Competition Policy and Scenarios for European 3G Markets*

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Although Europe has historically been well positioned in mobile communications, a number of challenges have recently arisen regarding the prospects of so-called third-generation mobile systems (3G). Challenges have escalated both in the marketplace and on the financial front for several leading European equipment manufacturers and operators. More notably, the regulatory conditions for 3G in Europe have become severely fragmented, despite long-standing efforts to achieve a common market, and extraordinarily high license fees have been paid to governments in some member states.

This has given rise to a major debate over the merits and demerits of the license fees, as well as methods of spectrum allocation, which addresses more than just the European situation. This paper does not seek to add further pros and cons to this debate, but will use the present state of affairs[1] as a point of departure. We will propose some solutions for a future possible scenario.

The scenario that we have in mind is the possibility of a major take-up of 3G technology whereby various European country markets are profitable for market players. What are the financial conditions in order to achieve profitability in the various markets? In particular, what are the financial conditions determining profitability in an "expensive" license market such as the United Kingdom or Germany? On the basis of such an estimate, what

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1 For extensive coverage of the spectrum allocation debate, see for instance the recent special issue in *Telecommunications Policy* on Practical Steps to Spectrum Markets (2003).

are the incentives for pan-European mobile operators to use profits from profitable country markets to cover license costs in other, more "expensive" markets? What are some of the possible consequences of such cross-subsidies, both from a political and competition stand point? Are there any solutions, or possible ex ante policy responses to such a development?

We do recognise that this positive growth scenario may not materialise i.e. that 3G will not be a commercial success. Under such circumstances, other policy measures and considerations will evolve and a lot of literature explores this possibly negative outlook[2].

The paper is structured in the following way. The following section develops the financial simulation, focusing on the pan-European players since they operate in several markets with varying profit potentials and also face markets with high license fees. The section after discusses some of the possible consequences of the various profit opportunities in European markets and how pan-European operators may respond to these differentials. Their response may raise new considerations for competition policy, especially coordination between member states and the European Commission. Then we conclude the paper.

■ Scenarios of 3G Growth for Pan-European Players

This section analyses the 3G business case for selected countries and the market landscape for pan-European operators in particular. By pan-European operators we mean Vodafone and Orange, the only operators that aim to cover most of Europe[3]. This analysis will pin-point the consequences of high license fees and examine whether operators are likely to enjoy any financial return on their investments in licenses, while looking at alternative sources of revenue for operators. In the process, we assess operators' markets and their respective financial outlooks based on detailed simulations of operator costs and revenues and by taking into account the situation in each market. We do not look at non-cash items such as impairment charges and goodwill, since they do not impact cash flows, net debt or dividend payments and thus do not influence financial viability. Instead we look at

[2] See for instance POUILLOT, 2002; BJÖRKDAHL & BOHLIN, 2002.

[3] A European Commission sponsored report on the 3G market also identified Vodafone and Orange as the only two pan-European players (see European Commission, 2002).

operational and capital expenditure plus the impact of the cash license fees[4].

3G license fees

We start by providing the 3G business cases for Vodafone in the UK and Germany, the two markets with the most expensive 3G licenses. One can argue that it is difficult to make a forecast for 3G licenses that have a duration of 20 years. However, we focus on an estimate of the required ARPU[5] for a profitable business case (positive NPV). We approach this estimate in two different ways. The first approach is based on an estimate of required ARPU for the total customer base. This offers an understanding of the level of ARPU that must be generated by 3G to produce a profitable business case. The second approach is based on estimates of the expected pace of 3G penetration and what each 3G customer has to spend, in terms of both incremental and flat ARPU.

United Kingdom

Vodafone spent GBP5,960 million on its 3G license in the UK and is required to cover 80% of the population by the end of 2007. In order to achieve the required coverage, our estimates indicate that Vodafone will need to invest GBP1.6 billion in the 3G network. This figure only includes costs for rolling out the network and we assume that Vodafone will follow its strategy and build its own 3G network in the UK, thus avoiding any network sharing; see Figure 1.

