

Agenda

Advancing economics in business

The European mobile mergers controversy

As the European mobile market continues to experience high growth in customer usage of data services, but at best stagnation of revenues, how should mobile mergers be analysed? Marc Lebourges, Europe and Economics Regulation Director at Orange, follows his 2014 *Agenda* article by looking at these developments and the current situation for mobile operators. The article responds to the February 2017 *Agenda* article, ‘Mergers and innovation: fewer players, more ideas?’

The rapid growth of 2G mobile services in Europe in the 1990s and at the beginning of the 2000s was supported by infrastructure competition. This competition between, generally, three mobile network operators (MNOs) in each national market was able to respond to public demand for mobile telephony. It was also facilitated by the technological evolution of mobile devices and networks, incentivised by massive network and commercial investment by operators. From a market structure perspective, it was a time of cross-border mergers that led to the birth of European mobile giants, of which Vodafone is the most prominent example.

The 3G wave, which was expected in 2000 but actually emerged several years later, provided additional spectrum and improved efficiency for mobile. This allowed up to six MNOs to technically coexist in national markets. The achievement of ubiquitous mobile penetration in the population, and the incremental revenues of SMS and data on top of voice services, allowed the revenues of the mobile industry to continue to grow, and mitigated the impact of this fragmentation of mobile market structures.

Market fragmentation, however, gave way to concentration as the number of players decreased from six to five, or from five to four—for instance, through the T-Mobile/tele.ring merger in Austria in 2006 and the T-Mobile/Orange merger in the Netherlands in 2007. This wave of mergers was not blocked by competition and regulatory authorities, which were more interested in the development of a fringe of virtual mobile operators (MVNOs) that were intended to provide additional competition as alternative retailers of MNO infrastructures.

4G technology emerged after full mobile penetration had been achieved. The mobile industry could therefore no longer expect significant revenue growth from the

expansion in the number of consumers. 4G requires high investment, in spectrum licences, the deployment of new physical antennas connected by fibre, and the roll-out of successive generations of 4G equipment such as LTE and LTE advanced. Furthermore, the quality of 4G data services facilitates the substitution of mobile telephony and SMS services and revenues by free voice and messaging Internet applications such as Skype and WhatsApp, under the protection of net neutrality regulation. European regulation has also undercut mobile revenues derived from mobile termination and international roaming services.

These trends have led to a financial squeeze, and are one of the key drivers behind 4–3 merger projects between MNOs in several European countries. To date, this has resulted in controversial and conditional merger approvals with remedies in Austria and Germany, the abandonment of a proposed merger in Denmark, refusal in the UK, and agreement subject to the obligation to secure the entry of a new MNO in Italy.

This tension between the mobile industry and European competition authorities has translated into an unresolved economic controversy about the impact of mobile mergers on investment and overall consumer welfare. With 5G investment on the horizon, the stakes are higher than ever.

The traditional view on the relationship between the level of competition and investments

The empirical observation that competitive markets generally exhibit more investment and innovation than industries under a monopoly provides proof of Arrow’s ‘escape the competition’ effect.¹ This contrasts with

Schumpeter's argument that the prospect of earning monopoly rent incentivises investment and innovation.²

The 'escape the competition' perspective is conveyed in the OECD 2014 report on efficient mobile market structures, which calls for policies maximising the number of mobile licences per country in order to support investment and consumer benefits: 'in countries where there are a larger number of MNOs, there is a higher likelihood of more competitive and innovative services being introduced and maintained'.³

The same perspective is supported by a theoretical working paper by Motta and Tarantino.⁴ Based on a comparison of pre- and post-merger equilibria, the paper argues that, unless there are sufficient economies of scope, mergers are always anticompetitive, reducing investments and consumer welfare. However, the two main reasons why mergers are being considered in the mobile industry are excluded from the Motta and Tarantino model. First, by increasing operating profits, a merger may extend the geographical area for which investing in an antenna to provide the service in an additional cell is incrementally profitable for the operator, taking into account the geographical heterogeneity of mobile network costs and revenues. Second, mergers are meant to provide significant efficiency gains in both operating costs and investments. The absence of these factors from Motta and Tarantino's model means that the policy implications of their paper should be treated with caution.

Reasons to question the traditional view on mobile markets

The argument that more fragmented mobile markets result in greater efficiency and better consumer outcomes can first be challenged with common-sense arguments. Mobile activities exhibit strong economies of scale and require a significant investment in fixed (and often sunk) costs. Thus, each operator needs to serve a large consumer base in order to be efficient. Moreover, the number of MNOs must be limited for technical reasons so that each operator owns sufficiently large bands of spectrum to provide high-speed services.

Network sharing between operators—which competition authorities have often mentioned as a potentially equally efficient option but with less restrictive effects on competition—can be only a subsidiary solution to these issues. This is because network sharing needs to overcome significant governance problems which would require a multi-principal–agent approach to be properly addressed by formal economic theory.

