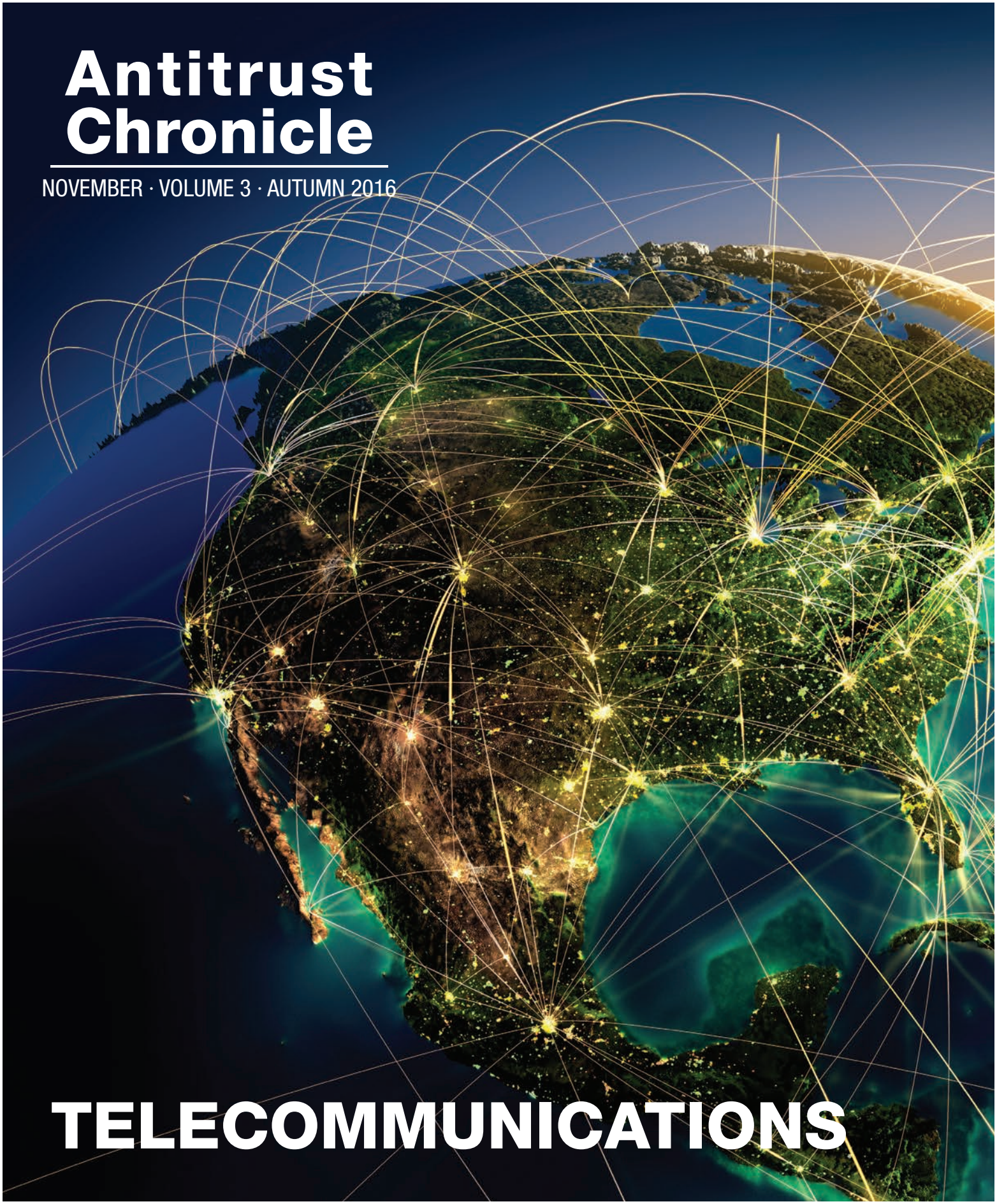
Antitrust Chronicle

NOVEMBER · VOLUME 3 · AUTUMN 2016



TELECOMMUNICATIONS

CPI COMPETITION POLICY INTERNATIONAL

TABLE OF CONTENT

LETTER FROM THE EDITOR

Dear Readers,

This month, the Antitrust Chronicle (AC) brings you a special edition on antitrust issues in the telecoms sector, focusing on the evolution of 5G technology. Across jurisdictions, many experts and practitioners agree that 5G differs from previous cellular generations and there are numerous antitrust issues that potentially come along with these changes and. Some wonder if today's regulations are able to deal with the new developments in the telecoms sector. An overarching question is whether there is a problem of regulation or competition or both?

Should the advent of 5G lead to a regulatory revolution? Is there a tradeoff between standardization and variety? Telecoms regulations in the U.S., EU and other jurisdictions are addressed and analyzed. Do we have a "mobile fixation"?

Articles in this month's AC feature discussions on issues related to network neutrality, spectrum policy, bundling behavior in telecoms (namely "triple-play" bundles), the trend towards Over-The-Top service providers and telecoms mergers.

Some of the recent merger cases discussed in this month's issue include, among others: Hutchison Italy/Wind; Telefónica Deutschland/E-Plus; Altice/PT Portugal; Vodafone/Ono; and Liberty Global/Base.

We are delighted to offer our CPI Talks this month which features an interesting interview with Commissioner Elena Estavillo of Mexico's Federal Telecommunications Institute.

Be sure to keep an eye out for some exciting new changes to the AC in January 2017! We hope you enjoy reading this new issue of our AC magazine.

Thank you, Sincerely,
CPI Team

SUMMARIES

CPI TALKS

CPI - Interview with Commissioner Maria Elena Estavillo, Mexican Telecom Regulator

In this interesting interview, Commissioner Estavillo addresses questions concerning the telecom reforms in Mexico, the asymmetric regulation applied to incumbents to introduce competition in different markets, the relationship between concentration and inequality and the role of the regulator among other topics.

The video of the interview will be soon available at www.competitionpolicyinternational.com

CPI SPOTLIGHT

CPI ANTITRUST CHRONICLE WILL ACCEPT SUBMISSIONS AND PROVIDE MONTHLY OUTLET FOR PUBLICATION OF HIGH-QUALITY ARTICLES ON COMPETITION POLICY.

The CPI Antitrust Chronicle is a publication, sent globally to more than 38,000 members of the competition policy community world- wide. On average, 10,000 competition policy professionals read the Chronicle every month, including regulators, judges, executives, academics and practitioners.
Starting in January 2017, the CPI Antirust Chronicle will adopt a new format offering more content to readers and a unique opportunity for writers to publish their scholarly and practical papers on competition law and related regulatory issues. At the same time, the CPI Antitrust Chronicle will launch a print version available through Amazon in addition to its monthly online edition.

The CPI Editorial Team will continue selecting the topics for the Antirust Chronicle and sending selective invitations to antitrust experts to contribute to our magazine. However, the Antitrust Chronicle will also accept submissions on any topic related to competition policy and regulation, and publish those that pass the criteria for our monthly editions.

In addition, the best contributions to the CPI Antirust Chronicle will become part of a special CPI Journal released at the end of 2017.
For this new Antitrust Chronicle, the CPI Editorial Team will publish the topic of the upcoming monthly issue two month in advance on our site and social networks, along with the instructions for interested authors to register and participate.

ANNOUNCEMENTS

CPI ANTITRUST CHRONICLE JANUARY 2017

The first Antirust Chronicle of 2017 will address Competition in Digital Markets, a highly debated topic nowadays, mostly in Europe, but with worldwide effects.

CPI encourages authors to address this topic from the angle they considered most interesting or especially relevant.
Contributions to the Antirust Chronicle are about 2,500 – 5,000 words long. They should be lightly cited (follow bluebook style for footnotes) and not be written as long ponderous law-review articles with many in-depth footnotes. As with all CPI publications, articles for the CPI Antitrust Chronicle should be written clearly and with the reader always in mind.

Interested authors should send their contributions by December 15, 2016 to Sam Sadden (ssaden@competitionpolicyinternational.com) and Aitor Ortiz (aitor.ortiz@competitionpolicyinternational.com) with the subject line "Antitrust Chronicle", a short bio and picture(s) of the author(s).
The CPI Editorial Team will evaluate all submissions and will publish the best papers. Authors can submit papers in any topic related to competition and regulation, however, for the January issue, priority will be given to articles addressing Competition in Digital Markets. Co-authors are welcome. Contributions to this CPI Antirust Chronicle will be considered for our CPI Journal.

WHAT IS NEXT?

This section is dedicated to those who want to know what CPI is preparing for the next month. Spoiler alert!

The December edition of the AC will contain a variety of articles addressing some hot topics. For instance, we will have contributions explaining the tax rulings on State aid, reverse payments settlements, IP rights, the hospital merger cases in the US or the energy market investigation in the UK.

CPI TALKS: INTERVIEW WITH COMMISSIONER MARIA ELENA ESTAVILLO, MEXICAN TELECOM REGULATOR

Thank you, Commissioner Estavillo, for granting this interview to CPI.

Since 2013, the Federal Telecommunications Institute ("IFT") is not only a telecoms regulator but also an administrative entity in charge of applying competition policies in the telecoms and broadcasting sectors. Could you tell us more about this new role?

That's true. With the 2013 constitutional reform, the IFT was in fact created as an autonomous body - that is, an agency independent from the executive. In this new institutional design all competition powers were granted to the IFT for telecommunications and broadcasting. That means that we now have two competition agencies in Mexico: We have the same powers and we apply the same laws, but we're responsible for different sectors. The Competition Commission reviews all sectors except telecommunications and broadcasting.

This has been a very interesting change, considering that the realities of our markets, how they have behaved in the past and experiences we've had with our past agencies -both regulatory and competition agencies - and that may explain why Mexico has taken this course.

As for the institutional design, the IFT has very broad responsibilities in regulation as well - broader than the old regulatory agency used to have. We are now responsible for telecommunications and broadcasting, so we have to impose asymmetrical regulations for "preponderant" and "dominant" agents. We have to impose limits to concentration of the broadcast spectrum; limit also the cross-ownership of this spectrum; we have to manage the spectrum and grant licenses; and we have to foster plurality, diversity and competition.

This is interesting because, as a regulatory agency, one of our main objectives is to foster competition… but we are also the competition agency. So we authorize the mergers, we investigate and sanction cases of abuse of dominance, cartels… We're in charge of advocacy too in these sectors. And one interesting change to the competition law that applies both for the competition commission and for us, is that we also have to identify "essential facilities" in cases where we define the conditions for access. We also have to identify barriers to competition in the market, and either order their removal or simply "recommend" - it depends on the nature and origin of these barriers.

I would also say that we have some interesting advantages by having these two responsibilities in the same agency. The first is that we have specialized knowledge of our sector, and this helps in making better competition decisions. This is a very complex sector, very technical, so this is helpful in decision-making. We have directly available information because of our knowledge and because of our administrative power over the sector, and this also helps us to base our decisions on. We bring a competition perspective to all regulatory decisions, and this is also an interesting change.

And we also have the capacity to create, adjust and remove specific regulations, which a traditional competition authority doesn't have. A traditional agency may recommend making changes to the regulation, but in our case, if we detect that some regulation is causing competition problems then we may act directly on those rules. And we also have a direct capacity to remove some other regulatory barriers to entry, for example by granting licenses for the broadcast spectrum, which is very important in this case.

One of the most controversial concepts coined during the telecoms reforms is "preponderancia" or in other words, the application of asymmetric regulation for the incumbents in Mexico. How is this relevant for Mexico at this time?

I would first like to talk about our recent history, which explains this new concept of "preponderance."

We had in the past gone through at least 15 years of efforts by the former regulators - both the Commission for Telecommunications and the Competition Commission under the ancient institutional design- where they made several attempts to regulate the incumbent agent in telecommunications using the old laws and powers, and all these attempts did not arrive at success.

So, we have to look at this "solution" - this new constitutional solution - in the view of this history of trying to draft some kind of asymmetric regulation that couldn't come to life.

In a practical sense, we can say that this is a practical solution to an important problem that we've had. But I can also say that this practical solution is not so different from the first decisions to impose ex-ante regulations in other countries - and particularly in Europe - where he decision was made to impose regulations on

incumbents who had more than 40 percent of the market. Those were decisions made several years ago, so maybe they're not so close to our own history, but they are past experiences. So, as for this concept of "preponderance": we named it, but it's not really the first time that regulators have adopted these kinds of measures.

I would say that for the moment this has been a real success because, after trying so hard to come to asymmetric regulation in our country for 15 years or more, we managed to do it in only six months after the constitutional reform and the institution was created. In fact, we had a constitutional mandate to do it in this period of time, which was really short and optimistic - but we managed to do it. So I would say it has been a very great success up to this point. We still have to work a lot in perfecting and making sure that all these regulations are enforced and are effective. But for the moment this has been a very good change, because we are now working with new rules that can help to enhance competition.

Is Mexico a reference for other Latin American countries in this regard? Do you see other regulators interested in adopting this rule?

There has been a lot of interest, particularly in Latin American countries. In fact, there is at the moment a proposal in Colombia to adopt this concept of preponderance exactly, to work in the same manner as in Mexico.

A much debated topic nowadays is the effect of market concentration on inequality. Experts claim that merger consolidation is raising inequality in some countries. Mexico has in fact very concentrated markets in telecommunications and broadcasting. How is the IFT addressing these concerns?

Concentration is a really big challenge for us. We understand that the telecommunications and broadcast sectors are always concentrated, because there are some conditions that stimulate this concentration: We have economies of scale and scope, network externalities… So these phenomena make it so that there is always some degree of concentration in these markets. Nevertheless, we know that the market is more concentrated than those in other countries, and we look at this as one of our biggest challenges.

That's why, in addition to defining and enforcing this asymmetric regulation on incumbents, we are also making different efforts to change this level of concentration. We've been working on eliminating barriers to entry to the market, specifically licensing the available spectrum. We are also working in liberating new frequencies in the spectrum to make it available for the market, and we're facilitating the secondary market for the spectrum. This is a new condition made possible by our new law - this wasn't permitted before - but we're fostering arrangements between licensees of the spectrum that can help them switch frequencies between them, to rent them out… and this helps to make better assignments of the spectrum and use it in a better way.

Using the insights and the information we get through our regulatory activities, we have been in contact and been looking at certain phenomena and problems we see in the markets, and this has helped us to initiate competition procedures: that's also another way for us to act directly in a way we believe can help the competitors to move more freely. We have also been forcing access to essential facilities, which is very important in these markets. Mainly through ex-ante regulations and also in "must offer-must carry" obligations that are a part of this new legal framework. This has actually been helping in our markets.

We've been looking at some results:
In concentration the results are still very modest, that is true. We expect that they will be getting better. But we are also aware that this is a long term effort, so the aim of all these measures is to foster a more competitive dynamic for the market, which will itself lower concentration.

One of the results that we have seen, for example, is a very important decrease in prices for mobile communications. That is the market where we've seen the best results. We will be pursuing these same efforts and trying to expand our results to other markets, but for the moment we are very optimistic regarding the results we are getting from the mobile sector.

Also, in penetration of the internet - which is one of our most important objectives because of the social and economic impact the internet has for the country - mobile broadband has expanded from 30 percent in 2014, and in the most recent trimester of 2016 we have reached 56 percent, so this is also very good news for the country. In fixed internet broadband we are also at 46 percent, so this is also a good result. These figures that I mention come directly from our carriers, as we prepare statistics for the sector, but we also have statistics come from other sources. Acamaya Media and Telecomm, who measure latent internet velocity for different countries in Latin America, give their latest figures which show Mexico as the No. 1 country in terms of broadband speed. So this is also very good news for us. We were not in first place before, so we moved up a few places, and this is also very good.

I could say that the best results we've had at the moment are in mobile telecommunications, where we also have new players - some very interesting moves. For example, AT&T, which is a global competitor, acquired two… well, I should say "small" competitors because of their share of the market in Mexico. AT&T acquired these two carriers and is now bringing a new dynamic to the market. It has been a very interesting move, because AT&T had not been "absent" from the market. AT&T had been in the same group as the incumbent -América Móvil- for many years. So this movement is a signal of the changes in economic incentives and expectations that are good for competition and investment in our markets. So I would point at this movement as part of a structural change that is very interesting and talks about a positive mood and expectations, which have proved for the moment to be very positive for the market. There have been many changes, so it is difficult to say how much each factor

contributes to what we are looking at, but we are seeing good results in the mobile sector.

What are the biggest challenges for an institution that enacts sector-specific regulation and overseas markets for potential competition infringements? Is this better or worse for market players and consumers?

I believe it has worked very well in this sector, mainly because of the specialized technical characteristics of this sector, which make it difficult for non-specialized persons to understand. And this is maybe the most difficult part for a traditional competition agency: To cope with the necessities of such a specialized and dynamic sector, that is changing all the time. So maybe it could work for other sectors with these characteristics. I would not say that it's a recipe for all sectors, because other markets are easier to grasp. Maybe because they don't change all the time, because technology is not such an important factor in changing the market, the definition and attributes of services… So this arrangement works for the sector, but I wouldn't say that it's necessary for all sectors. But it could be that with other markets, which share similar characteristics, it could be considered. I have looked at all these practical advantages of having both responsibilities, and it really works well in this sector.

Also, I wouldn't say that everything that has been working is due to having both responsibilities under the same agency. There are other factors that have helped a lot and that came about because of all the changes in the legal framework. Because the truth is that we now have powers that the ancient competition commission did not have. So this is a mixture of different factors that have been working well.

What does it mean to be a new "competition agency" in the national and international antitrust community? Any expected project you can mention for the near future?

Our nature is very particular, so we have been working a lot to communicate to other agencies around the world our responsibilities and our nature as a competition agency, which is not always easy to understand because we are so different from other competition agencies. We have been working successfully with international organizations - for example, we are part of the Competition Commission of the OECD, so we have been very active in this organization. We have also been bringing this interest in competition to other organizations that work on telecommunications. For example, at the IFT's proposing, the Group of Economic Competition was created within the Latin American Forum for Telecommunications (what we call Regulatel), so it's interesting that we can bring this perspective to traditional international telecommunications organizations.

We are continually promoting encounters with other competition authorities and experts, and we have started to organize an annual International Competition Seminar in Mexico. We had the first one last year, which was very successful, and this year's event is coming in the next couple of weeks with a very interesting group of experts from all parts of the world. We also created, within the IFT, a "studies center" that is like a think-tank - an internal think-tank-dedicated to studying telecommunications and broadcasting. These experts are in constant direct communication with other experts in the country and abroad, and are focused in matters related to practical cases for the IFT, issues that we see will be very important in the near future. So all of these activities are helping us to keep up with what other authorities are doing, what other academics and experts are thinking about in this sector, and also as a part of our work of communicating to other agencies our responsibilities, our work and objectives, and what we are doing here in Mexico.

Thank you, Commissioner Estavillo, for a wonderful interview and for sharing your time and expertise.

MOBILE FIXATION? A REVIEW OF RECENT EC DECISIONS IN THE TELECOMS SECTOR

BY SASCHA SCHUBERT[1]

I. INTRODUCTION

The EU telecoms sector has gone through several years of intense M&A activity, characterized by horizontal 4:3 mobile consolidation on the one hand and fixed/mobile ("FM") integration on the other. Whether and in which direction consolidation will continue over the coming years depends in part on the prospects of obtaining regulatory clearance. After a series of highly publicized and sometimes controversial European Commission ("EC") decisions, now may be an appropriate time to take a step back and look at the broad themeswhich are emerging from those cases.

1 Sascha Schubert is a Partner in Freshfields Bruckhaus Deringer's Antitrust, Competition and Trade Group. He is based in Brussels.

II. HORIZONTAL MOBILE MERGERS: THE END OF 4:3?

The EC has reviewed six 4:3 mergers of mobile network operators ("MNOs") since 2012. All of them were subject to in-depth probes.[2]

The EC did not claim that these mergers would create or strengthen a single dominant position. Rather, it raised non-coordinated effects concerns on the basis of a number of factors, none of which it considered to be individually decisive. Its analysis focused on the closeness of competition between the parties; the extent to which one of them exerted disproportionate competitive pressure despite (or because of) its small market share ("important competitive force"); the likely reaction of other competitors to hypothetical price increases by the merged entity;and variations of upwards pricing pressure (UPP) analysis. In its most recent investigations, the EC also found a risk of coordinated effects. At a high level, three aspects are worth highlighting:

First, in line with what can be observed in other sectors, the review of the parties' internal documents has become a key element of the EC's assessment. For example, in its most recent decision in the case of *Hutchison Italy/Wind*, the competitive assessment starts with a 30 page discussion of the parties' internal documents.[3] The internal documents are, quite literally, setting the stage for the remainder of the analysis.

Second, the test for measuring competitive harm as it has been defined by the EC in successive decisions, leaves the EC with significant discretion. This has been criticized by many observers as effectively lowering the threshold for regulatory intervention in merger projects. The EC's recent decision to block the 4:3 mobile consolidation in the UK[4] is under appeal and it cannot be excluded that the EC may have to revisit its approach once the Court has delivered its verdict.

