



# Regulating Access to Networks

# Foreword

I hope you enjoy our third Vodafone Policy Paper. Our aim in these papers is to provide a platform for leading experts to write on issues in public policy that are important to us at Vodafone. These are the people that we listen to, even if we do not always agree with them. These are their views, not ours. We think that they have important things to say that should be of interest to anybody concerned with good public policy.

**Arun Sarin**, Chief Executive, Vodafone Group

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Richard Feasey



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## About the Essays

Interventions by regulators that force private parties to grant their rivals access to their own assets are some of the most controversial in regulation and competition law.

In telecommunications markets we have, in recent years, seen concerted attempts by regulators to impose 'access obligations' on one or more firms in the market, obliging them to make parts of their networks available to competitors on terms which are defined by the regulator rather than commercial negotiation.

This began first in the United States with requirements that the Regional Bell Operating Companies make parts of their fixed voice network available for resale in the mid 1990s but was followed by more strenuous efforts to require the 'full unbundling' of fixed networks around the world so as to facilitate the rollout of broadband services. This tide may now be receding in markets such as the US but still appears to be on the rise in Europe. More recently, efforts have been made both in Europe and elsewhere to extend this approach into mobile markets.

Although there is now a growing body of evidence associated with attempts to apply access regulation in both fixed and mobile markets across the world, few attempts have been made to draw general conclusions about what we have witnessed in recent years and what this might mean for regulation in the future. This paper – and the accompanying research – represents an attempt to begin to do that.

The wide ranging and ambitious nature of the enquiry meant that Vodafone sought the assistance of advisors from across the world. We asked each team to conduct a multi-market study of access regulation in fixed and mobile markets respectively.

Their reports, which they summarise in the papers that follow by Hausman and Sidak and by Waters and Ergas<sup>1</sup>, provide the substantive evidence which underpin the conclusions they present here.

We were interested in understanding the reasons which regulators provided to justify their initial decisions to introduce access regulation, to understand in particular whether these reasons might differ across or between markets and whether there were conditions which might explain why they did so, and to understand how the obvious differences between fixed and mobile markets – in terms of their competitive structure, origins, technology and prospects – informed approaches to and reasons for access regulation.

We then sought to assess, empirically whenever possible, whether the expectations of regulators at the start of the process were vindicated by subsequent market developments. We invited our authors to suggest what, in their view, might be the overall lessons to be drawn in the fixed and mobile markets they studied. The last paper is my own attempt to draw some general conclusions.

These papers aim to stimulate debate and thought. The views expressed are those of the authors and not Vodafone. We would welcome and encourage comments on the issues discussed. These should be sent to me at [richard.feasey@vodafone.com](mailto:richard.feasey@vodafone.com)

### Notes

<sup>1</sup> 'A Study of Regulatory Approaches to MVNOs', by NEEG and Gilbert & Tobin, 2004; 'Did Mandatory Unbundling Achieve its Purpose? Empirical Evidence from Five Countries' by Jerry Hausman and J Gregory Sidak, 2004. Both available from Vodafone on request.



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Jerry A. Hausman is the John and Jennie S. MacDonald Professor of Economics at the Massachusetts Institute of Technology. He has taught at MIT for 31 years and is Director of the MIT Telecommunications Economics Research Program. Professor Hausman teaches the course, "Competition in Telecommunications," to graduate students in economics and business.

In 1985, Professor Hausman received the John Bates Clark Award from the American Economic Association for the most outstanding contributions to economics by an economist under 40 years of age, and has also received the Frisch Medal from the Econometric Society.

Professor Hausman has published numerous papers in econometrics and applied microeconomics. His recent applied research has been in differentiated products and in telecommunications.



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Mr. Sidak is also the president and CEO of Criterion Economics, L.L.C., an international economic consulting firm, and has served with both the Federal Communications Commission and the Council of Economic Advisers in the Executive Office of the President. He has taught telecommunications regulation at the Yale School of Management, has written five books and has published around sixty scholarly articles and opinion essays in the *New York Times*, *Wall Street Journal*, and many other business periodicals.

Mr. Sidak's writings on antitrust, regulation, and constitutional law have been cited by the U.S. Supreme Court, state and federal regulatory commissions, and the European Commission, and he has testified before the U.S. Senate and House of Representatives on regulatory and constitutional law matters.

# Did mandatory unbundling achieve its purpose? Empirical evidence from five countries

## Executive summary

In the 1990s, mandatory unbundling became the proposed remedy of choice in regulatory and antitrust proceedings. For a decade or more, the dominant theme in regulatory and antitrust

law has been what might be called 'the spirit of sharing.' For example, in the United States, the Telecommunications Act of 1996 rests on the hypothesis that requiring a firm to share the use of its facilities with its competitors will enable the competitors eventually to build their own facilities, presumably to

the eventual benefit of consumers. The mandatory sharing of facilities is thus the segue to eventual competition between rival infrastructures or platforms. The corollary of this assumption is that, but for this exact form of regulatory intervention, natural market forces cannot be counted on to produce facilities-based competition.

Any firm may choose to unbundle or lease components of its network with a third party *at a voluntarily negotiated rate*. The firm is also able to decide the scope of unbundling it wants to undertake – how much of its network to resell. The term ‘mandatory unbundling’ describes an involuntary exchange between an incumbent network operator and a rival at a regulated rate where the scope of unbundling is determined by regulators. Determination of the access rate thus becomes the major bone of contention between incumbent and entrant, as a regulatory access rate that is equal to the voluntarily agreed-upon access rate cannot really be said to constitute ‘mandatory’ unbundling. When formulating that access rate, regulators have generally opted in favor of a measure of total element long-run incremental cost (TELRIC) or total service long-run incremental cost (TSLRIC) and against a measure of opportunity cost or option value.

## Why pursue mandatory unbundling?

In general, mandatory unbundling was believed to, among other items, (1) generate competition in retail markets through greater innovation and investment and lower prices, (2) generate greater competition in wholesale markets, and (3) encourage entrants to migrate from unbundling to facilities-based approach. Because our focus is on the benefits of mandatory unbundling, we do not consider its regulatory costs, such as the difficulties in implementation or compliance costs for operators. When considering unbundling, a regulator also should take account of a full range of efficiency considerations, including allocative (consumer welfare gains associated with greater penetration at lower prices), productive efficiency (producer surplus associated with reductions in marginal costs), and dynamic efficiency (how welfare is generated and distributed over time).

