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Call terminator 3: the ongoing debate in mobile telephony

Ofcom has recently reinstated its finding that H3G, the new mobile entrant, has significant market power (SMP) in terminating calls on its own network, following a requirement by the Competition Appeal Tribunal to consider the countervailing bargaining power of BT, the fixed operator. In contrast, ComReg, the Irish regulator, withdrew its SMP finding after a similar ruling on appeal. What can economics contribute to this ongoing debate on how to regulate call termination?

The issue of call termination charges on mobile networks has been the subject of intense regulatory debate across Europe for almost ten years. In the UK there have been two major inquiries involving the Competition Commission, in 1998–99 and 2002–03.[1] The European Commission took a view on how to approach regulation in these markets in the run-up to the implementation of the EU regulatory framework for electronic communications in 2003.[2] While many theoretical and practical arguments have been put forward in this debate, a broad consensus has now emerged across the EU on how best to regulate mobile call termination charges. The same approach is now being taken by the majority of European telecoms regulators, each of which has reviewed this issue under the new regulatory framework.[3] This common approach can broadly be described as follows.

– Each mobile network constitutes its own separate market for the purpose of call termination; therefore, each operator has SMP on its own network and is likely to be able to impose excessively high termination charges.

– A detriment to consumers arising from these high charges is that they result in a cross-subsidy from fixed-telephony users to mobile users.

– Regulation of call termination charges is considered justified in order to remedy this detrimental effect on fixed users.

However, questions have been raised over how to treat those operators that are new entrants into the mobile market and/or that still have a very small market share. Should they be subject to the same controls as the more established networks? Several regulators, including those in the UK, Sweden, Denmark and Ireland, have imposed somewhat lighter conditions on the new entrant. A more fundamental question is whether those new operators should be considered to have SMP in the first place. In the UK and Ireland, this has led to rulings by the respective appeals bodies, the Competition Appeal Tribunal (CAT) and the Electronic Communications Appeals Panel (ECAP).[4] Both have required the regulators, Ofcom and ComReg, to reconsider their SMP for Hutchison 3G (H3G).

At the heart of the two views on this lie two theoretical frameworks for determining call termination rates: 'traditional' access pricing theory and bargaining theory.

Access pricing theory

There is a large body of literature on access pricing in telecoms, in which interconnection agreements are assumed to follow a two-step process. First, operators set the rates for terminating calls on each other's networks and, once the rates have been agreed, they compete for customers by varying the call and/or rental tariffs. The key question these models seek to answer is whether mobile operators would have incentives to set cost-based termination rates if they were left to negotiate on their own in a hypothetical market where regulation (or the threat of regulation) did not exist.

Mobile-to-mobile interconnection

Various theoretical models analyse the interaction between two mobile networks seeking interconnection between each other in order to allow their customers to make off-net calls (ie, calls to subscribers on another mobile network). If operators are assumed to set their termination rates independently (ie, non-cooperatively), each operator takes the other network's termination rate as fixed. Therefore, each believes that if it increased its

termination rate, it would be raising its rival's costs and simultaneously experiencing an increase in termination revenues. The result is that both operators have incentives to set above-cost termination rates.

Would this result still hold if, instead of setting termination rates non-cooperatively, the models assumed that operators negotiate reciprocal terms of interconnection (ie, if they set termination rates cooperatively)?

Different models provide different answers. At one end of the spectrum, Armstrong (1998) predicts high termination rates because they are used as an instrument of collusion by operators: by raising each other's costs, mobile operators increase retail tariffs and are able to obtain higher profits.[5] However, Armstrong's result is sensitive to the (somewhat unrealistic) assumption that networks can only compete for customers by offering tariffs with only one price (ie, one flat per-minute tariff for all call types and no line rental). Laffont, Rey and Tirole (1998a and 1998b) studied a problem similar to that analysed by Armstrong, but considered the more realistic scenario in which networks offer both rental and per-call tariffs.[6] They showed that mobile operators would be indifferent to the level of termination rate agreed because any profits made on call termination would be competed away through lower rental tariffs (possibly achieved through handset subsidies).

