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## Do we (still) need to regulate fixed network retail markets?

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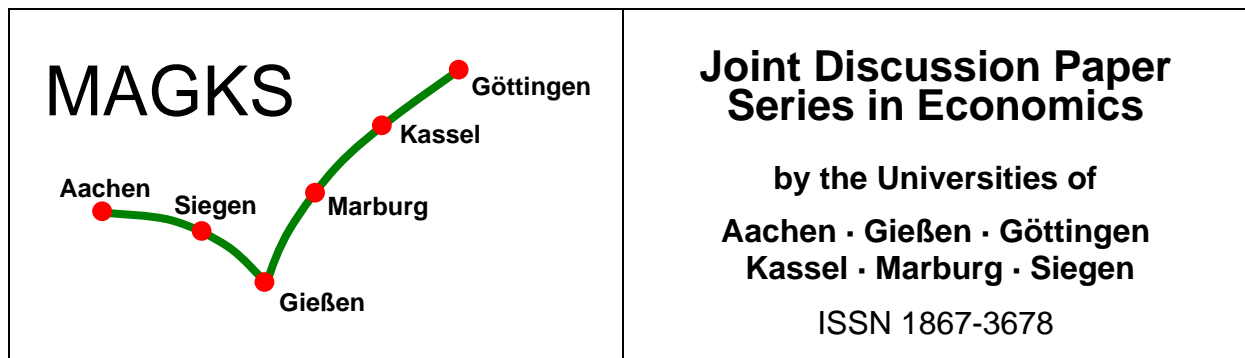
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**No. 26-2008**

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# Do we (still) need to regulate fixed network retail markets?

Wolfgang Briglauer\*, Georg Götz\*\*, Anton Schwarz\*<sup>†</sup>

November 2008

## Abstract

In the beginning of fixed network liberalisation in Europe in the late 1990s, the main concern of regulators was to lower calls prices. This was done by introducing wholesale regulation and promoting service based competition. Some years later, the concern of some regulators turned from too high calls prices to too low calls prices which might 'squeeze' entrants out of the market. We look at a simple model in which this development is explained by increasing competitive pressure from an 'outside opportunity', e.g. mobile telephony. We conclude that a margin squeeze is not necessarily used by the incumbent as a device to drive competitors out of the market and increase market power but can also result from increased inter-model competition. If this is the case, we argue that regulators should consider alternatives to cost oriented access prices such as retail minus or complete deregulation.

**Keywords:** access regulation, vertical integration, foreclosure, price squeeze, telecommunications, fixed networks

**JEL:** L12, L41, L42, L50, L96

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The views expressed are those of the author entirely and do not necessarily represent those of RTR or the Telekom-Control-Kommission (TKK). The usual caveat applies.

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# 1 Introduction

In 1997/98 the markets for fixed network voice telephony in Europe were opened to competition by granting alternative operators non-discriminatory access to regulated inputs from the incumbent operator (the formerly state owned monopoly provider and the only operator with a nation-wide network). The main forms of access which rapidly stimulated competition on retail markets for calls were carrier selection (CS) and carrier pre-selection (CPS): The alternative operator can buy origination, termination, and possibly transit services from the incumbent at regulated prices and only needs minimal infrastructure investments (at least one switch and point of interconnection with the incumbent operator are required) to offer calls services based on CS/CPS at the retail market.<sup>1</sup> Origination and termination take place in the network of the incumbent. Accordingly, the customer remains physically subscribed to the incumbent's network and can choose whether to use the incumbent or the entrant for making his calls. The initial success of carrier selection can be attributed to that relative ease of market entry, which has put pressure on the incumbent to lower prices on call markets. CS/CPS is still important today.<sup>2</sup>

In addition to regulation at the wholesale level, most countries also regulate the retail prices of the incumbent operator. Originally, the goal of this regulation was to protect consumers from 'excessive' pricing by the incumbent operator. Over time, as retail prices of the incumbent decreased, another issue arose: The incumbent might – absent retail price regulation – set the price of calls services so low that an equally efficient entrant in the downstream segment could not survive given the regulated access charge. Such price

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<sup>1</sup> For simple minute reselling business cases the list of activities necessary is reduced even further.

<sup>2</sup> According to European Commission (2008), Volume 2, p. 50, around 30% of EU subscribers use an alternative operator for international calls and around 28% for national calls. Only 13.5% of this is direct access while the rest is CS/CPS.

setting by the incumbent operator is also called margin squeeze or price squeeze and is now a main concern for most European regulators.

The topic of retail regulation gained new importance when the European Commission published a new Recommendation on Relevant Telecommunications Markets<sup>3</sup> in 2007, which holds that regulation on retail fixed network calls markets is unlikely to be necessary any longer (see Appendix for details of the EU regulatory framework). The main argument for this was that wholesale regulation and general competition law should be sufficient to address any competition problems which may arise on these markets. The main questions for NRAs therefore are: (i) Is ex ante regulation for retail calls markets (still) necessary, (ii) will regulation on retail access markets be sufficient or (iii) is regulation of wholesale access markets (origination, termination and possibly transit) sufficient to address (potential) competition problems? And if NRAs indeed cease to regulate the calls markets, (iv) which form of wholesale regulation is most appropriate? These issues will be of utmost importance in the upcoming market analyses (starting in 2009 in most member states).