Third, the parties have generally argued that their mergers give rise to efficiencies which outweigh any potential anti-competitive effects. In each case, the EC has rejected this efficiency defense, on the basis that the conditions of the test applied by the EC when

2 These mergers are: *Hutchison 3G Austria/Orange Austria; Hutchison 3G UK/Telefónica Ireland; Telefónica Deutschland/E-Plus; Telenor/TeliaSonera; Hutchison 3G UK/Telefónica UK;Hutchison 3G Italy/WIND/JV.*

3 Commission Decision of September 1, 2016 in Case COMP/M.7758 – *Hutchison 3G Italy/WIND/JV.*

4 Commission Decision of May 11, 2016 in Case COMP/M.7612 – *Hutchison 3G UK/Telefónica UK.*

assessing efficiency claims were not met. Importantly, the bulk of the savings which can be realized by merging two operators' networks concern fixed costs. The EC has generally disregarded those types of cost savings on the basis of economic theory which suggests that fixed cost savings are unlikely to be passed on to consumers. The EC has also repeatedly rejected the argument that the fixed cost savings would be partly reinvested in order to build more powerful networks. In fact, Commissioner Vestager has made it clear that she sees no link between consolidation and investment.[5]

Against this background, it would be reasonable to expect that, applying the test as defined in recent decisions, the EC is likely to raise concerns about any future 4:3 consolidation in a European mobile market, which would have to be addressed by offering remedies. When comparing the remedies which have been imposed in the successive cases, there is one consistent trend: over time, the remedies have become more and more demanding.

When Hutchison's took over Orange Austria in 2012, the EC was satisfied that any issues would be addressed by Hutchison's offer to grant virtual operators ("MVNOs") wholesale access to its network based on attractive terms.[6] In 2014, the EC cleared mobile mergers in Ireland[7] and Germany[8]. In those cases however, a plain "Austrian-style"MVNO remedy was no longer considered sufficient. While the EC did not insist on market entry by a new MNO, it requested that the acquirers sign up to a special deal: the MVNOs had to acquire 30 percentof the merged entity's network capacity upfront. This, according to the EC, created incentives for the MVNOs to compete which were similar to those of an MNO. In the subsequent cases relating to Denmark[9] and the UK,[10] the EC went one step further by insisting on market entry of a fully-fledged MNO. The merging parties were unable to accommodate that request, resulting in the withdrawal of the Danish notification and the prohibition of the UK transaction. Most recently, in Italy, the parties managed to convince a new MNO to enter the market and received EC clearance in exchange.[11] Strictly speaking, the Italian case does not therefore constitute a 4:3 consolidation: two MNOs merge, but another one enters ("4:4 merger").

Despite appearances, Commissioner Vestager has been keen to emphasize the EC's "case by case approach," and has stated that "there is no magic number"of MNOs required to maintain competition in national markets.[12] This seems to imply that the differences between the remedies imposed since 2012 may be explained by differences in the facts of each case, rather than by a change of policy.

It is certainly true that there are distinguishing factors. However, they do not fully explain the different outcomes. This may be illustrated by comparing the key features of the German and the Italian cases. Both concerned a combination of the third and fourth operator in large countries, resulting in a new market leader with a combined share of 30-40 percent. The EC claimed in both cases that the parties were close competitors, and in neither case were network sharing agreements an issue. There were also a number of more subtle differences, however it is not obvious why, on balance, the Italian merger should have been significantly more harmful to competition than the German merger. For example, it seems that MVNO competition was slightly more developed in Germany than in Italy, but on the other hand, based on the EC's findings, the merging parties in Germany seem to have been closer competitors than in Italy. The differences do not seem important enough to explain the paradigm shift from MVNO to MNO remedy.

This suggests that policy changes may have also played an important role. Right from the beginning of the recent EU mobile merger saga, the EC has been faced with a dilemma. Helping to establish high-speed wireless networks is a top EU priority, because they form the "backbone"of the European digital economy. Smaller MNOs have brought a strong case that they need to join forces in order to achieve the scale required to make the necessary investments in their networks and to catch up with larger rivals. While the EC has never formally recognized an "efficiency defense," these arguments may have nevertheless facilitated the earlier clearances, especially in small countries such as Austria or Ireland, where the argument that a fourth operator may be sub-scale seems intuitively compelling. On the other hand, the EC is concerned that a reduction of players below four may result in price effects in what it considers to beoligopolistic markets with high barriers to entry. These concerns were exacerbated by reports about perceived price increases in Austria following the 2012 consolidation. National authorities have been increasingly vocal in their criticism of the EC's practice of clearing 4:3 mergers, culminating in the fierce opposition of the UK authorities tothe Hutchison/O2 merger project. These controversies have not been without consequence on the EC's thinking.

As a result, since Commissioner Vestager took over from her predecessor, the EC has become more skeptical towards MVNO remedies. This can be illustrated by public statements. For example, in the EC's merger brief 1/2014, MVNO remedies in the German, Austrian and Irish cases were described as "equally effective" as

5 See, for example, Commissioner MargretheVestager's speech, 42nd Annual Conference on International Antitrust Law and Policy, Fordham University, October 2, 2015, available at: http://ec.europa.eu/commission/2014-2019/vestager/announcements/competition-and-digital-single-market_en.

6 Commission Decision of December 12, 2016 in Case COMP/M.6497 – *Hutchison 3G Austria/Orange Austria.*

7 Commission Decision of May 28, 2014 in Case COMP/M.6992 – *Hutchison 3G UK/Telefónica Ireland.*

8 Commission Decision of July 2, 2014 in Case COMP/M.7018 – *Telefónica Deutschland/E-Plus.*

9 Case COMP/M.7419 – *TeliaSonera/Telenor/JV.*

10 Commission Decision of May 11, 2016 in Case COMP/M.7612 – *Hutchison 3G UK/Telefónica UK.*

11 Case COMP/M.7758 – *Hutchison 3G Italy/WIND/JV.*

12 Commissioner MargretheVestager's statements following the withdrawal of the merger planned by Telenor and TeliaSonera.

MNO remedies.[13] In contrast, in a recent speech explaining why MNO entry was considered necessary as a condition for clearing the Italian mobile merger, Commissioner Vestager explained that:

> One alternative might have been to create or strengthen a virtual operator, which rented space on other companies' networks, to restore competition. But a virtual operator can't help being dependent on the companies that carry its data and its calls. So it's difficult to design agreements that give virtual operators the freedom to really compete. And you risk having to monitor the arrangement for years, to make sure physical operators aren't preventing them from competing. That's why, in the Italian case, we had a clear preference for a structural solution.[14]

This "preference for a structural solution" is unlikely to be limited to "the Italian case." To put it simply: in order to clear MNO mergers in 4 player markets, MNO entry seems to be "the new normal."

What is the impact of the EC's evolving approach on mobile consolidation in Europe? There are 11 four player markets left in the EU. In manycases, new MNO entry based on a divestment of spectrum and assets will not be possible, either because the merging parties do not have enough spectrum to divest or because such a far-reaching divestment would make the deal economically unviable.

It has been suggested that new MNO entry may in such cases be achieved through network sharing arrangements. However, the effects of network sharing on competition are not necessarily only positive. Each party to the netshare has a veto right over investments. As a result, investment decisions will often correspond to the smallest common denominator: the party which wants to spend less will normally prevail. From that perspective, an MVNO remedy may be better for quality competition than the entry of a network sharing MNO. Indeed, an MVNO remedy allows a new player to access the market without undermining investment competition, because the merged entity can continue to pursue its own network strategy uninhibited by veto rights over investment decisions.

Despite the EC's clear preference for MNO remedies, MVNO remedies have not been entirely excluded. However, the recent decisional practice indicates that they may only be acceptable in very exceptional circumstances.And the EC has yet to explain what such circumstances could look like.

III. FM INTEGRATION: A CLEAR TRACK AHEAD?

A key driver for FM mergers is the desire to address consumers' increasing appetite for multi-play offers, and the expectation that single-play customers can be converted into multi-play customers, which helps with customer acquisition and retention.

Complainants have argued that the creation of a second integrated player (cable/mobile) in addition to the existing integrated incumbent (DSL/mobile) would result in a market dominating duopoly of integrated FM operators, marginalizing the remaining non-integrated operators.However, in line with the EC's traditional reluctance to intervene in conglomerate mergers, these complaints have not gained much traction. Key conglomerate complaints which have been rejected by the EC include the following:

First, complainants have argued that non-integrated players (MVNOs with a fixed network or mobile-only operators) depend on access to the merging parties' respective (fixed and mobile) infrastructures in order to be able to offer multi-play services, which is crucial for competitiveness. The merged entity would have increased incentives to foreclose non-integrated players from such access.[15] The EC has carefully assessed but so far always rejected such foreclosure concerns. It has stressed the fact that there continue to be MNOs in the market which do not have a fixed network and whose incentives to host fixed MVNOs remain unaffected. Foreclosure of mobile players seeking access to fixed networks was considered implausible, mainly due to the existence of access regulation. Typically, the DSL incumbent has to offer regulated access to its fixed network, and in some countries, such as Belgium, such regulation extends to cable.

Second, it has been argued that non-integrated operators would be hampered by the integrated players' ability to cross-sell mobile services to existing fixed customers or vice versa, thereby leveraging a strong position in one market into another. According to complainants, this advantage would be reinforced by the fact that integrated fixed/mobile players can offer a quality and price which cannot be matched by non-integrated competitors.[16] These types of concerns have essentially been rejected as "efficiency offenses." The EC has found that such competitive advantages for integrated players, should they really exist, would force the non-integrated operators to invest in better products (such as multi-play offers via access to third party infrastructure) or to offer discounts, ultimately

13 European Commission, Competition Merger Brief, Issue 1/2014 – November.

14 Commissioner MargretheVestager's speech, 42nd Annual Conference on International Antitrust Law and Policy, Fordham University, October 2, 2015, available at: http://ec.europa.eu/commission/2014-2019/vestager/announcements/competition-and-digital-single-market_en

15 Commission Decision of September 20, 2013 in Case COMP/M.6990 – *Vodafone/Kabel Deutschland,* para. 384, 391-392, 396;Commission Decision of July 2, 2014 in Case COMP/M.7231 – *Vodafone/ONO*, para. 179; Commission Decision of May 19, 2015 in Case COMP/M.7421 – *Orange/Jazztel*, para. 809; Commission Decision of February 4, 2016 in Case COMP/M.7637 – *Liberty Global/BASE*, para. 314, 332.

16 Commission Decision of February 4, 2016 in Case COMP/M.7637 – *Liberty Global/BASE*, para. 359, 364.

benefitting the consumers. This would only not be the case if the competitive advantages of an integrated player would be sufficient to force other players to exit the market or to render them squarely uncompetitive. This very high standard of proof will be difficult to meet for any complainant. In the absence of such extraordinary circumstances, the EC seems to share the notifying parties' view that, far from creating an anti-competitive duopoly, FM mergers are good for competition because they have the potential toincrease the constraints on the incumbent integrated player as well as single-play operators.

Since 2013, the EC has reviewed six FM mergers.[17] None of these transactions have been prohibited or subject to remedies which made the parties withdraw the filing, contrary to what we have seen in the field of mobile consolidation. Four cases were cleared in Phase 1 (of which two were subject to remedies and two were cleared unconditionally) and two following in-depth probes (in each case subject to remedies). Combining a fixed infrastructure with a mobile infrastructure did not give rise to serious concerns in any of these cases. Where remedies were required, they were designed to remove or reduce any remaining horizontal overlaps, be it in fixed or in mobile. It is noteworthy that the EC is increasingly looking at competition between fixed/mobile bundles on a hypothetical "multi-play market," as opposed to focusing on competition between fixed services or mobile services only. However, again, concerns on the multi-play market have so faronly been raised to the extent that there was a horizontal overlap, i.e. where each party had already been offering fixed/mobile bundles pre-merger (such as in *Orange/Jazztel*).[18] The remedy in such cases consisted ofdivesting (parts of) the horizontal overlap with the effect that the transaction became closer to a "pure"fixed/mobile merger, which did not give rise toany concerns.

In one FM case (Orange/Jazztel), the EC has formally recognized the merger efficiencies claimed by the parties, something which is extremely rare in the EC's decisional practice. The parties had argued that the merger would allow them to eliminate variable costs in the form of MVNO wholesale fees which Jazztel would no longer have to pay post-merger because it could be hosted on the Orange network. The EC recognized that these variable costs savings werelikely to be passed on to the consumers. This is in stark contrast to the situation in MNO/MNO mergers, where, as mentioned above, the EC has generally rejected the parties' efficiency claims relating to the (mainly fixed) cost savings which canbe generated from network integration.

IV. CONCLUSION

The broad themeswhich seem to be emerging from the EC's recent telecoms decisions are the following: In what can likely only be explained by a policy shift, the EC has become increasingly critical of MVNO remedies in MNO/MNO mergers. As a result, the EC will now typically require the entry of a new MNO as a condition for allowing horizontal consolidation in 4 player mobile markets ("4:4 merger"). In contrast, as regards FM mergers, the EC has so far been by and large unimpressed by complaints, which related to foreclosure or marginalization of non-integrated operators by allegedly supra-competitive duopolies of integrated players. These conglomerate mergers have experienceda much more benign reception, and have even been implicitly welcomed as pro-competitive, subject however to the potential divestiture of any significant remaining horizontal overlaps.

17 These case are: *Vodafone / Kabel Deutschland; Vodafone/ONO; Orange/Jazztel; Altice/Portugal Telecom; Liberty Global/Base; Vodafone/Liberty Global.*

18 Commission Decision of May 19, 2015 in Case COMP/M.7421 – *Orange/Jazztel.*

TELECOMS MERGERS UNDER THE EU MERGER REGULATION: A NEW FRAME OF REFERENCE?

BY ANTONIO BAVASSO & DOMINIC LONG[1]

I. INTRODUCTION

On September 1, 2016, the EU Commission ("Commission") conditionally cleared a proposed joint venture that will combine the Italian mobile network operating businesses of VimpelCom and CK Hutchison Holdings (respectively, WIND Telecomunicazioni S.p.A ("WIND") and H3G S.p.A. ("3 Italia")).[2] The Commission's clearance is conditional on the divestment of sufficient assets that will allow Iliad SA to enter the Italian market as a new mobile network operator ("MNO"). This is the only "four-to-three" mobile network consolidation cleared by the Commission since the present Competition Commissioner, Margrethe Vestager, took office in October 2014 and comes in the wake of the prohibition of Hutchison's proposed acquisition of O2 in the UK in May 2016 and the abandonment in September 2015 of the Danish merger between TeliaSonera and Telenor after the parties to that deal failed to agree on commitments to address the Commission's concerns.

Over recent years the Commission has developed a rich decisional practice in response to a wave of consolidation in the telecoms sector.This gives rise to a number of interesting points on competition law and economics.In particular, a claim frequently made at the industry level is that, in the absence of in-market M&A consolidation, one or both of the parties to a merger would not be able to finance the investments necessary to remain competitive in an industry characterized by rapid technological changes and therefore would not be able to continue to deliver the benefits of innovation to end customers.Evaluating the strength of this claim in competition law and policy terms involves establishing: (i) the most likely conditions of competition in the absence of the merger (the "counterfactual"); (ii) what, if any, efficiencies are generated by the merger (and in particular confirming that those efficiencies are "merger specific"); (iii) the likely overall effect of the merger on consumer welfare; and (iv) what remedies may be required to address any negative effects on competition.

This paper considers some of the key trends in relation to those themes based on the Commission's decisional practice in reviewing MNO consolidations under EU Merger Regulation ("EUMR") in light of the recent clearance in *Hutchison 3G Italy/WIND*.[3]

II. THE COUNTERFACTUAL IN MNO CONSOLIDATIONS

For mobile telecoms mergers, as for any merger, a critical consideration is whether the competitive constraint posed by the merging parties can reasonably be predicted to be greater absent the merger as separate competitors (i.e. in the counterfactual scenario) than compared to the constraint that would be exerted in the market by the combined entity (i.e. the "factual scenario").

1 Partner, Allen & Overy LLP; Visiting Professor and Director of the Jevons Institute for Competition Law and Economics at University College London. Email: antonio.bavasso@allenovery.com. Senior Associate, Allen & Overy LLP. Email: dominic.long@allenovery.com.

2 Case M.7758, *Hutchison 3G Italy/WIND/JV*, Commission Decision of September 1, 2016.The authors advised WIND and its controlling shareholder, VimpelCom Ltd, on the European merger control aspects of this transaction.

3 Council Regulation (EC) No 139/2004 of January 20, 2004 on the control of concentrations between undertakings, 2004 O.J. L 24/1.

The Commission's position on this question is set out paragraph 9 of its Horizontal Merger Guidelines:

> In assessing the competitive effects of a merger, the Commission compares the competitive conditions that would result from the notified merger with the conditions that would have prevailed without the merger. In most cases the competitive conditions existing at the time of the merger constitute the relevant comparison for evaluating the effects of a merger. However, in some circumstances, the Commission may take into account future changes to the market that can reasonably be predicted. It may, in particular, take account of the likely entry or exit of firms if the merger did not take place when considering what constitutes the relevant comparison.

The Commission has assessed claims in each of the last five mobile telecoms consolidations considered under the EUMR that the competitive constraint exercised by one or both of the merging parties would deteriorate vis-à-vis the pre-merger status quo. In *Telefónica Deutschland/E-Plus*,[4] for example, the merging parties argued that E-Plus' "competitive potential would be limited in the absence of the proposed transaction due to the growing importance of data"[5] and that "E-Plus' investment capabilities are limited and it is questionable whether it would be able to build a competitive network in a stand-alone scenario in due time."[6] In a similar vein, the merging parties in *Hutchison 3G UK/Telefonica Ireland*[7] argued that while Three Ireland may have had every incentive to continue to grow and compete, it was not likely to have the ability to do so.In particular, the fact that Three Ireland had been loss making in each of the eight years since its market entry meant that it had been unable to make the necessary investments required to grow its market share while "its network will be congested more quickly than its rivals' due to its smaller spectrum holdings."[8] More recently, the Commission assessed arguments in *Hutchison 3G UK/Telefonica UK*[9] that Three UK was sub-scale and unable to grow organically absent the notified transaction.[10] In Hutchison 3G Italy/WIND the merging parties argued that, absent the transaction, neither would be able to finance the 4G network investments required to close a widening competitive gap between them and the two largest MNOs operating in the market, Telecom Italia Mobile ("TIM") and Vodafone.

In each of these cases, however, the Commission ultimately rejected merging parties' claims that an appropriate counterfactual analysis should take into account a deterioration of the competitive constraint posed by one or both of the merging MNOs.While each assessment is based on the particular facts of the case at hand (and, in practice, those facts are often redacted from the public version of the Commission's decisions), a number of common themes can be seen in the Commission's approach to assessing the counterfactual in mobile telecoms mergers.

First, the Commission places considerable weight on internal documents evidencing planned network investments and customer surveys of network quality.In *Telefónica Deutschland/E-Plus*, for example, the Commission noted that "In the absence of the proposed transaction, E-Plus plans to roll out […] network elements for its 4G network by the end of […] and to achieve [80-90]% outdoor population coverage with its 4G network by then."[11] Likewise, in *Hutchison 3G UK/Telefonica Ireland*, the Commission noted that "Three's 2013 Budget Plan shows Three's continued commitment to customer growth on a stand-alone basis."[12] With respect to claims that the stand-alone networks of merging parties will lose ground to those of larger rivals absent the notified transaction, again the Commission has repeatedly emphasized apparently contradictory evidence from internal documents.

Second, the Commission appears to be highly skeptical of merging parties' arguments that they would be incapable of profitably financing necessary investments.The Commission's decisional practice in this respect has put increasing weight on an assessment of merging parties' historic financial performance relative to competitors taking into consideration a variety of metrics including EBITDA,[13] capital expenditure ("CAPEX"), cash flow, weighted average cost of capital ("WACC") and return on capital employed ("ROCE").[14] Critically for the counterfactual analysis, however, the Commission also places considerable emphasis on merging parties' expected future financial performance as evidenced by business plans, investment forecasts and other internal documents.Most recently, in Hutchison 3G Italy/WIND, following a detailed review of the notifying parties' internal documents, the Commission concluded that "WIND's shareholders would have the incentives to financially support WIND if this

4 Case M.7018, Telefónica Deutschland/E-Plus, Commission Decision of July 2, 2014.Allen & Overy LLP advised KPN and E-Plus in relation to this matter.

5 Case M.7018, at para.335.

6 Case M.7018, at para.338.

7 Case M.6992, *Hutchison 3G UK/Telefonica Ireland*, Commission Decision of May 28, 2014.

8 Case M.6992, at para.475.

9 M.7612, *Hutchison 3G UK/Telefonica UK*, Commission Decision of May 11, 2016.

10 Case M.7612, at para.682.

11 Case M.7018, at para.402.

12 Case M.6992, at para.484.

13 Earnings before interest, tax, depreciation and amortization.In *Hutchison 3G UK/Telefonica UK*, the Commission noted that EBITDA was a useful indicator of financial performance to the extent that it "measures the profitability of core operations as it excludes factors…that are less relevant to the profitability of day-to-day operations and are discretionary to a business, such as the type of financing…by excluding interest expenses, EBITDA excludes the effect of bad, debt-financed investment decisions in the past, which is unrelated to the current operational performance of the business" (at para.709).

14 The Commission noted in *Hutchison 3G UK/Telefonica UK* that A ROCE equal to or greater than the WACC is an indication that a business generates sufficient returns to its investors.

was needed in order to maintain its competitiveness in the market"[15] and that as a result WIND was likely to have the ability and incentive to continue exerting an important competitive constraint.

