Regulatory Approach to Fixed-Mobile Substitution, Bundling and Integration

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Zusammenfassung

Der Diskussionsbeitrag adressiert eine Reihe von Entwicklungen, die das Verhältnis von Festnetz- und Mobilfunkdiensten zueinander verändern, namentlich die Substitution von Festnetz- durch Mobilfunkdienste sowie die Bündelung und Integration beider Dienste. Der Diskussionsbeitrag untersucht die treibenden Kräfte dieser Entwicklungen aus Nachfragersicht, erörtert die Auswirkungen auf die Marktabgrenzung und analysiert, ob sie einen Paradigmenwechsel in der ex ante Regulierung erfordern.

In einer kurz- bis mittelfristigen Perspektive ist ein solcher Paradigmenwechsel in der Mehrheit der EU-Mitgliedstaaten nicht erforderlich, so das Ergebnis der Analyse. *Erstens*: Fix-Mobil-Substitution beim Breitbandanschluss ist noch wenig entwickelt. Fix-Mobil-Substitution beim schmalbandigen Anschluss, obwohl sie einzelne Nachfragersegmente stark betrifft, rechtfertigt nicht die Definition eines gemeinsamen Marktes. In einzelnen Ländern mag es gerechtfertigt sein, für Mobilfunk- und Festnetzgespräche einen gemeinsamen Markt zu definieren. Allerdings erlaubt der Wettbewerb auf der Basis von Betreiberauswahl/Betreibervorauswahl und Voice-over-Broadband in den meisten Fällen schon die Abschaffung der ex ante Regulierung für Festnetzverbindungen auch da, wo Fix-Mobil-Substitution schwächer ausgeprägt ist. *Zweitens*: Integration von Festnetz- und Mobilfunk, obwohl sie potentiell neue Märkte entstehen lässt, ist nicht genügend ausgeprägt, um gegenwärtig schon eine regulatorische Prüfung zu rechtfertigen. *Drittens*: Etwaige Wettbewerbsprobleme, die mit der Bündelung von Festnetz- und Mobilfunkleistungen zusammenhängen, sollten auf der Basis der bestehenden Marktabgrenzungen analysiert werden.

Summary

The paper addresses fixed-mobile substitution, bundling and integration – developments which seem to question the prevailing paradigm of distinct regulatory architectures for fixed and mobile services. The paper analyses their driving forces from a consumer perspective, assesses whether they change market boundaries and analyses the implications for ex ante regulation of fixed and mobile services.

Taking a short to medium-term time perspective, the paper argues that a paradigm shift is not warranted for the majority of Member States concerned. *First*, fixed-mobile substitution at the broadband access level is still nascent. Fixed-mobile substitution at the narrowband access level, while clearly affecting certain customer groups, does not justify the creation of a converged market. The case may be less clear for calls, but the question whether calls markets should be converged is of lesser relevance. In most countries, competition as a result of carrier selection and carrier preselection as well as voice-over-broadband allows to abandon ex ante regulation of retail fixed calls markets even where fixed-mobile call substitution is weak. *Second*, fixed-mobile integration, while potentially giving rise to new relevant markets, is not sufficiently advanced to justify regulatory action. *Third*, any competition problems related to fixed-mobile bundling should be analysed within the framework of existing market definitions.

1 Introduction

Today the majority of customers in the EU have access to both a fixed line and a mobile phone. Only in jurisdictions, where fixed networks are poorly rolled out, customers in low-density areas have to rely on a mobile phone as the sole means of access to electronic communications services. Where customers have access to both a fixed line and a mobile phone, they traditionally use them in a complementary way: At home/in office they use the fixed line, and, while on the move, they use the mobile phone.

Not surprisingly, the regulatory approach throughout the EU is based on a clear distinction between fixed and mobile markets, both at the retail and wholesale level. The analysis underlying the Commission's initial *Recommendation on Relevant Product and Service Markets* adopted in February 2003[1] as wells as the draft of the revised *Recommendation* published in June 2006[2] is based on separate relevant markets for fixed and mobile services. Among these markets, the Commission identified 14 fixed and 3 mobile markets as susceptible to ex ante regulation. In the first round of market reviews, National Regulatory Authorities ("NRAs") have generally followed this approach and constructed two distinct architectures of ex ante regulation for fixed and mobile markets.[3]

This approach, which no doubt was appropriate in the past, is questioned by the emergence of two opposing developments: The *first* is fixed-mobile substitution ("FM substitution"), where customers substitute mobile services for fixed narrowband or broadband services. The *second* is fixed-mobile bundling ("FM bundling") and fixed-mobile integration ("FM integration"), where customers, rather than purchasing separate fixed and mobile services, purchase a bundle or an integrated product that incorporates both services.[4] Is the current regulatory approach still appropriate or should it be reviewed to better take account of the FM substitution, bundling and integration?

The EU regulatory framework has built-in triggers to adjust the scope of ex ante regulation if technological or commercial developments change competitive constraints and

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1 Commission Recommendation of 11/02/2003 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 communication networks and services, Brussels, 11/02/2003, C(2003)497.

2 Commission Staff Working Document, Public Consultation on a draft 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 communication networks and services Brussels, 28 June 2006, SEC(2006) 837. For a discussion of the revised Recommendation see U. Stumpf, "Markets Susceptible to ex ante Regulation: Methodology and Commission Recommendation", Communications & Strategies, No. 64, 4th quarter 2006, pp. 41-60.

3 Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on *Market Reviews under the EU Regulatory Framework: Consolidating the internal market for electronic communications,* Brussels, 6.2.2006, COM(2006) 28 final. See also Kiesewetter, W., Marktanalyse und Abhilfemaßnahmen nach dem EU-Regulierungsrahmen im Ländervergleich, WIK-Diskussionspapier Nr. 288, Bad Honnef 2007.

4 Often the term fixed-mobile convergence ("FM convergence") is used as a synonym for FM integration, sometimes the term encompasses both FM integration and bundling, and in some cases it is defined as covering FM substitution, bundling and integration.

modify the conditions of competition.[5] The *first* trigger is the susceptibility of markets to ex ante regulation. Broadly speaking, ex ante intervention in the value chain of a telecommunications service is only justified if, in its absence, competition problems would create substantial consumer harm at the retail level that could not be dealt with by competition law alone. If this is the case, the source of the competition problem has to be located in the value chain and the relevant markets susceptible to ex ante regulation have to be identified through a three-criteria test. The *second* trigger is Significant Market Power ("SMP") in markets identified as susceptible to ex ante regulation. Operators with SMP have to be subjected to ex ante obligations. The *third* trigger is the nature of competition problems in markets characterised by SMP. The mix of ex ante obligations imposed on a SMP operator has to be proportionate and selected in a way that matches the competition problems that would prevail in the absence of ex ante regulation. Whenever FM substitution, bundling and integration affects the susceptibility of markets to ex ante regulation, or removes or creates SMP, or changes the nature of competition problems in such markets, ex ante regulation must be adapted.

