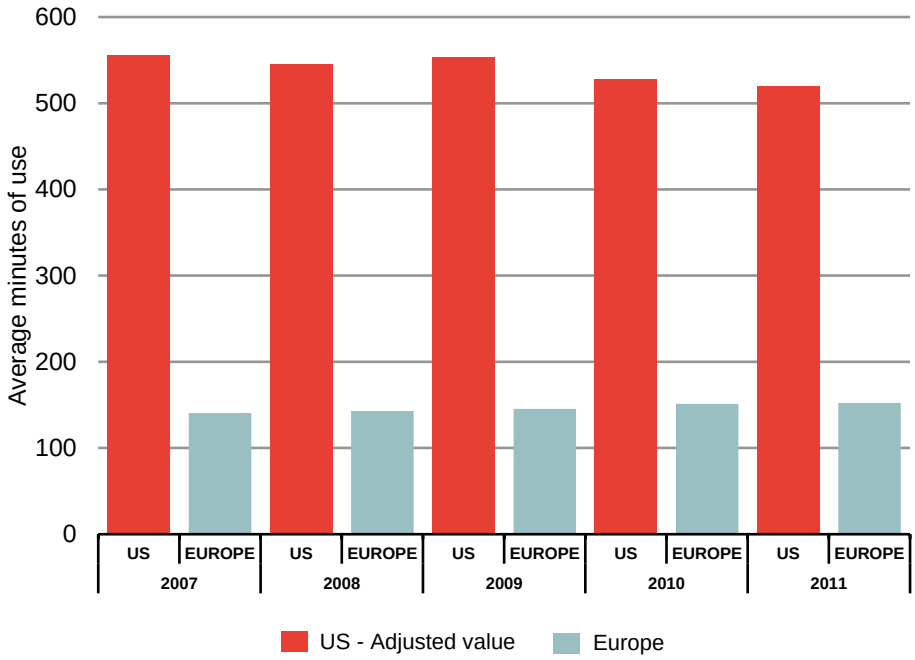
Despite the significant increase in the rate of reductions of MTRs across Europe, there has been very little convergence in usage between Europe and the US, as shown by **Figure 9** below.[25] There has been some narrowing in prices between Europe and the US, as shown by **Figure 10**. However, this convergence arose prior to 2009. Taking everything into account, there is no evidence to suggest that the Commission's recommendation has led to the consumer outcomes in Europe converging to the US ones.

23 Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU – Implications for Industry, Competition and Consumers (07/05/2009).

24 We use Merrill Lynch data because Analysys Mason data is not available for the US.

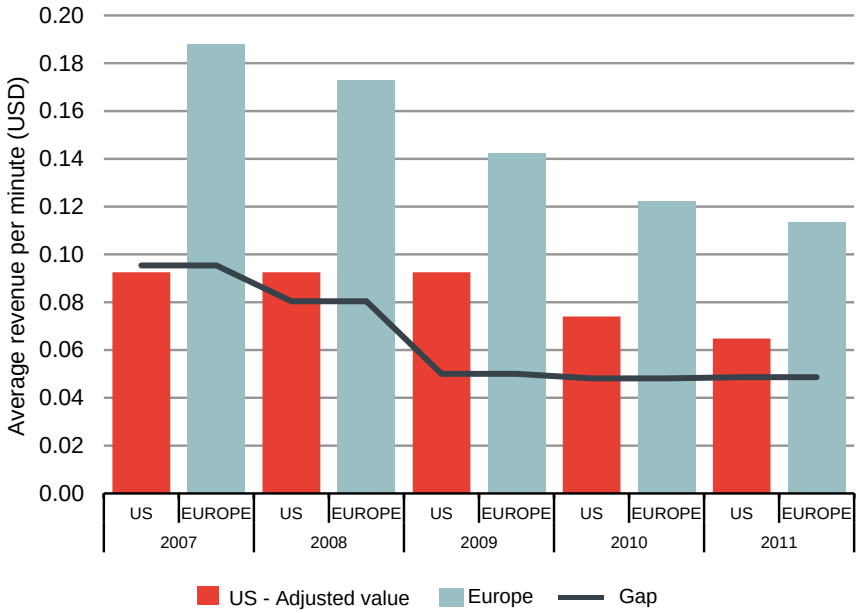
25 We downwards adjust the usage data for the US to make it comparable to Europe. The adjustment takes into account that a) there is a double counting of on-net minutes for the US, b) ringing time is included in the US data and c) calls in the US are rounded to the nearest minute.

Figure 9. Comparison of usage trends between Europe and the US (2007-11)



Source: Frontier analysis using Merrill Lynch data

Figure 10. Comparison of price trends between Europe and the US (2007-11)



Source: Frontier analysis using Merrill Lynch data

5 There is limited evidence of any link between MTR reductions and the market share of smaller operators

The Commission predicted that lower MTRs would increase competition in the mobile market. In particular, it expected that lower MTRs would make it easier for smaller operators to compete[26]:

"a significant reduction in termination rates to the cost level of efficient service provisioning would likely reduce the magnitude of any financial disadvantages stemming from traffic imbalances and thereby help facilitate competition from smaller operators".

It predicted that this increase in competition would offset any short-term waterbed effects:

"Increased competitive pressure resulting from the creation of a more level playing field for the provision of mobile calls will help ensure a continued downward momentum for overall retail prices, thereby off-setting any potential short-term waterbed effects."