More generally, the Commission appears to be of the view that for the purposes of identifying the appropriate counterfactual in mobile telecoms mergers, competing aggressively on price is often a viable competitive strategy for operators that may otherwise struggle to match the levels of network investment (and therefore quality of service) deployed by larger rivals.In *Telefónica Deutschland/E-Plus*, for example, the Commission noted that "anumber of respondents consider that E-Plus would continue to differentiate itself based on aggressive pricing, which would compensate for possibly lower network quality."[16] Likewise, the Commission placed considerable weight on evidence from internal documents collected from the merging parties in *Hutchison 3G Italy/WIND* that showed price remained one of the most important factors in determining customers' choice of network.

Finally, in a number of cases the Commission has been willing to speculate that a network sharing agreement ("NSA") could constitute an appropriate counterfactual to a merger between MNOs, in particular where parties have argued that they would otherwise face difficulties in independently financing necessary network investments.This is a crucial point.The fact that NSAs are theoretically possible is not in dispute.However, there is a wide range of possible NSAs (each with varying degrees of network integration) and the ability of parties to enter into an NSA is affected by a number of case-specific factors.If the Commission wants to rely on an NSA as a counterfactual to an assessment of a merger under the EUMR, then it is clear from the Horizontal Guidelines that it must first prove such an outcome is likely in the circumstances of the individual case and that it can reasonably be predicted.Conversely, any previous attempts by merging parties to reach an NSA which ended in failure (for instance in light of investment and/or benefit asymmetries between those parties under an NSA) would constitute prima facie evidence that an NSA is in fact nota counterfactual that can reasonably be predicted in the circumstances.It would then be for the Commission to disprove that presumption conclusively based on the available evidence.

Yet in *Hutchison 3G Italy/WIND* the Commission considered as part of its counterfactual analysis that the merging parties would be able to address difficulties in matching the investments of larger rivals by entering into anNSA as an alternative to the joint venture, concluding that:

> [s]hould H3G aim to accelerate its 4G network coverage and reduce its network capital expenditures, based on the available evidence, it would be able to rely on alternatives to the Transaction. H3G may for instance consider entering into NSAs with WIND…NSAs appear to be an option capable of delivering significant financial benefits to both WIND and H3G.[17]

If merging parties discharge their burden of proof in showing that absent a notified transaction the competitive position of one or both of the merging parties will deteriorate (e.g. through an inability to able to finance necessary investments), as a matter of principle, the Commission cannot simply assert that because NSAs exist between certain parties in certain markets, such a theoretically possible alternative transaction is an appropriate counterfactual.To do so would effectively amount to the Commission substituting its own judgement for the commercial experience and evaluation of the parties.Indeed, the Commission's own assessment in *Hutchison 3G UK/Telefonica UK* of the harm that the merging parties in that case could do to already existing NSAs (discussed below) suggests that NSAs are by their nature difficult to maintain where parties' incentives are not closely aligned – let alone agree in the first place.This of course interacts with the Commission's approach to efficiencies and ultimately its assessment of a merger's overall impact on consumer welfare.

III. THE COMMISSION'S APPROACH TO EFFICIENCIES

Under the Horizontal Merger Guidelines, for the Commission to take account of efficiency claims in its assessment of a merger and be in a position to conclude that as a consequence of those efficiencies there are "no grounds for declaring the merger to be incompatible with the common market," the efficiencies must satisfy the cumulative conditions of benefitting consumers, being merger-specific and being verifiable.[18]

To date, the Commission has found that most of the efficiencies claimed by notifying parties in MNO mergers fail to satisfy this test.Often, although not exclusively, on the basis that they have not been shown to be merger-specific.

The ability to enter into an NSA is crucial to the merger specificity analysis in mobile mergers and raises real questions as to whether the test is applied correctly as a matter of policy.The first such detailed assessment was conducted by the Commission in its review of *H3G Austria/Orange Austria.*[19] In that case, notwithstanding evidence that a NSA would not be workable given the very different commercial strategies pursued by each party, the Commission felt that it could not "rule out alternatives just because they might be more cumbersome or expensive for H3G to implement…[NSAs]

15 Case M.7758, at para.769.

16 Case M.7018, at para.406.

17 Case M.7758, at paras, 619 and 621.

18 Horizontal Merger Guidelines, at para.78.

19 Case M.6497, *Hutchison 3G Austria/Orange Austria*, Commission Decision of December 12, 2012.The authors advised Orange Austria and its controlling shareholder, Mid Europa Partners LLP, on the European merger control aspects of this transaction.

are plausible means of reducing capacity constraints. These are established business practices in the industry concerned. Thus more evidence would be needed to show why these measures would not be realistically chosen in the absence of the merger."[20]

The Commission reached a similar conclusion in *Hutchison 3G Italy/WIND* where it found that "it is undisputable that network sharing agreements constitute common business practice in the telecommunications industry and have been implemented successfully in a number of Member States"[21] and, in particular given significant differences between each of the notifying parties' spectrum portfolios, that "spectrum compensation from H3G to WIND would not represent an impediment" to an NSA.[22] In the Italian case, the Commission also conducted a detailed assessment of the cost savings that could be expected to arise under a variety of different types of NSAs, ultimately concluding that entering into an LTE NSA would result in substantial cost reductions and revenue synergies, while preserving a degree of retail competition that would be otherwise lost with the merger.On this basis, the Commission found that the merging parties had failed to demonstrate within the framework of the Horizontal Merger Guidelines that the network efficiencies arising from the notified transaction were sufficiently merger specific, likely to materialize and able to counter the anti-competitive effects that the Commission considered would otherwise result.

In contrast to the Austrian and Italian mergers, however, at the time of *Hutchison 3G UK/Telefonica UK* each of the four UK MNOs was a party to one of two NSAs active in the UK market: "MBNL" (between Three and EE) and "Beacon" (between O2 and Vodafone). The efficiencies claimed by the merging parties in the context of the Commission's review of the notified transaction were therefore limited to those not already achievable under the terms of their existing NSAs.However, neither MBNL nor Beacon involved the sharing of spectrum between NSA partners.The merging parties in the UK case therefore argued that the proposed transaction would generate efficiencies primarily through radio area network ("RAN") consolidation, including by way of more efficient use of spectrum, thereby resulting in increased network capacity, quality and speed.The Commission's assessment in that case, however, found that a spectrum sharing arrangement would allow the Parties to achieve "virtually the same network benefits as the network efficiencies which, according to the Notifying Party, would arise from the Transaction."[23] The Commission went on to recognize that while a hypothetical spectrum sharing agreement between the merging parties would still give rise to competition concerns vis-à-vis the non-merging MNOs party to the existing UK NSAs (discussed further below), and may also adversely affect overall investment incentives in the industry, such an arrangement:

> [w]ould not give rise to an elimination of price competition at the retail or wholesale market where the Parties would remain in competition...It is therefore a less anti-competitive means to achieve the network efficiencies claimed by the Notifying Party, even if the approval of any such spectrum sharing agreement by the competent authorities might require remedies to avoid harm to the Parties existing network sharing partners.[24]

This raises the question of how the Commission should assess a potential consumer-welfare efficiency which may at the same time give rise to a potential reduction of competition.[25] Ultimately this can only be done in an exercise of balancing the negative effects with pro-competitive effects but if the latter is limited to efficiencies achievable without an NSA that exercise in unduly distorted.

Interestingly, in establishing that spectrum sharing would have been a realistic alternative to the notified transaction in the UK, the Commission cited the example of the spectrum sharing agreement between TeliaSonera and Telenor in Denmark as evidence that such agreements are "feasible and an established business practice in the mobile telecommunications industry."[26] This position was echoed by Commissioner Vestager in a speech delivered in October 2015:

> In practice, we assess whether post-merger investment plans are credible and likely, merger-specific, and with benefits for end-consumers as opposed to shareholders.However, only a fraction of the efficiency submissions we have seen in successive cases have met these criteria.In this context, we should not forget that mobile network operators can share mobile networks and thus benefit from large efficient networks without the need for consolidation. The Danish case is a good example of this.[27]

20 Case M.6497, at para. 417.

21 Case M.7758, at para. 1512.

22 Case M.7758, at para. 1568.

23 Case M.7612, at para. 2473.

24 Case M. 7612, at para.2483.

25 Indeed, the Commission recently opened a formal investigation under Article 101 of the Treaty on the Functioning of the EU into an existing NSA arrangement in the Czech Republic between O2 and T-Mobile, citing concerns as to whether the NSA would slow down quality improvements in existing infrastructure and/or delay the deployment of LTE and future technologies. In announcing theinvestigation on 25 October 2016, Commissioner Vestager commented that "Network sharing agreements can bring about efficiencies, such as reduced deployment costs and may allow for network expansion to previously unserved areas. But, in some circumstances, network sharing may also reduce competition on the market. The network sharing agreement between the two major operators in the Czech Republic covers most of the country. We need to ensure that it will not reduce infrastructure competition and innovation" (European Commission, Antitrust: Commission opens formal investigation into mobile telephone network sharing in Czech Republic, Press Release IP/16/3539, 25 October 2016 (available at http://europa.eu/rapid/press-release_IP-16-3539_en.htm)).

26 Case M. 7612, at para.2482.

27 *Competition in telecom markets*, Speech given by Margrethe Vestager to the 42nd Annual Conference on International Antitrust Law and Policy

On this basis, it would appear that notifying parties will continue to face an extremely high evidential threshold in showing that in-market MNO consolidations generate efficiencies that meet the criteria set out in the Commission's Horizontal Merger Guidelines.

IV. ASSESSING COMPETITIVE EFFECTS

Not all 4-3 mobile mergers are equal.Clearly there are some common themes but the Commission does carry out a very case-specific assessment and recent cases (in particular the UK and the Italian cases) have highlighted some interesting aspects of the analysis of competition effects.We have selectively chosen two for the purposes of this article: network competition and coordinated effects.

A. Network Competition

In contrast to the Austrian and Italian mergers, at the time of H*utchison 3G UK/Telefonica UK* each of the four UK MNOs was a party to one of two NSAs already active in the UK market.The Commission's assessment of that transaction therefore included a detailed review of novel theories of harm related to the proposed transaction's impact on the ongoing operation of MBNL and Beacon and the subsequent competitive position of the merging parties' NSA partners. The Commission's assessment was predicated on an observation that "network sharing arrangements require a certain degree of alignment of interests between the network sharing partners to function properly."[28] In particular, the Commission considered that because the UK NSAs pre-merger "combine partners with certain shared characteristics in term of available spectrum,"[29] there was a risk that the proposed transaction would disrupt the alignment of those interests to the detriment of the competitive position of either EE or Vodafone (or both) insofar as the merged entity would not be incentivized to continue participation in both NSAs in the long term.

The Commission also identified a concern that the merged entity would be able to de-prioritize one of the shared networks without harming its own services to the same extent as those of the relevant NSA partner. While acknowledging that each of Beacon and MBNL included contractual protections where one partner fails to fulfil its obligations, the Commission concluded that:

> [t]he proper functioning of a network sharing arrangements [sic] requires more than the simple application of contractual terms. It also needs practical solutions to questions and situations that have not been foreseen in the contracts. Therefore, contractual protections by themselves are insufficient to ensure a proper functioning of a network sharing arrangement.[30]

On this basis, the Commission found that the proposed transaction could be expected to give rise to a significant impediment to effective competition ("SIEC") insofar as it would harm the competitive position of either one or both of the merging parties' NSA partners.

However, the Commission's finding that the UK NSAs would be disrupted through a dis-alignment of the NSA partners' interests seems to be at odds with its position in the Italian case – in the context of assessing hypothetical NSAs as an appropriate counterfactual – that: "numerous network sharing agreements that have been concluded in Europe and in the World show that the incomplete nature of contracts is not an obstacle to the closing of these cooperation agreements and that mitigating factors can be devised to avoid disagreements or opportunistic behaviour."[31]

The dynamic of network competition should make a difference in the Commission's substantive assessment of any merger-specific efficiencies claimed by notifying parties, as well as in the balancing act required to assess a merger's overall impact on consumer welfare.That dynamic can also clearly make the difference in relation to merging parties' ability to offer effective and commercially acceptable remedies to allay competition concerns.Both points are discussed further below.

B. Retail Level a New Focus on Coordinated Effects

In Hutchison 3G Italy/WIND, the Commission concluded the transaction was likely to give rise to non-coordinated anti-competitive effects on the retail market for mobile telecoms in Italy.It found that as the merged entity would have significant market share, it would "not have the incentive to compete on the market in the same way as the Parties did before the Transaction separately."[32] The Commission's reasoning in this respect seems to be based mostly on unsubstantiated (and sometimes self-serving) responses to the Commission's market investigation questionnaires and a selection of some historic public statements by competitors or analysts. However the Commission also carried out a very deep and detailed analysis of price effects expected to arise from the notified transaction (to which an entire Annex of the Commission's decision is dedicated).The key question for the Commission to assess therefore ultimately relates to the interaction between the price effects identified in that analysis and the efficiency claims of the merging parties, leading to a comprehensive assessment of the merger's overall impact on consumer welfare (discussed further below).

One of the interesting aspects of Hutchison 3G Italy/WIND relates to the weight attributed to the coordinated effects theory of harm.In its decision to open in-depth proceedings in H3G Austria/Orange Austria, the Commission felt that it could not rule out potential harm to competition arising through coordinated effects.In its final decision, however, while noting that some characteristics of the market may have been conducive to coordination and some past

Fordham University, October 2, 2015 (available at

28 Case M.7612, at para.1230.

29 Case M.7612, at para.1238.

30 Case M.7612, at para.1241.

31 Case M.7758, at para.1608.

32 Case M.7758, at para.952.

behavior of MNOs could point in that direction, the Commission concluded that the evidence available on potential coordinated effects did not meet the requisite standard of proof to establish an SIEC. Likewise, the Commission's decision in Hutchison 3G UK/Telefonica Ireland found that Irish mobile telecoms markets exhibited a number of characteristics conducive to coordination.In particular the Commission was concerned that a high degree of price transparency at the retail level would allow MNOs to both reach terms of coordination and detect any deviation therefrom.The Commission also rejected the merging parties' claim that mobile virtual network operators ("MVNOs") could be expected to disrupt any potential coordination – in part because the largest MVNO in Ireland, Tesco Mobile, was jointly controlled by one of the merging parties.The Commission recognized, however, that a number of factors suggested coordination would not be likely.In particular, the Commission noted that with a market share of 20 percent by subscribers and 18 percent by revenues, Eircom would be a much smaller MNO than the two market leaders post-merger and would therefore have an incentive not to follow a coordinated strategy.The Commission ultimately concluded that it did not need to reach a definitive position because the commitments offered by the notifying party to remedy potential unilateral effects in the Irish markets would also exclude the possibility of the transaction giving rise to coordinated effects.Similarly, in its decision to open an in-depth investigation in Telefónica Deutschland/E-Plus, the Commission felt that it could not rule out potential coordinated effects, in part because of a high degree of price transparency but also because that transaction would have created an increase in symmetry in respect of the market shares and quality positioning of the three remaining MNOs.Again, however, the Commission did not reach a definitive position on the likelihood of coordinated effects arising in that case as it found that the commitments offered would ensure MVNOs were in a position to disrupt any possible coordination between the remaining MNOs.

The Commission's press release announcing an in-depth investigation of *Hutchison 3G UK/Telefonica UK* also identified concerns that a reduction in the number of competing MNOs following the merger would increase the likelihood of coordination.Strikingly, however, coordinated effects are not mentioned at any point in the 685 pages of the Commission's final decision in that transaction.

In contrast, potential coordinated effects were a key element of the Commission's theory of harm in *Hutchison 3G Italy/WIND*, where the Commission found that the notified transaction would have increased both the incentives and ability for MNOs to reach terms of coordination.The Commission also identified a number of factors to suggest that coordination would be sustainable.In relation to the former, the Commission noted that not only would the merger reduce the number of MNOs from four to three, it would also remove a "maverick" competitor from the market insofar as H3G's relatively small market share meant that it would otherwise have had a much lower incentive to engage in coordination and would instead be incentivized to win customers through aggressive price cuts.[33] As with its assessment in Telefónica Deutschland/E-Plus, the Commission also found that the notified transaction would result in a relatively symmetric market of three MNOs with similar scale and market shares.In relation to the ability to reach coordination, the Commission found that MNOs in Italy had previously attempted to engage "in behaviour that could be considered the result of coordination,"[34] including with respect to waves of parallel price increases during Q4 2013 and Q1 2014.The Commission's assessment of this past conduct referred to a number of the parties' internal documents, as well as public statements made by WIND, Vodafone and TIM, in support of its conclusion that H3G's aggressive pricing was the primary reason coordination could not be sustained absent the notified transaction and that "the MNOs also shared the same view as to what would be the remedy to get rid of the two factors – H3G's aggressive tariffs and the MNOs' [below-the-line] tariffs – that prevented a full-fledged price stabilisation. That is to say, a merger between H3G and WIND."[35] The Commission also found that MNOs would be able to quickly detect and punish (including through price wars) any deviation from the terms of coordination which, in itself, would constitute a sufficiently credible threat to deter MNOs from deviating in the first place.

Finally, the Commission identified a number of practices that – while not strictly necessary for coordination to arise – would make it easier to reach and sustain coordination post-merger.In particular, the Commission noted that MNOs engaged in regular conference calls with their shareholders and investors (which were closely followed by the managers of competing MNOs) that could be used to make public statements to: (i) communicate the terms of coordination; (ii) threaten to adopt retaliatory measures in case of deviation; (iii) suggest actions to take coordination to a new stage; and (iv) thereby make it easier to reach and sustain coordination.In this respect, the Commission also identified investment banks as contributing to the likelihood of coordination in the Italian markets by conveying information to MNOs regarding each other's results and intended market strategies: "In a regime of coordination post-Transaction, the role of investment banks would therefore facilitate reaching terms of coordination and making it sustainable in time."[36]

33 The Commission's decision noted at paragraph 975 that firms with a comparatively low market share benefit appreciably less from coordination attempts than larger incumbents, since they have a smaller customer base on which they could earn a supra-competitive margin. Such firms are therefore much less inclined to cement the existing market structure by agreeing to engage in accommodative pricing and, on the contrary, they have a comparatively stronger incentive to try and win over customers from rivals through price cuts.
Case M.7758, at para.1049.

34 Case M.7758, at para.1049.

35 Case M.7758, at para.1076.

36 Case M.7758, at para.1201.

V. BALANCING PRO- AND ANTI-COMPETITIVE EFFECTS: CONSUMER WELFARE

It is an established principle of European case law that the Commission must determine whether a transaction notified under the EUMR is, overall, likely to give rise to an SIEC with no presumption as to either compatibility or incompatibility.[37] In doing so the Commission's assessment must bring together both its analysis of anti-competitive effects as well as its analysis of any efficiencies claimed by notifying parties.That is because in mergers that create not only supply-side efficiencies (e.g. cost reductions) but also demand-side efficiencies (e.g. quality improvements)[38] price effects are not a sufficient metric to determine the net impact on consumer welfare arising from that transaction.The Commission's decision in *Hutchison 3G Italy/WIND* indicates that this is an area where the Commission should adjust its policy to ensure that this balancing is not relegated to the category of an impossible and ultimately pointless exercise.

A standard methodology to quantify the consumer effects of a merger consists in producing a "merger simulation" model that weighs price effects and efficiencies (both supply- and demand-side) to estimate whether a given merger will be overall welfare enhancing.Crucially, a balanced analysis of a merger cannot be limited to a mono-dimensional assessment of price effects alone.In *Hutchison 3G Italy/WIND*, the parties submitted such a model and the Commission considered that some elements of it (in particular the online survey on which it was based) had a number of shortcomings which cast doubt on the verifiability of the conclusions.However the key policy point here relates to the burden of proof and standard required applicable to this type of detailed analysis relative to that of a collection of statements in internal documents and analyst presentations which are relied upon selectively (often ignoring evidence of a similar nature in support of claimed efficiencies).

The threshold of merger-specificity also plays a key role here.If the balancing act which it is ultimately incumbent on the Commission to carry out based on the evidence produced by the parties is constrained by an unreasonably strict and expansive test of what is merger specific (such that the Commission is effectively free to speculate on the viability of alternative transactions, even in the presence of evidence that those transactions had previously been attempted but failed), then this balancing act is in practice negated with a corresponding negative impact on merger control policy.Moreover if efficiency claims are negated as a result of a putative alternative arrangement which itself would also necessarily give rise to negative (albeit potentially less pronounced) competition effects (an NSA in the case mobile telecoms mergers) the balancing act cannot artificially assume that the proposed merger does not deliver the benefits that would also be produced by the alternative (less competitively harmful) arrangement.

37 See, for example, Case C-413/06P, *Bertelsmann and Sony Corporation of America v. Impala,* [2008] E.C.R. I-4951, at para.48.

38 D. Evans and J Padilla, "Demand-side Efficiencies in Merger Control" (2003) 26 World Competition, 167.

VI. REMEDIES

Perhaps more than any other aspect of the decision making process, a clear trend can be seen in the Commission's approach to assessing remedies in MNO mergers.In particular, while each case – and therefore the appropriateness of remedies offered by the notifying parties – is assessed on its merits, the Commission has been gradually moving away from remedies designed to boost the competitive constraint posed by MVNOs at the retail level of the market, albeit with a structural element of spectrum divestment (Austria, Ireland and Germany) towards remedies designed to secure the entry of a fully-fledged new network operator (UK, Italy).