The objective of this paper is to analyse the implications of FM substitution, bundling and integration for ex ante regulation under the EU regulatory framework for electronic communications services. *Section 2* explains the definition of FM substitution, bundling and integration as it used in this paper. *Section 3* examines the drivers of such developments from a customer perspective. *Section 4* assesses the impact of FM substitution, bundling and integration on relevant market boundaries. *Section 5* assesses whether and how the scope of ex ante regulation should be adjusted. *Section 6* rounds off the paper with conclusions. Note that this paper takes a short to medium-term time perspective. We focus on the next round of market reviews to be undertaken by NRAs, i.e., on a time perspective of 2-3 years. Longer-term changes may be more dramatic than the ones suggested in this document.

5 Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive).

2 What is FM substitution, bundling and integration?

FM substitution on the one hand and FM bundling and integration on the other hand are opposing developments. With FM substitution, customers substitute mobile for fixed services. In case of FM bundling and integration, customers purchase bundled or integrated fixed and mobile services from a single supplier rather then separate services from different suppliers.

Since FM substitution can affect calls, narrowband access and broadband access, it is useful to distinguish between three forms of FM substitution:

- *FM call substitution* occurs when customers, while preserving their PSTN line, use the mobile phone to make outgoing calls at home/in office. FM call substitution also includes the case, where customers make *all* of their outgoing voice calls at home/in office with a mobile phone, and maintain their fixed line for receiving voice calls and/or accessing the Internet with dial-up calls.

- *FM narrowband access substitution* takes place when customers give up a PSTN line in order to make and receive calls at home/in office over a mobile phone. FM narrowband access substitution also includes the case, where customers give up a secondary PSTN line, or switch from an ISDN line (with two channels) to an analogue line.

- *FM broadband access substitution* occurs when customers give up their fixed broadband line, which may be a DSL, cable or fixed wireless connection, to access the Internet at home over a mobile broadband connection.

FM bundling and integration are opposed to FM substitution, because customers remain connected to both a fixed and mobile network. However, FM bundling and integration differ in an important respect:

- *FM integration* occurs where customers, rather than using separate fixed and mobile services with separate devices, switch to an integrated fixed-mobile service using a single multi-mode device.

- *FM bundling* takes place if customers purchase fixed and mobile services from a single supplier with a single contract and a single bill, rather than from different suppliers with different contracts and bills. Compared to FM integration, FM bundling does not affect the network side of service provision.

FM bundling and integration can also be regarded as substitution phenomena. Customers, rather than “self bundling” fixed and mobile services purchased from different suppliers, switch to a bundled or integrated service provided by a single supplier.

3 What drives FM substitution, bundling and integration?

Section 3 looks into what drives FM substitution, bundling and integration. We analyse why customers may substitute mobile for fixed services, or switch from purchasing separate fixed and mobile services to bundled or integrated services. As with any substitution phenomenon, the functionality and price of the products (or product bundles) concerned is of key concern.

FM call substitution

An important driver of FM call substitution at home/in office is that using a mobile phone often results in a cheaper call compared to using the fixed line. *First*, many mobile pricing plans provide for discounted mobile on-net tariffs. Often, the cheapest way to reach a particular person is through a mobile on-net call assuming that the calling party has subscribed to the same mobile network as the called party. *Second*, customers increasingly subscribe to bundles of minutes for a fixed monthly charge, which may not be fully used up by calls made while away from home/office.[6] *Third*, home-zone tariffs offer prices for calls made at home/in office, which are similar to fixed-line prices.

Another major driver of FM call substitution is the convenience of using a handset for one's communication purposes that has personalised features and that does not have to be shared with other household members. This however is not an advantage valued throughout all customer types. Older persons, in particular, remain emotionally attached to a fixed line for the purpose of making calls at home. In addition, where in-house voice quality for mobile is inferior to a fixed telephone, customers may prefer to make and receive calls at home/in office on a fixed line.

To sum up, in a variety of particular circumstances, customers will find it beneficial to use a mobile for making and receiving calls at home.

FM narrowband access substitution

If using the mobile phone for making calls at home is beneficial, why not abandoning the fixed line altogether? Figure 1 illustrates the economic incentive for substituting mobile for fixed narrowband access in a simplified representation. We are looking at customers, which at the outset have both a fixed narrowband and a mobile subscription and which do not require access to an Internet service. E denotes the monthly expenditures (monthly bill) and q the number of monthly call minutes.

The straight lines show monthly expenditures as a function of monthly call minutes. The lines are based on the assumption of

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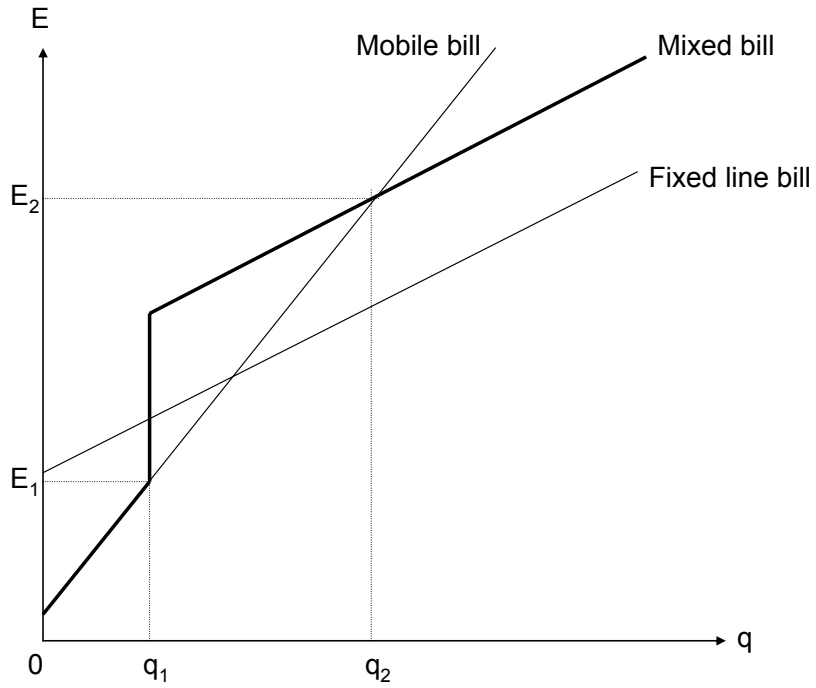
6 Note that minute bundles usually exclude international calls and calls to service providers, where per-minute prices generally remain more expensive if made from a mobile.

- a given user profile, i.e., a certain distribution of call minutes between calls to fixed subscribers, calls to mobile subscribers, international calls and calls to service providers, and a given distribution between peak and off-peak periods;
- a given set of prices for fixed and mobile access and call types, where the monthly charge of a fixed line is higher than the monthly charge of a mobile subscription, and the per-minute charge of mobile calls is higher than for fixed calls.

Three lines are distinguished in Figure 1 for different types of bills:

- mobile bill (use of mobile only),
- fixed line bill (use of fixed line only), and
- mixed bill (use of both mobile and fixed line).