To investigate these questions, we look at a simple model where a vertically integrated incumbent provides access to an essential input to an alternative operator (the ‘entrant’). We consider competition in homogenous goods and compare market outcomes under various regulatory regimes. The model setup draws on Briglauer/Götz/Schwarz (2008) where the more complex case of competition in differentiated products is discussed. A main difference to previous work on fixed network access regulation<sup>4</sup> is that we explicitly

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<sup>3</sup> European Commission (2007).

<sup>4</sup> See for example the seminal models of Armstrong (2002) and Laffont/Rey/Tirole (1998a and 1998b), the literature on sabotage (e.g. Economides (1998), Sibley/Weisman (1998), Beard/Kaserman/Mayo (2001), Weisman (2003), Mandy/Sappington (2007)) or the models in Biglaiser/DeGraba (2001), Gans/King (2005) or Sarmento/Brandao (2007).

model two asymmetries between the incumbent and the entrant: (i) While the incumbent is assumed to have zero marginal costs per minute within given capacity constraints, the entrant has the wholesale access charge as (perceived) positive and substantial marginal costs.<sup>5</sup> We call this the ‘vertical asymmetry’. (ii) The tariff structure of a typical incumbent corresponds to a two-part tariff. We therefore allow the incumbent to set a fixed fee and a price per minute. The entrant on the other hand can only set a linear price per minute.<sup>6</sup> We call this the ‘horizontal asymmetry’. Both of these asymmetries appear important when dealing with the service-based type of intra-modal competition we focus on.

Our modelling of competition in fixed network calls markets takes as a starting point that around 87% of European subscribers still use the incumbent operator for fixed network access in 2007 (with incumbents’ market shares above 95% in 12 Member States).<sup>7</sup> As noted above, CS and CPS are still the most important competitors in terms of retail market shares. We account for the increasing importance of facilities-based competition – either from within the wire-line sector (‘intra-modal’, e.g. cable networks or local loop unbundling) or from wireless telephony (‘inter-modal’) – by introducing an outside opportunity for consumers into our model. The extent of competitive pressure from the outside opportunity is decisive for the results of our model. Given this setup, we find that a margin squeeze might indeed occur in our model. However, this margin squeeze would not be caused by a foreclosure strategy of the incumbent but would be due to increased

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<sup>5</sup> The wholesale price may constitute up to 50% of total costs.

<sup>6</sup> Although CS/CPS operators could also set two-part tariffs in principle (where the user then pays a fixed fee in addition to the incumbent’s fixed fee), empirical evidence shows that customers are reluctant to accept such an ‘extra’ fixed fee, see for instance WAR (2004). This comes along with an increase in consumers’ demand for ‘one-stop-shopping’ solutions, see for instance RTR (2008), pp. 20-21. Overall, real market behaviour shows that incumbent firms not only employ a single two-part tariff but a rather broad system of non-linear price schedules (including combinations of optional tariffs). In turn, the entrants’ pricing scheme is comparatively realistically represented by simple linear tariffs. In a few European countries, in addition to CS/CPS, a ‘wholesale line rental’ product exists which allows an alternative operator to offer access services to consumers without having own infrastructure in place. We focus on the case where only CS/CPS is available since this applies to the majority of countries.

<sup>7</sup> See European Commission (2008), Volume 2, p. 53.

competitive pressure from other infrastructures such as mobile telephony or cable. The short run profit maximising price of the incumbent might then be below a wholesale access price at average costs and might squeeze entrants out of the market.

The rest of the article is structured as follows: Section 2 outlines the model and considers the unregulated incumbent as a benchmark case. Section 3 looks at a situation where only the fixed fee at the retail level is regulated as it was prior to liberalisation in many countries (there was a maximum fixed fee due to universal service considerations). Section 4 then introduces wholesale regulation and looks at developments which may occur due to increased competitive pressure from outside opportunities (most relevant mobile telephony) if the access price is set at average costs. Section 5 discusses alternative forms of access regulation. Section 6 concludes and contains some final remarks.

## 2 Benchmark: The unregulated incumbent

We consider a simple model where a vertically integrated operator (the incumbent operator  $I$ ) competes with an entrant ( $E$ ) who buys an essential input (origination and termination) at a price  $t$  from the incumbent operator. One unit of the input translates into one unit of output.<sup>8</sup> At the retail level, the incumbent operator is setting a two-part tariff with a fixed fee  $f$  and a per-minute charge of  $p_I$ . The entrant can only set a per-minute charge of  $p_E$ . Consumers subscribe to the incumbent, pay the fixed fee  $f$  and can then decide whether they use the incumbent or the entrant for their calls. For simplification, all other variable costs are assumed to be equal to zero. We assume that the incumbent has network fixed

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<sup>8</sup> Technology for voice-telephony might be described in such a way that producing one minute of retail telephony requires one minute of bundled wholesale services; otherwise, it would be just as right to say that producing one final unit requires (typically or at least) two wholesale inputs: one minute of (local) origination and one minute of (local) termination; in any case technology is characterized by fixed proportions.

costs of  $F$  to cover while the entrant does not face any fixed costs at the wholesale level.