In the Austrian case, for example, the notifying party committed to make available wholesale access to 30 percent of its network for up to 16 MVNOs on the basis of unit prices set out in a published "reference offer." It also committed not to complete the transaction before it had entered into an up-front agreement with one MVNO approved by the Commission on the terms of that reference offer. However, there was no obligation on the remedy-taker to commit to any minimum amount of capacity or usage.In addition, the notifying party committed to offer for divestment 2 x 10MHz of spectrum in the 2600MHz frequency band to a new entrant (which was to be divested alongside spectrum in the 800MHz frequency band, reserved from an upcoming spectrum auction by the Austrian telecoms regulator).Contingent on that spectrum being acquired, the notifying party also offered to divest unwanted sites following consolidation of the merged networks and to enter into a national roaming agreement.

However, following criticism of that remedies package (including from the Austrian telecoms regulator) for failing to secure any significant new entry to the market, the remedies offered in each of the Irish and German cases were designed to incentivize the in-coming remedy taker to compete aggressively by committing to an up-front acquisition of a fixed amount of capacity.In both of those cases this included a commitment to sell up to 30 percent of the relevant merged entity's network capacity to MVNOs at fixed payments under terms that would see the MVNO purchaser acquiring a dedicated "pipe" from the merged entity's network for voice and data traffic.In *Telefónica Deutschland/E-Plus*, this involved an up-front sale of network capacity (corresponding to a market share of up to 11 percent) to between one and three MVNOs at fixed payments.In its assessment of that commitment, the Commission noted that "with a fixed capacity that they committed to pay up-front at their disposal, the MVNOs will have increased incentives to fill the capacity they have committed to purchase by offering attractive prices and innovative services."[39] On 29 August 2014, the Commission subsequently approved an agreement between Telefónica Deutschland and Drillisch (which was previously active on the German market as a service provider) pursuant to which Drillisch would

39 European Commission, Mergers: Commission clears acquisition of E-Plus by Telefónica Deutschland, subject to conditions, Press Release IP/14/771, July 2, 2014 (available at http://europa.eu/rapid/press-release_IP-14-771_en.htm).

acquire 20 percent of the combined entity's capacity with an option to purchase a further 10 percent.Similarly, in *Three/Telefónica* Ireland, the commitment involved a sale of the merged entity's network capacity to two MVNOs at fixed payments.Significantly, Three was required to conclude an access agreement under the terms of the commitments with at least one MVNO prior to completing its acquisition of Telefónica Ireland, subject to the Commission approving the potential purchaser.The Commission noted that "*The main effect of introducing the fixed price/fixed capacity model is that it will create a strong incentive for the MVNO entrant to fill its purchased network capacity by aggressively acquiring customers.*"[40] Three subsequently concluded the two MVNO agreements with Liberty Global's UPC and Carphone Warehouse.

To facilitate one (but not both) of the MVNOs which acquired divested capacity transitioning to a full MNO in Ireland at a later date, Three also committed to make available for divestment for a period of ten years from 1 January 2016 one block of 900 MHz spectrum, two blocks of 1800 MHz spectrum and two blocks of 2100 MHz spectrum.Likewise, Telefónica Deutschland also committed to offer to divest spectrum (2x10 MHz in the 2100 MHz band and 2x10 MHz spectrum in the 2600 MHz band) and certain assets (including sites and retail outlets, as well as offering to enter into national roaming and passive network-sharing agreements) to either a new MNO entrant in the context of the upcoming German frequency auctions or to an MVNO who acquired network capacity under the first part of its commitment offer.Finally, Three also committed to continue the "Mosaic" network-sharing agreement with Eircom in Ireland on improved terms, while Telefónica Deutschland committed to extend existing wholesale access agreements and to offer 4G services to the wholesale market, as well as removing certain contractual clauses in its agreements with wholesale customers which could prevent switching to another MNO.

By the time of *Hutchison 3G UK/Telefonica UK* the Commission had begun to move away from the use of MVNOs as a central component of a remedy structure.In that case, the notifying party offered a package of commitments designed to address the Commission's three main theories of harm, namely: loss of competition between the merging parties, harm to the competitive position of the merging parties' NSA partners and harm to the competitive position of MVNOs.A full review of that remedies package is beyond the scope of this paper.However it is notable that while the remedies offered in that case were designed to replicate as far as possible the competitive position of a new entrant MNO, they did not include a commitment to divest individual mobile telecoms assets (such as sites and spectrum rights) to a new entrant MNO.Instead, Hutchison offered to grant a "perpetual fractional network interest" to a new entrant operator ("NEO") in the network operated and/or used by O2 (subject to any limitations contained in roaming or site sharing agreements with third parties, the Network) amounting to a confidential proportion of the Network's total capacity.The commitment included a confidential mechanism to determine the minimum amount of capacity that would be taken by the NEO over time and envisaged that the NEO would pay a fixed price in consideration for the network interest.The notifying party also submitted a term sheet signed with a confidential third party designed to give commercial effect to the NEO commitment.The economic rationale of this proposal is that the level of commitment of the NEO would mimic that of a fully-fledged MNO and therefore produce similar incentives to compete.

However, the Commission noted that the term sheet was not a final agreement and was not submitted as a formal part of the commitments.On that basis, the Commission concluded that the submission of the term sheet did not ensure that there would be timely and likely entry of a new competitor.On substance, the Commission felt that the proposed NEO arrangement should be characterized as a long term access commitment containing optional elements and uncertainties that entailed a long term commercial and technical dependence on the host MNO.[41] Crucially, notwithstanding a right for the NEO to opt out of certain network investments,[42] the Commission's assessment found that a NEO's dependency on the investment decisions of the merged entity might influence its decision as to the Capacity Share it would elect to utilize over time.In rejecting the commitments, the Commission therefore concluded that:

> This dependency constitutes a fundamental difference between a NEO and an MNO in the long run as a NEO would not only be required to reimburse the Notifying Party for the costs for the capacity that it intends to utilise, but also for an undefined return on investment, while an MNO can always invest into capacity and get access to it at cost. As a result, a NEO is unlikely to be able to compete effectively against other market participants, and in particular against MNOs.[43]

In contrast to the position of the parties to the UK transaction (each of whom was also party to a NSA with one of the two remaining UK MNOs), the notifying parties in the Italian case were free to offer to divest individual components of their respective mobile telecoms networks to a potential remedy-taker.In that case, the remedies offered consisted of a package of assets and related agreements designed to ensure the entry of a new, independent, MNO to the Italian market and included: (i) 2 x 35 MHz of mobile radio spectrum at various frequency bands (900 MHz, 1800 MHz, 2100 MHz and 2600 MHz); (ii) a divestment and colocation of several thousand mobile base station sites; and (iii) transitional agreements allowing the remedy-taker to make use of the merged entity's network (including in relation to 2G, 3G and 4G technologies) while it builds out its own network.Another very significant difference from the UK case was that the merging parties in the Italian transaction were able to

40 Case M.6992, at para.983.

41 Case M.7612, at para.2999.

42 The Commission noted that the opt-out would not apply to features or services which would lead to an improvement in coverage, capacity, speed or cost of the network.

43 Case M.7612, at para.3001.

present the Commission with executed agreements with a potential remedy-taker, Illiad SA, during the Commission's review of the main transaction, i.e. a "fix-it-first" remedy structure.As a result, the Commission's clearance decision approved not only the substance of the remedies package but also the identity of the remedy-taker, noting that as a successful entrant to the French telecoms market Iliad "has the know-how and expertise to operate, invest and innovate in the Italian market."[44]

On clearing the Italian transaction, Commissioner Vestager stated that the remedy package accepted by the Commission:

> [s]hows there is no need for a trade-off between competition and growth through consolidation. Telecom companies can grow in Europe by consolidating within the same country, if the conditions are right. They can also grow by expanding cross-border. This is the case for Iliad. It will increase its footprint in another Member State as a new European player. We welcome this. [45]

Interestingly, the Commissioner also said of the Italian merger that:

> One alternative might have been to create or strengthen a virtual operator, which rented space on other companies' networks, to restore competition. But a virtual operator can't help being dependent on the companies that carry its data and its calls. So it's difficult to design agreements that give virtual operators the freedom to really compete. And you risk having to monitor the arrangement for years, to make sure physical operators aren't preventing them from competing.[46]

The Commissioner suggests that – in 4:3 MNO consolidations – while the door is not yet entirely closed on NEO remedies based on an up-front capacity and investment commitment, it is currently no more than ajar.

---

44 *Mergers: Commission approves Hutchison/VimpelCom joint venture in Italy, subject to conditions,* European Commission - Press release, September 1, 2016 (available at http://europa.eu/rapid/press-release_IP-16-2932_en.htm).

45 Statement by Commissioner Vestager on Commission decision to approve Hutchison/VimpelCom joint venture in Italy, subject to conditions, European Commission – Statement, September 1, 2016 (available at http://europa.eu/rapid/press-release_STATEMENT-16-2934_en.htm).

46 Competition and the Digital Single Market, Speech by Commissioner Vestager, September 15, 2016 (available at http://ec.europa.eu/commission/2014-2019/vestager/announcements/competition-and-digital-single-market_en).

NETWORK NEUTRALITY IN AN INCREASINGLY DIVERSE WORLD

BY CHRISTOPHER S. YOO[1]

I. INTRODUCTION

Over the course of the last year, regulatory interest in network neutrality has intensified. In the U.S., the Federal Communications Commission ("FCC") responded to the judicial invalidation of its initial effort to regulate network neutrality by adopting a second Open Internet Order ("OIO") in February 2015, which was upheld by the courts in June 2016. In Europe, the European Parliament's inclusion of strong network neutrality provisions in the Single Telecom Market legislation prompted opposition from the Council of the European Union, which ultimately led to the adoption of a compromise solution in October 2015. The Body of European Regulators for Electronic Communications ("BEREC") issued guidelines in August 2016 regarding the best way to implement this legislation. In India, the Telecommunications Regulatory Authority of India ("TRAI") adopted a regulation in February 2016 that prohibits all discriminatory tariffs for data services on the basis of content.

The basic premise behind network neutrality is that providers should not favor any network traffic based on its source or the content or application with which it is associated, either by blocking certain traffic or by charging differential amounts for delivering it. Network neutrality is animated by a vision in which the Internet adheres to the best-efforts architecture around which the network was initially organized and that has to date proven so successful in promoting innovation. In essence, this vision effectively requires network providers to focus their efforts on providing a single class of service. Network neutrality proponents claim that doing so promotes innovation by ensuring that all creators and content and applications have access to the broadest possible market and by preventing them from having to pay differential amounts for network access.

The benefits provided by having a single platform for which all content and applications providers can design their offerings unquestionably represents an important source of value on the Internet. What is often overlooked is that network size is not the only source of value. The benefits of mandating net uniformity must be traded off against other aspects, such as the inherent loss of variety and the inability to appeal to new users.

In other words, the debate has failed to provide any basis for distinguishing the circumstances under which having a single, monolithic design is optimal from those in which a more diverse architecture might serve consumers better. A key consideration is the homogeneity or heterogeneity of consumer preferences. If people's demand for network services is relatively uniform, the optimal course is to deploy a single network designed to satisfy those preferences. As demand for network services becomes more heterogeneous, eventually optimality will demand that network providers offer a broader range of services to meet that demand. This variety can both better satisfy users who already in the market and attract in new users who are not yet in the market.

This analysis suggests the need to understand the tradeoffs inherent in any decision to standardize around any particular design and to appreciate that any such standardization can have hidden costs. Only by framing standardization as a question of optimality can regulators discern when mandating network neutrality might

1 Christopher S. Yoo is the John H. Chestnut Professor of Law, Communication, and Computer & Information Science and the Founding Director of the Center for Technology, Innovation and Competition at the University of Pennsylvania.

be good for consumers and when economic welfare may be better served by permitting a greater diversity of network offerings.

II. BETTER SATISFACTION OF CURRENT USERS

Competition policy has long understood the potential benefits of standardization through the lens of the now substantial literature on network economic effects. As is now well understood, network economic effects exist when the value of network increases with the number of users connected to it.

Were network size the only relevant source of value, standardization would always be the preferred course, and all networks would offer only a single class of service. In reality, networks have always offered a variety of services. Unless those alternative services are to be dismissed as mistakes, making sense of this behavior requires a better understanding of the value created by alternative classes of service. What emerges is an appreciation of how variety can be a source of consumer welfare outside the price-quantity space. The advantages from being part of a larger network must be traded off against the disadvantages of surrendering product variety.

A. The Tradeoff from Between Standardization and Variety

Discussions of network economics often overlook the fact that size is only one of many potential sources of economic welfare in network industries. When tastes vary, consumers can also generate surplus by consuming a product more closely suited to their tastes.

The tradeoff is framed nicely by a short and easily accessible article by Joseph Farrell and Garth Saloner.[2] Suppose that there are two groups of users, each with a preference for a different standard. Each group faces a choice. It can adopt the standard preferred by the other group, which would provide it with the benefits of being part of a larger network, but would require it to forego the benefits of employing its preferred standard. Or it can adhere to its preferred standard, which would allow it to realize the benefits from using the standard more closely aligned with its preferences, but reduce the size and thus the value of the network in which it participates.

The implications of this model are elegant and clear. If preferences are uniform, variety provides no value, and consumers are best served if everyone is part of a single network. The optimal tradeoff changes as preferences become increasingly heterogeneous. At some point, the value from variety dominates the value from network size. When that occurs, the optimal outcome is for users to be part of separate networks.

B. Implications for Network Neutrality

This simple model offers some real insights into the debate over requiring networks to offer only a single, uniform class of service. The current Internet is designed to provide a particular cluster of services. The best-efforts architecture does not provide any guarantee as to how quickly any particular traffic will arrive at its destination or indeed if it will arrive at all. The applications that dominated the early Internet (email and web browsing) were fairly tolerant of delays of a fraction of a second and of irregularities in the timing with which individual packets arrive (known as "jitter"). They were able to engineer around the lack of reliability at the cost of introducing even larger delays.

The modern Internet is quite different. In the developed world, the user base has exploded both in terms of numbers and heterogeneity, and users are employing a more diverse range of applications that are making more intensive and varied. Perhaps most salient is the rise of streaming video, which according to Cisco represented 68 percent of consumer Internet traffic as of 2015 and is projected to grow to 82 percent by 2020. Sandvine reports that in 2016 two applications, Netflix and YouTube, together represented more than half of all downstream peak-period traffic, with 35 percent and 18 percent respectively.

Streaming video is just one example of how modern applications are demanding a different combination of network services. It demands significantly more bandwidth and is far more sensitive to jitter, while at the same time being more tolerant of lack of reliability as well as initial delays in initiating the video stream. Other applications, such as streaming audio and Voice over Internet Protocol ("VoIP"), require different clusters of services.

Network Services Demanded by Established Internet Applications

Application	Bandwidth	Reliability	Delay	Jitter
E-mail	Low	High	Low	Low
Web browsing	Medium	High	Low	Low
Streaming audio	Medium	Low	Low	High
Streaming video	High	Low	Low	High
VoIP	Low	Low	High	High

Newer applications are placing still different demands on the network. Interactive video is far more sensitive than streaming video to delay. The advent of the Internet of Things is creating a new array of applications that require still different clusters of network services. And waiting in the wings are even more experimental technologies, such as virtual reality, autonomous vehicles and technologies that have yet to be conceived, that may place still different demands on the Internet.

2 Joseph Farrell and Garth Saloner, "Standardization and Variety,"Economics Letters 20: 71, 1986.

Network Services Demanded by Emerging Internet Applications

Application	Bandwidth	Reliability	Delay	Jitter
Interactive video	High	Low	High	High
Smart metering	Low	Medium	High	Low
SCADA	High	High	Low	Low
Video surveillance	High	High	Medium	High
Mobile workforce	Low	High	Low	Low
Smart homes	Low	Medium	Low	Low

The increasing variety of demands that new applications are placing on the Internet suggests that forcing the Internet into a single class of service may not always represent the best way to promote innovation. While certainly beneficial to content and applications whose demands are aligned with the cluster of services provided by current design of the Internet, mandating net uniformity would harm innovations that require something different from the network.

As a technical matter, no single architecture can perform all of these combinations of functions equally well. Indeed, the engineering literature is replete with articles recognizing that there are many tasks that the current Internet is not well designed to implement, including security, mobility and mass media distribution. While these aspects were less important when the Internet first emerged, modern Internet usage has made them mission critical for many users.

In short, the emergence of these new applications has increased the heterogeneity in the demands that people are placing on the Internet. As these demands become sufficiently heterogeneous, at some point, requiring that the entire network offer only a single class of service becomes suboptimal and bad for consumers. Enforcement of overly restrictive network neutrality policies would reduce the consumer surplus being generated by the network and would force those who value new uses the most to turn to private networking and non-compliant technologies, such as Multi-Protocol Label Switching ("MPLS"), to get the networking services that they need.

Network diversity can also open new dimensions along which network providers can appeal to customers. Consider T-Mobile's Binge On, which allows users to stream video without having that traffic count against their data caps. This plan is designed to appeal to young people and others who place a particularly high value on the ability to watch streaming video. The ability to design services to appeal to subsets of the overall customer base represents a new source of consumer value. In the process, it opens new dimensions along which network providers can compete.

In the developing world, the rationale for providing different levels of service plays out slightly differently. In countries where the ability to pay is more limited, offering service plans optimized for the applications that users value the most can allow providers to serve existing customers at lower cost. In this case, network diversity is designed not to address the increasing heterogeneity of applications, but rather to reflect differences in the nature and intensity of consumer demand.

The recognition that different types of users need different clusters of services is the reason that telecoms regulation has long permitted network providers to offer different classes of service so long as they make each class available to anyone who wanted it. In other words, non-discrimination required treating all users within each class of service equally; it did not forbid creating premium services and charging those who place a particularly high value on those services more.

The 2015 OIOrepresents a fairly significant break from these well-established principles. It explicitly bans paid prioritization, defined to include favoring some traffic over other traffic in return for compensation. While all other aspects of the Order are subject to an exception for reasonable network management, this exception does not apply to the ban on paid prioritization.

These provisions are designed to prevent network providers from creating different classes of service and charging customers different amounts for them. What has gone largely unrecognized is the extent to which they represent a significant deviation from the established principles of common carriage and telecom regulation. Although network neutrality often purports to be a return to approaches taken in the past, closer inspection underscores just how radical forcing the Internet into a single class of service actually is.

III. ATTRACTING IN NEW USERS

Allowing network providers to offer different classes of service can do more than just increase the welfare of those who are already using the Internet. It can expand surplus still further by attracting in new users. Regular Internet users may find it surprising to discover that the primary reason for non-adoption is the lack of perceived need and relevance, which ranks well above a lack of digital literacy, availability and cost as the primary barrier to adoption. Indeed, this finding is consistent in both the developing and the developed world.

Alternative service plans can help address this problem. Consider the emerging practice of zero rating, which allows users to access certain applications without having that traffic count against their data caps. The most prominent example is Facebook's "Free Basics" program, which provides users with free feature phones and free access to a suite of applications that is open to any service that can satisfy the technical requirements. Because the Internet is generally regarded as an "experience good"that must be actively used before one can appreciate its benefits, such programs can play a

key role in demonstrating to non-adopters the benefits of joining the Internet community.

Some critics regard zero rating plans as network neutrality violations because they give discounted (in fact, free) access to certain applications, but not others. While generality offers real benefits to consumers, the engineering community has long recognized that it comes at a cost. In a world where many subscribers can pay no more than US$ 3 per month for Internet access, many network providers are offering service-specific plans that support only those services that customers want the most, such as email, web browsing, and a limited number of other applications. The ability to provide services that are less than the full range normally provided by the Internet can create real value by demonstrating the value of adoption to those who have not yet done so and by lowering the burden that providers must meet in order to offer service.

IV. A BRIEF COMMENT ABOUT INTERCONNECTION

There is one aspect of the FCC's 2015 OIO that represents a significant expansion of the network neutrality debate that has received almost no attention. Throughout almost the entirety of the debate, network neutrality focused exclusively on how traffic was treated within the network of last-mile Internet service providers. At some point between the 2014 proposal of the rules that would become the current OIO and the 2015 adoption of those rules, the scope of regulation was expanded to include how networks hand off traffic to each other.

Although many aspects of the debate over network neutrality seem well established, this aspect is quite new. A full analysis of the implications of this expansion exceeds the scope of this brief article. Suffice to say, regulators should exercise extreme caution before embracing such a novel development until its implications are better understood.

V. CONCLUSION

The value of a single Internet operating on a uniform set of principles is both intuitive and seductive. Closer inspection reveals that requiring Internet service providers to provide only a single class of service can have a cost both to consumers and to innovation. Mandating network neutrality runs the risk of depriving consumers of the benefits of variety. It also foregoes the opportunity of providing those who have not yet adopted the Internet because of lack of perceived need with a low-cost way to discover its benefits. Such costs loom particularly large in a world where what consumers want from the network has become increasingly diverse and in which more than half of the world's citizens are not yet on the network.

Indeed, there is an "ever was, ever shall be" quality to the debate over network neutrality that is quite at odds with the way that both engineers and economists approach problems. Both disciplines tend to frame issues in terms of optimality that is contingent on the particular circumstances. Neither would pretend that a single solution exists that is inherently superior regardless of the underlying conditions. Instead, they tend to adopt a more dynamic, context-sensitive approach that examines whether technical or economic changes have altered the optimal outcome. The debate over network neutrality would be far healthier if it examined how patterns of usage have changed over time and created a framework for understanding the implications of those changes for the optimal network design instead of treating the existing architecture as an inviolable feature that necessarily must be preserved.