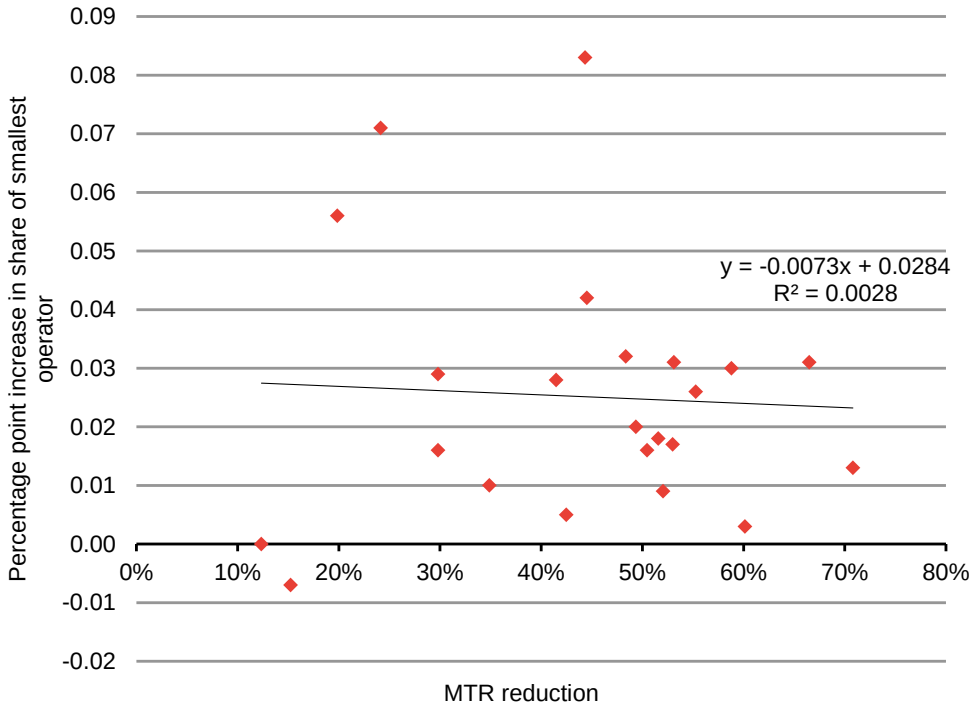
To analyse the impact that MTR reductions have had on competition we have looked at the effect of MTR reductions on the market share of the smallest operator since the Commission's recommendation in 2009.[27] The main finding is that although nearly all of the smallest operators have experienced an increase in their market shares, there does not appear to be any relationship between this and MTR reductions.

26 Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU – Implications for Industry, Competition and Consumers (07/05/2009).

27 We identify the smallest operator in 2009Q1 and then look at how the market share of this operator has changed. Our analysis therefore doesn't look at new entrants.

There is limited evidence of any link between MTR reductions and the market share of smaller operators

Figure 11. Correlation analysis of MTR cuts and changes in the market share of the smallest operator (2009Q1 to 2011Q3)



Source: Frontier analysis using Telegeography data on market shares and BEREC information on MTRs

There is limited evidence of any link between MTR reductions and the market share of smaller operators

6 MTR cuts and the fixed market

Up to this point, we have focussed on what appear to have been the two main objectives of the Commission, namely mobile prices and usage. The Commission also predicted that its Recommendation would have little impact on the fixed market. We find that the evidence is not consistent with the MTR cuts being fully passed on as lower fixed-to-mobile call prices to fixed consumers, whilst fixed-to-mobile usage has not increased.

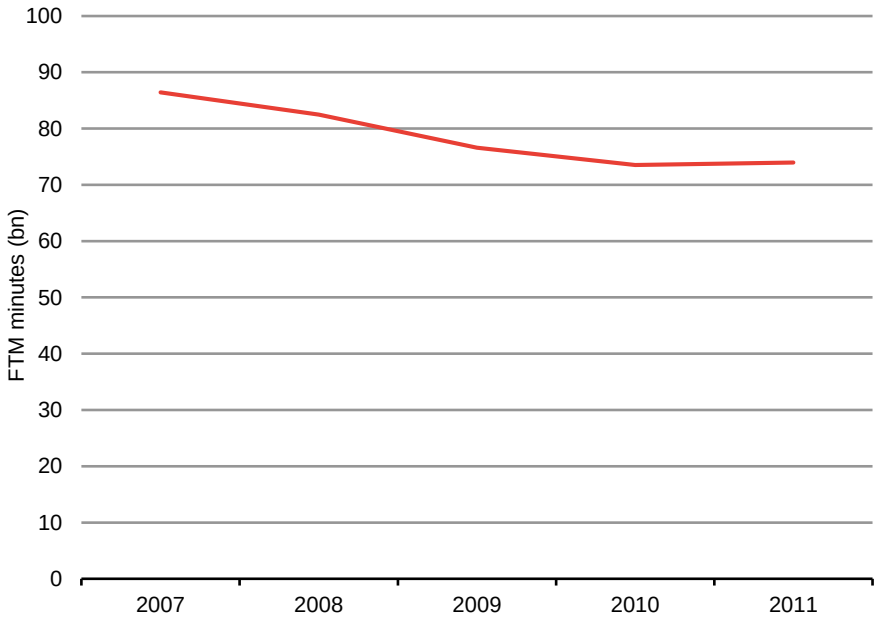
In the remainder of this section we present our findings for the following impact channels:

- fixed-to-mobile usage; and
- fixed-to-mobile prices.

6.1 Impact on fixed-to-mobile usage

As the Commission predicted, the MTR cuts seem to have had little impact on fixed-to-mobile (F2M) usage. Total F2M traffic has fallen slightly with no noticeable change in the level of F2M usage per fixed subscriber between 2007 and 2011.

Figure 12. Trends in fixed-to-mobile traffic since 2007

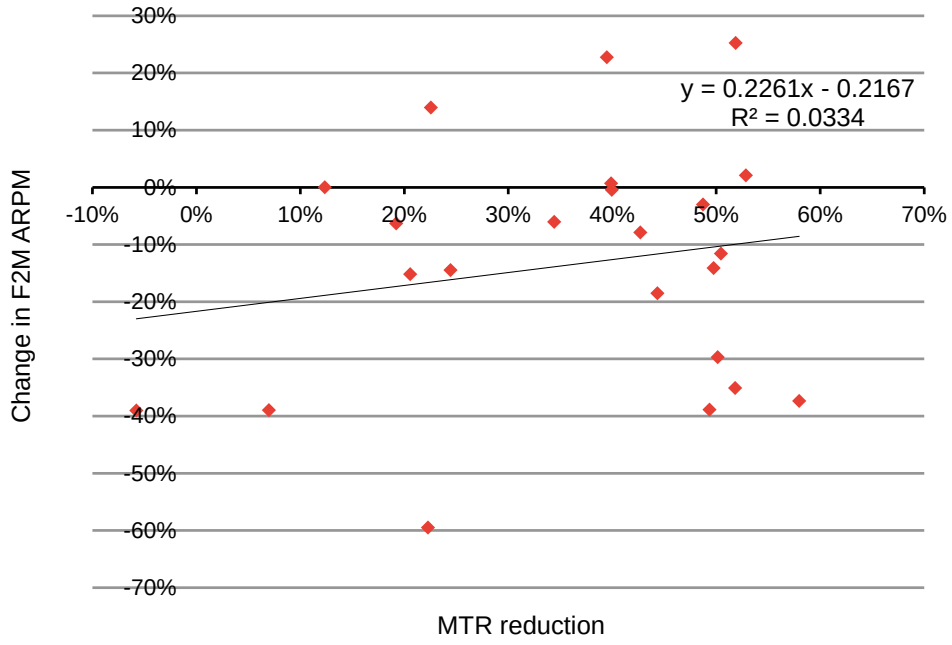


Source: Analysys Mason

6.2 Impact on fixed-to-mobile prices

The available evidence suggests that the lower MTRs have not been fully reflected in lower F2M call prices. For example, correlation analysis shows that countries with the largest MTR cuts have not had the largest reductions in F2M call prices (see **Figure 13**).