### Rationale 1: Competition in retail markets is desirable

In a static model that does not consider investment in future periods, consumers benefit from mandatory unbundling to the extent that such regulation lowers retail prices. In a dynamic model, mandatory unbundling at regulated rates runs the risk of decreasing investment by both ILECs (by truncating returns by granting a ‘free option’ to CLECs) and CLECs (by increasing the relative return of UNE-based entry). Despite these factors, proponents argued that the net effect of mandatory unbundling was to increase investment by both ILECs and CLECs.

According to its proponents, mandatory unbundling at regulated rates encourages innovation and investment on behalf of both

incumbents and entrants. In its *Third Order* implementing the Telecommunications Act, the FCC explained that a positive by-product of mandatory unbundling at TELRIC was greater innovation on behalf of entrants and incumbents. The more competitors in the market, the FCC reasoned, the greater the incentive to introduce a new technology to gain a technological edge. With the correct incentives in place, the need for wholesale regulation would disappear. With greater facilities-based investment, the FCC reasoned, the market could one day be relied upon to discipline ILEC prices for local services.

Although it was aware of arguments that mandatory unbundling at regulated rates might discourage ILEC investment, the FCC believed that other factors in the marketplace would mitigate these negative effects. For example, investment by cable companies in cable modem service was believed to be sufficient motivation for ILECs to invest in DSL facilities. Although the negative investment effects might not overcome these other factors, it is not clear how mandatory unbundling at regulated rates actually *increases* investment by ILECs. One theory is that an ILEC would have to respond to greater competition from CLECs by investing in new facilities. But to the extent that those new investments would be subject to unbundling rules, those investments might not be undertaken. Another theory is that the ILEC will invest in new access technologies that potentially will not be subject to unbundling rules.

When a CLEC obtains an access line at incremental cost, it is free to charge the end user an amount anywhere between the incremental cost and the retail price. A CLEC can charge below incremental cost if it can bundle the access line with other services such as vertical services or long distance. Competition among CLECs is predicted in theory to discipline CLECs in their pricing behavior. If competition among CLECs is intense, then the retail price offered by CLECs should equal the access price for the unbundled loop plus the incremental cost of other inputs. Finally, ILECs must respond to price cuts by CLECs with their own price cuts. The equilibrium outcome of that game is lower prices.

The FCC believed that the Telecommunications Act encouraged the agency to promote retail price competition through mandatory unbundling. Even if the mandatory unbundling at TELRIC never led to facilities-based competition, the FCC reasoned, consumers would be better off to the extent that prices for local services declined. Because ILECs enjoyed a cost advantage vis-à-vis CLECs, the FCC argued, it was preferable from a social welfare perspective for retail prices to be based on the ILECs’ costs and not on the CLECs’ costs. Because ILECs are subject to state-sponsored price regulation, it was not clear that prices would decrease absent subsidised UNE rates. Although the FCC was concerned about stimulating retail competition for local telephone and broadband access services, most European regulators focused exclusively on stimulating retail competition in broadband markets.

### Rationale 2: Competition in retail markets cannot be achieved without mandatory unbundling

In general, a vertically integrated firm prefers retail sales by its affiliated retail division to sales by an unaffiliated retailer. This preference can be reversed, however, if the access price exceeds the retail margin. Much academic work has been dedicated to analysing the incentives of vertically integrated firms to deny access to key inputs to unaffiliated downstream rivals. If a vertically integrated firm can solidify its market power in future periods by refusing to deal with rivals in a downstream market, then that firm has an anticompetitive reason for such a refusal to deal. A vertically integrated firm might also refuse to deal with other unaffiliated firms in the downstream market as a means to acquire market power in that market.

Although no ILEC prefers unbundling its network elements *at a regulated rate* to selling its services through its own retail division, some ILECs have voluntarily unbundled their network elements to rivals at a commercially negotiated rate. For example, in January 1995, Rochester Telephone implemented its own 'Open Market Plan' for unbundling network services in New York. Under the Open Market Plan, Rochester restructured itself into a network services company, which retained the Rochester name, and a competitive company, Frontier Communications of Rochester, which the New York Public Service Commission regulated as a non-dominant carrier. Rochester provided on an unbundled, non-discriminatory basis the local loop, switching, and transport functions as a wholesaler, at discounted (yet voluntary) prices lower than its standard retail rates.

More recently, during a period of regulatory uncertainty due to litigation in the D.C. Circuit, several U.S. ILECs entered into voluntary agreements with CLECs for unbundled access. In April 2004, BellSouth announced that it had signed commercial agreements with Dialogica Communications, Inc., International Telnet, and CI2 for pricing of and access to BellSouth's incumbent network. In the same month, AT&T offered its own proposal for voluntary agreements. AT&T suggested that the commercial rates be based on AT&T's average UNE-P per-line cost in a particular state as of March 1, 2004.

These voluntary negotiations were largely in response to the regulatory vacuum created by the D.C. Circuit vacatur of the FCC's *Triennial Review Order*, which remained in effect until June 15, 2004. In addition, federal regulators and the Bush administration have urged the RBOCs and such rivals as AT&T to negotiate access rates on their own. On August 20, 2004, the FCC released a set of stop-gap rules that required the RBOCs to continue leasing their lines to CLECs at regulated rates for six months. On October 12, 2004, the Supreme Court declined to hear cases filed by AT&T Corp., MCI Inc., and an association of state utility regulators seeking to reinstate the original unbundling rules. If the FCC cannot meet the six-month deadline, the RBOCs would be free to increase access rates by as much as 15 percent for existing customers who purchase their service through CLECs.

In the United States, a CLEC is considered 'impaired' when lack of access to an incumbent LEC network element poses a barrier to entry that is likely to make entry into a market 'uneconomic.' In its Triennial Review Order, the FCC offered the following factors that contribute to entry barriers in the provision of local telephone service: (1) scale economies, (2) sunk costs, (3) first-mover advantages, (4) absolute cost advantages, (5) and barriers within the control of ILECs.

According to its proponents, mandatory unbundling is necessary to overcome such barriers. The corollary of this proposition is that, without mandatory unbundling, facilities-based investment cannot occur. In its May 2002 decision vacating certain portions of the *UNE Remand Order*, the D.C. Circuit concluded that the Commission had failed to adequately explain how a uniform national rule for assessing impairment would help to achieve the goals of the Act, including the promotion of facilities-based competition. In particular, the Court stated that 'to rely on cost disparities that are universal as between new entrants and incumbents in *any* industry is to invoke a concept too broad, even in support of an initial mandate, to be reasonably linked to the purpose of the Act's unbundling provisions.'