Figure 1: Substitution of mobile for fixed narrowband access



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We assume that the number of mobile call minutes originated while away from home/office is q_1, leading to mobile expenditures of E_1. For making calls at home, the customer may use his/her fixed line or the mobile phone. If he/she uses the mobile phone at home, he/she has to pay a relatively high (average) per-minute price for a call. If he/she uses the fixed line, the (average) per-minute price for a call is lower (repre-

sented by a flatter slope of the bill line), but he/she also has to pay a monthly rental. If the monthly call volume at home is smaller than (q_2 - q_1), it is preferable to use the mobile phone also for calls at home; the customer is better off by abandoning the fixed line. If the monthly call volume at home is higher than (q_2 - q_1), keeping the fixed line is preferable.

Clearly, the incentive to FM narrowband access substitution is most pronounced for low-usage customers. While switching to mobile-only leads to higher per-minute prices paid for calls at home, it also allows to save the fixed monthly rental. Note that universal service legislation sometimes requires fixed incumbents to offer subsidised light user tariffs with discounted monthly rentals and calls, which may eliminate the price advantage of using a mobile for low-usage customers.

In this simple graphic representation, the benefit of FM substitution only depends on the prices of access and outgoing calls. What about incoming calls? The price of making a call to a mobile phone is higher than the price of making a call to a fixed phone. However, because of Calling-Party-Pays, customers typically do not take into account the cost of incoming calls. Nevertheless, multi-person households and firms will not be immune to the cost of incoming calls. Where the cost of calling home/the office is internalised, a mobile connection is less likely to be considered as a substitute for a fixed connection. The example of home-zone products, however, shows that mobile operators can address this issue by offering customers a geographical telephone number for calls made and received in the home-zone and by charging fixed termination rates if the customer is called on his/her geographical number.

Turning from price to functionality, the convenience of a single personalised handset is also a driver of FM access substitution. Nevertheless, there are a number of reasons, why customers may not regard mobile access as a substitute for fixed access. *First*, many households remain emotionally attached to a fixed line.[7] Mobile devices are also less susceptible to common usage, and multi-person households in particular may prefer to keep a fixed line. *Second*, where mobile in-house voice quality is inferior, customers will prefer to maintain a fixed connection at home/in office. *Third*, many customers do not want to give up their fixed narrowband line, because they use it for dial-up Internet access or need it to purchase DSL access (which is often bundled with the telephone line). These customers do not regard a mobile connection as a substitute for a fixed narrowband connection with regard to Internet services. This however may

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7 As a research report for Nokia has put it: “From an emotional viewpoint, the landline phone represents the home. The home number is perceived as long lasting, permanent and identifies the family unit as opposed to the individual. The overall call experience from a landline is viewed positively, associated with longer, relaxing conversations with friends and relatives. In this sense, the mobile phone represents the more hectic, modern lifestyle away from home, while the landline represents the security and safety of the family home.” Cf. Nokia, Fixed-to-Mobile Substitution: An ongoing global evolution. Key learnings from global research. 2004, p. 2.

change with new mobile broadband offerings provided over UMTS networks, in particular if upgraded to HSPA[8]. We will address this issue further below.

In sum, the potential for FM access substitution is clearly limited to a sub-set of predominantly residential customers. These customers can be distinguished by the following features:

- They use the fixed connection predominantly for the purpose of making and receiving voice calls and do not require Internet services at home.
- They are part of single-person households and do not need to share the phone at home with other family members.
- They have low to medium usage intensity and therefore benefit most from prepaid or home-zone products.

FM broadband access substitution

In terms of price, similar to the situation in fixed narrowband access, lower-usage customers can be better off using mobile at home for broadband Internet access, while this does not hold for higher-intensity users. This, again, is particularly true if customers need a connection also while on the move, and therefore FM substitution would allow to save the fixed monthly charge. There are home-zone offerings, flat rates and special low-user rates which may address the needs of such customers.

In terms of functionality, data rates for mobile are perceived to be lower than for fixed access. This however is no longer generally true. Mobile broadband offerings have emerged which can be regarded as roughly equivalent to fixed offerings. UMTS is able to provide data rates equivalent to lower bandwidth DSL (sometimes called “DSL light”). The implementation of HSDPA increases data rates further, so that mobile broadband becomes a functional equivalent to DSL up to 2 Mbs offerings, and further increases in speed are possible.[9] Fixed broadband, however, will keep its advantage for higher bandwidth. In particular, customers will not regard a mobile connection as a substitute for a fixed broadband connection with regard to HDTV and Video-on-Demand services for which higher transmission rates are required than those currently made available by mobile networks.

It should also be noted that, in future, FM integrated services may become more widespread, and customers may not regard a mobile-only service as a substitute for a full FM integrated solution. FM integrated services are discussed further below.

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8 HSPA: High-speed packet access. HSPA is the common name for the first two steps in the evolution of WCDMA, HSDPA for the downlink and Enhanced Uplink.

9 HSDPA is able to provide peak data speeds up to 14.4 Mbs.

FM bundling

Simple bundling of fixed and mobile services does not affect the functionality of the services. Its prime purpose is to allow customers to make transactional economies by contracting with, and getting billed by, a single supplier ("one-stop shopping"). Price-wise, FM bundles may also be cheaper, because, on the supply side, there are economies of scope from retailing both fixed and mobile services by a single entity. Transactional economies and price savings are the main drivers of FM bundling.

FM integration

FM integration is not a totally new development. A number of years ago some fixed incumbents have marketed narrowband dual-mode devices allowing to connect to an ISDN line at home via DECT and to make GSM calls while on the move. These offerings were a commercial failure. More promising appears to be a new generation of integrated devices which combine wireless access to a DSL connection at home (or in public hotspots) and a GPRS/UMTS connection while on the move. However, at the end of 2006, FM integrated offerings have been commercially introduced only in a few Member States,[10] and in one case announced to be withdrawn again.[11]

Clearly, FM integrated services represent more than a simple bundle of fixed and mobile services. *First*, customers use a dual-mode handset for both at home and away rather than two distinct terminals. This is possible by a Wifi connection, which connects the handset to the DSL line at home. *Second*, in the future, there may also be seamless handover of calls, whenever the customer enters or leaves his/her home zone. *Third*, each household member will have its own handset, and its own single number, address book and voice mail. *Fourth*, the value proposition also promises a consistent quality of service regardless of the location and the networks used.

Price-wise FM integrated services may be cheaper, since there are economies of scope in retailing (marketing, selling and billing). The integration of networks may however also create additional costs. The price of the handset will largely depend on the scale realised, with cheaper handsets becoming possible if mass production takes up. For the short-term future, the scales are not yet there to allow low-cost handsets, and suppliers of FM integrated services may have to subsidize handsets to provide an incentive for customers to switch from purchasing separate fixed and mobile services to a FM integrated service.

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10 Examples are France (Neuf Cegetel's Beautiful Phone), or the UK (BT's Fusion).
11 Deutsche Telekom's T-One.

4 Does FM substitution, bundling and integration change market boundaries?

The analysis underlying the Commission's initial *Recommendation* of markets susceptible to ex ante regulation is based on a strict separation of fixed and mobile markets. The draft of the revised *Recommendation* reduces the number of markets susceptible to ex ante regulation, but the boundaries of the markets examined remain the same as in the initial *Recommendation*. With little modifications, the Commission's market definitions have been generally echoed by the NRAs, when carrying out the first round of market reviews. A summary of the market definitions is shown in Table 1.