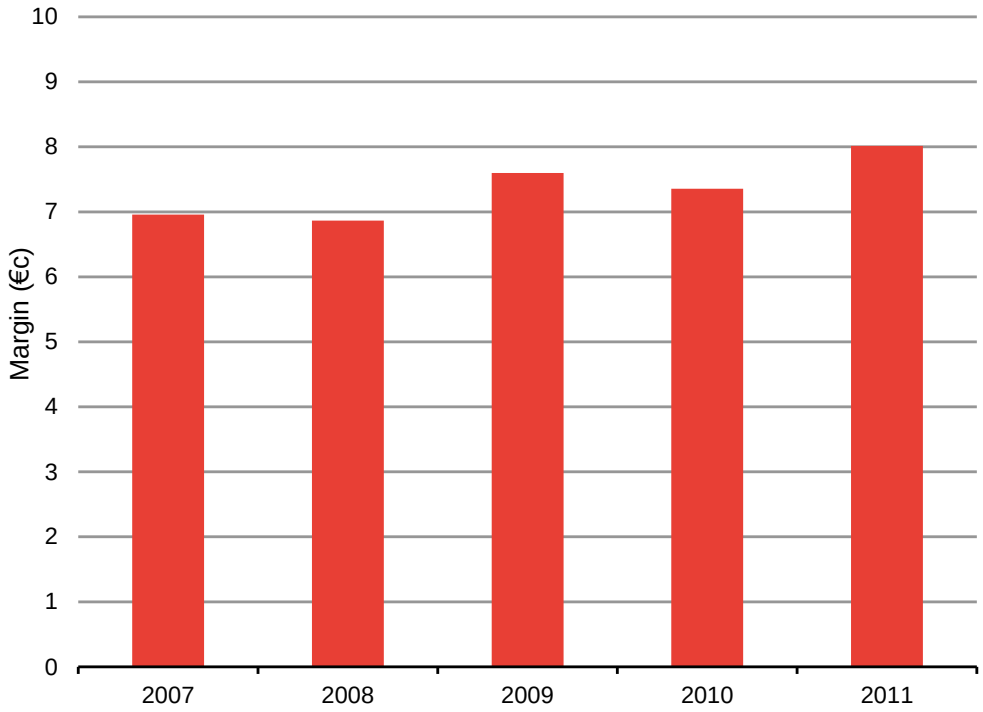
Figure 13. Correlation analysis of MTR cuts and changes in F2M prices (2009 to 2011)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

Consistent with the above cross-country evidence, lower mobile termination rates on F2M calls have not been fully passed through to retail F2M call prices – see **Figure 14**. Since the Commission's Recommendation in 2009, we estimate that fixed operators' margins have increased from €5bn to €6bn, despite falling volumes.

Figure 14. Trends in F2M margins since 2007



Source: Frontier analysis using Analysys mason data.

There is variation in the relationship between MTRs and F2M prices across countries, partly reflecting differences in the regulatory environment. Operators in some countries, such as Germany and Poland[28], are required to pass-through MTR reductions to F2M prices. On the other hand, MTR margins have increased in many countries where there are no such regulatory constraints.

28 Ovum Country Regulation overviews.

7 Accelerated MTR cuts could have a detrimental impact

MTR cuts could also affect other areas that are important for consumer outcomes. In particular, MTR levels could impact mobile penetration rates and mobile operators' investment levels. We find that it is too early to conclude whether the accelerated MTR cuts are having a detrimental impact on mobile penetration rates and investment (capex), but there is some evidence of a risk.

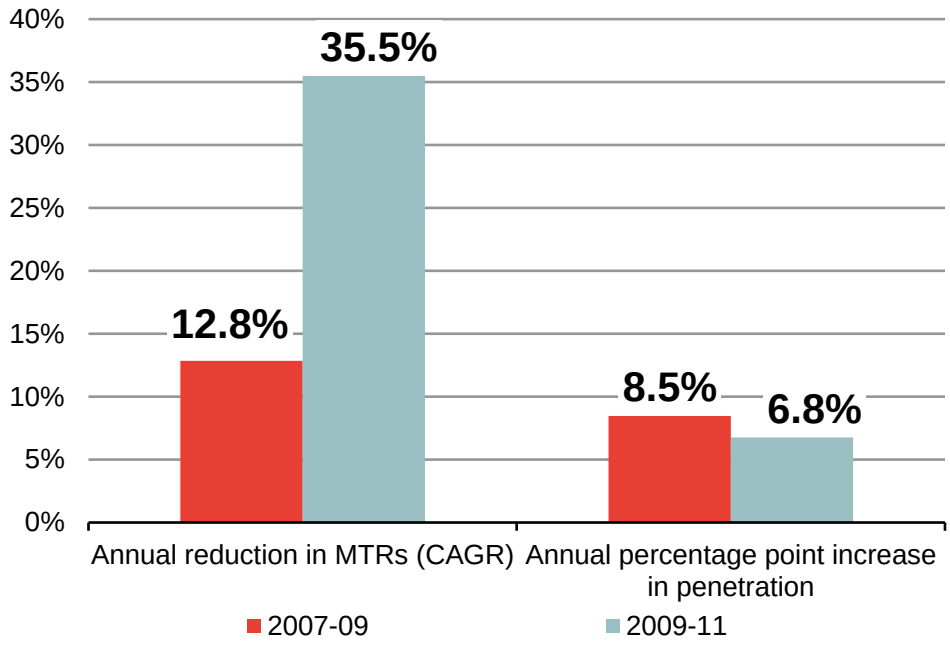
The following sections present our findings for the following impact channels:

- mobile penetration rates; and
- mobile operators' capex;

7.1 Impact on mobile penetration rates

There is some evidence that MTR cuts have dampened the increase in mobile penetration rates. Between 2007 and 2011, mobile penetration rates rose in all countries. However, mobile penetration rates have increased at a slower rate since the Commission's Recommendation on MTRs.