Opponents of mandatory unbundling also cite the large sunk cost of the ILEC's network, but for different reasons. They argue that sunk costs imply that regulators should abstain from appropriating the quasi-rents of ILECs, which undermines the incentive of ILECs to invest in new technologies. They also argue that, to the extent that network investment cannot be directed toward other uses in the event of low market demand, large sunk costs require that access prices are set higher than what would otherwise be necessary to induce investment under a standard present discounted value calculation.

### Rationale 3: Mandatory unbundling enables future facilities-based investment

Access-based competition is supposedly the stepping stone to facilities-based competition. This proposition, or hypothesis, lies at the heart of regulatory decisions on unbundling and access pricing that the FCC and its counterparts in other nations have made since the mid 1990s. To put the matter more precisely, the question is whether regulated access-based entry is a substitute for or complement to the same firm's subsequent sunk investment in facilities. In the telecommunications industry, the examples of the stepping-stone hypothesis are numerous. For example, MCI successfully made the transition from reseller of long-distance services to facilities-based carrier. The leasing of selected unbundled elements at regulated prices is vigorously defended by CLECs and regulators as a complement to subsequent facilities-based entry, not a substitute for it. Within the strata of regulated access-based entry options, regulators may consider UNE-P to be a stepping stone to a CLEC's subsequent investment in its own switches and its more limited reliance on unbundled local loops.

In implementing the unbundling rules, the FCC sought to follow the intent of Congress by creating an intermediate phase of competition, during which some new companies would deploy their own facilities to compete directly with the incumbents. The FCC thus sought to force the incumbents to allow others to access their systems, in the hope that mandatory unbundling would create competitors who would later invest in their own facilities.

In the long run, the FCC expected that entrants would build their own facilities because doing so would enhance the entrants' ability to compete more effectively with incumbents. Thus, mandatory unbundling would allow entrants to derive revenue from offering services over the unbundled network elements, and then use that revenue to construct their own networks once the technology shifted. Of course, if the access rate were set too low, the transition to facilities-based competitor would not occur, as CLECs would never find it in their interests to invest in their own facilities. If access rates were set just right, this transition to facilities-based competition would generate additional social benefits.

**Rationale 4: Competition in wholesale access markets is desirable**

Competition in the input markets was, by itself, desirable. Input-level competition can, in theory, generate technological innovation and incentives for gains in productive efficiency and can eventually lead to regulatory withdrawal. Facilities-based entry by CLECs in the current period meant that future entrants would not have to depend exclusively on ILECs to obtain network elements. The FCC believed that mandatory unbundling would expedite this process. In theory, facilities-based entry generates 'greater benefits' than UNE-based entry because the former signals a credible commitment to stay in the market. If an entrant has not made sunk investments in infrastructure, it cannot use sunk costs to make that signal. Nor will the incumbent face the prospect of durable capacity that survives the demise of the company that invested to create it. Moreover, facilities-based competition leads to technological

diversity, which increases choice and may provide newer and better services because the CLEC does not depend on a legacy network.

The FCC envisioned that facilities-based entrants would spawn a new generation of UNE-based entrants, who in subsequent periods would become facilities-based entrants. Thus, the FCC believed that mandatory unbundling at TELRIC would evolve into voluntary access arrangements. Under this scenario, some facilities-based entrants might choose to become a pure wholesaler of network elements, leaving the retail component to other CLECs.

Competition among facilities-based providers to supply network elements to future generations of CLECs would decrease the price of those network elements. The next generation of CLECs would, in turn, pass those savings along to end users in the form of lower retail prices. At some point in the process, the regulator could, in theory, withdraw and allow a competitive market for inputs to discipline the price of retail service.

In practice, however, regulators are reluctant to relinquish their power to control entry and allocate rents in a given market. This vision of mandatory unbundling also ignores the strategic use of regulation by competitors. Given the large rents at stake, it is not realistic to believe that the regulatory machinery could be dismantled very easily. Indeed, in the United States, the degree of regulation has increased since the passage of the Telecommunications Act of 1996.

In summary, mandatory unbundling was based on the following rationales: (1) competition in retail markets is desirable, (2) competition in retail markets cannot be achieved without mandatory unbundling, (3) mandatory unbundling promotes future facilities-based investment, and (4) competition in wholesale access markets is desirable. Fortunately, there is testable hypothesis associated with each rationale. Table 1 shows the four rationales and their associated testable hypotheses.

**Table 1: Rationales for mandatory unbundling and associated hypotheses**

Rationale	Testable Hypotheses
(1) Promote retail competition	Lower retail margins, greater ILEC investment
(2) Entry barriers prevent platform competition	Entry by cable, wireless, or other providers
(3) Stepping stone to facilities-based competition	Conversion from UNE-based to facilities-based entry
(4) Wholesale competition	Competitive access networks, lower access prices

If competition among CLECs is robust (rationale 1), then CLEC margins should disappear and consumers should enjoy lower retail prices. If mandatory unbundling is truly necessary for retail competition (rationale 2), then entry barriers should prevent any firm from constructing a rival platform. If mandatory unbundling is a stepping stone to facilities-based investment (rationale 3), then we should observe individual CLECs transitioning from UNE-based to facilities-based approaches over time. Finally, if mandatory unbundling promotes wholesale competition (rationale 4), then we should observe facilities-based CLECs acting as wholesalers of network elements.

## The unbundling experience in five countries

With the benefit of several years of experience, we evaluate the extent to which the rationales for mandatory unbundling were substantiated in practice. We focus on the unbundling experience in the United States, the United Kingdom, New Zealand, Canada, and Germany. For each country, we examine whether any of the

four primary rationales for mandatory unbundling at TELRIC was substantiated in practice. We rely on data from the relevant regulatory agency that implemented the unbundling regime. For example, we discuss why regulators in New Zealand did not adopt mandatory unbundling. In compiling the country surveys, we observed a large variation in the degree to which economic analysis informed the regulator's decision-making process. In the United States, for example, the process was informed by legal interpretation of specific language (such as the meaning of 'impaired') or by engineering measures of hypothetical operating costs. In New Zealand, by contrast, the process was informed largely by economic analysis and by international experience with mandatory unbundling. Using economic methods, the New Zealand regulator literally assigned net welfare gains to each regulatory option and selected the path with the greatest net welfare gain. To be fair, New Zealand had the benefit of studying the experience of other nations before it decided on the optimal regulatory approach. The FCC still has not used economic analysis when modifying its rules, despite the fact that the United States now has more than six years of unbundling experience.