ENGINEERING COMPETITION THROUGH SPECTRUM POLICY: PREVIOUS APPROACHES AND WHY 5G NEEDS CHANGE

BY MARTIN CAVE & WILLIAM WEBB[1]

I. INTRODUCTION

Thirty years ago, spectrum management was a backwater, in which the resource (not usually in short supply) was allocated to the generally very small number of users – many in the public sector – by administrative or command-and-control methods. Where competition for it existed, recourse was had to beauty contests as an assignment method.

The development of terrestrial and satellite multi-channel television, and the unprecedentedly fast global diffusion first of mobile voice and now of mobile broadband, have changed all that, and alerted governments throughout the world to the realizable value to commercial organizations of an asset which they control, and which the data suggest is an important contributor to economic growth in all countries – rich and poor.

These factors have focused attention on new ways of using markets and prices for distributing spectrum across different uses ("allocation") and to individual users ("assignment"), in a matter which improves technical efficiency – for example by reducing waste and hoarding – and achieves greater allocative efficiency, by directing spectrum to its most efficient users. These goals are sought not only from commercial spectrum users, but also from users in the public sector, which collectively account for about one half of total spectrum use.

This paper reviews these developments in "marketizing" spectrum, but it also addresses new approaches to spectrum management based upon sharing, either via so-called spectrum commons or by a more limited set of users. This method is particularly apposite to the next great challenge facing spectrum management, the development of 5G mobile networks.[2]

II. MARKET METHODS AND SPECTRUM MANAGEMENT

Spectrum is a natural resource which is an input into many production processes. Its economic and military applications came into prominence at the time of the First World War, when it became subject to government control. Thereafter it remained subject to command and control regulation until a first fully developed proposal by Ronald Coase in 1959 to subject spectrum used for broadcasting to allocation by a market process.[3]

This proposal initially met with little success, and it took several more decades until the use of auctions to assign spectrum licenses first came into use in New Zealand in 1989. But what really propelled the use of auctions globally was the development of mobile voice communications in the following years. Mobile communications were capable of being provided by several operators, and the

1 Martin Cave is a regulatory economist specializing in competition law and in the network industries, including airports, broadcasting, energy, posts, railways, telecommunications and water. William Webb is a highly experienced strategist, technologist and Board member. His experience spans industry, Government and academia and roles include CTO, CSO, CEO, Board Chairman, consultant and advisor.

2 Some of these points are elaborated further in Martin Cave and William Webb, "Spectrum Management: using the airwaves for maximum social and economic benefit," Cambridge University Press, 2015

3 On the proposal's reception and on U.S. spectrum policy more generally, see Thomas J Hazlett, "The Political Spectrum," Yale University Press, 2017.

choice of those operators could be accomplished by a competitive process which should in principle direct the spectrum into the hands of those best able to use it – to the ultimate benefit of end users. Since then, auction data show that more than 14,000 national or regional lots have been auctioned, each characterized by the number of MHz available, (often) the technology to be used, (almost invariably) the nature of the service to be provided, the geographical coverage of the permitted service, the duration of the license and limitations on the interference which use of the band can inflict on adjoining bands or geographies.

Auction design changed considerably in this period. Initially, a specified number (typically two to five) of broadly similar licenses were auctioned, one to each operator – the number chosen determining the starting market structure. But as operators acquired portfolios in different bands and diverged in their market shares, it became common to sell larger quantities of lots of smaller size, permitting more flexible choices and sharpening competitive tensions. Spectrum in different bands was often auctioned together, again widening choice. Auction design adapted to deal with these cases, as the economics profession responded strongly to the challenge by developing sophisticated new procedures, notably the simultaneous multiple round auction and combination clock auctions.

As with other allocation methods, auctions can go wrong, for a catalogue of reasons. The successful bidder may be not the most efficient user of the resource, but the most optimistic (a phenomenon known as the "winner's curse"). Bidders with market power in downstream communications services may have an incentive to use the auction to deny rivals access to market: as the U.S. Department of Justice puts it, their bids may have a "foreclosure motive," as well as an "efficiency motive."More generally the spectrum regulator may wish to use the auction process expressly to promote or protect competition in downstream markets.

This has led to the inclusion within auctions of a variety of mechanisms associated with competition goals. The most common (though not in U.S. auctions) is a limitation on the amount of spectrum an operator can buy – a spectrum cap. Or some operators can receive preference in bidding, by means of a spectrum floor. Or spectrum can be set aside for new entrants.

On top of this, auctions can incorporate measures to achieve equity or universal service objectives. Thus, one license may carry with it an obligation to provide service to a specified proportion of land mass or population – a "coverage obligation." If this bites, greater coverage is achieved at a cost to auction revenues. Spectrum auctions have generally risen to the challenge of delivering these goals, although there have been some failures.

In most auction processes, full payment for the license is made up-front. Thus, while a firm's willingness to pay is determined by its expectation of how competition will evolve in the relevant service market, the amount paid becomes (in the absence of trading opportunities) a sunk cost, having – according to economic theory – no impact of future prices. This proposition has been disputed by those claiming that higher auction prices "cause"service prices to rise. But recent empirical evidence appears broadly to support the "sunk cost"view.

Of course, this does not preclude the government from withholding available spectrum from sale, and increasing its revenues by acting as a straightforward monopolist. But given the impact of communications services on growth, and the resulting tax revenues it brings, this is likely to be a short-sighted policy only making sense within a limited time horizon.

Auctions in the primary market are clearly the jewel in the crown of market instruments applied to spectrum. Many jurisdictions have also made provision for secondary trading within the period of a license. But while very substantial trades have taken place in the U.S., many of them associated with the withdrawal of sometimes quite large regional operators selling out to the diminishing number of national operators such as AT&T and Verizon, trading in other jurisdictions has been largely confined to licenses supporting lower value uses such as by taxi firms. Mobile communications firms may see their spectrum as a strategic asset which they are unwilling to trade to their rivals in the service market.

A subset of trades or re-auctions of spectrum has, however, been triggered by the wave of consolidation affecting the mobile communications sector. The European Commission in particular, acting as a competition authority, has made approval of the merger conditional upon the release of spectrum by the combined entity, with a view to "replacing"the lost competitor.

An alternative approach often adopted where auctions cannot be applied involves charging users a price which is set administratively, rather than derived from a market process. Under the old regime users paid charges which in combination were intended to defray the costs of the spectrum management agency. These charges are now dwarfed by the economic value of spectrum in certain uses, revealed in auctions. Cost recovery prices thus fail as a price signal. In a competitive market, the price for a spectrum band would be determined by its opportunity cost – the cost of the next best alternative to that spectrum in producing the service in question. This can be estimated, and used as a price. The process is not fool-proof, but, after making suitable adjustments to manage the risk of error, it can discourage the hoarding of valuable spectrum in inefficient uses.

III. APPLICATION IN PUBLIC SECTOR

The public sector typically sits on half of the total spectrum available, and retrieving surplus spectrum from such users is an essential component of any spectrum policy. Several approaches have been tried: conducting spectrum use audits; charging such users an administrative price (which will only work provided that the finance ministry does not increase that user's budget precisely to compen-

sate for its additional cost of spectrum); setting spectrum release targets; and allowing public sector users to trade spectrum to the commercial sector and keep part of the proceeds. The last approach effectively integrates public and commercial spectrum markets (as most input markets for, say, electricity and commercial space are integrated) in a way which might in the long run lead to substantial efficiency benefits, but such measures are still in their infancy. It is probably most productive to try cumulatively a variety of approaches, and seek to wear down resistance.

IV. HOW SUCCESSFUL HAS LIBERALISATION BEEN?

What does this add up to? Auctions have made a big difference, generally for the good, despite tendencies for some governments to restrict supply. The effect which they have on allocative efficiency is a factor, as is their ability to convert what would otherwise be private scarcity rents into rents which accrue to the state. The other approaches such as trading and pricing so far play an auxiliary role.[4] However, we now turn to another approach – spectrum sharing – which is having an increasing impact on solving spectrum shortages, with the potential for a much greater effect.

A. 5G and Its Spectrum Requirements

The main thrust of spectrum regulatory activity around the world is now turning towards 5G, and with its many different elements and issues. This provides a useful framework to discuss the key challenges facing regulators over the coming decade.

5G differs from previous cellular generations in both its breadth and its uncertainty. In the past a new generation has broadly been faster than the previous one, with specific frequency bands designated near-globally to support it. There is not the space here for a detailed discussion of the arguments around 5G's role, but broadly it is expected that it will be faster than 4G, provide greater capacity especially in urban areas, provide support for the Internet of Things ("IoT"), integrate better with other systems such as WiFi, and potentially enable new services via extremely fast links. Equally, some have noted that with mobile network operators ("MNOs") seeing declining profitability and end-users generally not paying more for faster services, the business case for many of these is unclear, and it is possible that 5G may just end up being the continued evolution of 4G. Robust competition between MNOs is seen by many regulators as a way to ensure rapid deployment of 5G services but the costs of delivering multiple 5G networks are driving operators to consider cooperative models.

Achieving all of these aims requires a range of different bands of spectrum but the uncertainty means that timing and modes of access need to be flexible. Current methods of spectrum access for 5G being discussed include:

"Classic" access to harmonized bands agreed world-wide. As discussed in the first part of this paper, the preferred approach is for regulators to clear the bands then auction them with exclusive licenses to the mobile operators. The key focus is the 700MHz band but others are also discussed.

Access to bands below 6GHz on a license assisted basis. Operators consider that they will need substantial spectrum below 6GHz to provide capacity and relatively high data rates. Attention has focused on the 4GHz band but this is used globally by a range of other services such as air-traffic control and fixed links. It seems unlikely that it can be cleared and auctioned within the timescales desired and so approaches to sharing with incumbents, with an agreed priority of access, are being investigated.

Use of unlicensed spectrum as an additional resource. Even with all these bands some fear that there will be insufficient spectrum and that making use of the unlicensed bands at 5GHz may be necessary. These bands are widely used for WiFi – raising fears of interference. Various approaches where the MNOs might opportunistically use the bands for additional downloading have been proposed.

Access to high-frequency bands for new business cases. The ultra-fast solutions will require use of very high frequency bands likely above 20GHz. With their short-range propagation, and with the uncertainty of the timing and success of 5G solutions, shared access may be suitable.

B. 5G and Shared Access

From the discussion above it is clear that only a small part of 5G spectrum will be found through classical "clear and auction." Much of the rest will come from some form of shared access. Here we provide an overview of sharing, show which elements are relevant to 5G and consider whether sharing can foster competition.

Primitive forms of spectrum sharing among alternative uses or users have been in place from the beginning of spectrum use. For example, spectrum can be shared temporally or geographically via a conventional licensing process. So-called spectrum commons have also existed for a long period. Here users of very low powered devices (which are unlikely to interfere with one another) can transmit without a license provided that they obey specified power limits.

However, it is now apparent that a more efficient way of sharing the spectrum in a wider class of environments is via "dynamic"spectrum sharing, which allows one user opportunistic access to spectrum not being used by another user. The structure we follow

4 On this see further Martin Sims and Toby Youell, "Understanding Spectrum Liberalisation," CRC Press, 2015.

in this section is set out in the simple table below which has two dimensions – whether access is restricted and whether interference is controlled in any way once access has been granted.

	Unrestricted access	Restricted access
No interference control	Commons	Classical sharing
Controlled interference	Database controlled access	Collaborative working with incumbent

We can see how these apply to 5G in the modified table below.

	Unrestricted access	Restricted access
No interference control	(1) Cellular use of unlicensed bands at 5GHz	(2) Sharing with incumbents in high-frequency bands Controlled interference
Controlled interference	(3) Not used (but some non-5G projects still active in places)	(4) Working with air traffic control and others at 4GHz

We discuss each of these below.

Case (1) – access to 5GHz bands. The 5GHz band is classic "spectrum commons," with no licenses granted[5] and access allowed to technologies that meet general rules on power levels and politeness. In principle, as long as the variant of 5G proposed for this band meets such requirements there should be little debate as to whether to allow it. However, a case of "too big to fail" has developed which causes regulators and others to pause for thought. The band is currently almost exclusively used by WiFi. If the 5GHz band were to become congested due to 5G using the band this might cause significant consumer detriment.

This issue raises interesting questions as to whether regulators should recognize unlicensed applications that have become successful and offer them some degree of protection. It would intuitively appear that this is both appropriate and hard to avoid, but it sets precedents that may lead to mis-matched expectations in the future. It also shows that the value derived from unlicensed bands is substantial – perhaps greater than that derived from licensed bands on a per MHz basis. This implies a much greater focus on regulation of unlicensed spectrum moving forward, including more efforts to identify additional bands for unlicensed usage and to monitor and manage existing bands. Such efforts would be most effective on a global basis. Generally, unlicensed usage does not hinder competition, but equally does not actively encourage it either.

Case (2) –sharing with incumbents in high frequency bands. In these bands the existing license holders are often satellite users and fixed links. Both are static, with directional antenna and in many cases tend to be outside of urban areas. Given that the best bands for 5G are not yet determined, and the extent of deployment and business model for 5G ultra-fast solutions very unclear, then clearing these users appears premature. Instead, 5G could work around them. Where sharing has been proposed, regulators tend towards geographical exclusions zones around existing users.

The biggest challenge with this approach is the tendency for exclusion zones to become excessively large once a worst-case modeling exercise is performed. This can be resolved by making greater use of measurements to determine interference rather than predictions and adding some incentive on the incumbents to share as widely as possible. As with case (1) this should not hinder competition but equally it does little to promote it.

Case (3) – TV white space and similar. In this case, unlicensed access is allowed into licensed bands when interference can be carefully controlled, typically through the use of a database that unlicensed devices have to query prior to transmission. This was the concept behind TV white space, which garnered much interest around 2010. However, interest has faded partly because it has proven hard to get regulatory approval in all but a handful of countries, partly because the TV spectrum has progressively shrunk as bands have been identified at 800MHz then 700MHz for cellular, and partly because alternative approaches have been found for applications such as IoT that were proposed for TV white space.

Case (4) – Collaborative access in 4GHz bands. Collaborative access has been proposed where (1) clearance of bands looks problematic and likely to take overly long and (2) the incumbents do not have uses that can readily be ring-fenced geographically. In these situations, operators see collaborative access as a "next-best" approach where they negotiate with the license holder(s) as to how they can best gain access.

There is still much to be worked out with collaborative access, especially where it is the regulator that assigns the shared rights, as might be the case where the incumbent is a governmental user such as defense. Here the form of the license, the number of licenses granted, and the auction approach adopted still require attention. It may be that 5G will be a valuable first deployment that will pave the way for more widespread usage. Incumbents may prefer to share with only one other player, or with a subset of MNOs. This could reduce competition but the grounds for regulatory intervention in such cases appear weak.

5 With the exception of some radar use in some countries which unlicensed users have to detect and work around.

V. CONCLUSIONS

We have shown how spectrum management has changed to introduce market forces and promote competition, primarily through the use of auctions as a tool to assign spectrum. This has led to vibrant and innovative mobile broadband deployment around the world. However, through discussion of the spectrum needs for 5G, we have illustrated how the approach of clearance and auctioning can only be used for a subset of the spectrum needed and that a range of sharing mechanisms are more appropriate for some bands. Equally, we have discussed how these sharing tools can be difficult to introduce, still have details to be determined and could, in some cases, hinder competition.

Clearly, there is much still that needs to be done, predominantly by regulators and competition authorities. Our recommendations are:

- Move to a position where (almost) all licensees are shared. The case of 5G has shown that much of its access will be shared. Sharing has been assisted by the development of new real time technologies for dynamic spectrum sharing which allow multiple users to coexist. It is time for these possibilities to be reflected more fully in rights of access to spectrum by the replacement of exclusive licenses by arrangements which allow access to multiple users, possibly on a hierarchical basis which gives some users priority over others. The result to be expected is much greater flexibility in use of spectrum and lower prices of access to it. This could be accomplished by a process of progressively replacing exclusive licenses with less restrictive alternatives, introduced in ways which managed the associated risks. We recommend in the future a brisk increase in the number of licenses recast in this way, even if in practice some of these will continue to be exclusively.

- Reconsider ways to derive technical sharing criteria. History has shown that sharing calculations are almost always excessively cautious leading to much spectrum being unused. Changing license conditions towards the amount of interference that a user is allowed to generate, measuring actual interference rather than modeling it, specifying the minimum performance levels expected of receivers, and utilizing real-time databases to modify transmitter powers when interference does occur will allow for very substantial improvements in efficiency as well as providing the tools for a range of novel approaches to sharing.

- Intervene where necessary to promote competition. Some sharing arrangements may see only a subset of MNOs able to access a band. Regulators will need to form a view as to whether this prevents robust competition and if so, to find some remedy. Given the uncertainties as to how sharing will evolve it seems better to examine outcomes and act where needed rather than restrict activities in advance.

- Reconsider regional and global spectrum management. Spectrum for 5G and for unlicensed applications ideally needs allocating on a global basis and yet we have seen national interests put first in some cases leading to fragmentation and delay. There is greater scope for regional collaboration if appropriate frameworks can be found that do not limit innovation. Regional bodies should study their role and look for where they can add additional value. This is an issue of fundamental importance which deserves careful and disinterested study at a very high level.

THE ADVENT OF 5G: SHOULD TECHNOLOGICAL EVOLUTION LEAD TO REGULATORY REVOLUTION?

BY PETER ALEXIADIS & TONY SHORTALL[1]

I. INTRODUCTION

The much awaited next generation of mobile technology is referred to as "5G" and is much more than a radio access technology.5G is constituted by a portfolio of access and connectivity solutions which require the deployment of a new flexible air interface directed to extreme mobile broadband deployment and usually associated with the provision of faster downloads and lower latency.[2] The deployment of 5G technology will deliver virtually ubiquitous, ultra-high bandwidth "connectivity" not only to individual users but also to connected objects. A wide range of applications and sectors will be served in a 5G environment, including professional uses (e.g. assisted driving, eHealth, energy management and possibly safety applications). In order to ensure interoperability with past generations of mobile communications, the availability of LTE networks will provide a key technical bridge between 5G and its predecessor technologies, with 5G deployment embracing previous generations of access modes.[3]

A regulatory commitment has been agreed upon by the Member States and the European Commission ("Commission") that 5G will be introduced throughout the European Union ("EU") by 2020 at the latest,[4] with the key hardware already scheduled to be made available over the course of the year 2017.[5] Specific objectives have been established to have 5G deployed in at least one major city within the EU by 2020 after a commercial launch in 2018, with all urban areas and major terrestrial transport paths being covered by 2025.[6]

The question which we seek to address below is whether the broad political commitment to fulfilling these 5G objectives across the EU by 2025 can somehow be aligned with the technological changes that will be effected by this new technology and the regulatory changes that might be necessary to accommodate those changes. Moreover, we need to consider the policy implications at the EU level of a failure to adapt regulation to the dictates of the new technological environment which may absorb as much as 500 Billion Euros in investment over the next tenyears.

1 Peter Alexiadis, Partner, Gibson, Dunn & Crutcher LLP / Brussels Office and Visiting Professor, King's College, London. Tony Shortall is a regulatory economist who is the founder of Telage.

The authors would like to thank Charles Clarke for his assistance in marshalling the research necessary to put this paper together. All errors of analysis or judgement, however, remain the sole responsibility of the authors.

2 "Ericsson White Paper – 5G Radio Access" (Uen 284 23-3204 Rev C), April 2016 (available at: https://www.ericsson.com/res/docs/whitepapers/wp-5g.pdf).

3 Ibid., at p. 2.

4 Commission's webpage "Towards 5G" (https://ec.europa.eu/digital-single-market/towards-5g). See also the Commission Press Release, "EU and Brazil to work together on 5G mobile technology," February 23, 2016.

5 See article "Ericsson to start delivering 5G components in 2017- Market Watch," August 31, 2016 (http://www.marketwatch.com/story/ericsson-to-start-delivering-5g-components-in-2017-2016-08-31).

6 Commission Communication, "Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society," COM(2016) 587 final (https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-587-EN-F1-1.PDF).

II. TECHNOLOGICAL EVOLUTION

The introduction of 5G signals the evolution of a number of technological and commercial parameters when compared to what is available currently across the EU. These parameters include:

- massive growth in system capacity;
- very high data rates compared to 4G networks;
- very low latency (i.e. close to the speed of light);
- ultra-high reliability and availability;
- very low device cost and energy consumption, along with the ability to use higher frequencies effectively above 600 GHz; and
- energy-efficient networks.[7]

As noted in the Commission's Working Paper,[8] 5G proposes to create a wireless link with capacities that approach those of fiber optic networks. From a telecoms industry perspective, two significant changes that are already underway will be greatly enhanced. The first is the rise of Software Defined Networks ("SDNs"), which will allow the control of network resources to be opened up to third parties, with the possibility for these third parties to manage their own physical or virtual resources individually. For example, given that emergency or military networks require complete operational autonomy, 5G could provide them with the capability of being part of an existing network rather than being positioned beside it, as is the case today. The second is Network Function Virtualization, which offers the prospect of specific network functions being implemented in software which runs on generic hardware, without the need for costly hardware-specific machines; in short, this will provide the speed with which to deploy new services and functions that can otherwise be deployed by traditional telecoms operators over a period of perhaps 18 months or longer. As such, this would approach the dynamics of the Internet in terms of the timing of new deployments.