At the other end of the spectrum, Gans and King (2001) predict that mobile operators would actually prefer low termination rates as an instrument of collusion.[7] They reach this conclusion by extending the Laffont, Rey and Tirole model to allow for price discrimination in call tariffs—ie, differentials between on-net calls (within the same network) and off-net calls. The effect of this assumption is to make the intensity of competition on rental tariffs more sensitive to the level of termination rates. When termination rates are above cost, firms would compete more fiercely; when they are below cost, competition is significantly muted. Thus, Gans and King conclude that, given the choice, mobile networks would prefer low termination rates, possibly even 'bill and keep' arrangements (ie, where termination rates are zero).

Carter and Wright (2003) extend the results of the Laffont, Rey and Tirole model by including network asymmetry with respect to market shares.[8] The key result of Carter and Wright's model is that it is the large network that will prefer cost-based termination rates. The intuition behind this result is as follows: if termination rates were above cost, the large network would end up sending more calls to the small network than it would receive.[9] It would therefore experience an interconnection deficit. If, however, termination rates were below cost, the large network would receive more calls than it would send, but given that termination rates are priced below cost, it would also experience an interconnection deficit—hence the preference for rates at cost.

Fixed-to-mobile interconnection

Several other models analyse the incentives faced by mobile operators to determine the termination rate for fixed-to-mobile calls. They assume that the fixed termination rate is regulated and, unlike the models discussed above, the termination rate being negotiated is not reciprocal. Based on these assumptions, Wright (2002) found that mobile networks will always have the incentive to set termination rates at, or above, the monopoly level.[10] This is because, at the margin, increasing the termination rate will always increase per-customer call termination profit. Similar conclusions are reached by Gans and King (2000).[11]

These results have a strong intuitive appeal. Because the fixed termination rate is regulated, the problem is that of a classic monopoly provider (the mobile network) maximising profits by raising its price (the termination rate). Moreover, the termination rate demanded by the mobile operator could be even higher than the monopoly price because this will increase the cost of fixed-to-mobile calls without a corresponding increase in the cost of mobile-to-fixed calls. Not only does this make having a mobile phone more attractive than having a fixed phone, but it also introduces an implicit cross-subsidy from fixed to mobile operators that can be used to attract more mobile subscribers.

Main implications of access pricing theory

The predictions of the 'traditional' mobile-to-mobile access pricing theory are highly sensitive to each model's assumptions. Arguably, the models predicting low mobile-to-mobile termination rates (Gans and King, 2001 and Carter and Wright, 2003) make more realistic assumptions about the mobile market (eg, two-part tariffs, on-net/off-net differentials, market share asymmetry). In that sense, their results could be considered to have more relevance from a policy perspective. Indeed, in its submission to Oftel (and later to Ofcom), Vodafone suggested that mobile-to-mobile termination rates should be deregulated since, as stated by economic theory, mobile operators have strong incentives to set low reciprocal termination rates.[12]

Oftel disagreed, claiming that these results relied on the assumption of balanced traffic. With traffic imbalances, the operator with the surplus of incoming calls would have an incentive to raise termination rates above cost, while the operator with a deficit would have an incentive to reduce them.[13] The final outcome of the negotiation on reciprocal termination rates would then depend on the relative bargaining power of each party. In the recent round of the mobile call termination market review, Ofcom upheld this view.[14]

That said, according to the models of fixed-to-mobile interconnection discussed above, mobile operators appear to have the unambiguous incentive to set high fixed-to-mobile call termination rates. Moreover, the evidence from the evolution of mobile call termination rates across Europe seems to support the view that the incentive for mobile operators to set high termination rates has dominated the incentive of setting them at a low level—lending support to NRAs' decisions to regulate this market.[15]

Bargaining theory

In its appeals in Ireland and the UK, H3G challenged the application in its own case of the economic approaches to call termination outlined above. In the appeal process, H3G submitted an economists' report (Binmore and Harbord, 2005) explaining why Ofcom's and ComReg's reasoning in determining that H3G had SMP was erroneous, and claiming that applying bargaining theory to this case would be the right approach to assessing the relative bargaining power of the negotiating parties, as required by the Commission's SMP guidelines.[16]

Binmore and Harbord (2005) argue that the negotiation over the mobile call termination rate between an entrant mobile operator and the incumbent fixed operator is one of a bilateral monopoly in which there is a single buyer and a single seller. This can be contrasted with the implicit assumption in the fixed-to-mobile models of a single monopoly supplier of termination services. In a bilateral monopoly, the outcome of such a negotiation depends on the relative bargaining power of each party, which can be assessed by determining each party's gains from an agreement (the agreement gains). The higher the agreement gains, the more a party has to lose if negotiations are not concluded successfully and, consequently, the lower its bargaining power.