Retail fixed costs are assumed to be zero for both types of operators.

The profit of the entrant is

$$(1) \Pi_E = x_E(p_E - t),$$

while the profit of the incumbent is

$$(2) \Pi_I = f + x_I p_I + t x_E - F$$

with  $x_i$ ,  $i = I, E$ , denoting quantities of the incumbent and the entrant, respectively.

We consider a framework with price competition in homogenous products and linear demand for calls of a representative consumer of the form  $x = a - p$ .

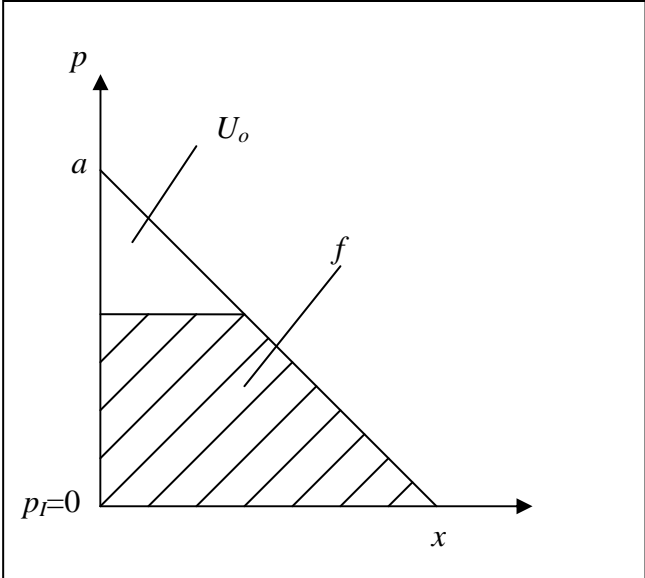
The unregulated incumbent obviously maximises his profit by setting  $p_I = 0$  (as marginal costs are zero) and appropriates all consumer surplus with the fixed fee:

$$(3) f = \frac{a^2}{2}.$$

The fixed fee is equal to the incumbent's profits, part or all of which have to be used to cover the fixed costs  $F$  of the network. If the consumer faces an outside opportunity for making phone calls, e.g. from mobile network operators, potentially providing him a utility



of  $U_o$ , the maximum fixed fee the incumbent can charge is reduced by  $U_o$ . Profits are still maximised by setting  $p_I = 0$  (see Figure 1).<sup>9</sup>



**Figure 1: The unregulated incumbent**

With regard to entry, the incumbent is indifferent between supplying the calls service himself and providing access to equally efficient entrants without market power at  $t^U = p_I = 0$  (where  $t^U$  denotes the unregulated access charge). This result is an instance of the ‘Chicago Critique’<sup>10</sup> of foreclosure according to which there is only one profit which the incumbent can fully skim by means of the fixed fee. If potential entrants are ‘equally efficient retail outlets’, the incumbent is indifferent between internal and external provision. Since the incumbent can always prevent the entrant from increasing prices by setting a retail price of  $p_I = c = 0$ , the entrant has no market power and there is no double marginalisation problem. In the case of  $p_I = p_E = 0$ , we assume that the market is split between the incumbent and the entrant by any arbitrary tie-breaking rule, e.g. 50:50. It has to be noted, however, that voluntary access by an incumbent fixed network operator has, to

<sup>9</sup> We use this simple assumption to allow for effects of inter-modal competition, however, we abstract here from the potential strategic interactions between the different market segments (e.g. mobile vs. wire-line).

<sup>10</sup> See Posner (1975) or Bork (1995).

our knowledge, never been observed in practice. So ‘being indifferent’ might rather be interpreted as ‘no access’.

### 3 Regulated fixed fee $f$

Prior to fixed network liberalization (before 1997/1998) most incumbent operators (many of them state owned) were – implicitly or explicitly – subject to regulation of the fixed fee. Mainly due to universal service considerations, the fixed fee had to be kept below a certain level. This meant that the incumbent could not set calls prices to zero and use the fixed fee to appropriate consumer surplus.

In terms of the model we have to distinguish three cases:<sup>11</sup>

- Case 1:  $f^R$  plus the utility of the outside option  $U_o$  is so small that optimal linear prices are charged (this will occur if  $f^R + U_o < a^2/8$ ).<sup>12</sup>
- Case 2:  $f^R$  plus the utility of the outside option  $U_o$  is in a medium range where it becomes binding with equality, such that a marginal change in  $f^R$  has an effect on calls prices ( $a^2/8 < f^R + U_o < a^2/2$ ).
- Case 3:  $f^R$  is large and no longer binding ( $f^R > a^2/2 - U_o$ ). This brings us back to the unregulated case and therefore will not be further discussed here.

#### Case 1:

The incumbent will set the optimal linear price at  $p_I^* = a/2$  (see Figure 2 left hand side) and is indifferent between granting access at  $t^U = p_I^*$  and supplying the market himself.

