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## Call a friend?

**THE POTENTIAL FOR LARGE MOBILE NETWORKS TO USE DIFFERENTIAL CALL CHARGES AS A MEANS OF FORECLOSURE**

*In many, but not all, countries mobile-to-mobile (M2M) access charges are set in excess of cost; and mobile phone customers have to pay higher charges to call subscribers to different mobile networks ("off-net" calls) than to call other subscribers to their own network ("on-net" calls). Such behaviour raises questions as to the incentives on mobile network operators (MNOs) to set efficient M2M access charges, the relative position of large and small networks, and the impact of their behaviour on consumer welfare. Frontier's modelling work challenges the received regulatory wisdom that large operators may use high charges to foreclose their competitors.*

In many countries, the price that a mobile customer pays for calling someone on another mobile network is much higher than the price of calling someone on the same network. National Regulatory Authorities around Europe have been taking an increasing interest in these price differences and it seems to have become accepted by →

them that, if left unregulated, mobile networks have an incentive to set high M2M access charges; and that differential on-net and off-net pricing can be used by large operators as a foreclosure weapon against smaller competitors.

One version of this fear of foreclosure is summarised by the European Regulators Group of National Regulatory Authorities (the ERG) in its consultation on appropriate remedies under the new EU framework<sup>1</sup>. The ERG argues that low on-net and high off-net charges generate “tariff-mediated network externalities” for the customers of the larger network, and so put small networks with few participants “at a disadvantage”<sup>2</sup>.

Another version is summed up by the Irish regulator, Comreg, in its notification to the EC on wholesale call access<sup>3</sup>. This document suggests that M2M access charges could be raised to “directly influence the retail tariffs of competitors in the mobile market and could cause potential margin squeeze issues”<sup>4</sup>.

The underlying argument advanced by both runs as follows. First, setting the M2M access charge above cost will mean that off-net calls are more expensive than on-net calls. Second, the customers of a large network can be expected to make proportionately more on-net calls than the customers of a smaller network. So subscribers to the smaller network will experience a higher average call charge. This is the “disadvantage” to which the ERG refers. However, this is not supported by the academic literature.

The early works on this topic by Armstrong (1998)<sup>5</sup> and Laffont, Rey & Tirole (1998)<sup>6</sup> found that networks are able to use their reciprocal access charges as an instrument of collusion: by raising each other’s costs, they can dampen competition and raise their profits. However, virtually all papers published subsequently call this conclusion into question. These later analyses indicate that, under more realistic assumptions, networks do not have a clear incentive to drive up reciprocal access charges. Such papers typically indicate that mobile operators would prefer to set M2M access charges at cost<sup>7</sup>. As retail charges tend to be set to reflect the underlying marginal costs that the network faces, this means that retail off-net call charges would also be set at cost.

Laffont, Rey & Tirole indicated that this result was special to the case where networks are not able to charge any form of fixed rental charge (including periodic handset charges for pre-pay customers). However, work by Gans & King (2000)<sup>8</sup> suggested that it might actually be profit-maximising to set access charges (and hence retail off-net) charges below cost, when operators could discriminate between the retail price of on-net and off-net calls; while Carter and Wright (2003)<sup>9</sup> suggested that when networks are of unequal size, it is the larger network that has the stronger incentive to set access (and off-net retail charges) at cost.

## OUR ANALYSIS

To understand fully the relationship between two-way access charges and on-net/off-net differentials, it is necessary to think rigorously about the interaction between these factors. Frontier has designed a flexible simulation model, which we can use to compare the relative magnitude of the different effects identified in the literature, so as to identify which are most important in driving MNOs behaviour and draw practical conclusions about charges. This model enables us to answer a number of critical questions.

### 1. Do high M2M charges advantage larger operators?

The model enables us to look at competition between two networks. Following the differentiated Bertrand approach, it is assumed, for simplicity, that customers are distributed along a line, with the competing networks located at either end. The networks compete for customers by offering prices designed to maximise the welfare that customers would get from subscribing to their networks. Customers choose the network that they believe offers them the greatest welfare - taking into account a search cost that, other things being equal, makes them favour the closest on the line. In running the model, the degree of differentiation between networks can be controlled by adjusting the size of the search cost parameter. The higher the search cost, the more

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“differentiated” the networks, and the less the intensity of competition.

In our model, we followed the lead set by Gans & King, allowing networks to differentiate between on-net and off-net prices. In these circumstances symmetric networks (two, sharing the market 50:50) would choose to set a reciprocal access charge below cost. This is illustrated in Figure 1, which shows the results from our model relating equilibrium profits to the level of the M2M access charge.

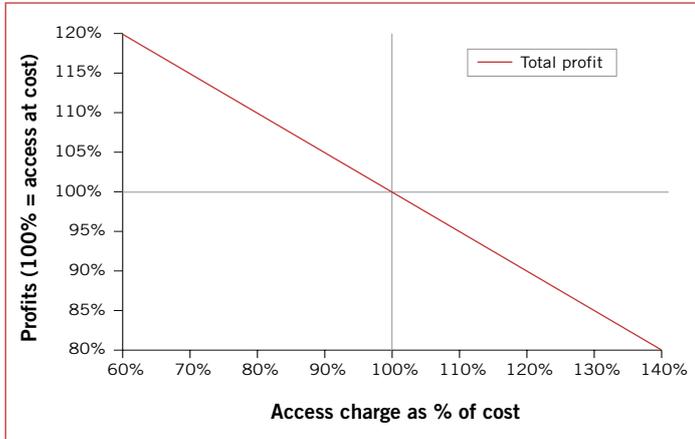


Figure 1: Gans & King - the effect of access charges on profits

Source: Frontier model

The intuition behind this finding is that, as M2M access charges increase, the value to each network of stealing each other’s customers also increases dramatically. So higher M2M access charges greatly intensify inter-network competition, putting pressure on profits.