Table 2: Summary statistics that inform the rationales for mandatory unbundling, by country

Country	Rationale 1: Retail Competition	Rationale 2: Entry Barriers	Rationale 3: Stepping Stone Hypothesis	Rationale 4: Wholesale Competition
United States	Slight increase in prices of local voice services; ILEC capital expenditure decreases	Cable share of residential broadband: 66% (June 2003).  Cable share of switched access lines: 2% (June 2003)	No evidence in support	Competitive provision of DS-3, transport, and switching for enterprise customers
United Kingdom	No measurable decline in prices of telecommunication services; CLEC DSL share almost 50%; broadband prices have decreased; ILEC capital expenditure decreases	Cable share of broadband: 41% (July 2003).  Cable share of residential lines 19% (March 2002)	No evidence in support	Competitive backbone fibre and metropolitan access network services; 51% of wholesale revenues are controlled by entrants
New Zealand	Prices for telephone call charges have remained flat; telephone and rental connection charges have increased slowly; ILEC capital expenditure decreases between 2001 and 2003	Facilities-based CLEC share of voice: 7% (June 2002)  Facilities-based share of residential broadband: 28+% (June 2003)	No evidence in support	No evidence of facilities-based competitors
Canada	Prices for telephone services have increased faster than inflation; ILEC capital expenditures increased through 2001, then decreased; CLEC capital expenditures per revenue dollar decreased after 1999	Cable share of residential broadband: 64% (2002)  CLEC share of local lines: 4.8% (2002)	No evidence in support	CLEC share of wholesale lines is 20% (2002), but total wholesale lines constitute only a 2.5% share of total lines
Germany	Mild decrease in prices for fixed line telephone services; Significant decrease in prices for Internet access; ILEC capital expenditures decreased	Cable & powerline telecommunications (PLT) share of broadband: 1.5% (Dec. 2003)  CLEC share of local lines: 3.5% (Dec. 2003)	No evidence in support	Wholesale market has not developed

Our analysis can be summarised according to key metrics that inform the rationales for mandatory unbundling. In Table 2, we provide those summary statistics by country.

As Table 2 shows, with a few possible exceptions, the rationales for mandatory unbundling do not appear to be substantiated in practice. The clearest example is the stepping stone hypothesis, which fails to be substantiated in any country in our survey. The entry barriers hypothesis, which implies that mandatory unbundling is necessary to overcome entry barriers in local communications, is rejected. In each country in our survey, the existence of facilities-based competition between cable providers and ILECs proves that the barriers to entry in local communications, to the extent they exist, are not insurmountable. Finally, competition from CLECs generally does not appear to lower retail prices, with the possible exception of the decline in Internet access prices in Germany following the imposition of mandatory unbundling.

The summary statistics provided in Table 3 are not the same as summary statistics of the effects of mandatory unbundling on market shares in voice telephony and in broadband.

Table 3 provides CLEC market shares of DSL lines and voice lines by country.

**Table 3: Summary statistics of structural effects of mandatory unbundling, by country**

Country	CLEC Share of DSL Lines	CLEC Share of Voice Lines
United States	5.4% (June 2003)	14.7% (June 2003)
United Kingdom	48.8% (July 2003)	17.0% (Dec. 2003)
New Zealand	28% (June 2003)	7% (June 2002)
Canada	9% (2002)	4.8% (2002)
Germany	11% (Dec. 2003)	3.5% (Dec. 2003)

Sources: EU Ninth Report at 59; Ofcom FTMI Update at tbl. 2; CRTC, Report to the Governor in Council: Status of Competition in Canadian Telecommunications Markets, Nov. 2003, at 41, 57 (tbl 4.26); RegTP, Annual Report 2002, at 19, 20 (5 February 2003).

As Table 3 shows, CLECs have acquired significant market shares in the United Kingdom (48.8 percent of DSL lines) and in the United States (17.0 percent of voice lines). It bears emphasis, however, that a high market share for CLECs does not justify mandatory unbundling on an ex post basis. Similarly, a high market share for ILECs does not imply that mandatory unbundling was justified.

## Lessons learned from the unbundling experience

There are two possible explanations for why a rationale for mandatory unbundling at TELRIC was not substantiated in practice. First, the rationale was never supported in theory. Second, the rationale was supported in theory but those theories could not be transported from textbook into practice. For example, an exogenous shock, unforeseen by the regulators, may have occurred and the regulatory framework was not sufficiently flexible or robust to cope adequately with it. Much analysis has been devoted to the first explanation.

For the second category of rationales, we identify several factors that might prevent a regulator from achieving the goals of mandatory unbundling at TELRIC. These factors highlight the importance of robust regulation – namely, regulation that can accommodate an exogenous change to the system or a range of possible reactions by the regulated firm. To the extent that mandatory unbundling regimes are not designed with this property in mind, they are more likely to fail in practice.

### The rationales that were not correct in theory

Some of the rationales for mandatory unbundling were not supported in economic theory, which implies it was extremely unlikely for regulatory intervention – no matter how perfectly executed – to serve its purpose. The first rationale that fails in theory is the contention that competition in retail markets cannot be achieved without mandatory unbundling. This rationale cannot account for the significant facilities-based competition that has emerged independent of mandatory unbundling. For example, cable television providers did not avail themselves of access obligations yet have positioned themselves to make significant inroads in residential voice markets and have seized two-thirds of the market for high-speed data in the United States. Wireless networks have displaced significant minutes of long distance service that previously traveled across fixed networks and have displaced some primary and secondary fixed lines altogether for a growing number of voice customers. In enterprise markets, facilities-based CLECs have successfully replicated the incumbent's fixed network and can therefore provide competitive voice and data packages for large businesses. Even if such facilities-based competition never materialised, regulators could have pursued alternative policies to reduce retail prices. For example, price controls are a direct, albeit inefficient, means to force prices toward marginal costs. Hence, mandatory unbundling was not solely responsible for the facilities-based competition that emerged in voice and data services.

The second rationale that fails in theory is the idea that mandatory unbundling would stimulate competition in the wholesale market for network elements. If wholesale supply of network elements were a viable business strategy, then one would expect several firms to pursue and succeed at such a

strategy. But the experience in the United States and elsewhere suggests that the most valuable 'component' of the network is the carrier's relationship with the customer. It therefore makes little sense to cede this valuable asset to an intermediary for the sake of avoiding the retail costs of providing the service to the end user. Moreover, the idea of divorcing the wholesale activities from the retail activities ignores the significant economies of scope that can be realised in their joint production. For these reasons, it was not reasonable for regulators to expect that mandatory unbundling would induce a host of new carriers to enter and limit their business plans to wholesale activities only.