Table 1: Relevant markets assessed for the Commission's Recommendation

Value chain	Relevant retail markets	Related relevant wholesale markets
(1)	**(2)**	**(3)**
Fixed narrowband	Fixed narrowband access (1)	ULL
	Fixed national calls (1)	ULL; Wholesale call termination on individual fixed networks; Wholesale fixed call origination; Wholesale transit
	Fixed international calls (1)	
	Narrowband Internet access (2)	Wholesale fixed call origination
Fixed broadband	Fixed broadband access (3)	ULL; Wholesale broadband access
Mobile narrowband	Mobile services (4)	Wholesale call and SMS termination on individual mobile networks (5) Wholesale access and call origination on mobile networks
Mobile broadband	Mobile data services	-

Notes:

(1) In the initial *Recommendation*, the Commission distinguished between two markets, one for residential customers and one for non-residential customers. The distinction is no longer used in the draft of the revised *Recommendation.*

(2) Bundle of narrowband calls and Internet connectivity.

(3) Bundle of broadband connection and Internet connectivity.

(4) Bundle of mobile access, national and international calls and SMS, international roaming.

(5) The initial *Recommendation* did not include SMS termination in the wholesale mobile termination markets. The draft revised *Recommendation* included SMS termination.

Note that the Table above looks at all relevant markets assessed by the Commission, and not only at relevant markets finally identified as being susceptible to ex ante regulation. Column (1) distinguishes between four value chains: fixed narrowband, fixed broadband, mobile narrowband and mobile broadband. Column (2) lines up the associated relevant retail markets. Column (3) adds the related relevant wholesale markets. Note that the same wholesale market may be linked to several retail markets; e.g., ULL

is related to four retail markets (fixed narrowband access, fixed national calls, fixed international calls and retail broadband access).

Neither the Commission, nor NRAs, have defined markets for FM bundled products. Moreover, FM integrated products, at most, were nascent at the time of publication of the *Recommendation*, and regulators therefore had no reason to assess their impact on competition.

Are FM substitution, bundling and integration likely to affect the traditional market boundaries as reflected in the current Commission *Recommendation* and NRAs' market reviews? In the following section, we will explain the methodological approach to this issue and provide some tentative answers.

FM substitution

Figure 2 illustrates how FM substitution may affect traditional market boundaries. Historically, we have one of the following two situations: Case (1) in the Figure depicts the situation where there is a distinct market for fixed services and another one for mobile services (for simplicity, we neglect the split between access and outgoing calls for fixed). Case (2) stands for a situation where fixed markets are further segmented according to customer types, e.g. in low-usage and high-usage customers, or residential and non-residential customers as suggested in the initial *Recommendation*. Compared to (1), such a segmentation requires a break or gap in the chain of substitution between alternative tariff and service options targeted at the two different customer groups.

FM substitution can impact on the traditional market boundaries in the following ways:

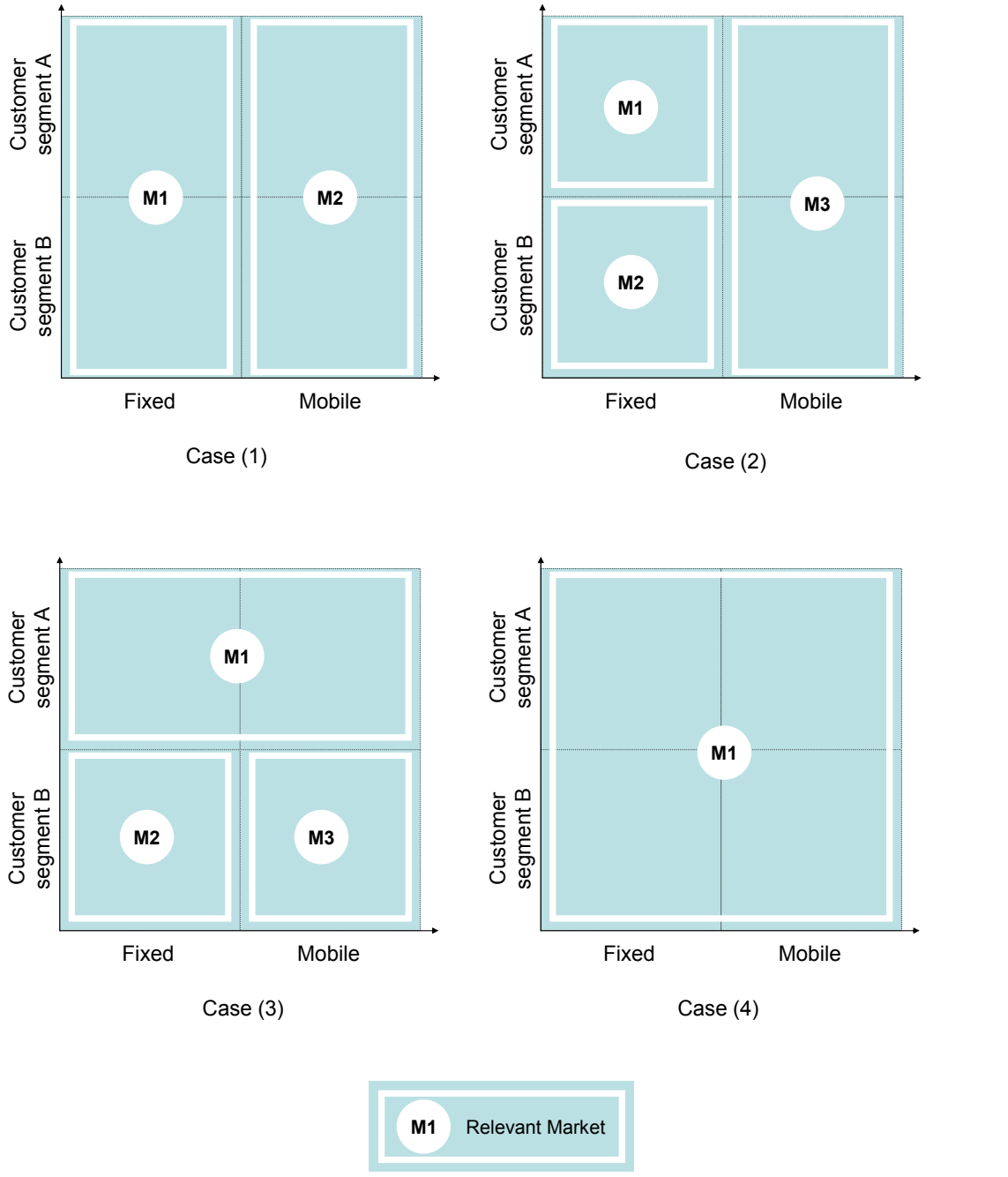
1. FM substitution is weak, and the traditional market definitions as depicted in cases (1) or (2) remain unaffected.