We then extended the original work to model the situation where the two networks are of unequal sizes. We now have two conflicting pressures. On the one hand, there is a “static” effect: as noted earlier, if M2M access charges are set above cost then off-net calls cost more than on-net ones, and this favours the larger network. On the other hand, there is the “dynamic” effect illustrated in Figure 1: if access charges are set above cost all networks will put extra effort into winning market share, and this intensifying of competition reduces profits.

We therefore used our model to assess which one of these two effects was likely to dominate. What we found was that the dynamic effect is much stronger than the static one regardless of the parameters chosen for the model, the dynamic effect emerged as the stronger. (This is illustrated in Figure 3.) In other words, even though high access charges would seem to give the larger network an advantage, it will still be wary of setting high access charges, because of the threat to profits from the stimulus to competition.

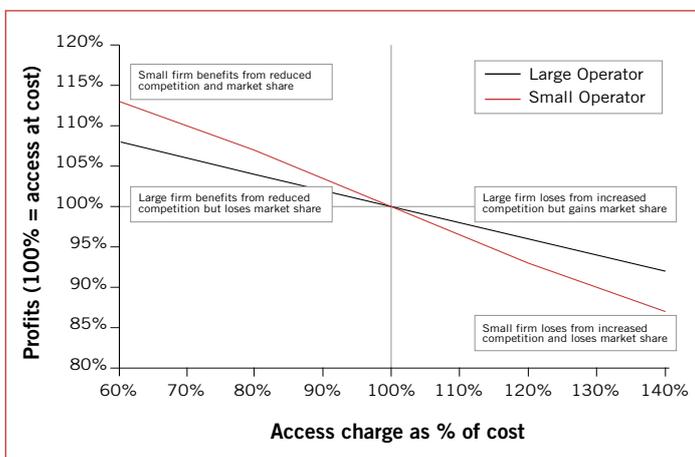


Figure 2: Sensitivity of profits to access charge with network asymmetry

Source: Frontier model

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## 2. What is the risk of predation?

Our modelling suggests that maintaining high (reciprocal) M2M access charges is not a profit-maximising course, even for larger networks. However, this does not resolve the question of the risk of predation. For by definition, predation involves a dominant company engaging in behaviour that is not profit-maximising in the short run, in order gain advantage in the long run.

We have therefore used our model to answer the question of whether a dominant operator would find it easier to “buy” market share by raising access charges or by the more conventional means of cutting retail prices. Our results are shown in Figure 3.

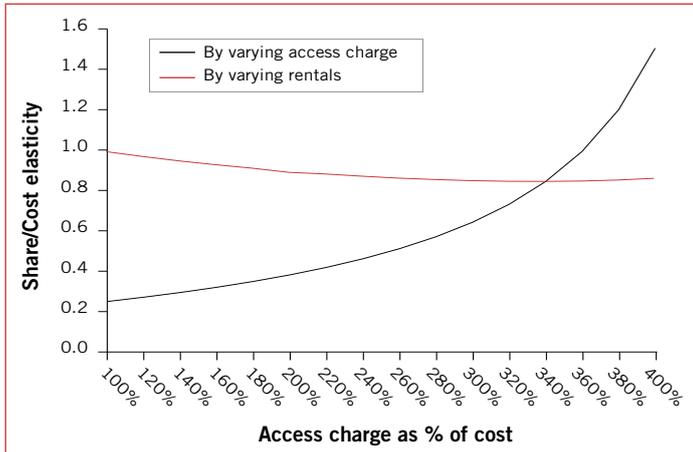


Figure 3: Relationship between market share gained and profit foregone by varying access charges or monthly rentals

Source: Frontier model

These results indicate that provided access charges are in the vicinity of cost, cutting retail prices is a much more effective strategy for gaining market share. Only when access charges are already several times cost does it become more efficient for the dominant firm to try to use access charges to drive up its market share. The exact cross-over point depends on the strength of competition in the market and the degree of asymmetry between the large and the small players, but at all plausible values for these parameters the argument is on the side of retail prices.

<b>SOURCE</b>	<ol style="list-style-type: none"> <li>1. “Consultation Document on a Draft joint ERG/EC approach on appropriate remedies in the new regulatory framework”, 21st November 2003.</li> <li>2. A “network externality” occurs when the value that each subscriber to a network gets from being a subscriber increases as the total number of subscribers increases. Assuming equal pricing for all calls, interconnection between two competing networks, allowing subscribers to call other subscribers on either network, also creates a network externality effect by increasing the number of people with whom each subscriber can communicate. If the price of on-net and off-net calls differ then “tariff-mediated network externalities” are created, because subscribers care about which network the people they want to call are on.</li> <li>3. “Response to Consultation and Notification to the European Commission – Wholesale voice call termination on individual networks”, Comreg Doc. No. 04/62a, 8th June 2004.</li> <li>4. See para. 4.35.</li> <li>5. Armstrong, M. (1998), “Network Interconnection In Telecommunications”, <i>Economic Journal</i>, 108 (May), pp. 545-564.</li> <li>6. Laffont J.J., Rey P. and J Tirole (1998), “Network Competition I: Overview and Nondiscriminatory Pricing”, <i>RAND Journal of Economics</i> 29 (1-37)</li> <li>7. If charges were set reciprocally and without the risk of arbitrage with F2M access charges.</li> <li>8. Gans, J.S &amp; King, S.P. (2000), “Using ‘Bill and Keep’ Interconnection Arrangements to Soften Network Competition”.</li> <li>9. Carter M. and W. Wright (2003), “Asymmetric Network Interconnection, <i>Review of Industrial Organisation</i> 22 (27-46).</li> </ol>
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