More broadly, however, the importance of each of the characteristics listed above will also vary by reference to its application and usage. Very low latency[9] will have many relevant applications ranging from connected cars to a variety of Internet of Things ("IoT")[10] applications, many of which will need very low bandwidth but also a very low latency (for instance, bespoke advertising). Similarly, medical applications are clear candidates for services requiring reliability and availability, but these characteristics are also required for other types of public services. The low energy and energy consumption characteristics will invariably be very important, especially in remote areas IoT applications such as farming sensors that indicate soil moisture on a fortnightly basis. However, the more general observation is that the advent of 5G promises to deliver connectivity in ways going far beyond the capabilities of the existing telecoms sector which will drive the broader European economy, with many parts of that economy, including transport, manufacturing and health services, benefiting from the availability of these networks (or not operating optimally, as the case may be, in their absence).

III. REGULATORY REVOLUTION

Whereas the technological changes identified above can rightly be said to constitute the natural evolution (albeit accelerated) of telecoms technology, their impact on the EU regulatory framework for electronic communications networks and services might be more revolutionary, given that the effect of service provision and device capabilities is likely to be very disruptive, with their implications being felt both within the electronic communications sector and well beyond. This can be illustrated by the clear pressures effected on a range of key issues that raise important policy choices that regulators will need to make. For example:

1. The deployment of 5G mobile networks cannot occur in isolation and must be accompanied by a comparable upgrade to the fixed network. Thus, a 1Gbps wireless network is of little value to society if it is backhauled by a 100Mbps backhaul link.[11] The Commission's regulatory commitment to technological neutrality is under pressure given its industrial policy imperative to achieve latency, bandwidth, jitter and other parameters above certain key thresholds in the fixed network. Hence, the Commission's identification of "Very High Capacity"[12] limits under fixed technology as embracing three and possibly four solutions, and its parallel emphasis on investment priorities in the Communications Code, seems to reflect a coherent policy designed to achieve such aims.

7 Press Release, "5G enabled by massive capacity, connectivity," by V. Held, April 20, 2016 (available at: https://insight.nokia.com/5g-enabled-massive-capacity-connectivity). See also "Ericsson White Paper – 5G Radio Access," op. cit. at pp. 3-4.

8 Commission's Communication, "5G for Europe: An Action Plan," COM(2016) 588 final (https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-588-EN-F1-1.PDF).

9 Latency describes the time takenfor data to travel between its source and destination, measured in milliseconds.

10 The 'Internet of Things' is how computers, sensors and objects interact with each other and process data. See the Commission's Staff Working Document, "Advancing the Internet of Things in Europe," April 19, 2016: https://ec.europa.eu/digital-single-market/en/news/staff-working-document-advancing-internet-things-europe.

11 "Backhaul" refers to the part of the network that connects local access to the core internet network (or backbone network) to carry and deliver data (see https://ec.europa.eu/digital-single-market/broadband-glossary).

12 Commission's Proposal for a Directive, "establishing the European Electronic Communications Code (Recast)," COM(2016) 590 final 2016/0288 (COD) (http://eur-lex.europa.eu/resource.html?uri=cellar:c5ee8d55-7a56-11e6-b076-01aa75ed71a1.0001.02/DOC_1&format=PDF).

2. The nature of network ownership and operation, as we understand it, will inevitably change in a 5G environment, given that infrastructures will be able to adopt a multi-tenancy model.[13] This is because the SDN and NFV evolutions can deliver the phenomenon of "network slicing," which effectively creates separate networks that are housed within one physical infrastructure in a way that is tantamount to them being situated on separate physical infrastructures. In this way, each "physical network"will also be able to host multiple service providers who supply specialist niche services over that network.

Given that network fragmentation manifests itself in terms of the greater availability of niche services, multiple "tenancies"on networks and the proliferation of service providers and software applications, it seems inevitable that the range and form of traditional access relationships will need to be re-assessed. For example, the usual trade-off between the costs of network duplication versus the benefits of end-to-end competition will need to be reconsidered, at least with respect to rural areas. With 5G networks, the benefits of competing physical networks can be delivered even over one network with virtually no loss of autonomy or independence on the part of the operators hosted on that network. The current concerns about network sharing agreements and the point at which such sharing occurs in the network (a Radio Access Network or otherwise) would occur in a very different context under 5G. Faced with very high deployment costs, especially in rural areas, it would be more appropriate for Competition Authorities to promote a more benign policy with respect to network sharing and co-investment in a 5G context.

Operators would also have a degree of independence unimaginable under today's network architectures.[14] This may affect the nature of the access relationship expected by regulators, in terms of whether or not the usual SMP standard[15] is sufficiently robust to address market failures in a 5G environment (or even if it continues to be necessary to justify any regulatory intervention under the SMP standard). For example, it is foreseeable that, with only one network operator in large parts of a Member State, regulatory concerns might arise. However, with multiple operators in urban areas but sharing a single physical network elsewhere, a priori, one would expect a level of competition equivalent to fully deployed separate networks throughout the Member State. Other complicating factors include the multi-sided nature and the particular economic characteristics that are associated with such markets. Consideration should even be given in this context to whether a robust "three criteria" test[16] could even be performed on these potential 5G markets or whether in the short term at least a regulatory exemption or "holiday" should apply.[17]

At another fundamental level, this development also raises the broader question of whether the technological imperative of delivering next generation communications services should indeed continue to occur in a world made up of multiple, fragmented networks, or would be better suited to developing more efficiently in a concentrated environment. The fragmentation in service delivery, spectrum allocation and co-tenancy of networks which could characterize a 5G environment, especially given the technological imperative of delivering much more data much more quickly, seems to be more compatible with the idea that seamless communications services might be delivered better in a more concentrated operator environment. However, any such policy orientation seems to be in conflict with the Commission's current competition policy in the context of mergers in the communications sector.[18] The question that therefore needs to be asked is whether current competition concerns about network consolidation as a result of electronic communications sector mergers should be tempered with the acknowledgement that there will be a different range of competition/innovation trade-offs that will emerge in the future; in such an environment, the balance maintained under the Commission's current merger practice might shift after 2020. This is especially the case given that issues such as trust and security will become increasingly more important where it might be a single network infrastructure that hosts many service providers which emerges to deliver all services, both commercial and otherwise.

13 Commission supporting document of the 5G Public-Private Partnership, "5G Vision - The 5G Infrastructure Public Private Partnership: the next generation of communication networks and services" (available at: https://5g-ppp.eu/wp-content/uploads/2015/02/5G-Vision-Brochure-v1.pdf).

14 See Commission's Staff Working Document, "5G Global Developments," SWD(2016) 306 final (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2016:306:FIN).

15 Commission Guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services, OJ C 165, 11.7.2002, at pp. 6-31.

16 Under this test, ex-ante economic regulation is capable of being imposed if three criteria can be satisfied, namely: (i) insurmountable structural entry barriers exist; (ii) the market structure behind threshold barriers lacks effective competition; and (iii) ex-post competition law would not adequately address the identified market failure(s). Recital 11 of the Preparatory Working Document of the Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex-ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, 9.10.2014 C(2014) 7174 final ("Relevant Markets Recommendation").

17 Consistent with the previous approach taken towards the regulatory treatment of 'emerging markets' under the EU electronic communications Regulatory Framework, where a policy preference is expressed for only ex-post competition rules to apply.

18 See, most recently, Case M. 7758 Hutchison 3G / WIND in the Commission Press Release onSeptember 1, 2016: http://europa.eu/rapid/press-release_IP-16-2932_en.htm; the Commission Press Release, "Mergers: Commission prohibits Hutchison's proposed acquisition of Telefónica UK" (IP/16/1704), 11 May 2016. See Case No COMP/M.7612 – Hutchinson 3G UK / Telefonica (2016); Case No COMP/M.7419 - TeliaSonera/Telenor/JV (abandoned by the parties on the September 24, 2015).

3. The deployment of 5G technology will support communications within and among the so-called IoT. This will mean that the vast bulk of communications that takes place in the emerging electronic communications environment is one where the traditional value chain collapses. No longer will voice communications be the primary revenue source for operators, nor will they account for the bulk of communications. Instead, machines communicating with machines (e.g. self-driving cars)[19] will provide the momentum for the business case in the sector.

This tends to have a tremendous impact on the potential for distributional welfare in the EU, as innovation and efficiency inure to the benefit of a myriad of industries in which Europe is a leader, including pharmaceuticals, motor vehicles, robot technology, mechanized food production and so forth. Moreover, given that Europe is home to two of the world's three largest equipment manufacturers, the benefits to the European economy become self-evident. Given that traffic volumes in the IoT will exceed mobile communications as soon as 2018, and given the increasing amount of functionality being built into the Cloud to cater for such traffic, fundamental questions might need to be asked about the extent to which consumer harm will occur (and the nature of that harm) if traditional access relationships are not maintained. However, it will also need to be taken into account that issues of quality and ubiquity of access will invariably be much more important criteria relative to price in the framing of access relationships in an IoT environment.

4. The technical capabilities which 5G will bring are such that they are capable of rendering highly problematic any attempt to enforce the Net Neutrality rules currently contained in the TSM Regulation.[20] The result of increased demand in a 5G world will inevitably lead to greater challenges in network management and will render the notion of "best efforts" an unworkable legal standard in an environment where real-time, high capacity communications are required. In the words of the United Kingdom's 5G Innovation Centre, 5G networks will be optimizing traffic flows on the basis of "user and network context information such as where, when, why, who and what is being requested."[21]

A unique feature of 5G technology is that it will allow for flexible transport programmability, which facilitates the division of transport resources into multiple (isolated) slices or parallel channels. This will enable network operators to exploit their networks to optimize their resources across different segments of available spectrum (understood to be primarily in the 3400-3800 GHz bands, although 5G will in all likelihood involve a mix of frequencies and technologies). Indeed, one of the key innovations introduced by 5G technology – network slicing – would be effectively undermined in terms of its commercial effects if the parallel channels available under a 5G environment were not permitted greater flexibility in their differential treatment of traffic in light of its physical properties and economic value.

The open question is whether mobile network operators will be able to manage their networks in such a way as to be able to implement Net Neutrality principles as between these separate capacity streams or channels, especially given the surge in traffic loads and the number of connected devices that will be capable of being sustained in a 5G environment. One can anticipate in these circumstances a backhaul bottleneck being present that goes well beyond the data capacity shortages experienced currently by customers in the wireless access segment.[22] In such a case, the advent of 5G technology will challenge the basic working assumptions about how capacity can and should be managed. As one commentator notes: "This seems completely incompatible with traffic management limited to technical requirements. Thus, strictly drafted net neutrality guidelines may hamper Europe's 5G aspirations."[23]

Accordingly, an acknowledgement of the importance of traffic management techniques in the 5G environment sits most comfortably with the policy imperative of adopting a flexible approach to the issue of "discrimination" that is consistent with competition law principles. By contrast, excessive regulatory intervention is likely to distort competitive industry structures business models in advance of the deployment of 5G technology by 2020, at which time fundamental questions will need to

19 IEEE's article "Self-Driving Cars Will Be Ready Before Our Laws Are - Putting autonomous vehicles on the road isn't just a matter of fine-tuning the technology," By N. A. Greenblatt, January 19, 2016 (available at: http://spectrum.ieee.org/transportation/advanced-cars/selfdriving-cars-will-be-ready-before-our-laws-are); Nokia's News Blog, "Self driving cars: enroute to 5G," By T. Sens, June 2016 (available at: https://blog.networks.nokia.com/mobile-networks/2016/06/23/self-driving-cars-enroute-5g/); and Qualacomm's News Blog, "The path to 5G: Paving the road to tomorrow's autonomous vehicles," June 7, 2016 (available at: https://www.qualcomm.com/news/onq/2016/06/07/path-5g-paving-road-tomorrows-autonomous-vehicles).

20 Regulation (EU) 2015/2120 of the European Parliament and of the Council ofNovember 25, 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union ("TSM Regulation"), OJ L 310, 26.11.2015, pp. 1–18. See also BEREC "Guidelines to National Regulatory Authorities (NRAs) on the implementation of the new net neutrality," August 30, 2016 available at: http://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/guidelines/6160-berec-guidelines-on-the-implementation-by-national-regulators-of-european-net-neutrality-rules).

21 See Institute for Communication Systems 5G Innovation Centre (in association with University of Surrey), "5G Whitepaper: The Flat Distributed Cloud (FDC) 5G Architecture Revolution," January 2016, at p. 2.

22 See Radio Access and Spectrum White Paper, "5G Radio Network Architecture," February 3, 2014, at p. 14.

23 See R. Kenny, "Net Neutrality: Guidelines or straitjackets?," EurActiv.com, May 2, 2016. (Available at: http://www.euractiv.com/section/digital/opinion/net-neutrality-guidelines-or-straitjackets/).

be asked about the scope of the Net Neutrality concept.[24] An overly-expansive approach to Net Neutrality, as has recently been undertaken by BEREC,[25] has a logic which runs the risk of dissuading operators from providing differentiated services. As such, the approach towards Net Neutrality sits very uncomfortably with a next generation of 5G technology which facilitates the provision of such differentiated services. European policymakers may come to regret what appears to be their current failure to interpret and apply Net Neutrality policy in a manner which takes due account of the technological benefits capable of being delivered by 5G technology.

5. Whereas so-called Over-the-top ("OTT") operators are proving to be a new competitive force in the current 3G-4G environment which is challenging the market power of traditional incumbent network operators,[26] it will be software providers which will provide competitive impetus in the new 5G environment. That environment will have many of the characteristics of a multi-sided market. In such markets, traditional forms of regulation can do more harm than good,[27] given that below-cost pricing by an operator on one side of the market may be necessary, even if that operator is dominant on the relevant market identified for antitrust purposes; put another way, cost-based pricing in such an environment is just as likely to kill a market before it ever starts.

The inability of sector-specific regulators and competition authorities to deal with the necessary economic balancing which comes with markets being genuinely multi-sided may mean that network operators are at a relative competitive disadvantage vis-a-vis those OTT operators that can seize upon advantages of scale and scope to target those parts of the value chain that are most commercially attractive. So much of what will occur in competition terms under 5G is likely to take place in the context of such multi-sided markets, the impact of which is little understood under sector-specific regulation or, indeed, even under competition policy as it stands today.

6. Another area where regulation has recently "evolved"with particular consequences for 5G deployment and operations is likely to be the domain of roaming. In a context where download and upload speeds will be measured in Gbps, "squaring the circle"of wholesale pricing for roaming services becomes more important (if no less clear) given that average monthly mobile consumption is forecast to be at least 50GB[28] by 2022.[29] While some commentators have floated the idea of retail roaming restrictions in the form of offers that do not even offer roaming services,[30] others have suggested that the very high cost of wholesale data roaming may impede the development of 5G in the first place. The Roaming Regulation undermines operators' ability to put forward special packages for one sector or another (connected cars, logistics, etc.) since the ability to price discriminate under the Roaming Regulation is greatly curtailed. Consolidation provides one possible solution to the revenue shortfall being experienced by smaller EU Member State-specific operators, but the idea of an automated car crossing EU borders without an efficient roaming regime in place raises serious issues about the creation of a single EUmarket.

Alternative pricing solutions will therefore need to be found to deal with large data volumes, and a means of purchasing wholesale WiFi might be required if no market solutions emerge. Moreover, given the potentially below-cost roaming obligations to which mobile operators might be subject under the latest legislation supporting the Roam Like At Home ("RLAH") regime, it is difficult to envisage how smaller mobile network operators will survive economically, especially if they are expected to invest in 5G.

7. While the relative importance of competitive telecoms offerings has in the past not only been seen to be important in its own right but as also providing a strong pricing bedrock upon which other economic sectors in the EU can flourish (e.g. cheap telecoms services fuel a more efficient financial services sector), 5G will now create an environment in which the telecoms service is itself entwined into most high-value primary economic activities taking place within the EU. Thus, in the IoT (as discussed above),

24 See P. Alexiadis, "EU Net Neutrality Policy and the Mobile Sector: The Need for Competition Law Standards," Chillin Competition (https://chillingcompetition.com/2016/05/16/eu-net-neutrality-policy-and-the-mobile-sector-the-need-for-competition-law-standards-by-peter-alexiadis/) and Concurrences No.3-2016.

25 Op. Cit.at footnote 20. BEREC is the pan-European body representing National Regulatory Authorities established in 2009 under the terms of Regulation (EC) No.1211/2009.

26 "BEREC Report on OTT services" ("BoR (16) 35"), January 29, 2016 (available at: http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5751-berec-report-on-ott-services).

27 Two-sided markets (a simpler form of a multi-sided market) can be identified where "the platform can affect the volume of transactions by charging more to one side of the market and reducing the price by the other side by an equal amount; in other words, the price structure matters"; see J.C. Rochet and J. Tirole (2003), "Platform Competition in Two-sided Markets," Journal of the European Economic Association. Related multi-sided platforms have been defined as having "two or more groups of consumers" (…) "who need each other" (…) "who cannot capture the value of their mutual attraction"; and who "rely on a catalyst to facilitate" their interaction". See Evans and Schmalensee, The Antitrust Analysis of Multi-Sided Platform Businesses (National Bureau of Economic Research, Working Paper No w18783, 2012).

28 See "Assessment of the cost of providing wholesale roaming services" in the EU FINAL REPORT, a study prepared for the Commission DG Communications Networks, Content & Technology by TERA Consultants. Contract number: 30-CE-0738141/00-00 SMART number: 2015/0006.

29 Based on the Commission's current proposed wholesale charges, this would represent a monthly roaming wholesale charge of €425.

30 Such a commercial option would challenge the prospects for "Roam Like At Home" services: see BRUGEL WORKING PAPER | Issue 3 | 2016 by J. Scott Marcus & Georgios Petropoulos.

it will be the telecoms industry which becomes the technological backbone for many industries which rely on machine-to-machine communications,[31] rather than merely providing them with a competitive wholesale "input" which needs to be provided at a competitive price.

Accordingly, when considering the range of legitimate public policy issues affecting the contours of an access relationship and the pricing of that access, sector-specific regulators will inevitably need to take into account welfare benefits and efficiencies which are not only more dynamic (rather than the current static policy goals) but which are also much more complex because they involve considerations going far beyond the traditional issues which are usually relevant only to the electronic communications sector.[32]

8. Given that the basis of asymmetric economic regulation of operators under the current EU Regulatory Framework has been based on the identification of relevant "markets" that are worthy of ex-ante regulation,[33] 5G threatens to disrupt traditional market analysis techniques in the sector, inter alia, because:

- It will be unclear whether the advent of new technology creates a new relevant service market (or markets) in terms of patterns of supply (e.g. different spectrum and differently priced spectrum, mixed spectrum, a mixture of technologies and so forth)[34] and demand (e.g. premium prices for certain specialist services).[35]

- It will be similarly unclear whether we have a situation characterized by the phenomenon of chain substitution over the years in which the full transition from current generation networks to 5G will materialize (as occurred in the migration between narrowband and broadband on traditional copper networks),[36] or whether we can assume that 5G will assimilate older generation technologies within its scope.

As a result of these inevitable tensions, given that market definition lies at the heart of the market analysis approach which underpins the current EU Regulatory Framework, the potential for the fundamentally different assessment of market power might materialize in a 5G environment. The policy momentum might therefore shift from the current asymmetric approach to economic regulation to an approach which might forego the initial analytical step in defining relevant markets by progressing directly to the identification of market power because of its likely impact on competitive constraints.[37] A more appropriate response, as suggested above, might be for regulators to declare that the markets which are being reviewed are "emerging markets" insofar as the three criteria test cannot be applied effectively, given the various unknowns in the market. A future review of the market's status might be signaled at some period in the future, perhaps fiveyears out from initial deployment. This kind of clarity could be very beneficial to network roll-out plans.

9. The deployment of 5G technology will also put pressure on two unrelated areas which have to date played a relatively insignificant role in the development of regulatory policy, namely:

- As noted above, the pressure on treating the provision of backhaul as a regulated service will invariably increase as fixed and mobile service offerings become increasingly offered on a seamless basis. As the recent controversy involving access to BT's backhaul service has illustrated,[38] obtaining full and seamless access to backhaul will be a matter of increasing focus for mobile operators keen on providing converged fixed-mobile service offerings in a much more diverse 5G environment.

31 For example, industrial sensors, self-driving cars and other emerging uses of the Internet have needs that cannot be satisfied by the operations of a "general purpose" network.

32 Refer to the criteria listed in Articles 8 and 12 of the Access Directive (Directive 2002/19/EC).

33 For example, Commission Recommendation 9.10.2014 C(2014) 7174 final ("Relevant Markets Recommendation").

34 Higher frequency bands will offer greater capacities with disruptive technological capabilities, such as a large number of simultaneous communications with users/devices, and will open up the prospect for user data rates that can meet the International Telecommunication Union (ITU) requirements for 5G (i.e. exceeding 10 Gb/s).

35 The characteristics of 5G represent in most cases such a shift in capacity that chain of substitution issues are much less likely to arise. Like narrowband and broadband internet access, even if pricing would enable a chain of substitution analysis, certain services will not work on one but not the other. The old "click here for narrowband""click here for broadband"options or some equivalent will likely re-appear in a 5G context, suggesting the existence of separate markets.

36 See paras. 57 and 58 of the Commission Notice on the definition of relevant market for the purposes of Community competition law, OJ C 372, 9.12.1997, pp. 5-13.