2. FM substitution is more pronounced and impacts in particular on customer segment A, e.g., low-usage or residential customers. If the traditional market definition is (1), the increased competition in customer segment A could lead to a break in the chain of substitution on the fixed side creating a disconnect between low-usage and high-usage customers, or residential and non-residential customers. FM substitution would turn case (1) into case (2). If a break already exists between the two customer groups - in other words: if we traditionally already have situation (2) - FM substitution could reinforce the gap. Market boundaries as depicted in (2) would not be affected, but the outcome of the market analysis could change.

3. FM substitution is particularly strong for customer group A (low-user customers). It could lead to a converged market for this customer group by transforming cases (1) or (2) into case (3).

4. FM substitution is strong and affects all customer segments. Chain substitution is also strong enough to prevent a disconnect between types of customer groups, and between fixed and mobile offerings. We end up with one converged market for fixed and mobile services for all customer types. Case (1) or (2) is transformed into case (4)

Figure 2: FM substitution and market definition



When determining the impact of FM substitution on market boundaries in practice, we face the difficulty that FM substitution does not affect all fixed customers in a similar way. Because there is no average or representative customer our analysis can focus on, we have to rely on a hypothetical monopolist test. The hypothetical monopolist test is concerned with the response of consumers at the *margin* and not with the response of average or typical users. It examines whether there are enough *marginal* customers which would make any attempt by a hypothetical monopolist firm to increase price for a fixed service unprofitable. The test asks whether a hypothetical monopolist supplier of a fixed service would be able to permanently increase its price above the competitive level by a small but significant amount, i.e. 5-10%, without loosing sales that would make the price increase unprofitable. To give an example: If a price increase for a fixed service, say fixed national calls, would be profitable, FM call substitution would *not* be strong enough to justify a converged market. In other words, mobile national calls would not be part of the same relevant market as fixed national calls. In contrast, if a price increase for fixed national calls would be unprofitable, mobile national calls would be in the same relevant market as fixed national calls.

The hypothetical monopolist test can be made operational by a critical loss test. The critical loss is the relative loss of sales which would render a 5 (or 10) % increase of the price of a fixed service unprofitable to a hypothetical monopolist. The critical loss (expressed as a proportion of the initial amount of sales) can be mathematically expressed as

$$(1) \qquad CL = \frac{\Delta q}{q} = \frac{\Delta p/p}{(\Delta p/p) + m}.$$

where $\Delta p/p$ is the assumed price increase (0.05 or 0.10) and m is the price-cost margin (the difference between the initial price and the marginal cost, expressed as a ratio of the initial price).[12] Hence, the critical loss can be calculated once the price-cost margin for the fixed service is known.

The critical loss can be transformed into a critical price elasticity of demand. This critical price elasticity is the price elasticity which would have to exist in reality in order to render a 5% or 10% price increase for a hypothetical monopolist unprofitable. The critical price elasticity can be expressed as

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12 See Harris, B.C. and Simons, J.J., „Focusing Market Definition: How Much Substitution is Necessary?“, Research in Law and Economics 12 (1989), pp. 207-226. See also LECG, Quantitative Techniques in Competition Analysis, Research Paper Prepared for the Office of Fair Trading, London 1999, pp. 77-85, or Cave, M., Stumpf, U. and Valletti, T., A Review of certain markets included in the Commission's Recommendation on Relevant Markets subject to *ex ante* Regulation, An Independent Report, 2006 (“Economic Experts Report”), pp. 10-13. For a recent application of the critical loss test by Ofcom, see Ofcom, Review of the wholesale broadband access markets 2006/07, Consultation document, 21 November 2007, pp. 164-170.

(2) $$CLE = \frac{\Delta q/q}{\Delta p/p} = \frac{1}{(\Delta p/p) + m}.$$

Table 2 shows the critical loss and the critical price elasticity for a 5 and 10 % price increase and for different price-cost margins ranging from 0.10 to 0.90.

Table 2: Critical loss and critical price elasticity

Price-cost margin (m)	Price increase ($\Delta p/p$)			
	0.05		0.10	
	CL	CLE	CL	CLE
0.10	0.33	6.7	0.50	5.0
0.20	0.20	4.0	0.33	3.3
0.30	0.14	2.9	0.25	2.5
0.40	0.11	2.2	0.20	2.0
0.50	0.09	1.8	0.17	1.7
0.60	0.08	1.5	0.14	1.4
0.70	0.07	1.3	0.13	1.3
0.80	0.06	1.2	0.11	1.1
0.90	0.05	1.1	0.10	1.0

If the actual price elasticity for a fixed service, say fixed calls, is at least as high as the critical level, a price increase for fixed calls above the competitive level would be unprofitable for a hypothetical monopolist, and mobile calls should be included in the same relevant market as fixed calls. If the actual price elasticity is below the critical level, mobile calls should not be included in the same relevant market as fixed calls.

Price-cost margins, and hence the related critical price elasticities, can be derived from cost-modelling. The price-cost margins for fixed narrowband access and calls which we suggest below are rough estimates subject to further verification. The value suggested for retail broadband access has been estimated by Ofcom.[13] Even though the suggested values of the price-cost margins lie within a broad range, the rough order of magnitude is in many cases sufficient to allow conclusions.

Actual price elasticities for retail narrowband access and calls are taken from econometric studies found in the literature, many of them are for countries outside the EU. More

13 Ofcom, Review of the wholesale broadband access markets 2006/07: Identification of relevant markets, assessment of market power and proposed remedies, Consultation Document, 2006, Annex 4.

up-to-date estimates would be based on consumer surveys in EU Member States, such as the ones for retail broadband access used by Ofcom.

FM call substitution

For fixed calls, the price-cost margins is likely to be in the neighbourhood of 0.6 to 0.9. This suggests a critical price elasticity of demand between 1.1 and 1.5 for a price increase of 5 % and between 1.0 and 1.4 for a price increase of 10 % (see Table 2).

Estimations of price elasticities of demand for fixed calls are limited to a few countries.[14] Price elasticities for fixed calls differ between types of calls, with local calls having the lowest elasticities (0.04 to 0.11) and long-distance national and international calls having the highest elasticities (0.10 to 1.55 respectively 0.30 to 1.54).[15] The evidence is not fully conclusive. While for local calls, the estimated elasticities seem to be generally lower than the critical level, they lie both below and above the critical level for national and international calls.

It should also be noted that many of the price elasticity estimations cited refer to countries outside the EU. Furthermore, the estimations are likely to be outdated, since they are based on older data. Two opposing recent developments are not reflected in the data. *First*, fixed calls prices have decreased over time as a result of competition based on carrier selection. As we move down the demand curve for fixed calls, the price elasticity of demand decreases. *Second*, mobile calls have converged towards fixed calls in terms of quality and price. As a result, the demand curve for fixed calls has shifted to the right, resulting in an increase in the price elasticity of the demand for fixed calls for a given fixed calls price level. The net effect could be an increase or decrease in the price elasticity for fixed calls.

NRAs will have to carry out further empirical examinations to determine the impact of FM call substitution on market boundaries in their particular country. Consumer surveys are required to establish actual price elasticities and allow an assessment of whether demand-side substitution is strong enough to justify the definition of converged calls markets.