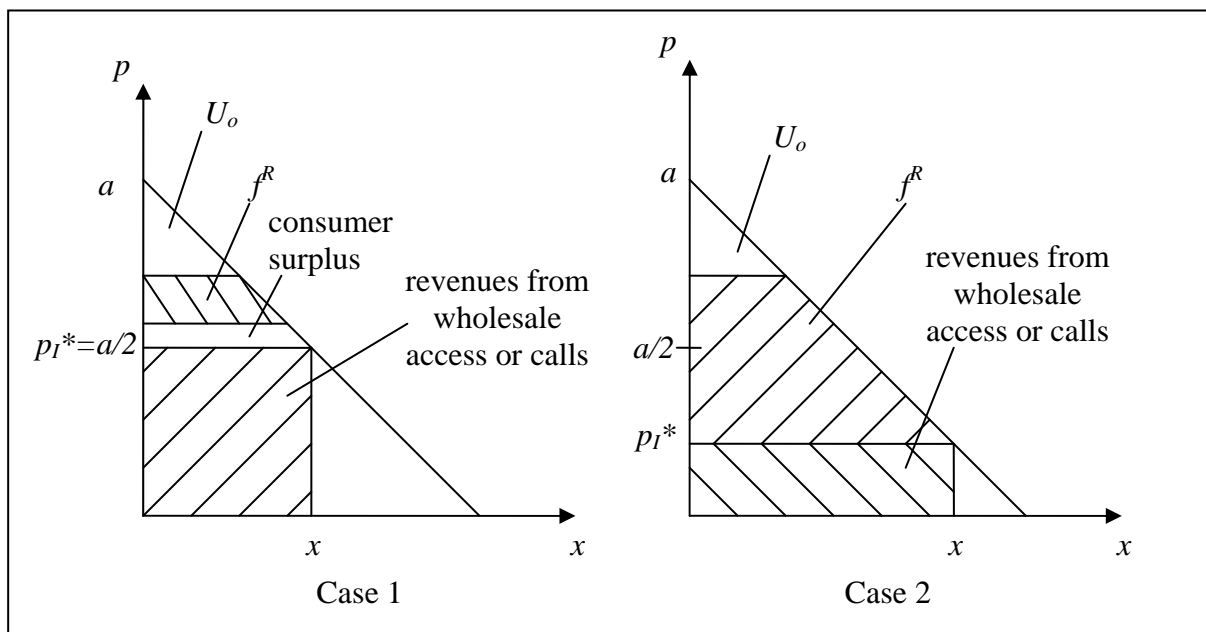
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<sup>11</sup> In the further discussion we call the ‘optimal’ retail price of the incumbent (given the regulated fixed fee  $f$  and/or access charge  $t$ )  $p_I^*$ .

<sup>12</sup>  $a^2/8$  is the consumer surplus with optimal linear prices ( $p_I^* = a/2$ )

**Case 2:**

The incumbent operator will set the retail price  $p_I$  such that the utility from making calls is just as large as the regulated fixed fee  $f^R$  plus the utility of the outside option  $U_o$  (see Figure 2 right hand side). This is the maximum price where a consumer still participates. Again, the incumbent is indifferent between providing access at  $t^U = p_I^*$  and supplying the market himself.



**Figure 2: Optimal retail price with different levels of regulated fixed fee**

As can be seen, the incumbent will withdraw consumer surplus also by means of the calls price if the fixed fee regulation is binding. The optimal calls price will be higher the smaller the regulated fixed fee is (up to the level where the optimal linear price for calls is charged).

The regulation of the fixed fee therefore was one factor which led to a situation with comparatively low fixed fees but comparatively high calls prices prior to liberalisation.

## 4 Fixed fee $f$ and access charge $t$ regulated

One of the main goals of fixed network liberalisation in the end of the 1990s was to bring down retail calls prices. This was done by setting a wholesale access price at ‘efficient’<sup>13</sup> average costs. In terms of our model this would be

$$(4) \quad t^{CO} = c_a + \frac{F}{x_E + x_I} ,$$

where  $t^{CO}$  is the cost oriented access price,  $c_a$  are the marginal (or, in practice, variable) costs of access (which are close to zero). The regulator usually calculates average costs based on accounting data from the incumbent operator and/or engineering models, forecasts quantities for the next period based on the quantities of the previous periods and sets the access price as in (4).<sup>14</sup> However, rather than modelling this procedure we simply treat the access charge as exogenous and analyse the effects of an access charge below or above the optimal retail price of the incumbent. There are two reasons for proceeding in this way. First, we cannot restrict the level of fixed costs  $F$  a priori in a meaningful way. Second, we do not want to enter a discussion about a possible strategic manipulation of the output by the incumbent to affect the access charge. This possibility is due to the problem that an endogenized  $t$  would be determined based on realized quantities. We assume that the incumbent’s profits are high enough in equilibrium so that he can cover at least that part of the fixed costs which is not sunk.