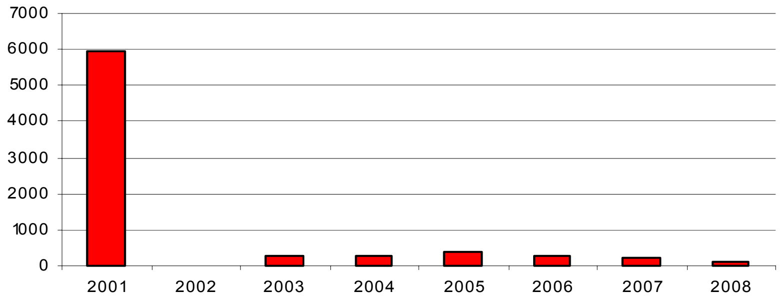
As far as operational expenditure is concerned, we only calculate the additional costs generated by 3G on top of existing running costs. This should provide a better understanding of the impact of 3G on the existing business. It is important to understand the contribution of 3G, which is supposed to increase revenues thanks to services that cannot be distributed with existing implemented technology. Voice- and low-bandwidth-based services can already be distributed by operators through 2G and these services should not therefore be taken into consideration when investigating the impact of 3G revenues and costs. Our aim here is to understand the

[4] See the JRC/IPTS/ESTO study, op.cit. for more details.

[5] Average Revenue Per User

financials without any so-called cannibalism. If we allow 3G to cannibalise 2G services, the 3G business case looks better than its value-added contribution. We aim to present the "true" business case for 3G technology and use this approach to interpret the extra ARPU required from 3G.

Figure 1: Distribution of the investment involved in rolling out the 3G network in the UK (GBP million)

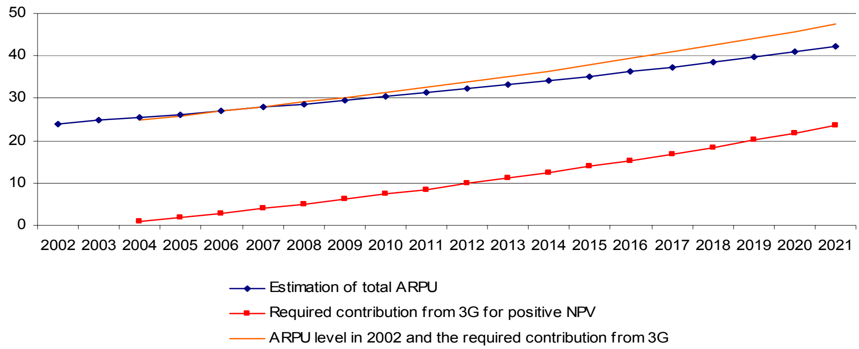


2001 cost is the license fee

To understand the necessary level of ARPU that 3G technology needs to generate, 3G revenues from the total customer base are used in calculations in order to relate these to total ARPU. The question we are addressing is what the total ARPU has to be in order to maintain 2G revenue levels while at the same time building a profitable business case for 3G. Our calculations do not include handset subsidies, since our figures are based on the total customer base from the start (in the analysis below we will include handset subsidies). Thus, our approach has more downside risk than upside risk. Moreover, we do not calculate with any terminal value, as our figures are based on the whole license duration. The weighted average cost of capital is 8.8%. See Figure 2 for our results.

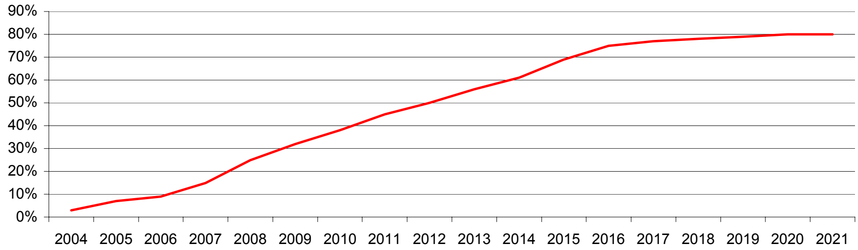
The results show that the contribution from 3G must be significant if Vodafone is to get a return on its 3G investment. With this incremental increase in 3G ARPU it emerges that Vodafone must get GBP23.5 extra per month from each user from the total customer base in real (not nominal) terms by 2021. Based on ARPU in 2002, which was GBP24 per month, we see that for Vodafone not to cannibalise its existing business and at the same time get a return on its 3G investment, the operator must generate an ARPU of about GBP48 per month in 2021. This holds even if we are not reckoning with an increase in voice, SMS and GPRS revenues (we use a constant ARPU of GBP24 and the ARPU posted by Vodafone in 2002) and do not include any 3G-handset subsidies. If handset subsidies are included, the required 3G contribution is even higher.