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14 Estimates of price elasticities of demand for fixed and mobile services have been extensively discussed in the context of the New Zealand Commerce Commission's consideration of the allocation of the costs of the Telecommunications Service Obligation (TSO). See Hird, T., Efficient Recovery of TSO Costs, A Report Prepared by NERA, Sydney, October 2003, pp. 22-33; and Frontier economics, Critique of NERA Report on Efficient Recovery of TSO Costs. Report prepared for Vodafone New Zealand, October 2003; as well as the Contribution of Vodafone on the "Review of price elasticities of demand of fixed line and mobile telecommunications services", Contribution, August 2003. The latter (p. 8) surveys the empirical evidence cited here.

15 Note that we use here and in the following absolute values for price elasticities.

FM narrowband access substitution

The price-cost margin for fixed narrowband access is likely to be much lower than for fixed calls. We estimate it not to be higher than 0.5, possibly lower. The critical price elasticity for a cost-price ratio of 0.5 is 1.8 for a 5 % price increase and 1.7 for a 10 % price increase (see Table 2 above). Lower values of price-cost margins for fixed narrowband access would result in higher critical price elasticities.

Traditionally, the demand for fixed narrowband access is significantly less price elastic than the demand for calls.[16] The price elasticities of demand for fixed line rental reported in the literature are below 0.1. Again the estimates may be outdated and price elasticities may have changed. It is however unlikely that actual price elasticities of demand for fixed narrowband access may have risen above the critical value of 1.7 or 1.8.

In the new Member States, fixed networks are less rolled out than in the old Member States, and 2G mobile networks provide coverage in lower density areas, where fixed networks do not. In those Member States, mobile penetration rates are typically higher than fixed penetration rates. This is sometimes taken as evidence of more FM substitution. However, the substitutability of mobile for fixed is not affected by how much mobile coverage exceeds fixed coverage. This is clearly revealed in the hypothetical monopolist test which asks whether a small but significant increase in the price of fixed narrowband access would lead to a loss of fixed subscriber lines high enough to make the price increase unprofitable. The answer to this question is not affected by mobile coverage being better than fixed coverage.

FM broadband access substitution

Ofcom has estimated that the proportion of marginal costs to prices for retail broadband offerings lie within a range of 0.25 to 0.50, in other words, the price-cost margin lies within a range of 0.50 to 0.75.[17] Hence the critical price elasticity lies between and 1.3 and 1.8 for a 5 % price increase and between 1.2 and 1.7 for a 10 % price increase (see Table 2 above). Given the relatively low uptake of mobile broadband so far in comparison with fixed broadband, it is doubtful whether a sufficient number of mobile customers would regard mobile broadband as a substitute in order to fulfil a hypothetical monopolist test.

FM bundling

Economies of scope on the supply side and transactional economies on the demand side provide an incentive for suppliers and customers to offer and purchase fixed and mobile services as a bundle. However, this does not necessarily justify defining a rele-

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16 See the references cited in footnote 14.

17 Ofcom, Review of the wholesale broadband access markets 2006/07: Identification of relevant markets, assessment of market power and proposed remedies, Consultation Document, 2006, Annex 4.

vant market for FM bundles. Customers who purchase a FM bundle from a single supplier may return to purchasing individual components from several suppliers if the price of the bundle is increased above its competitive level. If that is the case, the FM bundle will not create a separate relevant market in the competition law sense; instead the components will be part of distinct relevant markets.[18]

FM integration

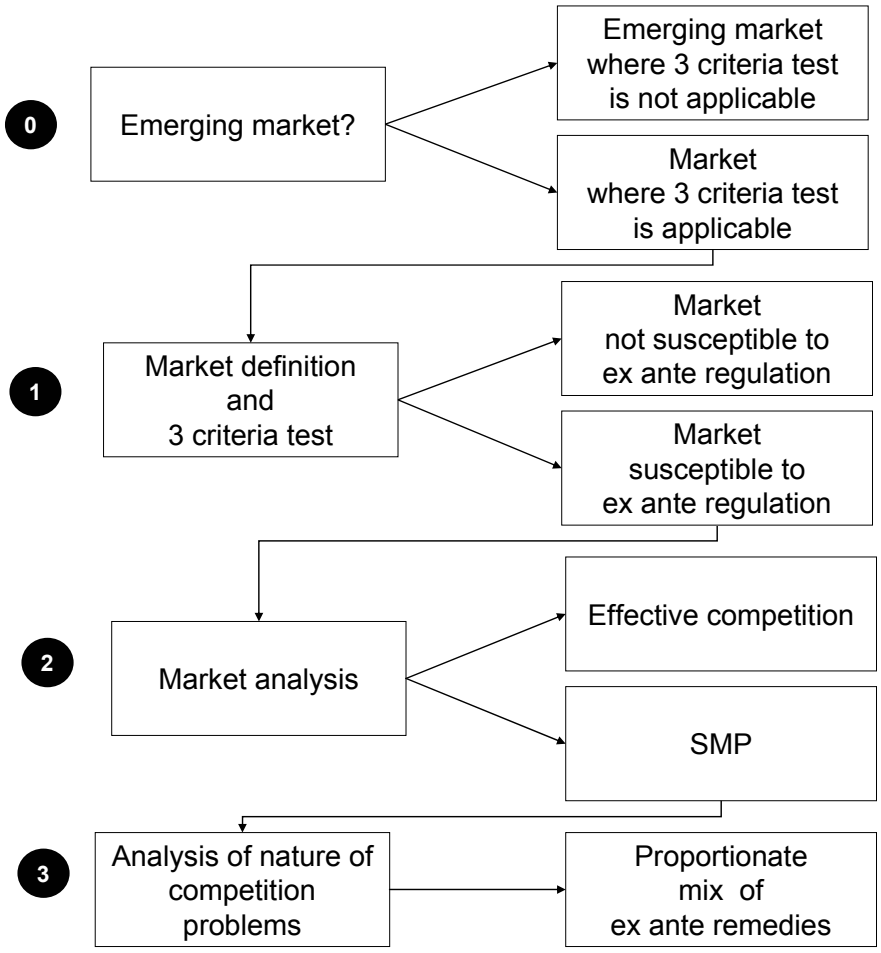
The take-up of FM integrated services is still negligible. As the Working Paper of the Commission on the draft revised *Recommendation* put it, FM integration "is not expected to be a widespread phenomenon during the life of the revised *Recommendation*". Any current assessment is explorative rather than based on empirical evidence. We would nevertheless expect that, in contrast to FM bundling, FM integration is likely to create a new relevant market in the future. A FM integrated service is different from a simple FM bundle, because it provides added features and superior functionality. Applying a hypothetical monopolist test to a FM integrated service is unlikely to show that purchasers of FM integrated services will switch back to purchasing separate fixed and mobile services in case of a price increase for the FM integrated service above the competitive level.

18 The Commission in its Working Paper to the draft revised *Recommendation* (p. 16) has argued in a similar way.

5 Does FM substitution, bundling and integration affect ex ante regulation?

The EU regulatory framework has a number of built-in triggers for regulatory change which, in principle, allows it to respond to market developments such as FM substitution, bundling and integration. Regulatory changes are triggered in three ways as illustrated in Figure 3.