Figure 15. Annual changes in MTRs and penetration rates (2007-09 vs. 2009-11)

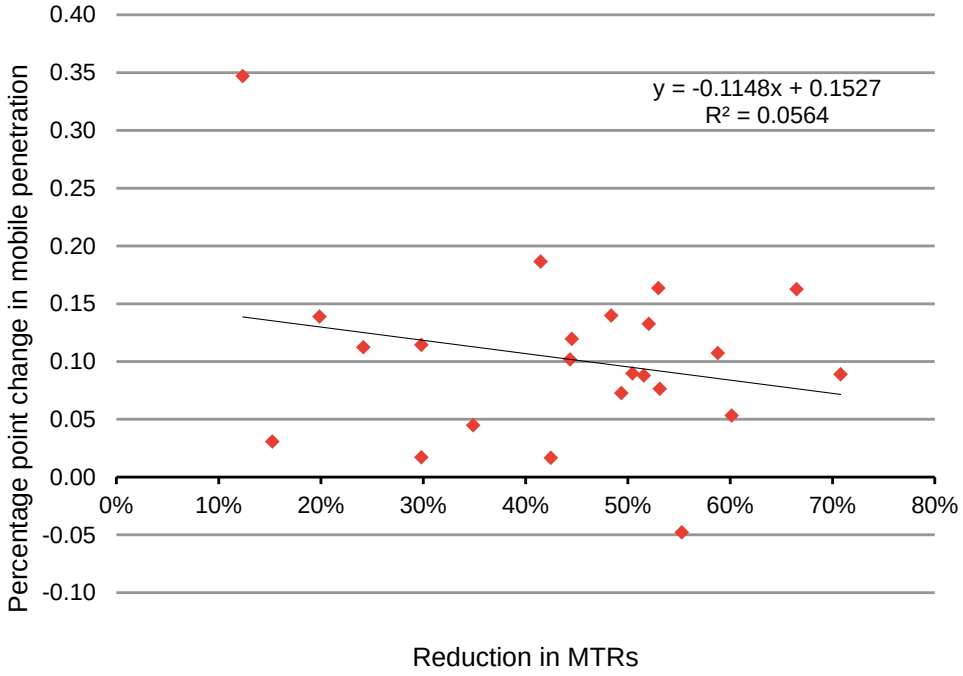


Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data.

Correlation analysis shows that the countries with the largest MTR reductions have tended to have smaller increases in penetration rates, providing evidence of the risk of an adverse effect.

Accelerated MTR cuts could have a detrimental impact

Figure 16. Correlation analysis of MTR cuts and changes in penetration rates (2009Q1 to 2011Q3)



Source: Frontier analysis using BEREC information on MTRs and Analysys Mason data on mobile penetration

7.1.1 Additional statistical analysis supports a penetration level risk

Mobile penetration rates are likely to be affected by several factors other than MTRs. For example, despite most European countries having reached mobile penetration levels of 100% or more, overall take-up rates have continued to increase in most countries over the last years.

Econometric analysis again allows us to distinguish between the effect on penetration rates of a) falling costs of providing mobile services, b) the Commission's Recommendation, and c) the general diffusion effect. This is achieved by interacting MTRs with a time dummy that takes on a value of 1 from 2009 onwards, which is when the Commission made its Recommendation. This interaction term can be expected to capture the effect of the Recommendation on penetration rates. We use annual data from 2005 to 2011 covering 23 countries.

We ran a regression of mobile penetration rates on MTRs, MTRs interacted with a time dummy, a linear time trend and GDP per capita.[29] We found that the co-efficient on the MTR interaction term is positive and significant (see **Table 4**). More sophisticated statistical techniques are therefore consistent with a relationship between accelerated MTR cuts (the policy shift) and slower increases in penetration rates – this would be consistent with the operation of a waterbed effect, suggesting that MTRs cuts in excess of reductions in underlying costs could have dampened mobile penetration.

Table 4. Regression results on the link between MTRs and penetration rates

Variable	Coefficient	P-value[30]
Constant	-1.835	0.344
MTRs – cost trend	0.045	0.261
MTRs – policy impact	0.256	0.004
Diffusion factor	0.068	0.000
GDP per capita	0.168	0.397

Source: Frontier analysis

7.2 Impact on mobile capex

As F2M revenues decline, and absent a 'complete waterbed', this would be expected to imply that mobile operators will have fewer funds for investments. There is a risk therefore that mobile operators' capex will fall, as a result of accelerated MTR cuts. Correlation analysis, as shown in **Figure 17** below, reveals that those countries with higher MTR cuts have indeed had larger falls in capex per connection (although the simple statistical test suggests that this is a weak link). We have looked at the relationship between the lag in MTRs and capex per connection because mobile operator's investment plans are normally determined some time in advance.

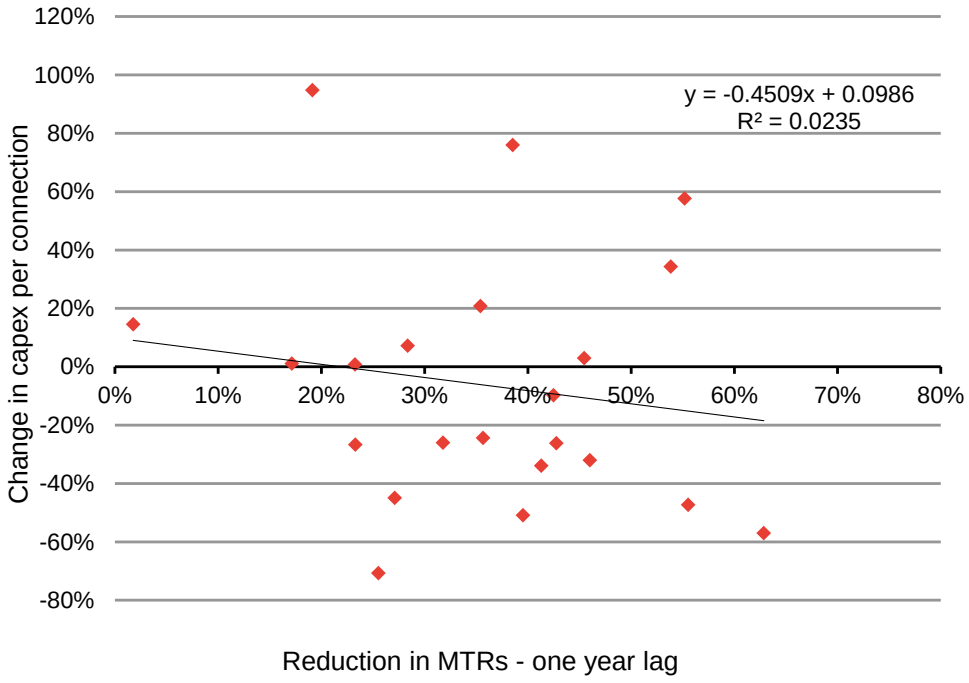
29 We use fixed effects on a panel data set of 23 countries between 2005-2011. Our preferred specification is $Log(Penetration_{it})=\beta_0+\beta_1 Log(MTR_{it})+ \beta_2 D_{2009\text{-}2011} *Log(MTR_{it})+ \beta_3 (Time\ trend) +\beta_4 Log(GDPcap_{it})+u_i+\varepsilon_{it}$