Figure 2: Estimate of ARPU (total customer base) from 3G to get a positive NPV and its impact on total ARPU (in GBP per month).



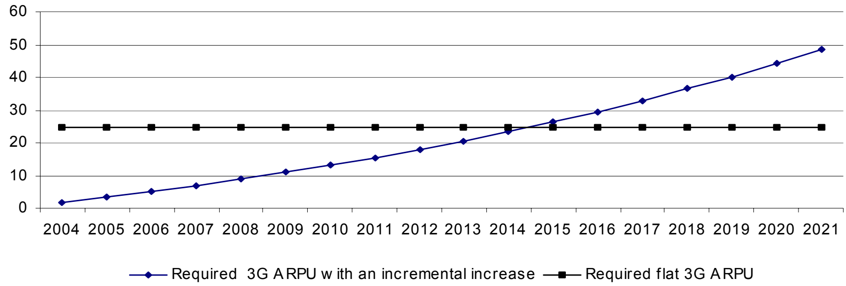
In another approach, we instead estimate the required average revenue per user from 3G at a specific 3G penetration rate. Figure 3 provides an assumed growth rate for 3G penetration. We include an average 3G handset subsidy of GBP150 in this analysis.

Figure 3: 3G penetration (of total mobile penetration).



We estimate the required ARPU from 3G in two ways. Firstly we estimate the required ARPU from 3G with an incremental increase, i.e. how ARPU should increase at a minimum as the 3G penetration increases. We then estimate the required ARPU at a flat rate, i.e. the minimum 3G ARPU level if it were constant over the whole time period (see Figure 4).

Figure 4: Required average revenue per 3G user for Vodafone to get positive NPV on 3G investment in the UK (in GBP per month)

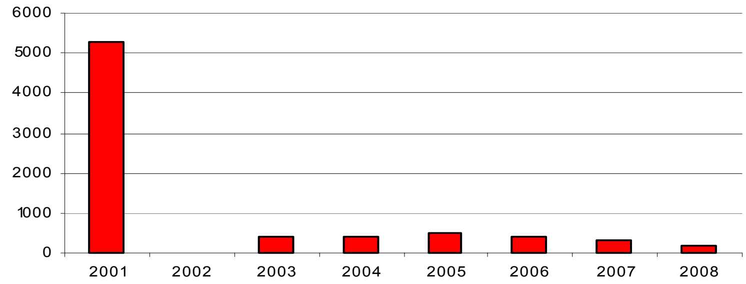


We can see that for Vodafone to get return on its investment, ARPU from 3G has to be GBP24.50 assuming a flat ARPU. It is again important to remember that that this revenue has to come from data services that 2G cannot deliver, thus advanced data services or large files that require high bandwidth, in order not to cannibalize existing 2G revenues. As a result, we do not think it likely that Vodafone will get a return on its 3G investment in the UK. The reason is that we question whether users are prepared to pay GBP24.50 on average on high-bandwidth services for the license duration, in addition to what they spend on traditional low-bandwidth services (such as voice, SMS, etc.). If additional revenues from 3G are lower than this figure, Vodafone will not get a sufficient return on its 3G investment.

Germany

Vodafone paid GBP5,300 million for its 3G license in Germany. Vodafone is required to cover 25% of the population by the end of 2003 and 50% of the population by the end of 2005. We estimate that Vodafone will invest GBP2.2 billion in the 3G network, assuming that Vodafone will build its own network. On this basis we only include costs for rolling out the network; see Figure 5.

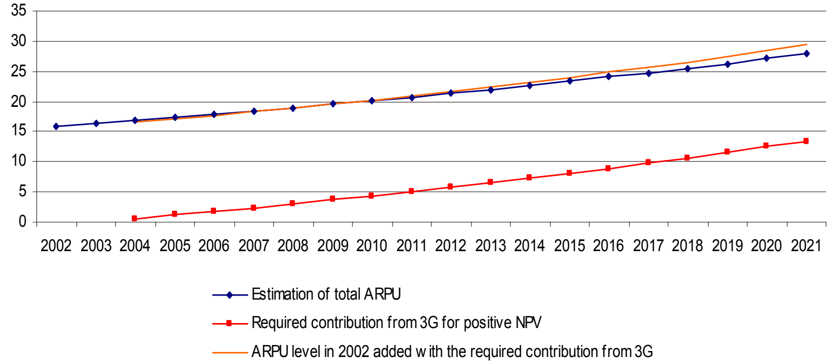
Figure 5: Distribution of the investment involved in rolling out the 3G network in Germany (in GBP million)



2001 cost is the license fee.