Another common-sense argument has been developed in an Idate report for Ericsson and Qualcomm.⁵ The report compares revenues, investments and unit prices between the USA and the five largest European countries (EU5). It finds that lower mobile revenues in Europe have led

to a growing gap of investment per inhabitant in Europe compared with the USA: from -21% in 2008 to -54% in 2014. As a consequence, LTE take-up is at least two years later in Europe, data usage is three times lower, and the average price per Mb is higher in Europe than in the USA. All of this is despite the fact that the investment:revenue ratio has remained similar in Europe to that in the USA.

A more sophisticated econometric approach has been developed in a working paper produced for the CERRE think-tank.⁶ By looking at 33 countries between 2002 and 2014, this study econometrically estimates how prices (measured using the OECD's 'basket' methodology), investment per operator and investment at industry level vary with the HHI⁷ when mobile market structures change as a result of entries or mergers. A generic 4–3 merger is then modelled as generating a variation of the HHI, which itself generates variations of prices and investment using the econometric estimate of how these variables change with the HHI. The study finds that 4–3 mergers result in higher prices but more investment per operator, although not at the industry level. This outcome has been heralded by competition authorities⁸ as proof that 4–3 mobile mergers have negative effects, increasing prices but not the overall level of investment in the industry. However, in my view, such an interpretation is premature and unproven. There are a number of reasons for this.

First, the HHI measures not only the number of operators but also asymmetry between operators. The hypothesis used in the study, that these two dimensions of market concentration have the same impact on market outcome, prices and investments, would need to be further justified in the context of the study. Second, the analysis of investments in the study may be affected by the way in which missing investment data is estimated: the investment per customer of an MNO for which no figure is available is assumed to be equal to the average investment per customer of MNOs for which investments are known in the same national markets. This hypothesis could over- (under-)estimate how industry investment grows with the number of MNOs if MNOs for which investments are unknown have smaller (larger) investment per customer than average. Third, the relative efficiency of industry investment with and without a merger should also be considered: the higher the number of MNOs, the more likely investment at the industry level is to include some degree of inefficient duplication of fixed costs. Fourth, the conclusion on price is based on the use of the traditional 'usage baskets' methodology, which is inappropriate for identifying investment-related consumer benefits, as shown below. Finally, the study analyses past operations from a time when mobile markets were voice-centric. The results may not hold for data-centric mobile markets in which subscriber and usage growth rates are very different from what they were when mobile provided mainly telephony. I therefore believe that this is not the end of the story and that further empirical evidence is needed.

Evidence that the current European mobile market structure does not maximise investment

The most recent available evidence on the impact of competition and market structure on mobile investment is provided by two papers published by Hounghonon and Jeanjean.

- The first,⁹ using an international panel of 110 MNOs observed from 2005 to 2012, shows that the investment per subscriber in mobile markets follows an inverted-U relationship with the ratio of EBITDA (earnings before interest, tax, depreciation and amortisation) margin on revenue, with a maximum level of investment for a 37% ratio. This is significantly above the current level of EBITDA margin ratio observed in European markets, which is generally equal to or below 30%. The paper also reveals that short-term impacts of profitability on investment are amplified in the long term.
- The second¹⁰ proves that today in Europe, an increase (decrease) in the number of MNOs per market would generate a small short-term increase (decrease) but a much higher long-term decrease (increase) in investment per subscriber. The current average number of operators per market in Europe is therefore too high to optimise investment per subscriber in the long run.

The policy message which can be derived from these two papers is that the current average level of price competition and market fragmentation in Europe is excessive for maximising long-term mobile investments per subscriber.

Evidencing consumer benefits of mobile investment requires appropriate instruments

Competition authorities typically measure consumer benefits in mobile markets by assessing the evolution of consumer prices using the 'basket' methodology: for a set of typical 'baskets' of monthly minutes, SMS and data consumption, the best price available in the market matching each basket is identified at any given time and the evolution of these prices over time is measured.

The OECD, the European Commission, and regulatory authorities such as RTR in Austria and Arcep in France typically use this approach to analyse mobile price evolution. It is derived from methodologies aimed at disentangling the 'price' effect for given volumes (inflation) from the 'volume' effect for given prices (growth) in macroeconomic analysis. But the relevance of this approach for macroeconomic purposes does not imply that it accurately measures consumer benefit in the context of merger control.

As formalised in economic theory, consumer benefit depends on the following.

- How price allocates the surplus generated by any transaction between the provider and the consumer. The traditional basket methodology is able to capture this element of consumer surplus.
- How prices determine the volume of transactions chosen by consumers. The volume effect of prices is not captured by the basket methodology, in which volumes are constant. But it could be captured using complementary price measurement methods—in particular, an average unit price takes into account the actual level of consumer consumption; and a 'hedonic' price regression identifies how each component of a mobile offer is incrementally priced, and therefore how prices incentivise usage.
- The quality of the service associated with each transaction. This is ignored in the basket approach but can be directly measured—for instance, in the case of mobile markets, by using objective indicators such as download speed, coverage, or signal availability.