37 For an example of such an approach in the merger context, see Joseph Farrell and Carl Shapiro, "Antitrust Evaluation of Horizontal Mergers: an Economic Alternative to Market Definition," The B.E. Journal of Theoretical Economics 1, 2010.

38 BT / EE merger (closed, January 2016) cleared conditionally by the UK Competition and Markets Authority (https://www.gov.uk/cma-cases/bt-ee-merger-inquiry) (and the NewsTalk article, "Telecom companies raise concerns as BT's £12.5bn EE takeover is cleared by regulators," January 15, 2016 (available at: http://www.newstalk.com/Telecom-companies-raise-concerns-as-BTs-125bn-EE-takeover-is-cleared-by-regulators). See also the Ofcom Press Release, "Plans to make digital communications work for everyone," July 26, 2016 (available at: http://media.ofcom.org.uk/news/2016/making-digital-communications-work-openreach-bt/).

- There is every reason to suggest that environmental issues will increasingly need to be considered as a very important policy trade-off in a sector-specific analysis, under the sort of approach usually conducted under Article 101(3) TFEU,[39] given that 5G networks are especially environmentally-friendly and the fact that their deployment would be consistent with the EU satisfying other environmental goals.[40]

10. As the capacity of networks to carry more data grows, the greater will be the relevance of competition concerns about "big data."[41] With more specialist niches in which data can be collected and an increasing array of related or neighboring markets in which that market power can be exploited, the difficulties faced in determining whether the dangers of big data outweigh the benefits of mass data collection and processing will multiply for competition authorities and sector-specific regulators alike in a 5G environment.[42] Depending on the business model used and the industrial sector addressed, companies will assess the value of data with great difficulty given the different types of data at issue (e.g. real-time or historical), amounts of relevant data and the quality of the data being used. Accordingly, companies availing themselves of 5G technology may value data differently and be more or less inclined towards the restriction of access to it.[43] This is because the amalgamation of data sets creates value that benefits from significant "network effects," which means that the value of combined data sets will increase in a non-linear manner. With the adoption of the new General Data Protection Regulation, [44] which sets new standards for the protection of personal data in the EU, including through the enhancement of individuals' control over their data (e.g. via a new right for data portability), it is no surprise that competition authorities have already started to test the applicability of competition law tools to big data issues.

39 Recital 24 of the Access Directive (Directive 2002/19/EC), OJ L 108, 24.4.2002, pp. 7-20, already provides that: "The development of the electronic communications market, with its associated infrastructure, could have adverse effects on the environment and the landscape. Member States should therefore monitor this process and, if necessary, take action to minimise any such effects by means of appropriate agreements and other arrangements with the relevant authorities."

40 For example, Orange Press Release, "The 5G of the future: a network that will have the environment and low energy embedded in its technological DNA," November 4, 2015 (available at: http://www.orange.com/en/Responsibility/Environment/COP21/5G). Article 101(3) TFEU foresees the exemption from the Article 101(1) prohibition in circumstances where two sets of positive and negative conditions can be fulfilled. Refer also to para. 49 of the Communication from the Commission Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements, OJ C 11, 14.1.2011, pp. 1-72.

41 The UK Competition and Markets Authority published a report, "The commercial use of consumer data," in June 2015, while the Commission and Germany's Federal Cartel Office have begun to consider the issue in the context of their investigations into both Google and Facebook. The French and German competition authorities announced (at the end of 2015) reviews of the significance of big data and published a report on 10 May 2016 (titled: "Competition Law and Data," available at: http://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?__blob=publicationFile&v=2).

42 Op. cit., "Competition Law and Data" Report, published (on May 10, 2016) by the French and German authorities. See also, Big Data and Competition Policy, by Maurice Stucke and Allen P. Grunes (Oxford University Press, 2016). In addition, for an overview of the EU investigations into "Big data" concerns, refer to the article "European Antitrust Enforcers Move on Holders of Big Data," Kluwer Competition Law Blog (available at: http://kluwercompetitionlawblog.com/2016/05/26/european-antitrust-enforcers-move-on-holders-of-big-data/).

43 See discussion in O. Batura, "Challenges in personal data for the competition law analysis," Network Industries Quarterly, Vol. 18, No. 3, 2016, pp. 3-6.

44 Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

IV. CONCLUSIONS

The question which needs to be addressed is whether the current review of the EU Regulatory Framework for electronic communications, which was showcased by Commission President Juncker on September 14, 2016[45] and considered in the debates at the Digital Assembly in Bratislava on September 28-29, 2016,[46] is sufficiently flexible and robust to accommodate technological imperatives alongside difficult policy choices. As some commentators have argued, the failure to create the right environment in which 5G can flourish might have serious repercussions on the EU's economic growth.[47]

In general, the legislative Proposals put forward by the Commission in the context of a future Electronic Communications Code-appear to be coherent both in broader policy terms and with respect to the related work streams within the Commission which relate to 5G deployment (e.g. 5GPPP, 5GAPWG, RSPG and so forth). The perspective taken by the Commission is holistic and recognizes that these technologies form part of a large and diverse communications ecosystem. As such, many of the key enablers for successful 5G deployment seem to be addressed in a manner that is targeted and appropriate.

In particular, the Commission's emphasis on encouraging investment not only in 5G but also in the fixed infrastructure upon which 5G mobile deployments will depend, seems to be well considered. The Proposals on spectrum also seek to ensure a more coordinated approach, and given the importance of scale and timing for 5G, this may be an issue whose time has come. Similarly, other aspects of the Proposals such as those on network security and service integrity, appear to be appropriate for a 5G environment which will demand more exacting standards. As regards a number of the regulatory fine-tuning measures that might need to occur in order to accommodate fully 5G deployment, there is nothing in them to suggest that key policy drivers expressed in relation to the launch of the Proposals are not sufficiently flexible to be able to achieve such an aim.

However, there remain concerns, and the most significant issues arise from either recent legislation in the form of the TSM legislative package[48] or issues which lie outside the competence of the Commission's DG CNECT, which is responsible for regulatory policy in the communications sector. Thus, while reference is made in the Proposals to the need to update State Aid rules, this subject-matter lies firmly within the competence of the Commission's DG Competition. Similarly, network sharing (even for rural areas) and indeed future consolidation through mergers, which may be critical aspects of the industry's evolution, will remain within DG Competition's exclusive sphere of competence. It may be that network consolidation might address the latter of these concerns in the event that DG Competition softens its current position on mobile mergers by focusing more on the qualitative dimensions of competition and a more all-encompassing consumer welfare standard (as opposed to narrower consumer pricing concerns).

Perhaps the greatest threats, however, come from the recently adopted TSM legislative package (which, unlike the current Proposals, is largely incoherent with other policymaking). Both the Net Neutrality provisions, as interpreted by BEREC, and the Fair Use Policy roaming proposals[49] create significant obstacles to the business case which underpins 5G. As noted above, the Net Neutrality provisions in particular risk undermining one of the principal characteristics of 5G – namely, network splicing and the commercial exploitation of fragmented networks. The authors firmly believe that the Commission needs to clarify the application of doctrine of Net Neutrality in a 5G context if existing networks are to be enabled for 5G.

While the question of how to regulate roaming generally and wholesale roaming charges more specifically is a more prosaic issue, it is nonetheless an important issue in terms of the likely commercial success of 5G within the prescribed 2020 timeframe. Given the enormous changes to the volumes of data consumed that will be enabled by 5G, wholesale costs of data must be consistent with operators' domestic rates if the RLAH policy is to continue in the manner in which it has been proposed. However, achieving this level of wholesale charging without eroding the value of network operators also remains a challenge in response to which no solution has emerged.

45 Commission Press Release, "State of the Union 2016: Commission paves the way for more and better internet connectivity for all citizens and businesses," September 14, 2016 (available at: http://europa.eu/rapid/press-release_IP-16-3008_en.htm).

46 Commission Article, "Digital Assembly 2016 in Bratislava: "Putting the Digital Single Market at the heart of Europe,"" September 22, 2016 (available at: https://ec.europa.eu/digital-single-market/en/digital-assembly-2016-bratislava).

47 See L. Proud, "Europe may end up behind the curve on 5G internet," Reuters.com,September 1, 2016 (Available at: http://blogs.reuters.com/breakingviews/2016/09/01/europe-may-end-up-behind-the-curve-on-5g-internet/).

48 Regulation (EU) 2015/2120 of the European Parliament and of the Council of November 25, 2015, laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union.

49 Draft Proposal at http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17681.

OTT ARE UBERS AND ECS ARE TAXIS. OR NOT?

BY RAYMUNDO ENRIQUEZ & GERARDO CALDERON[1]

I. INTRODUCTION

It is often the case that laws need to catch up with new developments in the world. Technology is certainly not the exception, as today's laws seem at times to be behind the curve. We haverecently seen how established operators and regulators around the world face great challenges introduced by digitalization. The most complex of these being whether it is appropriate toframenew services into regulation geared towards already established technologies and if this is the best way to protect consumers and competition.

In this article,we briefly discuss the views ofactors from the established Electronic Communication Services ("ECS"), whogenerally support regulating services, and views from new Over-The-Top ("OTT") services providers, whoargueagainst being subject to such regulations.

We also focus on the disruptive effect that OTT services have on the telecoms sector and the approach of regulators in dealing with these effects. Finally, we compare other industries that had, or are experiencing, similar effects.

II. WHAT IS AN OTT SERVICE?

OTT services deliver media content (i.e. audio, video, text, images, etc.) over the internet and bypasses traditional distribution (i.e. broadcast, radio, written publications). Services that come OTT are typically related to media and communications and are at lower prices since they face very little, or much lower, costs than those that have to be borne by the actors in traditional methods of delivery. OTT services providers rely on Internet access providers for the technical transmission of the offered content. The following are examples of OTT services or applications for a regular user of the Internet: streaming video (e.g. YouTube); videoconferences (e.g. Skype or FaceTime); audiovisual on-demand content (e.g. Netflix, Claro TV, etc.); messaging services (e.g. WhatsApp, Line, etc.) and social networks (e.g. Facebook, Twitter, LinkedIn, Waze). These services require a terminal device with Internet access, like a mobile phone, tablet, TV or videogame console. In essence, any service that users are receiving over the Internet that is not provided directly by Internet Service Providers ("ISP") could be considered an OTT service.

The key point of all of this is that OTT services do not come from the traditional telecoms or Internet service providers, rather these established operators are merely providers of the IP connectivity. The OTT apps ride "on top" of that Internet connection.

From a legal standpoint, itis not easy to find a definition of OTT services to date.[2] In Mexico, the Federal Telecoms Law ("FTL") does not provide a definition or these services, nor does the Federal Institute of Telecoms ("Ifetel").Ifetel has issued a formal criterion specifically addressing this matter, although it has considered OTT services when analyzing concentrations and issuing resolutions dealing with the telecoms industry.

1 Raymundo Enriquez & Gerardo Calderon head and senior associate of Baker & McKenzie's Antitrust & Competition Practice Group in Mexico, respectively.

2 The Body of European Regulators of Electronic Communications ("BEREC") defines these services as "content, a service or an application that is provided to the end user over the open internet." BEREC classifies OTT services into three groups: services that already qualify as an ECS, i.e. services that allow for calls to the publicly available telephone service ("OTT-0"); communication services that compete with ECS on end markets such as instant messaging and voice telephony ('OTT-1"); and other internet based services that do not compete with ECS such as social networks, search engines or online trading facilities ("OTT-3").

III. OUR VIEWS

The asymmetries in the cost structures between the different actors (i.e. ECS and OTTs) can be addressed from a regulatory standpoint – i.e. recognizing a different regulatory approach to different technologies– or can be analyzed from a competition standpoint, by determining if the new and the old really belong to thesame relevant market. Either approach may fall short from an adequate and sustainable response.

From a competition perspective, it is arguable that disruptive technologies have characteristics that are not substitutes forthe ECS's service. These OTT applications are often free of charge for consumers and rely heavily on established infrastructure that is not charged to the supplier of the new type of services. The ECS hence suffer the costs of heavy regulation, infrastructure maintenance and sometimes licensing expenses. Thus, their complaints on what is perceived as unfair competition from the OTT service providers. Furthermore, in many cases, the OTT service providers rely on the infrastructure that the ECS have to maintain. So, if the regulation does not provide for viable ECSmodels, what impact will this have on the trendy and cheap OTTs?The big question is whether this is a problem of regulation or competition or both?

Onecould think that OTT services are the Ubers in the telecoms industry, whereas ECS are taxis facing new, potentially competing services. But how close is the substitution between these services both from the supply and demand side? How should OTT services market(s) be defined? These questions, among others, remain to befully answered.

The lines between OTT services and ECS are becoming increasingly blurred, especially in certain services (i.e. text messaging and telephone services). However, there are also differences that remain clear. For instance, the regulatory framework in Mexico, where, similar to Uber, OTT services providers are less regulated than ECS. The latter must have a license granted by the government to operate, whereas OTT services operators are exempted. ECS have obligations related to price registration, quality of service levels, portability requirements, territories served, among others, while the former does not face such obligations. Notwithstanding, from the end user's perspective it seems, as with the Uber services, some of those differences appear to be more formalistic than real in some cases.

Regardless of the above, IFT has decided that OTT services, specifically video streaming services, will not be regulated under the same terms as traditional Pay-TV services. By following this approach, the debate about the impact of OTT services remains in terms of leveling the playing field. The main concerns are related to the challenges faced by traditional ECS with the expansion of online firms offering products which end users increasingly see as alternatives to their offerings.

The question is if such expansion would result in forcing ECS to exit the market, as it happened for instance to other potential competitors of OTT services providers (e.g. Blockbuster which closed all its stores, presumably after being unable to face competition from OTT providers like Netflix). This would hardly be the case for ECS, as OTT services providers need them, at least as an input for their own services.

OTT services are one of many pieces of the rapid technological progress and growth, generating tremendous benefits for consumers. Even in countries where incumbents historically faced no or very limited competition, prices for digital services have fallen rapidly in recent years. The key element for this progress in our view is the increased convergence of services, although technology and regulation/deregulation have also had an important impact.

All of the foregoing result in digital markets being dynamic, where both new and existing companies have powerful incentives to invest and innovate. The days when consumers were supplied by at least two telecomsproviders, for mobile and fixed services and in some cases by additional providers for Pay-TV and Internet services are almost gone. In today's highly competitive environment ECS providers put together bundled services to satisfy all telecoms needs from customers, including OTT services in many cases (i.e. Televisa, once considered dominant in Pay-TV services, has recently launched Blim as part of its offer in response tocompetitive pressure from Netflix. Another example is mobile services which now include OTT services like Whatsapp and Facebook in some bundled offers).

While undoubtedly digital convergence benefits consumers, it also creates complex challenges for regulators. For instance, the need of implementing enough flexible regulations to avoid distortions generated by outdated or obsolete rules. If regulators fail in this task, for instance by not eliminating discriminatory or static regulations, markets can become distorted and competition will be harmed.

In Mexico, the current FTL introduced relevant changes that aim to deregulate, or regulate more efficiently, rules for services providers(although further changes might still be required). Specifically, now all telecomsservices providers (at least those ECS), are able to incorporate services to a single license, rather than being obliged to request different licenses for each service. Before digital convergence, ECS providers and services operated independently from each other: fixed telephone and mobile services had one function, Pay-TV, etc. It therefore made sense to regulate them separately, under different legal frameworks.

The telecoms market is facing deep changes in the way its consumers interact, entertain andwork. Bundling today incorporates two-play to five-play offers. But that alone is not enough to rule the market, when the new reality is OTT services.

Many large ECS are currently exploring new vehicles at the level of media and entertainment as well as on-line digital lifestyles as an initial set of service priorities. In order to generate an attractive offer for consumers, operators should find a way to aggregate OTT services to their service portfolio either through active partnerships or, where appropriate, by acquiring service capabilities.

It has always been clear that consumers love TV content, but they now want the mobile, flexible, personalized and relatively low-cost service of on-demand service offered by OTT services providers like Netflix.They simply do not like the linear TV experience anymore, where channels present programs only at particular times on non-portable screens.

The Netflix success story is well known, which has not been an exception in Mexico, even facing the obstacle of the relatively low penetration of broadband services. Another success story of fast growth, and possibly more similar to the Uber-taxi case, is Whatsapp, which is used by nearly every mobile services user with a smartphone. Among those users, SMS services are rarely used.

OTT services are forcing a recalibration of telecoms services and raising the bar for customer loyalty and retention and service development. We already mentioned that Televisa has launched Blim in response to competitive pressure from Nexflix. America Movil, the dominant ECS provider in Mexico, has also launched its video-on-demand service called Claro Video. All the available options of its Infinitum bundled offers include Internet, voice services and unlimited access to Claro Video. America Movil's OTT offer includes both a free video-on-demand catalogue and a pay-per-view catalogue of more recent movies.

Determining whether the provision of free OTT services may raise competition concerns, and is detrimental to the development of the telecoms markets, is essential in view of their fast growth and penetration. Telecoms markets are typically dynamic and fast-moving. In these circumstances, dominant positions may not be enduring and therefore it is unlikely that OTT services generate competition concerns by themselves.

In addition, and although there seems to be evidence to conclude ECS and OTT services do compete between them, we can also see these services as complementary. While OTT services benefit from broadband networks, ECS also benefit from increased demand for bandwidth driven by OTT services, generating an auto-sustainable system.

IV. CONCLUSIONS

There is no doubt OTT services have introduced additional competitive pressure to ECS and the traditional telecoms services landscape, as Uber did in the transportation services market to taxis. However, there is no conclusive evidence that ECS and OTT services do compete directly, not only from the supply side, where apparently more differences can be found, as in the Uber-taxi case, but also from thedemand side, where there are also arguments to consider ECS and OTT services as complementary services (which is not the case for Uber and taxis).

The above is more or less true depending on the OTT service under analysis. As discussed, Whatsapp appears to be in more close competition with SMS than Netflix with Pay-TV.

Regardless of the approach taken, regulators have the responsibility of establishing adequate rules to level the playing field. Given the dynamics of both ECS and OTT services, regulations shouldnot be discriminatory or static, but rather flexible enough to avoid distortions and hopefully guarantee sustainability.

In Mexico, digital convergence and deregulation efforts by the government (i.e. the current Mexican Telecoms Law, among others) allow competition to increase in the telecoms market.But it is important to anticipate potential anticompetitive effects from the growth of OTT services and ECS providers' adverse reactions or attemptsto block new entrants.

If the right approach is taken by both service providers and authorities, there are opportunities for further development of digital convergence and the introduction of additional complementary capabilities between ECS and OTT services.

Based on what has been discussed, our conclusion is that no, OTT services are not the Uber of the telecoms services andECS are not the taxis. Uber does compete directly with taxis (at least for the user segment which owns a smartphone) and being, in our view, a better service it could potentially eliminate its current, less effective competition. OTT services could be seen as a competitor of ECS. However, the former providers need the later as an essential input to operate.

BUNDLING BEHAVIOR IN TELECOMS: WHAT FIRMS DO AND HOW EUROPEAN COMPETITION AUTHORITIES HAVE INCLUDED BUNDLING IN THEIR REASONING

BY AGUSTÍN DÍAZ-PINÉS & JOÃO VAREDA[1]

I. INTRODUCTION

Overthe last decade there has beena trend of growing demand of bundled offers in the telecoms industry, namely of the so called "triple-play"bundles which include fixed telephony, fixed Internet and pay-television services. However, bundling in the telecoms industry in itself is not a new phenomenon. Well-known traditional forms of bundling include fixed telephony and Internet access ("double-play"). More recently, we have also verified the emergence of so-called "quadruple-play" bundles. In addition to the three products that are contained within a triple-play bundle, quadruple-play bundles also include mobile services (telephony, SMS and Internet access).

For instance, in the selected countries included below, which coincide with those present in recent merger decisions by the European Commission and some European National Competition Authorities ("NCAs"), triple-play bundle penetration has stabilized or declined in the 2013-2015 period, which can be explained by the rapid increase of quadruple-play (triple-play plus mobile services) as Tables 1 and 2 show. Of note is the case of Spain where, in a context of a high penetration of bundled services, the most common bundle type is a triple-play which does not include pay-television but does include mobile services. This can be explained by the traditionally low penetration of pay-television services in Spain.

Table 1: 3-play penetration in selected countries (percent of fixed BB subscribers in a 3-play bundle)

3-play indicator (%)	2013	2014	2015
Belgium	39%	32%	32%
France	67%	69%	
Portugal		49%	44%
Spain	8%	5%	4%
Spain (3-play with mobile)	41%	45%	46%
United Kingdom	27%	30%	

Sources: IBPT (Belgium), authors' data collection from public sources (France, United Kingdom), Anacom (Portugal), CNMC (Spain).

Table 2: 4-play penetration in selected countries[2]

4-play indicator (%)	2013	2014	2015
Belgium	1%/4%	4%/15%	5%/18%
Portugal		8%/38%	11%/47%
Spain	1%/12%	4%/16%	7%/19%

Sources: IBPT (Belgium), Anacom (Portugal), CNMC (Spain).

1 Agustín Díaz-Pinés, European Commission, DG Competition,Centre de Recherche en Gestion, Ecole-Polytechnique/Université Paris-Saclay, France.JoãoVareda, European Commission, DG Competition, CEFAGE-UE, Universidade de Évora, Évora, Portugal. The content of this article does not necessarily reflect the official position of the European Commission. Responsibility for the information and views expressed lies entirely with the authors.