#### The rationales that were correct in theory yet were not satisfied in practice

The remaining rationales – namely, lower retail prices and the stepping stone hypothesis – are theoretically plausible yet were likely upset by factors not anticipated by regulators. Neither of these rationales can be ruled out on the basis of theory alone. Aside from high-end loops for enterprise customers and transport for all customers, there is little evidence of CLEC investment in their own facilities in fixed markets. CLECs generally appear to remain dependent upon unbundled elements and have made little attempt to substitute those assets with their own facilities. Instead, access seekers appear to have chased retail margins, as evidenced by the dramatic shift from resale to UNE-P in the United States, and to have regarded the various access inputs as substitutes in this process. The announced exits of AT&T and MCI from residential local access markets in the United States in 2004 further supports this conclusion.

There are two hypotheses that might explain the failure of the stepping stone hypothesis in practice. First, regulators have been remarkably unconditional in developing access regulations that would support the transition to facilities-based competition. In particular, regulators have failed to impose obligations to ensure that promises to evolve from UNE-based to facilities-based competitor are subsequently realised. For example, regulators could allow the prices for fixed unbundled elements to increase over time to ensure that access seekers have incentives to invest in their own facilities. Second, mandatory unbundling may have attracted 'fly-by-night' firms that were primarily interested in

short-term margins and eschewed long-term development of a rival network. Both cases are prime examples where economic theory cannot be readily transported from the textbook to the real world. Also, regulators failed to make and keep a 'credible commitment' to sunset mandatory unbundling, as in Canada, which provided incentives for CLEC strategic behavior to receive subsidised unbundled elements.

With respect to lower retail prices as a rationale, it is true that even artificial entry results in lower retail prices under most oligopoly models with homogenous products. Prices may not decline, however, if entrants differentiate their offerings with unique features or if the cost of entry prevents entrants from under-pricing the incumbent. The first explanation for why retail prices did not decline after the introduction of mandatory unbundling does not appear to be satisfied. There is scant evidence that entrants engaged in innovating offerings. At most, entrants 'innovated' by bundling voice and data services under a single offering, which may have allowed entrants to charge a higher price relative to a stand-alone replica of the incumbent's offering.

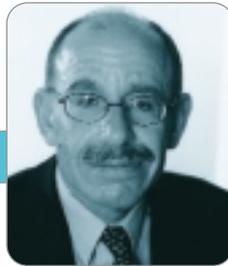
If significant product differentiation is not observed, then perhaps retail prices did not decline because entrants could not afford to under-price the incumbent's offering. According to this hypothesis, entrants overpaid for ILEC customers and were therefore incapable of offering discounts to customers. Stated differently, the only 'innovation' offered by entrants came in the form of branding and distribution rather than improvements in networks and other infrastructure. From 2001 through 2003, the largest U.S. data CLECs reduced their customer acquisition costs significantly, but often by not enough to remain cash flow positive. With a discount rate of 7 percent and a terminal value of 50 percent of fifth-year cash flows, a typical data CLEC will break even by spending \$260 or less to acquire a customer if there is no churn. By this calculus, Covad's customer acquisition cost of \$563 in 2003 did not permit it to recover its investment. Indeed, AT&T's abrupt exit strategy in 2004 is consistent with spending heavily on advertising its brand name, and with the prospect of selling its business to an incumbent. Apparently, the market did not develop as regulators had hoped.

## Conclusion

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Telecommunications regulators offered four major rationales for mandatory unbundling: (1) competition in the form of lower prices and greater innovation in retail markets is desirable, (2) competition in retail markets cannot be achieved with mandatory unbundling, (3) mandatory unbundling enables future facilities-based investment ('stepping-stone' or 'ladder of investment' hypothesis), and (4) competition in wholesale access markets is desirable. An empirical review of the unbundling experience in United States, the United Kingdom, New Zealand, Canada and Germany suggests that none of the four rationales is supported in practice. Rationales (2) and (4) were incorrect in theory and therefore had little or no chance of succeeding in practice. By contrast, the stepping stone hypothesis and lower retail prices were theoretically plausible under certain assumptions yet were not satisfied in practice. The stepping stone hypothesis may have failed due to selection bias created by the unbundling program – that is, the very firms that were attracted to compete with the aid of government support were not interested in developing long-term rival networks.

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# Regulatory approaches to Mobile Virtual Network Operators (MVNOs)

## Introduction

The last few years have seen Mobile Virtual Network Operators (“MVNOs”) emerge in a number of markets, some arising from clear regulatory intent and some not. But it is not clear that MVNOs have developed as policy makers and industry commentators anticipated, or that they have been helpful in meeting the policy objectives with which they have been associated. This paper<sup>1</sup> examined the MVNO experience in jurisdictions which have regulation requiring or facilitating MVNOs such as:

- Ireland and Hong Kong have made specific regulatory provision for MVNOs; and
- several Nordic countries have generic regulatory intervention that, while making no specific mention of MVNOs, requires mobile network operators (“MNOs”) to provide access to their networks;<sup>2</sup>

We have also examined jurisdictions which have, or have had, MVNOs but no regulation: Singapore, United States, UK and Australia.

We find that the contribution of MVNOs to price and packaging competition was material in most markets they entered, but fell well short of the model of an operator investing in its core network to deliver innovative services which regulators had in mind when regulating for MVNOs. Further, to the extent that market structures are moving in a direction to include MVNOs, our study shows that strategic factors and market conditions are more likely than regulation to determine the competitive success of MVNOs, and to motivate service innovation.

## What is an MVNO?

In theory, an MVNO has all of the attributes of a fully-fledged mobile operator, but for its own radio access network, which it shares with its host MNO.<sup>3</sup> In practice, the term MVNO is applied to at least three different models, as depicted in Figure 1:

- a “full” MVNO involves the MVNO providing its own network core, including a mobile switching centre (MSC), which may connect directly to the MNO’s radio access controller;