30 The P-value reflects the probability that the co-efficient is equal to zero. Typically, if the p-value is below 0.05, you would conclude that the co-efficient is significantly different to zero.

Accelerated MTR cuts could have a detrimental impact

It is difficult to form firm conclusions about the impact on capex however at this stage, as it will be influenced by a range of factors. But the current evidence is consistent with the existence of a risk that capex could be adversely impacted by accelerated MTR cuts.

Figure 17. Correlation analysis of MTR cuts and changes in capex per connection (2009Q1 to 2011Q3)



Source: Frontier analysis using data from Wireless Intelligence and BEREC reports.

Accelerated MTR cuts could have a detrimental impact

8 Summary

MTRs have fallen at a much faster rate since 2009. If countries continue to move towards MTRs based on 'pure LRIC', as appears likely, then this trend is likely to continue going forward. This report has provided an initial assessment of how consumer outcomes have changed. Our key conclusions are as follows.

- **No link to usage and prices.** Although usage has increased and prices have fallen, there is no evidence that these trends have been related to accelerated reductions in mobile termination rates. Despite a tripling in the rate of termination rate cuts since the introduction of the Commission's recommendation, we have not found evidence at the EU level of an acceleration in the rate of mobile price reductions or the rate of usage increase. Correlation analysis and econometric analysis confirms these findings.

- **No evidence of a link between MTR reductions and the market position of smaller players**. There appears to be no evidence of a positive link between the market share of smaller operators and the acceleration in MTR reductions since 2009.

- **Potential risk of lower take-up and investment**. It is too early to draw conclusions on the impact of accelerated mobile termination rate cuts on penetration rates and investment levels - there is a risk that they could have a detrimental impact.

Annex 1: Data used

Countries

We have used data from countries in the EU-27, except for Malta, Luxembourg and Cyprus due to data limitations. We have also excluded Greece, as we consider it to be an outlier given its recent extreme economic crisis.

Time period

For our econometric analysis, we use annual data covering the period from 2005 to 2011. Our correlation analysis covers the period between 2009Q1 to 2011Q3. For mobile prices and usage, we have also done correlation analysis for 2007Q1 to 2011Q3 as a robustness check. We have used a longer time series for the econometrics than we used for the correlation analysis, so that we could get a larger sample.

Variables

The following table provides a description of the data that we have used. [31]

[31] More details of the data that we have used are available upon request.

Table 5. Data used in our analysis

Variable	Definition	Source	Areas of analysis
Average mobile prices (1)	Voice retail revenue (excluding interconnection payments) divided by outgoing mobile minutes.	Analysys Mason	Correlation analysis, econometrics
MTRs	Mobile Termination Rate set by the regulator	BEREC reports	Correlation analysis, econometrics
Mobile usage	Outgoing minutes of use per active subscriber	Analysys Mason	Correlation analysis, econometrics
Mobile penetration	End of period active subscribers as a percentage of national population at year end	Analysys Mason	Econometrics
GDP per capita	GDP per capita adjusted for Purchasing Power Parity	IMF	Econometrics
Average mobile prices (2)	Voice ARPU (reported ARPU or service revenue per average subscriber, adjusted to exclude non-voice revenues) divided by reported MOU.	Merrill Lynch	Comparison between the US and Europe
Mobile usage	The Minutes of Use per month per average user is calculated by dividing total minutes of use on the operator's network by the average subscriber base during the quarter. It is measured in minutes and usually excludes traffic related to Mobile Data services. It includes both incoming and outgoing minutes.	Merrill Lynch	Comparison between the US and Europe
Capex	Capex per connection	Wireless Intelligence	Correlation analysis
Fixed-to-mobile prices	Fixed-to-mobile revenue divided by fixed-to-mobile traffic.	Analysys Mason	Correlation analysis, graphical analysis of pass-through
Fixed-to-mobile usage	Calls originated on circuit-switched fixed networks and terminating on mobile networks.	Analysys Mason	Graphical analysis
Market shares	Number of subscribers for each operator as a percentage of the total number of subscribers in that country.	Telegeography	Correlation analysis