The traditional basket methodology is therefore blind to two out of the three dimensions of consumer surplus: how price structures incentivise consumption; and the quality of the service provided to the consumer. These two dimensions are those that depend directly on operators' investment. It is therefore not surprising that authorities using the traditional basket methodology do not identify how operators' investment is passed through to consumers, as the instrument that they use is unable, by design, to identify these consumer benefits.

By contrast, studies using complementary indicators of consumer surplus can identify the benefits that consumers derive from operators' investments.

- Statistical analysis of the evolution of the average unit mobile price per Mb reveals that the constant and massive reduction of this unit price over time is directly and almost exclusively explained by mobile operators' investments, through their influence on mobile traffic growth.¹¹
- Hedonic regression of the evolution of mobile prices in France between 2011 and 2014 shows that the introduction of 4G in spring 2013 had a larger price reduction impact than the entry of French mobile operator, Free Mobile, at the beginning of 2012, a fact ignored by Arcep and the OECD analysis, which use the basket approach.¹² A study of price evolution in France and in Austria, using double-difference analysis of hedonic prices evolution (i.e. comparing the evolution in France and Austria with the evolution in other countries with similar characteristics but with stable market structures over the same period), shows that in France the entry of Free Mobile had generated a drop in voice prices but a relative increase in data prices, whereas the merger in Austria had the opposite effect of generating an increase in voice prices and a reduction in data prices.¹³

- In terms of quality of service, in the coming weeks GSMA is expected to publish an econometric analysis of the impact of the Austrian merger on quality,¹⁴ which notably will analyse the impact of the merger on the average speed per subscriber.

The message is clear: if competition authorities genuinely want to assess how operators' investments are passed through to consumers, they need to complete their tool box.

Addressing heterogeneous impacts of mergers on welfare

The above discussion also highlights that a merger may have heterogeneous impacts on different categories of consumers. Reductions of the unit price per Mb, better value for money, or increases in quality for the average customer, could go hand in hand with higher average revenues per user, and possibly also price increases for specific categories of customers—such as customers who require only one hour of mobile telephony each month. Similarly, a reduction in the price of data services may also be associated with an increase in voice prices.

What should competition authorities assessing mobile mergers do in such cases? Economic theory suggests that they should support a market structure that maximises

consumer welfare on average, even if it is not optimal for all categories of customers. However, specific behavioural remedies can be used to secure the interests of particular consumer segments, especially those that most require protection.

Conclusion

The traditional view, that more mobile operators always means more investment and higher consumer benefits, is still strongly supported by European competition authorities. However, it is being challenged by recent empirical evidence which indicates that the current level of market fragmentation in Europe is excessive for maximising long-term mobile investments per subscriber. In addition, if competition authorities genuinely want to assess how operators' investments are passed through to consumers, they need to complete their tool box.

It is likely that the 5G investment challenge facing the European mobile industry, which is experiencing flat or declining revenues, will keep alive the issue of horizontal mergers in mobile markets—and therefore also the economic controversy on the impact of mobile mergers on market outcomes.

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The views in this article are those of the author and do not necessarily represent those of Orange. The author's previous *Agenda* article can be found at Lebourges, M. (2014), 'The net neutrality debate', *Agenda*, August, <http://www.oxera.com/Latest-Thinking/Agenda/2014/The-net-neutrality-debate.aspx>.

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² Schumpeter, J. (1942), *Capitalism, Socialism and Democracy*, Harper & Row.

³ OECD (2014), 'Wireless Market Structures and Network Sharing', OECD Digital Economy Papers No. 243, p. 5.

⁴ Motta, M. and Tarantino, E. (2016), 'The Effect of a Merger on Investments', CEPR Discussion Paper No. DP11550, October.

⁵ IDATE Consulting (2015), 'Mobile operators' investments: Europe needs a pro-investment mobile regulatory framework', Whitepaper based on IDATE study for Ericsson and Qualcomm, November.

⁶ Genakos, C., Valletti, T. and Verboven, F. (2015), 'Evaluating Market Consolidation in Mobile Communications', CERRE, 15 September.

⁷ The Herfindahl–Hirschman Index, the classic indicator of market concentration.

⁸ European Commission (2016), 'Mergers: Commission prohibits Hutchison's proposed acquisition of Telefónica UK', press release, 11 May.

⁹ Hounghonon, G.V. and Jeanjean, F. (2016), 'What level of competition intensity maximizes investment in the wireless industry?', *Telecommunications Policy*, April.

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¹³ Hounghonon G.V. (2015), 'The Impact of Competition on the Price of Wireless Communications Services', in 'Essais sur la Concurrence et l'Investissement dans l'Industrie des Télécommunications', PhD thesis, Ecole d'Economie de Paris, December.

¹⁴ GSMA (2017), 'Evaluation of the Merger between Hutchinson and Orange in Austria'.