More generally, Binmore and Harbord state that the following factors reduce the bargaining power of entrant mobile operators (such as H3G) relative to incumbent fixed operators.

– An entrant cannot successfully launch its business if it has not reached an interconnection agreement with the incumbent fixed operator—its entire business plan must therefore be added to its agreement gains.

– The fixed operator would suffer a negative externality if another mobile operator successfully entered the market (eg, in the form of increased fixed-to-mobile substitution)—hence, this effect must be deducted from its agreement gains.

– When the market is saturated (high mobile penetration rates), the entrant is expected to attract customers from rival mobile networks. The incumbent fixed operator would therefore lose the current fixed-to-mobile profits it is making on those customers that migrate to the entrant. This effect must be deducted from its agreement gains.

Taking these factors into account, the bargaining model presented by H3G would predict that the outcome of the negotiation would be a mobile termination rate that is, at most, equal to the termination rate paid by the incumbent fixed operator to the established operators. If the entrant's costs were higher than this rate, no agreement would be possible because the entrant would demand a termination rate at least as high as its costs, but the incumbent fixed operator would benefit more by delaying negotiations indefinitely and earning the (higher) fixed-to-mobile profits from those customers that would migrate to the entrant. The regulator would then have to intervene in the negotiation.

In this respect, a crucial assumption of the Binmore and Harbord paper is that, should the regulator have to intervene in the negotiation, the most likely outcome would be either a benchmark-based termination rate (equal to the average rates on the established networks) or a strictly cost-based rate. This assumption gives strong incentives to the fixed operator to indefinitely delay an agreement.

An additional question posed by the bargaining theory model is whether these results can be extended to analyse the negotiation process between existing mobile operators and the incumbent fixed operator. Binmore and Harbord briefly discuss the application of this theory to a non-saturated market—ie, where a potential entrant's customers are assumed to be new customers who previously did not have a mobile phone. This would be analytically equivalent to assuming that this hypothetical entrant is in fact an existing mobile operator with an established customer base.

In comparison to the 'saturated market' case, the agreement gains of the fixed operator would now be greater (and its bargaining power less) because the existing mobile operator would be bringing a large termination business 'pie' to the negotiation table—unlike any potential entrant. The predicted outcome of the negotiation would be a termination rate set somewhere between the full monopoly rate and the termination costs of the mobile operator.

What to make of the two theories?

While analysing the same economic problem—the level of mobile termination rates—the two theoretical approaches reviewed above are seeking to address fundamentally different questions. The traditional access pricing theory is concerned with determining whether mobile operators have incentives to set high or low

mobile termination rates. Bargaining theory takes these incentives as given (high for a mobile operator, low for a fixed operator) and focuses on assessing the relative bargaining power of the negotiating parties.

In that sense, the two models could be seen as complementary. For example, when traditional models of mobile-to-mobile termination rates predict that operators have divergent incentives (eg, when traffic is not balanced, as argued by Ofcom), bargaining theory could be called upon to inform what outcome might be expected in a negotiation between these operators.

Seen in this light, bargaining theory seems to be a powerful framework to analyse the incentives of operators in the determination of fixed-to-mobile termination rates where, arguably, it is clear that one party wants a low termination rate and the other party a high one. In the particular case discussed here, where the negotiations take place with an entrant mobile operator, bargaining theory would suggest that the extent of countervailing bargaining power that a fixed operator enjoys is significant—on the (testable) assumption that the entire business plan of the entrant operator is at stake in the negotiations.

If this were indeed the case, and the fixed operator's countervailing bargaining power was such that NRAs could conclude that the entrant operator does not have SMP, new small mobile operators should not have call termination regulations imposed on them. The question still remains: at what point does the bargaining power shift away from the fixed incumbent operator? Will the fixed operator's countervailing bargaining power cease to be a constraint at some point as the entrant establishes its customer base, such that the mobile operator should now be deemed to have SMP?