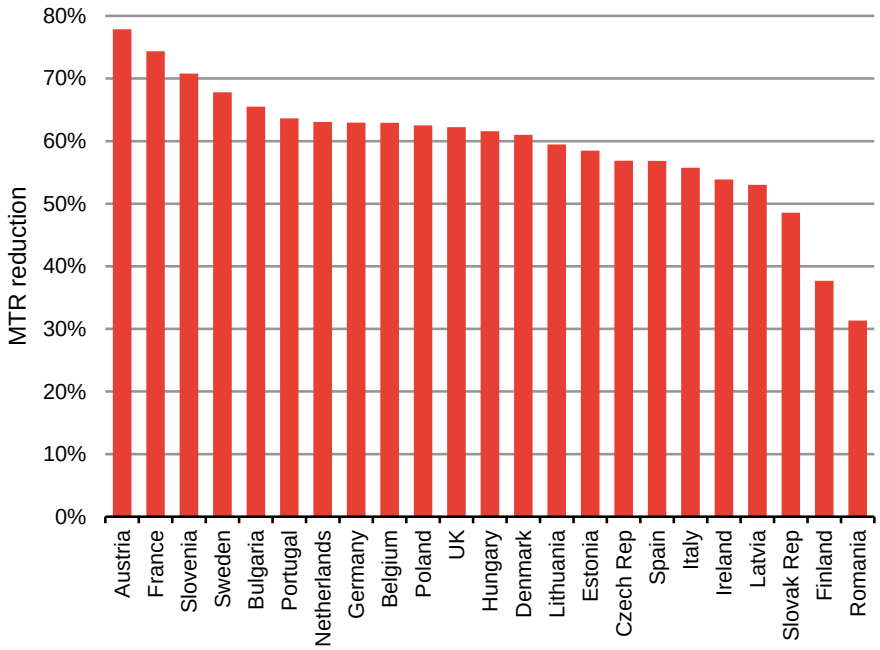
Source: Frontier analysis

Annex 1: Data used

High-level summary charts

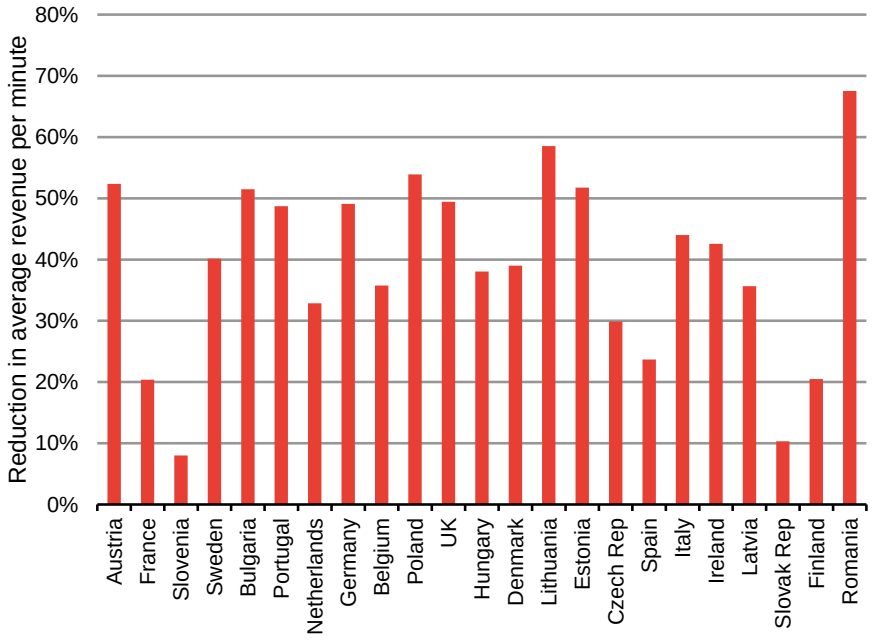
The following figures show the changes in MTRs, ARPM, usage per active subscriber and mobile penetration between 2007Q1 to 2011Q3.

Figure 18. Reduction in MTRs (2007Q1 to 2011Q3)



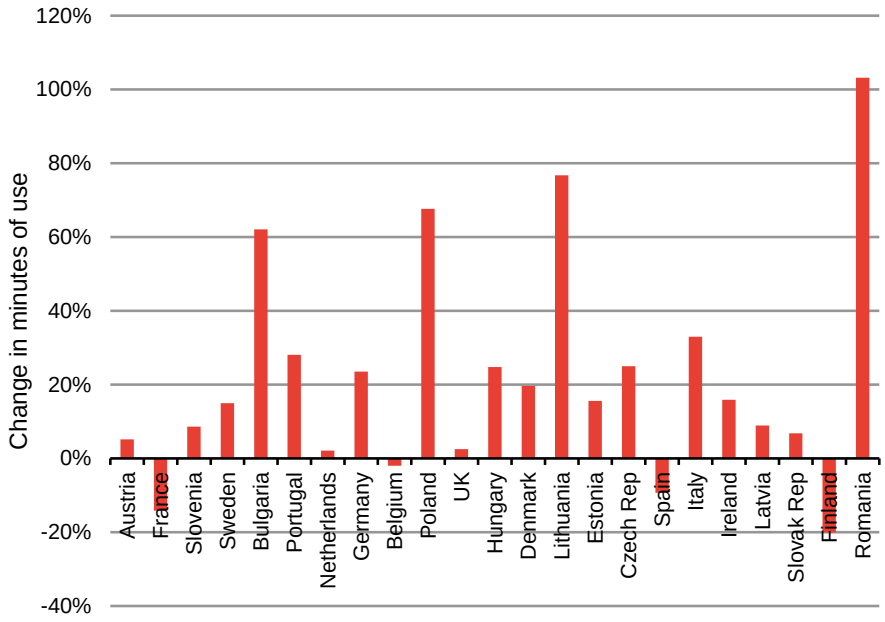
Source: BEREC information

Figure 19. Reduction in Average Revenue Per Minute (ARPM) (2007Q1 to 2011Q3)



Source: Analysys Mason

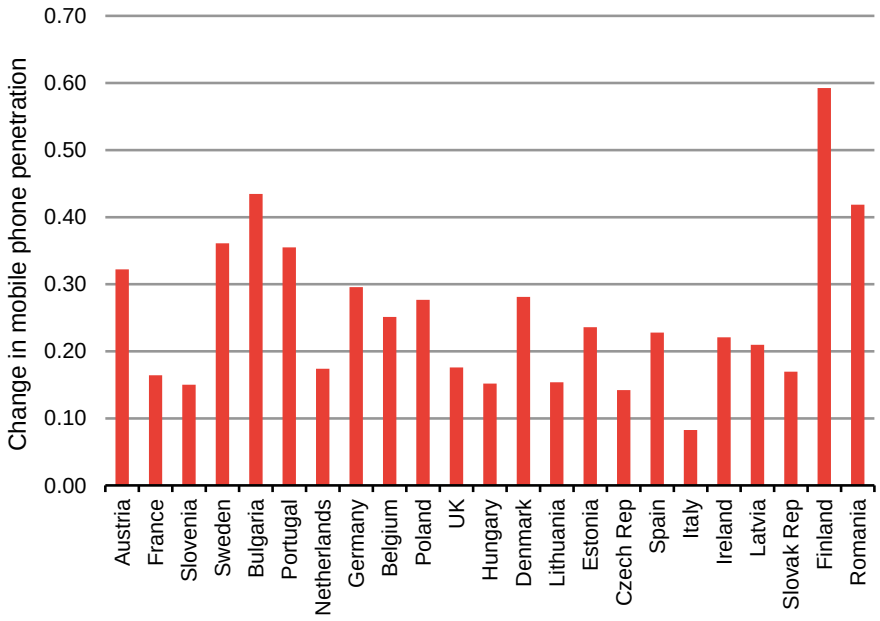
Figure 20. Change in minutes of use per active subscriber (2007Q1 to 2011Q3)



Source: Analysys Mason

Annex 1: Data used

Figure 21. Percentage point change in mobile penetration (2007Q1 to 2011Q3)



Source: Analysys Mason

Raw data

The following tables provide the key raw data that we used in our analysis.