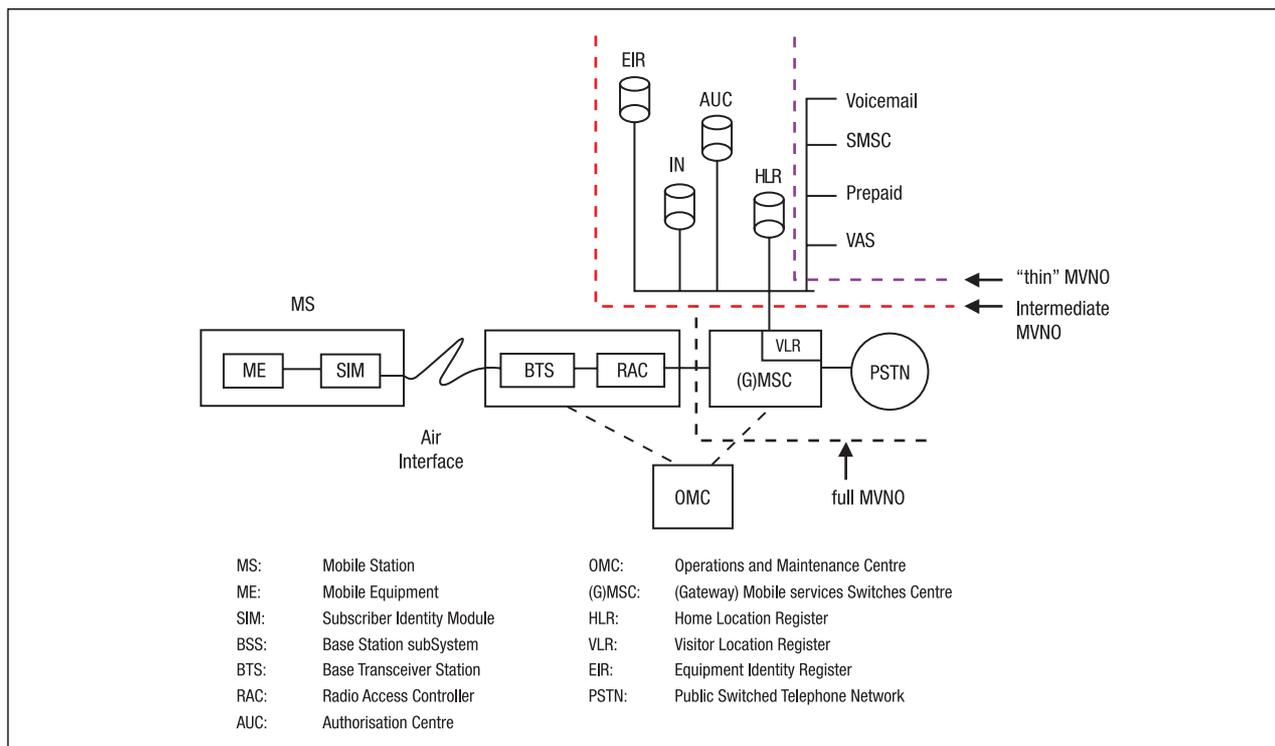


Figure 1: Full, intermediate and thin MVNOs

- an "intermediate" MVNO where the MVNO acquires a switched service but provides its own HLR. Alternatively, the MNO and the MVNO might jointly own the HLR and partition it;
- a "thin MVNO" where the MVNO provides "bolt-on" applications and content platforms. This MVNO model is not much different from an enhanced reseller.

This lack of clear definition between MVNOs has had at least two consequences. First it made it easy for the idea to be embraced by regulators and by commentators – it sounded plausibly efficient and commercial, without necessarily having enough detail to be thoroughly criticised. Second, it made it easy for entrants to adopt the title of an MVNO, whether or not they engaged in much more than resale. The MVNO concept provided an alternative "language" which regulators found more attractive than that associated with airtime resale, although some of the MVNOs were little more than resellers in MVNO "camouflage".

## Economic and regulatory theory of MVNOs

The mobile business case on which regulation of the mobile industry was traditionally based gave mobile operators the freedom to decide their own vertical structure and the limits of their own firm boundaries. These freedoms were not only valued by mobile operators – often young companies or business units with strong competitive cultures and no particular advantages of incumbency – but they were also appropriate from an economic and regulatory policy point of view. The mobile business presents economic and technological characteristics lacking in the fixed business, principally duplication of networks on an end-to-end basis, which enabled competition between vertically integrated companies to flourish and to be accepted by regulators.

The implicit decision by some regulators to move away from this vertically integrated model by mandating MVNO access<sup>4</sup> has been justified on two grounds:

- **Increase retail price competition:** The idea here is twofold. Firstly, with an increased number of players in the mobile market, each player – and in particular the incumbents – would see their market power decreased, resulting in procompetitive benefits for consumers. Secondly, more players in the downstream market would make collusion less likely and/or less sustainable;<sup>5</sup> and
- **Facilitate downstream innovation:** for example, in content provision, data services, or marketing/packaging for niche segments. The premise behind this rationale is that left to themselves, mobile network operators will not have sufficient incentives to open their networks to innovative content providers, even when it is economically efficient to do so.<sup>6</sup>

In discussing the first justification, regulators often employ the vocabulary of the bottleneck theory (i.e. spectrum "scarcity" means it is a bottleneck).

A bottleneck situation arises where an upstream firm controls an essential input for downstream firms, which cannot efficiently be replicated, and the bottleneck owner itself participates in a downstream market. As such, bottleneck language applies more appropriately to the fixed incumbent's copper local loop to justify unbundling, but not to competition between several end-to-end mobile networks.

Regulators also failed to consider whether their oligopoly concerns could be addressed through other regulatory means, such as by licensing more spectrum to permit the entry of additional network operators. In fact, in some jurisdictions with regulated MVNO access, 3G licences were not taken up, or were handed back (e.g. Sweden). Regulatory support for MVNOs may be less about a "scarcity of spectrum" than regulators' concerns about a "scarcity of capital", as a number of regulators seem to have conceded.<sup>7</sup>

The predominant rationale for MVNO regulation appears to be downstream innovation. While the first rationale given by regulators involved "stretching" the bottleneck concept, this second rationale has been applied with little regard for the state of upstream competition amongst the MNOs.<sup>8</sup> In assessing the role that regulators should play in transitioning to innovation enhancing vertical structures, it is worth considering whether vertical separation is needed for innovation to take place, and whether regulation is needed for efficient third party access to occur.

In response to the first question, economic theory does not prescribe that vertical separation is a necessary or sufficient condition for innovation to occur. The debate about the organisational forms most conducive to innovation is a long one, with many alternative opinions supported by either theoretical arguments or empirical evidence. Vertical restrictions may, in theory, reduce intrabrand competition (i.e. competition in the provision of services using the same mobile network) by limiting the number of sellers of a particular product competing for the business of a given group of buyers. But conversely, vertical restrictions can promote interbrand competition (i.e. the competition between brands or mobile networks) if they allow manufacturers (or network operators in the context of mobile telecommunications) to achieve efficiencies in the distribution of their products (or the provision of enhanced mobile services). In other words, if economic theory is of any help, this would be only to show that there is no general conclusion on the need for vertical separation for innovation.