Figure 3: Triggers of regulatory change



The *first* trigger is the susceptibility of a market to ex ante regulation. A market can only be identified as susceptible to ex ante regulation if three criteria are cumulatively satis-

fied.[19] The market must be characterised by high and non-transitory barriers to entry. There should be no dynamic trends to effective competition behind the barriers to entry. And application of competition law alone should not be sufficient to address any market failure. For example, even if FM substitution is not intense enough to justify a merged market, it could, together with Voice-over Broadband ("VoB"), drive fixed narrowband markets towards effective competition over a longer timeframe. Moreover, FM integration could create new markets, where potential competition problems merit an examination. Emerging markets should however not be made susceptible to ex ante regulation.[20]

The *second* trigger is SMP, as a result of which ex ante obligations have to be imposed. An undertaking is deemed to have SMP if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciably extent independently of competitors, customers and ultimately consumers.[21] On the one hand, FM substitution could erode existing SMP positions of fixed operators. On the other hand, FM bundling and integration could create new competition problems.

The *third* trigger is the appropriateness and proportionality of ex ante regulations, a trigger which is somewhat vague in practice. In principle, the mix of ex ante regulations chosen by NRAs has to be proportionate and should match the potential competition problems identified. E.g., if FM substitution erodes market power, but without fully removing SMP, the increased competition should be reflected in a lighter mix of remedies.

The triggers have also an important institutional side, which impacts on the speed of regulatory change. In principle, it is the NRA which is in charge of managing regulatory change, in other words: it is the NRA which pulls the trigger. However, the decisions of NRAs are strongly influenced by the Commission through recommendations, guidelines, guidance in various forms, and a potential veto. The European Regulators Group also plays an important albeit more indirect role.

First, the Commission issues a *Recommendation* on markets susceptible to ex ante regulation. The *Recommendation* creates a presumption for the NRA that the three criteria are met for a list of markets. In case national circumstances are different, NRAs can do their own three-criteria test to demonstrate that a recommended market is not susceptible to ex ante regulation, or a non-recommended market is susceptible to ex ante regulation. If NRAs deviate from the *Recommendation*, the Commission has the right to comment on, and eventually veto, such a decision. In sum, as far as susceptibil-

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19 The three criteria test is outlined in Recitals 9-16 of the initial *Recommendation.* In the draft *Revised Recommendation* the three criteria are discussed in Recitals 4-12.

20 Recital 5 of the draft of the *Revised Recommendation* defines emerging markets as markets, "where due to their novelty it is impossible to apply the 3 criteria". Emerging markets "should not in principle be subject to ex ante regulation even if there is a first mover advantage."

21 Art. 14.2 *Framework Directive*.

ity to ex ante regulation is concerned, the Commission sets the pace. NRAs have the burden of prove that national circumstances require a different approach.

Second, NRAs have to take utmost account of the Commission SMP Guidelines, when analysing a market susceptible to ex ante regulation.[22] The NRA's market analysis is subject to Commission comments and veto. Through its influence on the market analysis, the Commission can push NRAs towards what it considers to be best practice. NRAs may also comment on notifications of fellow NRAs, but have consistently refrained from doing so.

Third, NRAs should take account of the ERG remedies document as well as guidance voiced in the Commission's comments, when selecting remedies. "NRAs shall contribute to the development of the internal market by cooperating with each other and with the Commission in a transparent manner to ensure the consistent application, in all Member States, of the provisions of this Directive and the Specific Directives. To this end, they shall, in particular, seek to agree on the types of instruments and remedies best suited to address particular types of situations in the market place."[23] The Commission does not have the power to veto the remedies chosen by NRAs.

FM substitution, bundling and integration can impact on all three triggers of change. In the following, we assess the likely result taking into account the institutional background. Table 3 lays out the analysis of the Commission in its draft revised Recommendation, which serves us as a starting point. Column (1) shows the relevant retail markets assessed by the Commission. Column (2) summarises the Commission's findings on whether such retail markets would be characterised by competition problems absent any ex ante regulation at retail and wholesale levels. Column (3) shows the related wholesale markets that are susceptible to ex ante regulation. Where wholesale intervention is not sufficient to render competition at the retail level effectively competitive, the retail market is also susceptible to ex ante regulation, as indicated in column (4).

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22 Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services (2002/C 165/03).

23 Art. 7.2 *Framework Directive*.

Table 3: Markets susceptible to ex ante regulation in the Commission's draft revised Recommendation

Retail market	Competition problems absent regulation?	Wholesale markets susceptible to regulation?	Retail market susceptible to regulation?
(1)	(2)	(3)	(4)
Fixed narrowband access	Yes	ULL	Yes
Fixed outgoing national calls (1)	Yes	Call termination on individual fixed networks; ULL; Call origination; Local-tandem and inter-tandem transit (6)	No
Fixed outgoing international calls (1)	Yes		No
Dial-up Internet calls (2)	Yes	Call origination	No
Retail broadband access (3)	Yes	ULL; Whs. broadband access	No
Mobile access and outgoing calls (4)	Yes	Call & SMS termination on individual mobile networks; MACO (5)	No
Mobile data services	Emerging market	No	No

Notes:

(1) PSTN/ISDN calls and voice-over-broadband calls.

(2) Call to ISP bundled with Internet connectivity.

(3) Broadband connection bundled with Internet connectivity.

(4) Also including outgoing SMS as well as international roaming.

(5) The draft revised *Recommendation* included mobile access and call origination (MACO), subject to further consultation.

(6) The draft revised *Recommendation* defined a single market for transit services.

FM call substitution

Retail fixed calls markets are no longer included in the draft revised *Recommendation* on relevant markets susceptible to ex ante regulation. Hence, NRAs must not bother about the impact of FM call substitution at the retail level, notably about the question whether FM call substitution leads to converged markets or not. Besides, carrier select calls and voice-over-broadband calls are already two major competitive forces in the fixed calls markets, which seem to assure alone that, in most Member States, the three-criteria test for susceptibility to ex ante regulation is no longer fulfilled. *First*, even with a narrow market definition, the markets for fixed national and international calls are no longer characterised by high and non-transitory barriers to entry given that wholesale call origination and carrier selection/carrier preselection have become effectively implemented in most EU Member States. *Second*, even if barriers persist, the dynamics

behind the barriers reveal a tendency to more competition, essentially fuelled by new voice-over-broadband services and FM substitution. *Third*, competition law alone is likely to be able to cope with remaining competition problems such as margin squeezes.