As for the UK, we first investigate the required ARPU level from 3G of the total customer base to get positive NPV on the 3G investment. This enables us to compare the required ARPU from 3G with existing ARPU and investigate the required total ARPU for Vodafone both to get a return on its 3G investment and to retain its existing 2G-type service revenues. We do not calculate with handset subsidies in this first case. The weighted average cost of capital is 8.8% (see Figure 6).

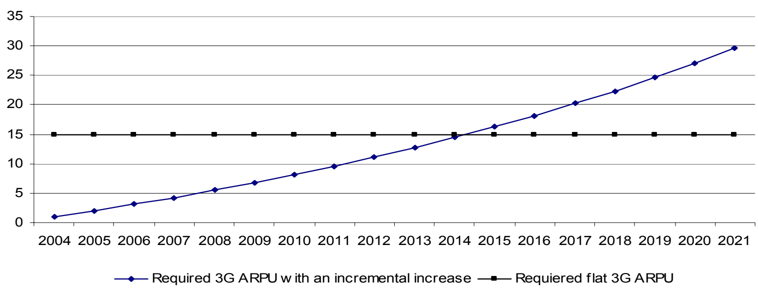
Figure 6: Estimate of required ARPU (total customer base) from 3G in Germany to get positive NPV and its impact on total ARPU level (in GBP per month).



The contribution in average revenue per 3G user in Germany compared with the UK is lower, as one might expect. The major reason for this is that Vodafone's customer base in Germany was 63% larger than its UK subscriber base in 2002. Even though Vodafone does not have to get as much revenue from each 3G user in Germany as in the UK, it is difficult to see the company getting a return on its 3G investment within the license duration. While there does not seem to be a large gap between the average revenue per user generated in 2002, the required level of ARPU generated by 3G and our estimate of total ARPU, it is important to understand that the estimated total ARPU also includes revenue increases from existing types of services.

In another approach we instead estimate the required 3G ARPU with the same rate of 3G penetration as in the UK (see Figure 7). This calculation is also based on the same average handset subsidies of GBP150 per user that were applied to the UK. Figure 7 shows that in Germany, Vodafone only has to get a flat 3G ARPU of GBP15, which is almost GBP10 less than in the UK.

Figure 7: Required average revenue per 3G user for Vodafone to get a return on its 3G investment in Germany (in GBP per month).



It can also be argued that Germany's larger population made its 3G license cheaper than the UK license. However, this is not entirely true. Customer quality is significantly better in the UK due to higher penetration and ARPU levels. Even so, the long-term potential for generating revenues is greater in Germany due to a population that is 23 million larger and similar levels of market competition to the UK. In conclusion, it will be easier for Vodafone to get return on the 3G license in Germany due to a customer base that is currently 8.3 million larger than in the UK, but it remains difficult to present a profitable case for the operator's 3G business.

Market landscape

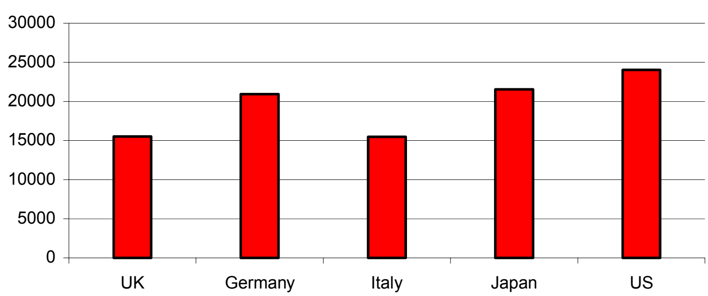
This section offers a comparative assessment of the main markets of the pan-European operators. The purpose is to identify potential sources of profit for pan-European operators in the future, as well as markets with a relatively unprofitable outlook.

Vodafone

For Vodafone we analyse the firm's key markets and the prospects of these markets for both the 2G and 3G business. To get an idea of financial futures, we investigate the markets by using in-depth simulations of the operators' costs and revenues and by taking into account each individual market situation. Our estimates assume that Vodafone will not increase its shareholding in these companies. Vodafone's key markets, thus the markets with the greatest impact and which are most important to Vodafone's results are the UK, Germany, Italy, Japan and the USA. These markets accounted for 74% of Vodafone's mobile telecommunications revenues and 69% of the company's total revenues in 2002.