2 This table shows two quadruple-play indicators (percent of quadruple-play subscribers as a percentage of mobile subscribers and percent of 4-play subscribers as a percentage of fixed broadband subscribers). The latter can be compared with triple-play indicators, which uses the same denominator (fixed broadband subscribers).

These bundled products are often perceived as being cheaper and also more convenient for consumers. Despite the benefits of bundles for consumers, they also have potential downsides. Problematic aspects of bundles can include switching problems or pricing transparency. Bundles can also be used in an anti-competitive manner to foreclose competitors.

In this article we start by discussing the reasons whyfirms in the telecoms sector bundle and the impact on welfare of these strategies. We then describe the most recent merger and antitrust decisions in Europe where telecoms bundles were assessed.

II. REASONS FOR BUNDLING

Bundling is used by firms for several reasons. Some of them are legitimate and even promote welfare, while others may raise antitrust concerns. In fact, a given bundling strategy may be pursued to attain quality improvements or cost reductions, or to limit or foreclose competition in a given market.[3]

First, firms may decide to sell a bundle with the objective of achieving quality improvements. For example, buying several telecoms services in a bundle instead of separately, possibly from different firms, or at least from different departments of the same firm, involves the convenience of receiving only one invoice, having to call only one consumer call center in case of repairs, etc. There may also be economies of bundling, if the cost of selling the products jointly in a bundle is smaller than the sum of the costs of selling them separately. Economies of bundling may emerge for several reasons in the telecoms sector. For instance, (i) marketing a bundle of fixed telephony, Internet and television services may be cheaper than marketing these services separately, (ii) billing a bundle of these services may be cheaper than billing these services separately, and (iii) having a customer service line for a bundle of these services may be cheaper than having separate customer lines for each service.

A second reason for bundling is related to price discrimination.[4] If customers have different valuations for a good, a firm would prefer to charge different customers different prices, according to their valuation. Price discrimination might be hard to implement since it requires that the firm (i) knows customers' individual valuations, and (ii) can prevent arbitrage. However, if the firm sells several goods whose customers' valuations are not positivelycorrelated, bundling can have an effect similar to price discrimination. In fact, by reducing customer heterogeneity, bundling helps implementingprice discrimination.

Third, bundling can be used to eliminate double-marginalization. Consider two firms selling two complementary products. In this case, a decrease in the price of one of them will increase not only the demand of that product but also the demand of the other firm's product. Since each firm maximizes its individual profits, neither of them takes into account the impact of its pricing decision on the other's profit. If the firms merged they would maximize joint profits, and therefore take into account the interaction between their pricing decisions and set lower prices, which would generate a higher joint profit. If the products were complementary but not always purchased or used together, the merged entity would prefer to discount the price only to customers who were purchasing both products. Such a strategy could be pursued through bundling.

Fourth, some authors argue that bundling can be used to extend market power across markets.In particular, a firm with market power in one market can use bundling to extend market power to another market where it has no market power.One of these cases is when bundling is used to create a barrier to entry. A firm with market power with respect to several products can offer them as a bundle to make entry more difficult for rivals offering only one product. Consider a firm that sells a bundle composed of products A and B but does not sell these products individually. If an entrant can only sell product A, then it is limited to selling its product only to consumers who value product A, but who do not value product B. Consumers who value A and B prefer to buy the bundle. Consumers who do not value A, but are unwilling to give up B must also buy the bundle. Therefore, bundling allows the multi-product firm to defend its products against single-product entrants, even if they are very competitive, without having to lower the price of either of its products.

Even if entry by a single-product firm occurs, bundling can also mitigate the impact of competition on the multi-product firm.[5] When the single-product firm enters the market, some of its customers are captured from the multi-product firm, but others are customers who were previously out of the market. The single-product firm appeals to those customers who value its product but not the other product. This group of customers is attracted to the single product firm and yet does not cause the multi-product firm a large loss in demand. The fact that the single-product firm only competes for a limited group of customers reduces the scope of competition. Bundling may also be used as a way of two competing firms better differentiating themselves, by having one firm selling the bundle and the other selling the individual product.

3 See, e.g. O'Donahue R. and J. Padilla, 2006, "The Law and Economics of Article 82 EC," Hart Publishing. and Nalebuff, B., 2003a, "Bundling, Tying and Portfolio Effects, Part 1 - Conceptual Issues," DTI Economics Paper no. 1 and Nalebuff, B., 2003b, "Bundling, Tying and Portfolio Effects, Part 2 – Case Studies," DTI Economics Paper no. 1 for comprehensive surveys on bundling.

4 For the analysis of bundling by a multi-product monopolist with the purpose price-discrimination see, e.g. Bakos, Y. and E. Brynjolfsson, 2000. "Bundling Information Goods: Pricing, Profits, and Efficiency," Management Science, 45(12), 1613-1630., McAfee, P., J. McMillan, and M. Whinston, 1989, "Multiproduct Monopoly, Commodity Bundling, and Correlation of Values," Quarterly Journal of Economics, 84, 271–284 and Schmalensee, R., 1984, "Gaussian Demand and Commodity Bundling," Journal of Business, 57, 211–230.

5 See Nalebuff, B., 2000, "Competing Against Bundles," Yale School of Management Working Papers 157, Yale School of Management.

Bundling can also be used for various other strategic reasons related to search costs and switching costs. Introducing a bundle means introducing an additional product in the market, and increasing the price inquiries and comparisons a customer needs to make. However, for customers who already decided to purchase both goods, having to inquire about the price of the bundle, instead of the prices of the various separate products that constitute the bundle, means reducing search costs. The impact of bundles in search costs is thus potentially ambiguous, and has to be evaluated on a case-by-case basis. Similarly, the impact of bundling onswitching costs is also ambiguous. On the one hand, a customer of a bundle will, probably, not be very sensitive to reductions in the prices of the individual products, since switching theprovider for one of the products could implychanging the contract for the provision of the remaining products. On the other hand, a customer of a bundle could be more sensitive to reductions in the prices of other bundles than a customer of individual products bought from separate suppliers.

III. WELFARE IMPACT OF BUNDLING

Bundling may be used for various reasons with both positive and negative effects on welfare. Therefore, an evaluation of the impact on welfare of a bundling strategy requires the detailed knowledge of the facts of the market, and balancing these opposing effects. The growing awareness of these elements seems to be shifting the evaluation of bundling from a per se illegality approach towards a "rule of reason" approach.

When bundling achieves quality improvements or cost reductions, the impact on welfare can be positive. In fact, quality improvements and cost reductions may increase firms' profits and consumer welfare too.

When bundling is used for price discrimination, the impact on welfare is ambiguous. Price discrimination increases firms' profits at the expense of consumer surplus. The overall impact on welfare depends on which of these two effects is stronger.

When a firm adopts a bundling strategy to create entry barriers or mitigate competition, this will generatea negative effect on welfare. The reason is that fewer or weaker rivals in the market will ultimately lead to higher prices and, possibly, lower product variety.

An assessment of the overall impact of bundling on welfare is thus complex. First, depending on the context, a given bundling strategy may be pursued to attain efficiencies, or to reduce competition. Hence, it may have a positive or a negative impact on welfare. Second, such strategy may simultaneously generate efficiencies and reduce competition and therefore, it may simultaneously have a positive and negative impact on welfare. This implies that the evaluation of the impact on welfare of a given bundling strategy should be done on a case by-case basis.

IV. DECISIONAL PRACTICE IN EUROPE (MERGERS)

The European Commission's decisional practice in merger cases for the telecoms sector has addressed bundling in a number of instances.[6] Given the technical difficulty for establishing a relevant product market for multiple-play services (whether fixed-only or fixed/mobile), the Commission has in all cases left the exact product market definition open, while still analyzing the role played by bundled services in its competitive analysis. The aim of this section is to provide an overview of the criteria that the Commission has taken into account in the assessment of multiple-play services. We cover the following cases: *Vodafone/Kabel Deutschland* (M.6990, Germany, 2014), *Liberty Global/Ziggo* (M.7000, Netherlands, 2014), *Vodafone/Ono* (M.7231, Spain, 2014), Altice/PT Portugal (M.7499, Portugal, 2014), Orange/Jazztel(M.7421, Spain, 2015) and *Liberty Global/Base* (M.7637, Belgium, 2016). The decision *Vodafone/Liberty Global* (M.7978, Netherlands, 2016) also includes a discussion on bundles but its public version has not been yet made publicly available.[7]

Needless to say, merger decisions address bundles to the extent that they are relevant to the assessment of each transaction, therefore the decisions are not directly aimed at investigating the competitive impact of bundles in general. In addition, conducting an exhaustive market definition exercise, i.e. empirically assessing whether bundles constitute a relevant product market, by means of a SSNIP test, for example, is a resource-demanding exercise. It is therefore understandable that the Commission has refrained from undertaking such analysis in recent cases. As mentioned, the Commission has left the product market definition in all cases described in this article, while undertaking an assessment for the possible multiple-play market(s). Interestingly, some cases such as Vodafone/Onoinclude a "double" assessment, which delivers the same result: (i) considering the horizontal overlap in the possible "multiple-play" market(s) and (ii) conglomerate effects between fixed and mobile markets, should a multiple-play market not exist.This double assessment adds to the review of the different market of standalone products, such as fixed Internet access.

In *Altice/PT Portugal*, the Commission found that most customers already purchased fixed triple-play bundles in Portugal, but also noted that the market investigation provided mixed results as to the existence of a multiple-play market. In the competitive assessment, the Commission found competition concerns based on the merged entity's market share in the possible fixed multiple-play markets (up to 60-70 percent in terms of value) and the closeness of competition (for fixed services only, as only PT offered multiple-play services with a mobile component).

6 Given the fast moving nature of these markets and the existence of a sufficiently high number of merger decisions, this article focuses on those from 2013 onwards.

7 http://europa.eu/rapid/press-release_IP-16-2711_en.htm.

In *Vodafone/Ono*, the market investigation indicated that triple- and quadruple-play services were becoming the norm in Spain. In the competitive assessment, the Commission conducted a conglomerate effects analysis between fixed and mobile services (or horizontal effects analysis if there were to be a multiple-play market). In the latter case, the Commission found an overlap, as both Vodafone and Ono offered multiple-play bundles, but noted that their bundles were relatively different (Vodafone wasweaker in fixed while Ono was stronger). The Commission also found that there were a number of alternative competitors on the market and that, although eliminating a current competitor, the merged entity would become a stronger competitor. Furthermore, the Commission ruled out conglomerate effects based on existing regulation for both the wholesale mobile and fixed markets.

In *Orange/Jazztel*, the Commission also left open the question of whether there is a multiple-play market (or several multiple-play markets), as that transaction raised competition concerns in the market for fixed Internet access irrespectively of how the packages included in such market. This is not surprising given the fact that Spain, as highlighted in *Vodafone/Ono*, likely has the highest penetration of fixed/mobile bundles in the European Union (in 2015, some 65 percent of fixed broadband subscribers where on a fixed/mobile bundle). Since 2012, and strongly driven by the incumbent operator Telefónica, the Spanish market is characterized by a strong presence of fixed mobile bundles. This market definition exercise was made based on the following factors: a) the market investigation revealed that bundles play an important role in the Spanish market but that theirimportance mainly relied on price discounts and, as a less important feature, convenience of having different services in the same package, and b) from the company's perspective, a very important driver was a lower churn (less customer switching), as companies perceived that it is more difficult for customers to switch if they subscribe to more than one service. The Commission therefore found competition concerns in the possible markets for (i) double-play, (ii) triple-play and (iii) the market comprising triple- and quadruple-play services.[8]

In *Vodafone/Kabel* Deutschland, the Commission noted that customers in Germany purchase triple-play offers including either only fixed (telephony, internet and television) or fixed and mobile services (with fixed telephony and Internet). In relation to the possible conglomerate effects between fixed and mobile services for offering multiple-play bundles (or the horizontal effects if such a market were to be defined), the Commission ruled them out largely based on their lack of merger specificity (foreclosing mobile operators from accessing the fixed network) and on the fact that fixed competitors would have competing mobile networks from which to procure a mobile component (foreclosing fixed operators from accessing mobile networks).

In *Liberty Global/Base*, the Commission did not discuss fixed bundles as that transaction only concerned fixed/mobile bundles. It noted, however, that fixed bundles (triple-play) were widespread in Belgium. An interesting aspect of this case is the discussion around undiscounted joint purchasing, which the Commission does not consider, based on its Guidelines, as bundled services.[9] Liberty Global (Telenet) did not offer fixed-mobile bundles under the meaning of the Guidelines, except for very limited exceptions. The Commission concluded that these offerings would likely not be included in a potential multiple-play market as most customers would switch back to the standalone services in the event of an increase in price. The Commission also noted that the large majority of Belgian customers purchase fixed and mobile services separately. According to the Commission's decision, the effects on the potential market for fixed and mobile services were analyzed under conglomerate effects. In that assessment, the Commission found it unlikely that there would be foreclosure of competitors and highlighted that becoming an integrated operator could be pro-competitive if there is a cost advantage in being a mobile network operator (Liberty Global already operated a mobile virtual operator in Belgium).[10] The Commission also mentioned that Base's customers could have access to unified billing. The Commission also echoed the operators' views that customers churn less.

In *Liberty/Ziggo*, the Commission noted that triple-play services had a high penetration rate in the Netherlands (around 50 percent), with television services playing an important role in that market, because cable operators only offered non-television services together with television services. Again, the Commission left the market definition open. The Commission further assessed competition concerns jointly for the markets of pay-television, fixed Internet access, fixed telephony and multiple-play services.

Some of the economic findings summarized in Sections 2 and 3 of this article emerge from the Commission's analysis. First, the lowerchurn which characterizes bundles appears to be one of the main reasons why telecoms operators bundle services. A second important aspect is the extent to which firms engage in price discounts associated with bundles. Price discounts seem to be the main reason for a high multiple-play take up in Spain. Overall, it seems that convenience, unified billing and potential additional services play a fairly limited role in operators' bundling behavior. Third, take-up of multiple-play services in different countries seems to exert an influence on the way the Commission looks at competition effects of bundles. Fourth, the Commission has recognized in some cases that the combination of fixed and mobile assets resulting from a merger may entail pro-competitiveeffects (see *Orange/Jazztel*). Finally, the

8 The difference between triple- and quadruple-play was TV services. One of the merging parties (Jazztel) did not offer TV services and hence the triple- and quadruple-play markets have been assessed together.

9 These services, widespread in Belgium for fixed/mobile combinations, involve unified billing for fixed and mobile services, but no price discount or technical improvements with respect to the standalone provision of the same services.

10 The fact that the merged entity could offer fixed mobile bundles at better costs was not formally assessed as an efficiency claim by the Commission, but was nevertheless mentioned in the competitive assessment.

very different take-up of fixed mobile bundles in different European countries seems to be due to strategic market-specific reasons rather than to an overall trend. Nevertheless, fixed mobile bundles seem to be increasing in all countries analyzed by the Commission.

In addition, European national competition authorities have also recently considered bundles, namely in: *Zon/Sonaecom* (Portugal, 2013), *Numericable/SFR* (France, 2014) and *MasMovil/Yoigo* (Spain, 2016).[11]

Zon/Sonaecom remains to date the only merger decision where a multiple-play market has been defined through a SSNIP test applied to triple-play products. Based on the econometric study by Pereira et al. (2013)[12] which shows that for the Portuguese market, given the absence of close substitutes, it would be profitable for a hypothetical monopolist controlling all triple-play offers to increase the price of these product by 5 or 10 percent, the Portuguese NCA closed the market definition for triple-play offers. As regards the remaining bundled offers, namely the three different double-play offers (telephony and internet, telephony and television services and internet and television services) and the quadruple-play offer (which adds mobile voice to the other three fixed services), the Portuguese NCA left open the possibility of the existence of such markets. In its assessment, the Portuguese NCA concluded there were competition concerns in the market for triple-play offers given the large horizontal overlaps between the parties and their closeness of substitution.

By way of contrast, *Numericable/SFR* focused on the analysis of conglomerate effects between fixed and mobile services and did not address the issue of market definition of triple- and quadruple-play services. The French NCA noted that most gross ads (customers acquired by operators) of fixed Internet subscribers come from quadruple-play offers and that the acquisition of SFR unlocked a mobile customer base to which the merged entity could sell quadruple-play. In addition, Numericable had a large footprint of fiber infrastructure which other operators did not have at the time, and could not deploy at short notice. For these reasons, the French NCA found that the merged entity had the incentive and the ability to foreclose fixed competitors, in particular through quadruple-play offers with very high speed Internet access. In addition, the French NCA noted that these effects would be compounded with lower churn levels due to bundling discounts and the complexity for customers to terminate contracts for many different services simultaneously. Finally, the French NCAnoted that fiber deployments were at risk because the transaction significantly reduced the addressable customer base for fiber Internet access.

These two decisions by NCAs depart from the Commission's practice in different ways. First, the Portuguese decision, unique in empirically defining a multiple-play market, remains a first of its kind. It is, however, doubtful that these type of analyses could be undertaken systematically, given their complexity and data needs. The *Numericable/SFR* decision is also unique for a different reason: it uses conglomerate effects to find competitive harm in relation to quadruple-play services in particular as regards fiber deployments. In a way, this departs from some of the Commission's reasoning that shows that having a new integrated operator may be positive. Moreover, the Commission relied on existing ex-ante regulation for the fixed network to rule out competitive harm in *Vodafone/Ono* while regulation did not play a role in the French decision. The French decision, however, takes place in the context of fiber deployments by all fixed operators, which the French NCA sees at risk. This risk was in turn addressed by a commitment offered by Numericable to grant access to its fiber network.

V. DECISIONAL PRACTICE IN EUROPE (ANTITRUST)

As regards anti-competitive practices, the position of competition authorities towards bundling has changed over the years. In the past, bundling was typically treated as per se illegal. Hence, in the absence of evidently recognizable and bundle specific cost-savings, competition authorities prohibited bundling. More recently, competition authorities seem to be applying a "rule of reason" approach where bundling strategies are analyzed on the basis of the evidence about potential pro-competitive and anti-competitive effects of the case.

A discussion paper of the Commission in the context of Article 102 of the Treaty on the Functioning of the European Union proposes an approach that consists of comparing the implied price of each component of a bundle with its cost.[13] This amounts to conducting an implicit predatory price test, and corresponds to checking if the price charged for each component is so low as to prevent equally efficient competitors from offering a competitive alternative. [14]

In Europe, up to now, there are no cases of telecoms bundling being deemed illegal by the Commission or NCAs. The only exception is a decision from the Luxembourg NCA in 2008.[15] Following a complaint by two competitors against EPT for abuse of its dominant position on the marketing of a product called "Integral," bundling the services of fixed telephony, mobile telephony and high-speed Internet access, the Luxembourg NCA identified a potential abuse in the form of illegal bundling. The Luxembourg NCA adopted a remedy prohibiting EPT from bundling the product IPTV (television by tele-

11 The *MasMovil/Yoigo* decision has not yet been published by the Spanish NCA and will therefore not be discussed.

12 See Pereira, P., Ribeiro, T. and Vareda, J., 2013, "Delineating Markets for Bundles with Consumer Level Data: The Case of Triple-play," International Journal of Industrial Organization, 31, 760-773.

13 European Commission (2005).

14 This approach has been followed, for instance, by the Office of Fair Trading in a case regarding the wholesale supply of TV channels carrying sport events (*BSkyB* case).

15 See http://www.concurrence.public.lu/fr/decisions/abus-de-position-dominante/2008/decision-2008-mc-01/index.html.

phone) with its product "Integral" or in any other bundled offer. This measure was valid until the competitors of EPT were technically and commercially in the position, based on a transparent and non-discriminatory offer to the network of EPT, to offer the same product on the fixed-line telephone network.

In 2014 Ofcom, the United Kingdom's dual national regulatory authority ("NRA") and competition authority for telecoms, published its TalkTalk non-infringement Competition Act enforcement decision[16] analyzing an allegation of margin squeeze against the fixed line incumbent as regards its bundle offer of premium sports content offered with very high speedInternet. In its assessment of margin squeeze, Ofcom assessed the profit margin across the bundle of products and found it to be sufficient to cover downstream costs, implying that an equally efficient competitor should have been able to compete with the fixed line incumbent across the portfolio of products. Yet the profit margin could not definitively be said to be sufficient, and effects were unclear in this dynamic market. This gap, therefore, required ex-ante regulation by Ofcom as NRA to monitor and enforce a sufficient access margin, rather than ex-post competition law enforcement.

VI. CONCLUSION

Despite the increasing trend for bundle offers in the telecoms sector in Europe, in its recent merger decisions, the Commission has so far refrained from taking a view as to whether multiple-play services (both fixed and fixed/mobile) constitute a separate product market. As a result, it has undertaken an analysis for the possible multiple-play market(s) and for the standalone markets and for hypothetical market including standalone and bundled services.For example, it has assessed fixed/mobile bundles both from the perspectives of conglomerate effects and the horizontal overlap in a possible multiple-play market(s). In the case of Article 102 assessments, there is no decision from the Commission prohibiting telecoms bundling.

There is one rare example of an NCA that adopted a decision where a market for triple-play offers was defined based on the empirical implementation of a SSNIP test, as well as a decision, although somehow old, where the telecoms incumbent was prohibited of adopting a bundling strategy as regards its television services.

16 Ofcom, Competition Act Final Decision, TalkTalk, (CW/01103/03/13) (October 21, 2014).


CPI
COMPETITION POLICY
INTERNATIONAL