At the beginning of liberalization,  $t^{CO}$  was set below the level of the retail price the incumbent would have charged without access regulation. Such a situation is depicted in

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<sup>13</sup> Efficient means that regulators corrected costs for ‘monopoly inefficiencies’.

<sup>14</sup> The FL-LRAIC (Forward Looking-Long Run Average Incremental Costs) approach has become the cost concept applied by most NRAs within European Member States (see Cullen International (2007)); however, the exact costing methodologies used by NRAs differ gradually with respect to cost bases and cost standards (LRAIC; LRIC; fully distributed costs, embedded direct costs, etc., see IRG (2000)). Since we treat the cost oriented access price as exogenous, these differences are not relevant to our analysis.

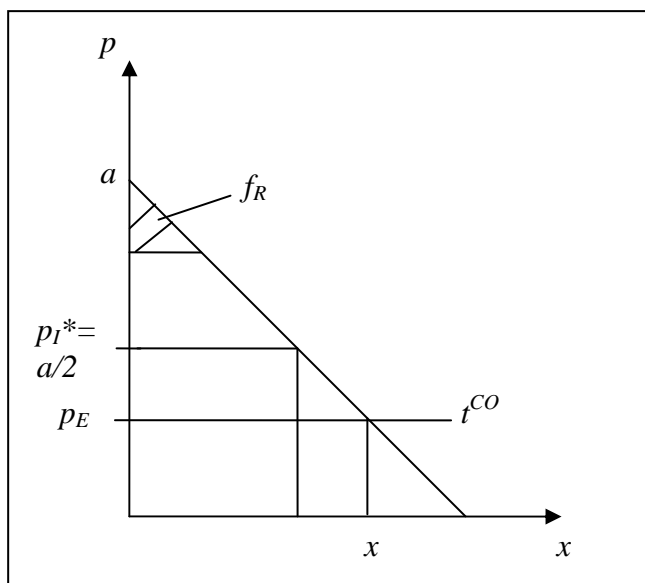
Figure 3. The regulated fixed fee was small and the value of outside opportunities (in particular mobile telephony) still low (zero in Figure 3) which resulted in a high  $p_I^*$ . With an access charge  $t^{CO}$  below  $p_I^*$ , the entrant could undercut the incumbent and gain market shares.

In practice, in the early stages of liberalisation the incumbent's retail prices typically reflected varying degrees of inefficiencies, monopoly rents, and a distorted tariff structure. Given regulated access conditions ( $t^{CO} \ll p_I^*$ ), it was rather easy for entrants to offer much lower tariffs. The main concern of regulators was not focused on a potential margin squeeze but rather on eliminating inefficiencies and excessive pricing. Additional concerns were that the vertically integrated incumbent firm might simultaneously employ diverse non-price discrimination strategies ('sabotage', 'raise rival's costs', see references in footnote 4), or strategically allocate common costs by making use of informational asymmetries.<sup>15</sup>

While in the model the entrant can gain the entire market if he undercuts the incumbent (by an arbitrary small amount), this extreme form of competition hardly applied in reality. Due to switching costs or 'incumbency advantages' (e.g. brand or product loyalty, good reputation, consumer inertia or uncertainty about quality of new entrants), the incumbent could reduce prices step by step to the competitors' level and still retain an often large share of the calls market. Many countries introduced retail price regulation of calls prices to ensure that the incumbent's prices were cost oriented/not excessive.

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<sup>15</sup> See Burton et al (2004), pp. 5-6. Generally speaking, enforcement of non-price discrimination appeared to be much more difficult in regulatory practice compared to pricing issues.



**Figure 3: Regulation of fixed fee  $f$  and access charge  $t$  at beginning of liberalisation**

In the course of time, cross subsidies between calls and fixed fees were gradually eliminated ('tariff rebalancing'), which led to an increase in fixed fees (on average).<sup>16</sup> Calls prices, on the other hand, dropped due to competition from CS/CPS providers.<sup>17</sup> As a consequence, price-cost margins reduced significantly for both, incumbent and entrant firms. At the same time, the utility provided by the outside opportunity, mobile telephony, increased significantly: While mobile penetration rates, minutes and revenues have increased substantially, the contrary could be observed for fixed line connections and calls in most countries.<sup>18</sup> More recently, competitive pressure from other fixed network operators such as cable operators and local loop unbundling operators which often offer voice and broadband services as a bundle has also increased.

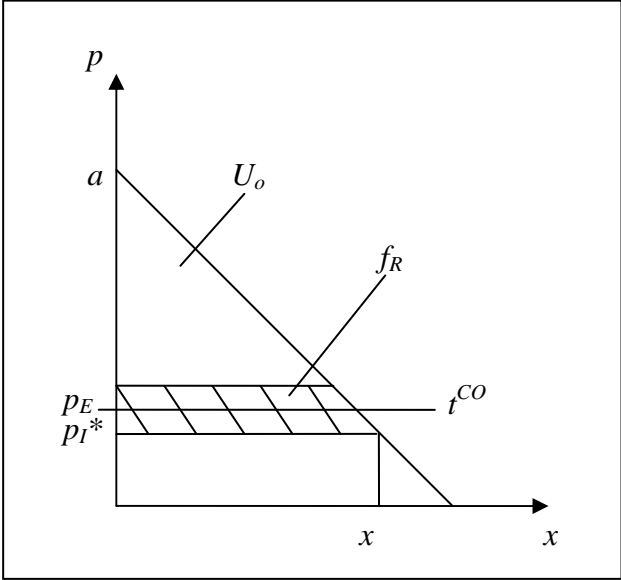
Nowadays, it can be assumed that in a number of countries the constraint from the fixed fee regulation and the outside opportunity is binding with equality and the situation is one

<sup>16</sup> The average fixed fee for residential users in the EU increased from €1.5 to €14.9 from August 2000 to September 2007. A comparable increase could be observed for business customers, see European Commission (2008) Annex 2, p. 65.