Figure 22. Mobile termination rates (€c/min)

	1Q 2007	3Q 2007	1Q 2008	3Q 2008	1Q 2009	3Q 2009	1Q 2010	3Q 2010	1Q 2011	3Q 2011
Austria	0.091	0.076	0.068	0.060	0.060	0.040	0.035	0.030	0.025	0.020
Belgium	0.116	0.090	0.090	0.087	0.087	0.087	0.088	0.089	0.043	0.043
Bulgaria	0.184	0.184	0.183	0.151	0.135	0.135	0.091	0.099	0.064	0.064
Czech Rep	0.103	0.104	0.113	0.126	0.111	0.087	0.076	0.065	0.055	0.044
Denmark	0.114	0.098	0.098	0.085	0.086	0.074	0.074	0.060	0.060	0.044
Estonia	0.169	0.169	0.107	0.088	0.088	0.087	0.087	0.078	0.078	0.070
Finland	0.071	0.071	0.053	0.053	0.050	0.050	0.049	0.049	0.044	0.044
France	0.078	0.078	0.069	0.069	0.069	0.048	0.048	0.031	0.031	0.020
Germany	0.091	0.091	0.082	0.082	0.082	0.068	0.068	0.068	0.034	0.034
Hungary	0.116	0.099	0.080	0.086	0.063	0.059	0.052	0.051	0.043	0.045
Ireland	0.101	0.101	0.099	0.099	0.096	0.096	0.097	0.080	0.056	0.046
Italy	0.122	0.109	0.108	0.108	0.094	0.082	0.082	0.083	0.070	0.054
Latvia	0.090	0.090	0.089	0.088	0.088	0.088	0.088	0.067	0.049	0.042
Lithuania	0.078	0.078	0.078	0.078	0.063	0.063	0.042	0.046	0.029	0.032
Netherlands	0.114	0.114	0.104	0.094	0.094	0.073	0.073	0.060	0.042	0.042
Poland	0.112	0.104	0.116	0.107	0.056	0.040	0.043	0.043	0.043	0.042
Portugal	0.110	0.110	0.110	0.110	0.072	0.066	0.065	0.060	0.050	0.040
Romania	0.074	0.074	0.066	0.068	0.060	0.054	0.053	0.051	0.051	0.051
Slovak Rep	0.107	0.111	0.106	0.113	0.099	0.099	0.073	0.065	0.066	0.055
Slovenia	0.144	0.144	0.075	0.064	0.065	0.054	0.052	0.049	0.046	0.042
Spain	0.105	0.098	0.082	0.071	0.064	0.057	0.062	0.056	0.050	0.045
Sweden	0.071	0.060	0.059	0.046	0.039	0.030	0.031	0.027	0.027	0.023
UK	0.090	0.084	0.074	0.077	0.072	0.056	0.055	0.053	0.052	0.034

Source: BEREC information

Figure 23. Mobile penetration rates (% of total population)

	1Q 2007	3Q 2007	1Q 2008	3Q 2008	1Q 2009	3Q 2009	1Q 2010	3Q 2010	1Q 2011	3Q 2011
Austria	103%	106%	110%	113%	119%	121%	126%	129%	133%	135%
Belgium	91%	96%	101%	105%	107%	109%	111%	113%	114%	116%
Bulgaria	103%	114%	122%	127%	130%	132%	134%	135%	141%	147%
Czech Rep	111%	114%	116%	118%	120%	122%	123%	123%	124%	125%
Denmark	109%	113%	113%	120%	123%	128%	134%	132%	132%	137%
Estonia	118%	119%	121%	127%	128%	129%	131%	134%	141%	142%
Finland	109%	113%	119%	126%	134%	142%	149%	158%	165%	168%
France	82%	83%	86%	87%	90%	91%	94%	95%	98%	98%
Germany	98%	104%	110%	116%	117%	121%	122%	122%	125%	128%
Hungary	93%	96%	100%	104%	107%	105%	107%	107%	108%	108%
Ireland	105%	109%	113%	116%	118%	119%	122%	124%	125%	127%
Italy	132%	137%	140%	139%	138%	134%	135%	137%	139%	140%
Latvia	93%	97%	98%	101%	101%	102%	103%	110%	109%	114%
Lithuania	135%	140%	142%	144%	143%	141%	141%	145%	145%	150%
Netherlands	102%	110%	116%	120%	124%	127%	116%	116%	116%	119%
Poland	93%	99%	104%	107%	110%	111%	112%	114%	118%	121%
Portugal	115%	120%	127%	134%	139%	142%	147%	149%	151%	151%
Romania	78%	91%	103%	113%	117%	119%	121%	122%	120%	120%
Slovak Rep	94%	94%	97%	98%	101%	98%	103%	106%	109%	111%
Slovenia	90%	93%	96%	99%	101%	102%	103%	103%	103%	105%
Spain	103%	106%	110%	112%	115%	118%	117%	121%	124%	126%
Sweden	106%	111%	113%	119%	123%	128%	130%	134%	137%	142%
UK	110%	112%	116%	119%	120%	122%	125%	127%	128%	128%

Source: Analysys Mason

Annex 1: Data used

Figure 24. Average revenue per minute (€c/min - voice only)