The margin squeeze issue merits a closer look, since it is often assumed that removal of ex ante regulation at the retail calls level would aggravate the problem. In fact, this is not necessarily true. *First*, if wholesale interconnect charges are regulated at cost-based levels, a margin squeeze is unlikely to occur unless the incumbent is able to cross-subsidise losses of its retail calls division. Regulators can prevent cross-subsidisation of retail calls by retail access if SMP regulation sets the price of retail access and/or wholesale line rental at a cost-based level. *Second*, cross-subsidisation could also be inter-temporal and fuelled by future profits once the margin squeeze has driven CS/CPS competitors out of the market. Entry barriers for re-entering the calls market however are low given the availability and continued SMP regulation of most wholesale inputs for CS/CSP operators. Even more important, given the uptake of voice-over-broadband and voice-over-Internet, the scope for raising retail prices for fixed narrowband calls in the future is unlikely to be a realistic perspective. For these reasons, margin squeezes do not appear to be a rational strategy and therefore are unlikely to be a major competition problem in retail calls markets.[24]

FM narrowband access substitution

In contrast to fixed calls, fixed narrowband access remains a market susceptible to ex ante regulation in the draft revised *Recommendation*. Not including mobile access in the same relevant market as retail fixed narrowband access is clearly justified given the available evidence. Access to the unbundled local loop alone is unlikely to render the retail fixed narrowband access market competitive over the lifetime of the revised *Recommendation*. *First*, FM narrowband access substitution does not seem to justify a broader market definition at this point in time. While it intensively affects a particular segment of the market, we do not think that this segment is large enough to justify the merging of fixed and mobile in a single narrowband access market. The fixed narrowband access market also continues to be characterised by high and non-transitory barriers to entry given the lengthy process of rolling out access networks on the basis of unbundled local loops. It should also be noted that, in many Member States, ULL does not play a major role in providing fixed narrowband access. In these jurisdictions, the emphasis of alternative operators clearly is on shared access, using it for providing broadband access. *Second*, while FM substitution impacts on the second criterion - the dynamics of competition behind the barriers – the impact does not seem to be strong enough to justify removing the fixed narrowband access market from the list of markets susceptible to ex ante regulation.

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24 Economic Experts Report on the Relevant Markets Recommendation, p. 64-65.

Given the high market shares, the insufficient potential competition coming from ULL based carriers, and the lack of countervailing purchasing power for fixed narrowband access, SMP is likely to persist. Hence the case of maintaining ex ante regulation. Regulators should however not neglect that mobile narrowband creates more competition for low-intensity users. A simply price cap at the retail level appears to be sufficient and, where FM substitution is pronounced enough, wholesale line rental may not be required as a remedy.

FM broadband access substitution

Fixed retail broadband access is not included in the *Recommendation* on markets susceptible to ex ante regulation, and NRAs usually limit regulatory intervention to the wholesale level. For the retail market, even the first criterion is not fulfilled. If ULL, and in particular wholesale broadband access are effectively implemented, barriers to entry to the retail broadband access market are sufficiently lowered to render competition effective. In addition, cable networks (where they exist) and WiMAX networks are likely to intensify competition behind the barriers (if barriers to entry and expansion remain). Moreover, mobile broadband has the potential to intensity competition in the segment of lower-usage customers, who do not use bandwidth-rich applications such as TV or video-on-demand.

FM bundling

As noted above, FM bundling is unlikely to create new markets. As a result, any competition problems created as a result of bundling must be analysed in relation to existing markets, notably when assessing SMP (market analysis stage) and when examining the appropriateness of ex ante obligations (remedies stage). The ability to bundle fixed and mobile services may increase market power in fixed retail markets and create market power in mobile markets. Access obligations however can only be imposed in markets where SMP can be found. While a mobile operator will easily find a fixed operator for a bundling strategy, it may be more difficult for all fixed operators to find a mobile operator. As long as the market for wholesale access and call origination on mobile networks is not characterised by SMP, mandatory access can not be imposed, and fixed operators have to rely on commercial incentives to find a partner for fixed-mobile bundling strategies.

FM integration

We have argued above that FM integrated services are likely to create a new retail market in the competition law sense. Such a new market is nascent and not included in the revised *Recommendation*. This raises the question if the Commission (in a future Recommendation) or an NRA (in a prior action based on Article 7) should define a relevant market for FM integrated services as a market susceptible to ex ante regulation. Recital 27 of the *Framework Directive* notes that “newly emerging markets, where de

facto the market leader is likely to have a substantial market share, should not be subjected to inappropriate obligations".[25]

The rationale not to make emerging markets subject to ex ante regulation is that only the prospect of a first-mover advantage would provide the incentive to undertake the investment in new products and create the new market. In other words, the benefits of the new products outweigh the risk that this market could also become foreclosed to competitors. Clearly the temporary exemption of an emerging market from ex ante regulation applies not only to retail remedies but also to wholesale remedies. Those network elements which are based on the investment should not be made subject to ex ante regulation. Regulators will therefore have to identify in which part of the value chain the investment takes place, and whether it is significant.

The most significant investment in relation to FM integration appears to be related to network integration in order to ensure seamless handover between WLAN and mobile networks. In turn, integration of voice mail systems, implementation of a single number etc. do not appear to be of an order of magnitude to justify a regulatory exemption. The development of appropriate handsets with multi-mode capability may require significant investments, but these investments will be carried out by handset manufacturers. Furthermore, regulators should not consider regulatory action as long as markets for integrated FM services are nascent and undeveloped.

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25 See also para. 32 of the *SMP Guidelines* which explain that "this is because premature imposition of *ex-ante* regulation may unduly influence the competitive conditions taking shape within a new and emerging market. At the same time, foreclosure of such emerging markets by the leading undertaking should be prevented. Without prejudice to the appropriateness of intervention by the competition authorities in individual cases, NRAs should ensure that they can fully justify any form of early *ex-ante* intervention in an emerging market, in particular since they retain the ability to intervene at a later stage, in the context of the periodic re-assessment of the relevant markets." This is simply echoed by Recital 15 of the initial *Recommendation*, but Recital 5 of the draft revised *Recommendation* the Commission proposes a precision: "Emerging markets, i.e. markets where due to their novelty it is impossible to apply the 3 criteria, should not in principle be subject to ex ante regulation even if there is a first mover advantage." The Commission Working Paper, in FN 14, uses a similar wording in defining emerging markets as "markets which are so new and volatile that it is not possible to determine whether or not the '3 criteria' test … is met".

6 Conclusion

Historically, regulators have relied on a regulatory architecture that is based on distinct relevant markets for fixed and mobile services, both at the retail and wholesale level. FM substitution, bundling and integration are developments that could put into question this approach. However, a paradigm shift is not yet warranted for the majority of Member States concerned. Clearly, leaving possible exceptions of very few Member States aside, regulators do not require a new approach when tackling the next round of market reviews. *First*, fixed-mobile substitution at the broadband access level is still nascent. Fixed-mobile substitution at the narrowband access level, while clearly affecting certain customer groups, does not justify the creation of a converged market. The case may be less clear for calls, but the question whether calls markets should be converged is of lesser relevance. In most countries, competition as a result of carrier selection and carrier preselection as well as voice-over-broadband allows to abandon ex ante regulation of retail fixed calls markets even where fixed-mobile call substitution is weak.[26] *Second*, fixed-mobile integration, while potentially giving rise to new relevant markets, is not sufficiently advanced to justify regulatory action. *Third*, any competition problems related to fixed-mobile bundling should be analysed within the framework of existing market definitions.

26 Exceptions are those Member States where interconnection and carrier selection is still associated with difficulties and broadband penetration is low.

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