In response to the second question, the obvious point is that an MVNO access obligation will be totally redundant with multiple competing networks when there is spare capacity on those networks. Each will have a commercial incentive to provide an MVNO with access. In any event no regulator can successfully design a structural policy of vertical organisation for such access that would encourage efficient innovative activities. The balance between the harmful and helpful sides of vertical restraints is very subtle in practice and may be impossible for a regulator to call, with the non-trivial possibility of doing more harm than good if such restraints are to be prohibited. This is particularly the case in an environment as dynamic as the mobile telecommunications business.

For example, if the promotion of downstream competition only means encouraging strategies of price cutting in some segments of the mobile market, its welfare impact may well be negative. First, if competition leads to denying the recoupment of efficient investments, then the short term gains would likely be outweighed by dynamic losses (eg: disincentives to invest). Second, the pricing of mobile services typically involves differentiated pricing structures whereby the efficient recoupment of investment costs means that service users contribute, at least to some extent, according to their willingness to pay and/or their price elasticities.<sup>9</sup> In other words, a disruption of retail pricing structure cannot, in and of itself, be a sufficient rationale for a regulator to mandate third party access. If price-cutting leads to a disruption of efficient price structures, then the overall welfare impact may be negative.

## Key points from the MVNO case studies

The question we sought to address from the case studies was whether MVNOs achieved the regulators' objectives and, if not, whether the experience was consistent with the economic theory outlined above.

Few, if any, MVNOs meet the definition of a "full" MVNO, which provided the paradigm for MVNO regulation. The two most cited examples of successful MVNOs are the Danish discount service providers and Virgin Mobile. The most successful Danish service providers had a choice between a reseller model and an MVNO model offered by the MNOs but choose the reseller model. Virgin Mobile appears to favour the same "thin MVNO" approach since it acquires end to end voice and data services from its host MNOs and the IT infrastructure that it does build, such as billing systems and content or applications platforms, are similar to those deployed by the Danish service providers.

MVNOs occur in both regulated and unregulated environments, the presence of MVNOs, and the relative success of some of them, in unregulated markets such as the US, UK and Australia suggests that, in the absence of regulation, MNOs will have commercial incentives to provide access. One of the most high

profile MVNOs, Virgin Mobile, operates only in countries without MVNO regulation.

The two markets with explicit regulation delivered little by way of MVNO success. MVNOs have a high failure rate in Hong Kong and, to date in Ireland, MVNOs have not taken the opportunity of seeking access to the "A" license network (which is the only license which bears the MVNO access requirement). The Nordic countries have general access obligations which could assist MVNOs, but in Denmark the successful discount service providers have chosen a resale model over MVNOs, and in Sweden a number of MVNOs have exited or shifted towards being discount resellers. MVNOs have failed in both regulated markets, such as Hong Kong and Sweden, and in unregulated markets, such as Singapore.

The presence and success of MVNOs seems more likely to be explained by market factors other than the presence (or absence) of MVNO regulation. MVNOs seem to do well in markets with relatively low mobile penetration at the time of their entry, such as the US. In those markets, MNOs see MVNOs as a means of targeting niche sectors in which they otherwise would be unsuccessful and as penetration is still growing, there is also sufficient opportunity and margin to sustain non-facilities based competitors.<sup>10</sup>

However, where markets have reached saturation and competition between MNOs is fierce, such as in Hong Kong and Singapore, there is clearly a higher "mortality rate" amongst MVNOs, even with a strategy of product differentiation: Shell Hong Kong, which lasted less than six months, is one of the few MVNOs which tried to offer an innovative data service rather than reselling the MNO voice services.<sup>11</sup> Although MVNOs are likely to be seen by the MNO as cannibalising their existing base, MNOs still face incentives to provide wholesale services. MNOs face a "prisoner's dilemma" in that if they do not strike an agreement with a potentially significant MVNO, one of their competitors will, thereby gaining the advantage of lower unit costs.

Clearly, MVNOs have produced some benefits in the markets they have entered. MVNOs such as Virgin Mobile introduced pricing and packaging innovations such as simplified pricing and "no strings attached" contracts. However, in both the UK and Australia, there was a material decline in retail prices for prepaid services in the year Virgin Mobile entered the market, but pricing returned to the pre-entry trajectory or slowed in subsequent years.<sup>12</sup> This suggests a limited once-off effect of entry.

The impact of the discount service providers in Denmark has been more dramatic, with pre-paid prices decreasing by 50% since Telmore and CBB Mobile entered the market in late 2003.<sup>13</sup> The Danish discount service providers have been able to operate on razor-thin margins for the very reason that they have eschewed a "virtual" carrier model and followed a resale or

arbitrage model offering a vanilla service using low cost Internet based sales and customer service channels.

It also seems clear from the case studies we conducted in our fuller paper that MVNOs, whether in regulated or unregulated markets, have not delivered on the promise of significant product innovation. This is hardly surprising given the limited infrastructure which MVNOs have deployed. Virgin Mobile has launched a range of value-added services in the UK, Australia and the US providing entertainment news, horoscopes, ringtone downloads and information about affiliated Virgin products, such as music releases and Virgin flight details. However, these services are similar to those provided by resellers and service providers that do not claim to be MVNOs, such as the Danish discount providers. It has been reported in the UK recently that Virgin Xtras are not as attractive as Vodafone Live! to the youth market now and that Virgin Mobile is currently re-evaluating its Virgin Xtras service with a re-launch planned.<sup>14</sup>

Whatever impact they may have had in particular markets, it is clear that ultimately the contribution of MVNOs to pricing and packaging innovation was nothing more than what resale could have achieved. Much the same can be said about the limited product innovation which MVNOs have produced.

## Lessons learned

This brings us back to the traditional vertically integrated mobile business model. Economic theory suggests that in competitive markets, market forces and the private incentives of entrepreneurs to maximise profits should be sufficient for ensuring that the pattern of vertical integration in a market is as close to the optimal as possible. Clearly, the mobile business model has been highly successful in promoting mobile services and competition, although there is evidence that market forces are now reshaping the organisation of the mobile industry to provide for more downstream participation by third parties. The Japanese and Korean experience with mobile data shows that, because MNOs are unable to keep pace with customer demand for content by developing it themselves, there are strong commercial incentives for MNOs to involve third party suppliers in downstream supply. Demonstrably, these commercially evolved models have been far more successful at delivering innovation in advanced mobile services than any of the MVNOs in other economies, whether MVNO access is regulated or not.