	1Q 2007	3Q 2007	1Q 2008	3Q 2008	1Q 2009	3Q 2009	1Q 2010	3Q 2010	1Q 2011	3Q 2011
Austria	0.15	0.14	0.11	0.11	0.09	0.10	0.08	0.08	0.08	0.07
Belgium	0.22	0.20	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.14
Bulgaria	0.12	0.10	0.09	0.08	0.07	0.07	0.07	0.07	0.06	0.06
Czech Rep	0.15	0.15	0.16	0.17	0.12	0.13	0.11	0.12	0.11	0.11
Denmark	0.16	0.16	0.14	0.15	0.14	0.13	0.13	0.12	0.11	0.10
Estonia	0.15	0.13	0.11	0.10	0.09	0.09	0.08	0.08	0.07	0.07
Finland	0.10	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08
France	0.15	0.16	0.15	0.16	0.14	0.15	0.13	0.14	0.12	0.12
Germany	0.20	0.19	0.15	0.14	0.13	0.12	0.11	0.11	0.10	0.10
Hungary	0.10	0.10	0.09	0.10	0.07	0.08	0.07	0.07	0.06	0.06
Ireland	0.17	0.17	0.14	0.13	0.14	0.13	0.12	0.12	0.10	0.10
Italy	0.15	0.14	0.12	0.13	0.11	0.12	0.10	0.10	0.08	0.09
Latvia	0.11	0.08	0.09	0.09	0.09	0.08	0.07	0.07	0.07	0.07
Lithuania	0.07	0.07	0.07	0.06	0.05	0.04	0.03	0.03	0.03	0.03
Netherlands	0.22	0.23	0.20	0.21	0.20	0.20	0.18	0.17	0.15	0.15
Poland	0.12	0.10	0.10	0.11	0.07	0.07	0.06	0.06	0.06	0.05
Portugal	0.16	0.16	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.08
Romania	0.07	0.08	0.06	0.06	0.04	0.04	0.03	0.03	0.02	0.02
Slovak Rep	0.11	0.13	0.11	0.14	0.12	0.11	0.09	0.10	0.10	0.10
Slovenia	0.11	0.12	0.11	0.13	0.10	0.11	0.09	0.10	0.09	0.10
Spain	0.18	0.19	0.19	0.18	0.17	0.17	0.17	0.17	0.15	0.14
Sweden	0.15	0.14	0.12	0.12	0.09	0.09	0.09	0.09	0.09	0.09
UK	0.17	0.16	0.13	0.12	0.10	0.10	0.09	0.09	0.09	0.08

Source: Calculated based on the Analysys Mason Telecoms Market Matrix

Figure 25. Average outgoing minutes per active subscriber

	1Q 2007	3Q 2007	1Q 2008	3Q 2008	1Q 2009	3Q 2009	1Q 2010	3Q 2010	1Q 2011	3Q 2011
Austria	155	161	177	169	179	171	172	164	166	163
Belgium	100	103	103	105	102	102	102	103	99	98
Bulgaria	58	69	74	84	82	89	86	93	96	94
Czech Rep	80	84	84	87	90	92	94	97	99	100
Denmark	117	121	130	125	124	124	123	130	136	140
Estonia	109	123	117	120	110	115	109	120	108	126
Finland	189	188	186	180	174	167	164	159	152	151
France	162	156	160	150	152	143	145	140	144	139
Germany	68	71	74	78	79	81	82	85	84	84
Hungary	113	121	122	130	125	132	129	137	134	141
Ireland	151	160	176	191	165	168	171	173	175	175
Italy	91	96	98	102	104	107	112	119	118	121
Latvia	101	152	123	134	114	126	113	113	110	110
Lithuania	73	88	81	101	98	104	113	122	124	129
Netherlands	95	86	89	85	85	83	93	96	101	97
Poland	68	83	82	91	93	99	106	113	112	114
Portugal	89	95	88	100	94	106	100	115	112	114
Romania	94	99	107	110	124	145	159	169	180	191
Slovak Rep	103	102	105	103	105	116	122	122	111	110
Slovenia	128	128	133	129	138	140	147	143	148	139
Spain	118	125	114	121	108	114	106	110	103	107
Sweden	127	133	140	140	140	143	149	149	149	146
UK	120	126	130	132	129	128	131	128	123	123

Source: Calculated based on the Analysys Mason Telecoms Market Matrix

Figure 26. Fixed-to-mobile average revenue per minute (€c/min)

	2007	2008	2009	2010	2011
Austria	0.15	0.14	0.13	0.12	0.11
Belgium	0.18	0.17	0.17	0.16	0.15
Bulgaria	0.26	0.25	0.23	0.20	0.23
Czech Rep	0.16	0.17	0.16	0.15	0.15
Denmark	0.18	0.17	0.16	0.16	0.16
Estonia	0.20	0.19	0.19	0.19	0.18
Finland	0.12	0.13	0.13	0.13	0.13
France	0.14	0.14	0.12	0.11	0.07
Germany	0.14	0.12	0.11	0.09	0.08
Hungary	0.19	0.19	0.17	0.17	0.14
Ireland	0.16	0.16	0.18	0.20	0.23
Italy	0.18	0.17	0.17	0.16	0.16
Latvia	0.14	0.14	0.11	0.09	0.07
Lithuania	0.16	0.15	0.14	0.11	0.09
Netherlands	0.14	0.15	0.14	0.14	0.13
Poland	0.22	0.20	0.13	0.11	0.08
Portugal	0.16	0.17	0.19	0.22	0.24
Romania	0.12	0.10	0.10	0.08	0.06
Slovak Rep	0.25	0.19	0.15	0.13	0.13
Slovenia	0.12	0.12	0.12	0.11	0.05
Spain	0.19	0.19	0.18	0.17	0.15
Sweden	0.11	0.09	0.08	0.09	0.09
UK	0.18	0.16	0.15	0.15	0.15

Source: Calculated based on the Analysys Mason Telecoms Market Matrix

Figure 27. Total fixed-to-mobile usage (millions of minutes)

	2007	2008	2009	2010	2011
Austria	1,150	1,155	1,083	1,029	994
Belgium	1,690	1,660	1,631	1,594	1,538
Denmark	1,381	1,317	1,220	1,118	1,007
Finland	803	678	564	491	441
France	11,910	11,686	11,318	10,948	13,648
Germany	14,014	13,402	13,185	13,019	12,896
Ireland	1,495	1,353	1,152	1,002	906
Italy	15,800	14,910	13,150	12,090	11,406
Netherlands	3,562	3,412	3,223	3,125	3,136
Portugal	1,161	1,095	992	889	802
Spain	7,289	6,699	5,883	5,517	5,560
Sweden	3,827	3,859	3,725	3,631	3,578
UK	14,470	13,277	12,155	11,852	10,841
Bulgaria	248	194	214	213	212
Czech Republic	527	451	386	343	316
Estonia	94	89	80	73	72
Hungary	695	636	578	558	721
Latvia	134	133	132	131	130
Lithuania	82	77	63	66	75
Poland	2,003	2,227	2,172	2,255	2,279
Romania	1,134	1,355	1,064	1,142	1,139
Slovakia	229	226	219	228	199
Slovenia	138	144	132	129	128

Source: Analysys Mason Telecoms Market Matrix

Annex 1: Data used

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