<sup>17</sup> In particular prices for national calls decreased significantly, see European Commission (2008) Annex 2, pp. 79 and 80.

<sup>18</sup> See European Commission (2008), Volume 1, p. 10, and OECD (2007), Figure 3.6.

of  $t^{CO} > p_I^*$  instead of  $t^{CO} < p_I^*$  as it was in the beginning of liberalization. The incumbent is setting prices closer to short run marginal costs while the access prices remains regulated at average costs. Such a situation is depicted in Figure 4.



**Figure 4: Regulation of fixed fee  $f$  and access charge  $t$  today**

As can be seen, there is a margin squeeze and the entrant will be driven out of the market. In the model, ‘foreclosure’ is complete in the sense that the entrant cannot match the price of the incumbent as long as  $t^{CO} > p_I^*$  and will have a market share of zero. In reality, it is also likely that CS/CPS entrants will have to exit the market more or less completely as their consumers are usually more price sensitive, the scope for product differentiation is very limited, and they have retail fixed costs (e.g. advertising) to cover.<sup>19</sup>

The bleak perspective of CS/CPS operators led regulators to shift their focus from preventing excessive calls prices to preventing a margin squeeze and to ensure survival of the entrants. Most regulators did this by introducing a price floor for the incumbent’s retail

<sup>19</sup> Note that the margin squeeze arises despite regulation of the fixed fee. If the fixed fee was not regulated,  $p_I^*$  would be equal to zero which would result into an even stronger margin squeeze.

calls price  $p_I^*$ . The incumbent was (and in many cases is) not allowed to set a retail price below a level which would impose a margin squeeze on the entrant at a given access price, i.e.,  $p_I > t^{CO} + m$ , where  $m$  is some percentage (or margin)  $> 0$  which is deemed to be necessary for the entrant to cover his costs.<sup>20</sup> However, such a price floor prevents lower retail calls prices and is therefore welfare reducing, at least from a static point of view. It also does not take into account the (possible) reason for the margin squeeze, namely increased inter-modal competition. Therefore, in such situations NRAs should consider alternative forms of access regulation, which are discussed in the following section.

## 5 Alternatives to cost oriented access prices

As the margin squeeze described above is primarily caused by a ‘too high’ regulated access price, an alternative to cost oriented prices would be either to reduce the access price to a level below average costs or switch to a retail minus access price,<sup>21</sup> i.e., in terms of the model,  $p_I = t^{RM}$ , with the incumbent determining  $p_I$  and  $t^{RM}$  simultaneously.

As regards an access price below average costs, such a price should be set at the level of  $p_I^*$ . It is unlikely, however, that the regulator has sufficient information to determine  $p_I^*$ . A retail minus access price, on the other hand, would have the following advantages: (i) it prevents a margin squeeze, (ii) the incumbent could set a retail price equal to  $p_I^*$  (i.e., the unregulated outcome in the model would be replicated),<sup>22</sup> and (iii) there is no need for retail price regulation. Even if the entrant had positive fixed costs to cover, the access price

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<sup>20</sup> This is the case in Austria, for example, where the incumbent, in principle, is not allowed to set retail prices lower than the interconnection prices. Similarly, in Germany, an ‘IC+25%’-rule was applied to test for a price squeeze between the (cost oriented) wholesale (interconnection, IC) price and the retail price (see Bundesnetzagentur, 2005).

<sup>21</sup> The retail minus rule is a simplified form of the efficient component pricing rule (ECPR), which is sometimes also called Baumol-Willig rule (see Willig, 1979).

<sup>22</sup> From a static point of view, regulators therefore should be indifferent between retail-minus regulation and no wholesale regulation. However, the existence of an entrant may have advantages from a dynamic point of view.



regulation could allow for this in order to ensure the entrant's survival, i.e.,  $t^{RM}$  would have to be set at a level  $t^{RM} = p_I^* - m$  ( $m$  as above).<sup>23</sup>

Another advantage of a retail minus access price over an access price at average costs is that the fixed network incumbent can lower retail (and wholesale) prices as competitive pressure from other infrastructures increases. An access price at average costs, on the other hand, *increases* if competitive pressure increases and more and more people substitute away from the fixed network: when the number of minutes goes down and fixed costs remain – largely – unchanged, average costs increase. This leads to the paradoxical effect that more competitive pressure would lead to higher prices (if the access price is increased, the incumbent would also have to increase the retail price in order to avoid a margin squeeze) which would lead to more substitution and even higher prices in turn.