As far as the Vodafone Group's total EBITDA is concerned, we believe that the US market will generate the greatest revenues for Vodafone; see Figure 8. However, Vodafone's Japanese operations will generate the largest growth, in terms of both EBITDA and its subscriber base. In the long term we believe that the Japanese market will outperform Vodafone's other markets. It is important to highlight that J-Phone has a market share of less than 20%. This means that the potential in Japan is tremendous compared to many European markets, which in numerous cases are mature, have too many competitors and lower customer quality. Telecommunications policy in Japan, which did not charge for 3G licenses and only consists of three market competitors, means that Japan is one example of a market in which Vodafone will make excess profits. These excess profits will probably be used to finance markets in Europe.

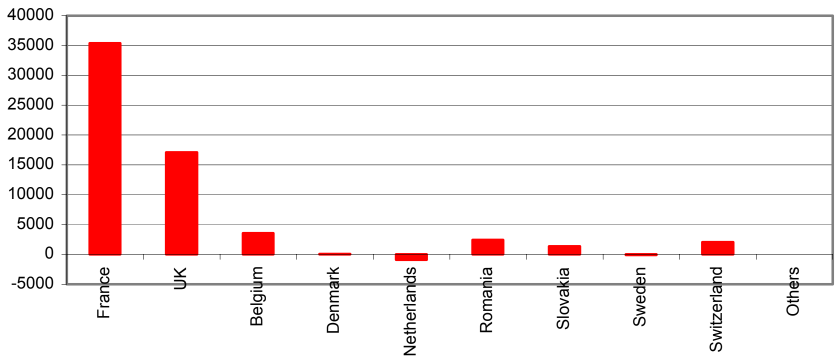
Figure 8: Accumulated EBITDA, 2002-2010 (in GBP million)



Orange

This section investigates Orange's financial prospects in its markets[6] (note that Orange's results are consolidated and that EBITDA margins are based on the total revenues in each market and not on service revenues). The results suggest that Orange will increase its revenues by 50% from 2001 to 2010. However, this increase is almost entirely due to two markets, France and the UK. Other markets will also improve, but compared with these two markets, their contribution in terms of revenues should be minor. EBITDA will increase significantly more than revenues, by 160% from 2001 to 2010, but this is also mainly due to the group's operations in France and the UK. Accumulated EBITDA in each country during 2001-2010 is presented in Figure 9, which clearly shows the imbalance for Orange.

Figure 9: Accumulated EBITDA (in EUR million)



Thus, Orange's present situation illustrates the huge differences in revenues gains within the European market landscape. Orange's financial imbalance will jeopardize its expansion strategy. While Vodafone has several operations that are responsible for generating the majority of its revenues, Orange has only two main sources, France and the UK. These two operations are, and will continue to be, of major importance to the company. However, it is interesting to note that there are markets in which Orange will not succeed. These markets are the Netherlands, Denmark and Sweden. In all these countries there is intense competition and low population. This means that Orange will need complementary profits from

[6] Orange has received a 3G license in Luxembourg. We have not taken Luxembourg into account in our calculations since Orange does not have any operations in the country to date. However, should Orange start to operate in Luxembourg, this will have an almost negligible impact on its results.

other countries to offset operations in the Netherlands, Denmark and Sweden. Hence revenues from other countries will have to finance activities in the Netherlands and Scandinavian markets, including their 3G licenses[7].

Implications for pan-European operators

Europe is not one single market (yet), but consists of a number of licensing conditions and regimes. Most conspicuously, auction fees vary considerably in Europe, as does market competition. Given the extraordinary license fees in some countries in the European market landscape, and the ensuing difficulties getting a return on 3G investments, the problem is simply: who will pay for the extraordinary license fees?

For example, the simulation shows that Orange will operate in unprofitable markets, such as Sweden, the Netherlands, and Denmark. If Orange has markets that are doing poorly over the long term, then other markets will have to support its loss-making activities, including any applicable 3G license fees. Furthermore, Vodafone's 3G licenses in both the UK and Germany will probably not be profitable. In order to get a financial return on the licenses, the contribution in revenues made by 3G must be significant. However, it seems unlikely that users in the UK will spend GBP24.50 per month on 3G-type services, as required to achieve a positive NPV according to the analysis. There will also be significant expenditure involved too. In Vodafone's UK market, the 3G CAPEX to cover roll-out obligations (including license fees) will equal accumulated EBITDA (in the UK) for both 3G and 2G during the first six years[8]. Thus, the analysis suggests that it will be difficult for Vodafone to finance its two most expensive 3G licenses – the UK and Germany – based solely on 3G revenues in the respective markets. Instead, those licenses will be financed by other means such as:

- Revenues from 2G-type services,
- Revenues from 3G in other countries,
- 2G-type revenues from other countries.