Having reconsidered the case after the CAT judgment, the view that has been adopted by Ofcom in its September 2006 consultation document is that it is only at the initial point before actual entry that the new mobile player has no SMP.[17] In other words, once an agreement is in place (either through regulatory intervention or negotiation), the second round of negotiations between the fixed and mobile operators would resemble the case of a non-saturated market discussed above, where the fixed operator's countervailing buyer power is significantly reduced. Indeed, this view, together with the criticism of Binmore and Harbord's assumption that a regulator's intervention would yield benchmark- or cost-based termination rates, has been used by Ofcom to uphold its original position that H3G has SMP in the market for wholesale mobile voice call termination on its network.

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[1] Monopolies and Mergers Commission (1999), 'Cellnet and Vodafone: Reports on References under Section 13 of the Telecommunications Act 1984 on the Charges made by Cellnet and Vodafone for Terminating Calls from Fixed-line Networks', January; and Competition Commission (2003), 'Vodafone, O2, Orange and T-Mobile', February.

[2] European Commission (2002), 'Commission Guidelines on Market Analysis and the Assessment of Significant Market Power under the Community Regulatory Framework for Electronic Communications Network and Services', OJ C 165/03; and European Commission (2003), '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 Communications Networks and Services', C(2003) 497, February 11th.

[3] See, for example, European Regulators Group (2005), 'Report on Experiences with Market Definition, Market Analysis and Applied Remedies', July 15th.

[4] *Hutchison 3G (UK) Limited v Office of Communications* (Case No 1047/3/3/04) [2005] CAT 39 and *Hutchison 3G Ireland Limited v Commission for Communications* (Decision No 02/05) (Appeal No ECA 2004/01).

[5] Armstrong, M. (1998), 'Network Interconnection in Telecommunications', *The Economic Journal*, **108**, 545–64.

[6] Laffont, J.J., Rey, P., and J. Tirole (1998a), 'Network Competition I: Overview and Nondiscriminatory Pricing,' *Rand Journal of Economics*, **29**:1, 1–37; and Laffont, J.J., Rey, P., and J. Tirole (1998b), 'Network Competition II: Price Discrimination,' *Rand Journal of Economics*, **29**:1, 38–56.

[7] Gans, J.S. and King, S.P. (2001), 'Using "bill and keep" Interconnect Arrangements to Soften Price Competition', *Economic Letters*, **71**:3, 413–20.

[8] Carter, M. and Wright, J. (2003), 'Asymmetric Network Interconnection', *Review of Industrial Organization*, **22**, 27–46. As noted above, uniform tariffs means no on-net/off-net price discrimination.

[9] This is because the average call tariff charged by the large network to its customers (a weighted average of the costs of on-net and off-net calls) would be lower than the respective tariff of the small network.

[10] Wright, J. (2002), 'Access Pricing under Competition: An Application to Cellular Networks', *The Journal of Industrial Economics*, **50**, 289–315.

[11] Gans, J. and King, S. (2000), 'Mobile Network Competition, Customer Ignorance and Fixed-to-Mobile Call Prices', *Information Economics and Policy*, **12**:4, 301–28.

[12] Oftel (2003), 'Wholesale Mobile Voice Call Termination Consultation: Proposals for the Identification and Analysis of Markets, Determination of Market Power and Setting of SMP Conditions', December, p. 65, para 5.64.

[13] Oftel (2003), op. cit., p. 65, para 5.68.

[14] Ofcom (2006), 'Mobile Call Termination: Market Review Consultation', March, p. 78, para 7.83.

[15] In the Netherlands, for example, mobile termination rates increased by 8.7% per year from 2000 to 2003, before any restrictions were placed on mobile call termination rates. Source: European Commission reports on the implementation of the telecommunications regulatory package (2000, 2001, 2002 and 2003).

[16] Binmore, K. and Harbord, D. (2005), 'Bargaining over Fixed-to-Mobile Termination Rates: Countervailing Buyer Power as a Constraint on Monopoly Power', *Journal of Competition Law and Economics*, **1**:3, 449–72.

[17] Ofcom (2006), 'Assessment of whether H3G Holds a Position of SMP in the Market for Wholesale Mobile Voice Call Termination on its Network', September 13th, paras 4.152 and 4.153.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.com

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