It therefore appears that regulators should switch from cost oriented prices (based on average costs) and a retail price floor to retail-minus access pricing in situations as described above. However, there are a number of implementation issues with regard to a retail minus access price. Some of them are the following:

As can be seen from Figure 4, an increase in the utility of the outside opportunity,  $U_o$ , will further reduce  $p_I^*$  (if  $f^R$  is not changed). It is possible now (and even appears likely in some countries) that  $p_I^*$  will tend to zero, at least for particular types of calls (e.g. national on-net calls). This would mean that the wholesale access charge (i.e., the charges for origination and termination which CS/CPS operators pay) would also have to be equal to zero. If the entrant has fixed (retail) costs to cover, there would even be a need for a 'negative' access charge (i.e., a per-minute payment from the incumbent to the entrant) if

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<sup>23</sup> However, the incentive for non-price discrimination would then re-emerge.

the entrant is to survive. It is highly questionable whether this would be a sensible form of access regulation. Further, this would be a quite drastic change to the current regulatory regime and might, for example, open up arbitrage opportunities with regard to termination, since other network operators could terminate their calls in the incumbent's network via a CS/CPS provider.

Other implementation issues relate to typically comprehensive retail price differentiation and the following difficulties in appropriate basket design. If the retail minus calculation is based on a retail price basket, retail price discrimination e.g. between residential and non-residential customers or on-net and off-net calls cannot be implemented on the wholesale level or could lead to competitive distortions. Likewise, retail-minus might not be simultaneously feasible for incoming (termination) and outgoing (origination) traffic. Indeed, the very fact that retail-minus has never been implemented for interconnection services underlines that those practical implementation problems have to be thoroughly weighted against the possible advantages.

However, if competitive pressure from an outside opportunity causes the margin squeeze as in our model, deregulation also has to be considered as an option. If the incumbent voluntarily wants to set calls prices below  $t^{CO}$ , then excessive calls prices should no longer be a concern for regulators. This means that not only retail regulation but also wholesale regulation could be lifted,<sup>24</sup> as it would no longer be needed to bring down calls prices from excessive levels. This leads to the somewhat surprising conclusion that a margin squeeze might not imply that more regulation is needed but that less or no regulation is needed due to inter-modal competition. Competition from mobile networks might

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<sup>24</sup> Wholesale deregulation in this context has to be seen with respect to CS/CPS regulation only, i.e., for call origination. It is not related to markets for call termination. Regulators consider these markets as bottleneck monopoly services on an individual firm level. Fixed and mobile operators are considered to have significant market power regarding call termination in their networks.

effectively work as a ‘price-cap’ for fixed network calls prices preventing the incumbent from increasing prices even if margin squeeze led to market exit of the entrant(s). This is less likely to apply for the fixed fee. Empirically, fixed-mobile substitution is much stronger for calls than for access.<sup>25</sup> Most regulators as well as the European Commission therefore consider the retail access market still as relevant for ex ante regulation.

Surprisingly, the Commission substantiates the ‘non-relevance’ of the fixed network calls markets in its new recommendation solely with regard to the increasing importance of broadband connections and associated technological innovations (most notably, IP-based telephony), as well as (in part only recently) imposed regulatory instruments on the wholesale level (such as Unbundling (ULL), Naked DSL, Wholesale Line Rental, Carrier Selection). Competitive pressure from mobile networks, which is effective on national scale, is not mentioned in the relevant sections of the new recommendation.<sup>26</sup>

Of course, there are other explanations of a margin squeeze than competitive pressure from an outside opportunity. It could also be part of a (dynamic, i.e., multi-period) foreclosure strategy of the incumbent, where he might sacrifice profits in the short run to drive out the entrants and increase prices again later on.<sup>27</sup> Regulators should thoroughly investigate the reasons for the margin squeeze. Our point is that a margin squeeze is not necessarily anti-competitive.

A margin squeeze might also occur due to cost disadvantages of the entrants. The distribution of market shares (high market share of the incumbent/lower market shares of

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<sup>25</sup> For a current overview of empirical studies see Stumpf (2007), pp. 14-15. Such differences in substitution patterns are due to the fact the substitution of access is a discrete decision (access or no access at all), whereas calls can be substituted continuously (on a minute-by-minute basis).

<sup>26</sup> Cf. European Commission (2007), explanatory note (2<sup>nd</sup> edition), p. 27-28.

<sup>27</sup> See Koboldt (2003), pp. 11-12, European Commission (2005) or ERG (2006).

the entrants) suggests that retail cost asymmetries due to economies of scale and/or scope still exist to a certain extent on the one hand.<sup>28</sup> Such a margin squeeze would also not be anti-competitive per se. It is mainly due to the promotion of inefficient entry. Regulators might be willing to accept inefficiency in the short run if the alternative is no entry at all (with poor potential for dynamic competition).<sup>29</sup>

Even if there is significant competitive pressure from an outside opportunity due to which  $p_I < t^{CO}$ , regulators might still be wary of the effects of deregulation. In voice telephony retail calls markets, competitive pressure from mobile operators (and also from cable operators) usually is much larger in the private than in the business segment and for national compared to international calls. These segments can be distinguished at retail level, however, it seems difficult and might even be impossible to distinguish them at the wholesale level. Therefore, if inter-modal competition for national calls of private users was sufficient to deregulate at the retail and the wholesale level, regulators might still consider wholesale regulation necessary for the business segment or for international calls. If, however, regulatory intervention is still called for, regulators should examine whether alternative instruments are available. A retail price-cap, for instance, might act as a safeguard against expropriation of certain segments.