[7] After the original analysis was conducted, Orange announced that it would abandon its Swedish 3G license (spring 2003).

[8]These estimates are obtained by comparing 3G investment for the UK market with its forecasted EBIDTA (not included in this paper however).

This net contribution outside of 3G and the country-specific license may have some implications for competition policy, which will be discussed in greater detail in the next section.

■ The Need for a Coordinated Competition Policy

There is a need for a coordinated *competition policy* to deal with the future competition issues that 3G licenses will bring to the fore, as well as emerging competition scenarios. The driver to such competition scenarios is based on the simple question – who will pay for the extraordinary license fees? It has been said that "there is no free lunch" and this saying also applies to license fees. Either shareholders and creditors will pay (through lower share values or through defaults), or users will pay through higher mobile prices. Since the pan-European market-place is highly skewed and uneven due to regulatory differences, the state of pan-European competition will be affected. In the long run, mobile pricing will not only be influenced by cost of delivery in each country (for network roll-out and operation), but will also depend on individual license fees (assuming new entrants will share the applicable cost of the fees). Given such uneven market conditions, various scenarios are possible, with different policy remedies.

Assuming first that 3G will fail in the European market-place, irrespective of country conditions, the cost of the licenses will simply be borne by shareholders and creditors. The European mobile market-place will be heavily restructured, with a number of defaults and consolidations. Given this scenario, competition policy should play the traditional role of safeguarding unhealthy dominance and monopolistic tendencies.

On the other hand, if we assume that the 3G market will experience sufficiently strong growth, the role of competition policy may have additional political significance. In this scenario, the burden of license investments will be shifted toward users. Even so, European country markets will differ in profitability. Profitability levels will depend on several factors including: the number of players, the size of the market, user preferences, demographics (degree of urbanization and concentration) and topography. If there is sufficiently strong growth, some markets may become profitable enough to allow "super-profits", i.e. profits above the normal return. These markets will certainly attract other players, particularly those burdened by high license fees elsewhere.

As shown in this paper, the pan-European player will have a strong incentive to use profits from some countries to pay off license fees in "expensive" countries. The "expensive" countries will not be able to provide a return on license fees on their own and pan-European players will need complementary profits from other countries in order to compensate for losses in such markets. As the simulations show, these complementary profits will come from 3G as well as 2G in other countries (since 2G is expected to remain highly profitable). There may also be cross-subsidies within one country from 2G to 3G. Pan-European market players will be in a privileged position to capitalize on the transfer of profits between countries. These players should also enjoy a competitive advantage due to their market dominance and the emergence of pan-European pricing schemes. There is also a potential for collusion regarding inter alia, pan-European pricing schemes which will need to be addressed[9].

Fortunately, EC competition policy does not need to be changed in principle, as in the low growth case scenario. However, certain aspects of current EC competition policy will need to be actively supported, after being debated rather intensely recently and scrutinized by the European Court. In other words, EC competition policy for 3G will need to be based on a country-by-country analysis that embraces the European perspective, due to the potential of collusion and cross-subsidies by pan-European players. There will consequently be a need for close cooperation between the European Commission's competition directorate and competition agencies in member states. Although commission agencies in member states will deal with their respective country markets, they will need support from the European Commission in terms of analysis of pan-European operators and pan-European pricing schemes. As a result, there will be a need for a strong European dimension to future analysis of competition evolution in 3G markets by member states. Independent assessment and in-depth analysis of the preconditions and drivers of the financial outcome for 3G will therefore be required on a continuous basis. There will be a need for more comprehensive analyses on an aggregated European level and more in-depth country-based investigations, in order to prepare policy-makers for possible future scenarios.

[9] Well known economists (and auction proponents) Ken Binmore and Paul Klemperer suggest that auctions can contribute towards special competition policy issues, for instance by potentially creating 'focal points' for collusion and price coordination (see BINMORE & KLEMPERER, 2002).

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