## 6 Conclusions and final remarks

Fixed line voice telephony faces increasing competitive pressure from mobile telephony and other networks (cable, or local loop unbundling). In this situation, the optimal retail

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<sup>28</sup> On the other hand the incumbent might still suffer from (historically inherited) X-inefficiencies. For instance, many formerly state-owned monopolies still have a high proportion of civil servants and therefore find it hard to reduce headcount/personnel costs.

<sup>29</sup> In the model, a margin squeeze can also occur if the regulated fixed fee is 'too high' (even if the utility provided by the outside opportunity is small). Such a situation seems unlikely to occur in practice, however.

calls price of the incumbent appears to be below the regulated (cost oriented) access price at least in some EU countries. This arises because wholesale regulation is based on the average, and not on the marginal costs of access. The resulting ‘margin squeeze’ led some regulators in Europe to introduce price floors which prevent the incumbent from lowering retail calls prices below a level where a margin squeeze in relation to the regulated access price would occur.

Our analysis suggests that access regulation at average costs is not appropriate in such situations since it results in ‘too high’ access prices. In addition, an access price at average costs is likely to increase with increased competitive pressure from other platforms (whenever the total number of minutes originating and terminating in the fixed network goes down). We have discussed whether retail-minus regulation is more appropriate in such circumstances. It would allow the incumbent as well as the entrant to lower their calls prices and would render obsolete retail price regulation. There are, however, a number of serious implementation issues related to retail-minus access pricing which would have to be overcome before the current regulatory regime can be changed.

As we have argued in the main text, a strong constraint on fixed network calls prices from other networks puts into question the need for regulation in calls markets (including wholesale regulation and the CS/CPS business case) itself. Regulators therefore will have to closely examine whether (and for which markets) competitive pressure from mobile telephony or other networks is strong enough so that the regulation of fixed network voice telephony markets would no longer be necessary at all or could be at least partially reduced. Even if fixed-mobile substitution is deemed to be non-sufficient to define a common market, it must be considered when the regulator decides upon the remedial measures imposed on the dominant operator.

Finally, fixed-mobile substitution patterns also have to be distinguished with reference to relevant market segments. Typically fixed-mobile substitution is much stronger for private consumers (compared to businesses) and national calls (compared to international calls). Therefore, the effects of a possible deregulation on markets where competitive pressure is not (yet) strong enough need to be considered as well.

## **Appendix: Regulatory Background**

The EU regulatory framework for electronic communications markets<sup>30</sup> requires national regulatory authorities (NRAs) to periodically analyse the state of competition on a certain number of markets and impose appropriate ex ante remedies in case that an operator is found to have significant market power (SMP).<sup>31</sup> To promote harmonization among Member States, the European Commission also published a list of markets which have to be considered by each NRA, the 'Recommendation on Relevant Markets'.<sup>32</sup> This Recommendation originally included the following fixed network voice telephony markets, which are the issue of this article (the number of the market corresponds to the number in the Recommendation):

Retail level:

1. Access to the public telephone network at a fixed location for residential customers.

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<sup>30</sup> See Directives 2002/19/EC, 2002/20/EC, 2002/21/EC and 2002/22/EC, OJ L108, 24.4.2002.

<sup>31</sup> The concept of SMP is based on the concept of dominance in general competition law (see European Commission (2002).

<sup>32</sup> European Commission (2003); it is possible to deviate from the Recommendation, however, the European Commission has a veto right with regards to decisions on market definition and SMP designation.

2. Access to the public telephone network at a fixed location for non-residential customers.
3. Publicly available local and/or national telephone services provided at a fixed location for residential customers.
4. Publicly available international telephone services provided at a fixed location for residential customers.
5. Publicly available local and/or national telephone services provided at a fixed location for non-residential customers.
6. Publicly available international telephone services provided at a fixed location for non-residential customers.

Wholesale level:

8. Call origination on the public telephone network provided at a fixed location.
9. Call termination on individual public telephone networks provided at a fixed location.
10. Transit services in the fixed public telephone network.

While all NRAs found SMP on the retail access markets (markets 1 and 2) and on the wholesale markets for origination and termination, a majority also found SMP on some or all of the ‘calls’ markets (markets 3-6). In many cases, therefore, not only the access to wholesale services, but also the prices of the incumbent’s retail services have been regulated up to now.

The new Recommendation<sup>33</sup> from 2007 does not include markets 3-6 any more and markets 1 and 2 have been merged to a single market.

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<sup>33</sup> European Commission (2007).

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