Hence, it appears likely, even inevitable, that as MNOs seek out the optimal firm boundaries in an environment where such innovation is imperative to success, the vertical structure of the mobile market will be altered – albeit in ways that are presently uncertain. As such, the boundaries of mobile firms – that is, what firms make or buy and sell or further process – are driven by fundamental tradeoffs in the marketplace that regulators are not in a better position to judge than the firms.

## Conclusions

While MVNOs have had a useful impact on competition, particularly in relation to pricing and packaging, they have failed to meet the innovation goals articulated by regulators. That MVNOs have fallen short of expectations is not surprising as they were borne of a process that was high on rhetoric and low on analysis as to why and how such intervention in vertical structures would improve competitive outcomes.

Initially, the different dynamics of vertical integration in the mobile and fixed sectors made it harder for access seekers to get traction with regulators than was the case in the fixed sector. Whereas competition between multiple end to end mobile networks quickly emerged, fixed entrants struggled to deploy significant local network infrastructure of their own. By positioning themselves as standing on the bottom rungs of the “ladder of investment”, fixed entrants were then able to argue for access, including unbundled loop access, as a complement to their own network deployment.

Would-be mobile entrants without spectrum were unable to position themselves in the same way in regulatory debates. As resellers, their claims for access tended to gain less sympathy from regulators given the more limited economic benefits which “simple arbitrage” delivers compared to the promise of fixed entrants climbing the ladder of investment. The idealised model of an MVNO with its own core network and associated intelligent network platforms provided “a ladder of innovation” justification which, much like the “ladder of investment” rationale for fixed network unbundling, led regulators to prioritise MVNOs over simple resale. The theoretical ability to substitute the network core of the MNO gave access seekers the cachet of a potential facilities investor, although they operated in practice much like resellers.

The regulators who introduced MVNO-specific regulation, Hong Kong and Ireland, were alive to this risk and required that MVNOs fit the definition of a “full” MVNO.<sup>15</sup> However, there are no MVNOs in Ireland, and most MVNOs in Hong Kong fail to meet the regulatory definition, although there have been “thinner” MVNOs, most of which have failed. The regulators who relied on general access regulation to require access for MVNOs, such as in the Nordic countries, spoke in terms of the “full” MVNO model when promoting the benefits of MVNO entry, but specified no minimum investment criteria. As our research found, there are operators in the Nordic countries which describe themselves as MVNOs, but which in actual fact are resellers or service providers.

While the benefits of MVNOs may be relatively modest, there is reason to believe the costs may be significant. Regulators have given little or no consideration to the investments and risks of MVNO regulation, possibly assuming that as MVNOs would be utilising “spare capacity”, the incremental costs to the MNO

would be low. However, MNOs are likely to need to invest in continuing expansion of their networks to meet their MVNO requirements and to continue to provide an adequate level of service to their own customers. The practical effect is to shift the risk of the substantial capital investment involved in mobile networks to the MNO because the MVNO can demand capacity on an “as required” basis, potentially at a regulated price, without any or any significant commitment as to quantity or term of supply.<sup>16</sup> Economists have referred to this as a “free option” which the MNO has been required by the regulator to provide the MVNO.<sup>17</sup> The size of this free option is illustrated by the difference in pricing between the Irish 3G licence with MVNO requirements (the A licence) and the licences without: the A licence had a value of less than 40% of the other licences, or £50 million less.

Our observations about MNVOs as “resale in a different guise” do not detract from the competitive value of resale (or enhanced resale on “thicker” versions of the MVNO model). The point is that decisions by regulators about the costs and benefits of mandatory MVNOs, including whether an MVNO actually is or is not likely to occur in the absence of regulation, should more clearly recognise MVNOs for what they are – a form of arbitrage. If viewed from this perspective, the gains realised from MVNO activities can be more accurately calibrated against the high risks associated with deployment of mobile infrastructure in assessing whether regulatory intervention is an appropriate step. Further, the fact that MVNOs seem to be as successful in nonregulated markets as regulated markets suggests that it is unnecessary to run the risks of MVNO regulation at all in order to secure those gains.

## Notes

- <sup>1</sup> This paper is a summary of a longer report prepared by the authors for Vodafone: “A Study of Regulatory Approaches to MVNOs”. The views expressed in both this paper, and the longer report, are those of the authors.
- <sup>2</sup> The French regulator, ART, is also considering imposing MVNO access conditions as part of its SMP reviews: *Analyse des Marchés pertinents, Consultation publique sur l'analyse du marché de gros de l'accès et du départ d'appel sur les réseaux mobiles ouverts au public*, December 2004.
- <sup>3</sup> See “Growing the MVNO model – a goal shared by all parties”, by EMC research, 24 Jan 2001, which reported on IBC's second MVNO conference, and noted among the conclusions: “If there was one thing which the conference brought to light, it is the fact that there will be many levels of MVNO ... This has given rise to a wide variety of definitions regarding what an MVNO is. A clearer definition may come with time...”
- <sup>4</sup> ART, Op. cit.
- <sup>5</sup> For example, “[t]o ensure Ireland gets early access to high quality 3G services at competitive prices [Etain Doyle, the Director Telecommunications Regulation] believe[d] that it [was] important to promote competition in the mobile telecommunications market at both the infrastructure and the service level. [She was] therefore keen to encourage new entrants at both these levels.”: ODTR, media release, 7 December 2000.
- <sup>6</sup> One of the objectives identified by the Hong Kong regulator, OFTA, for its Open Network Access Requirement is to “enable small and medium sized content or service providers to provide more innovative content, applications and services.” Office of the Telecommunications Authority, Hong Kong Third Generation Mobile Services Licensing, Information Memorandum, July 2001, para 2.2.1.
- <sup>7</sup> The Hong Kong regulator explicitly stated that its MVNO requirements would “enable parties who do not have the resources to bid for, or who have failed to obtain, a Licence, the opportunity to participate in the 3G market.” Office of the Telecommunications Authority, Hong Kong Third Generation Mobile Services Licensing, Information Memorandum, July 2001, at para 2.2.1. One of the reasons given by the French regulator for endorsing MVNOs was the likelihood that no-one would invest in a fourth 3G network: [www.art-telecom.fr/mvno](http://www.art-telecom.fr/mvno)
- <sup>8</sup> Hong Kong, for example, has one of the world's most intensely competitive mobile markets, with six operators competing across 11 2G networks, and another four 3G networks to be deployed; yet it is one of the few markets with mandated MVNOs.
- <sup>9</sup> Whilst generally analysed in the context of monopolies, such pricing structures are also observed in workably competitive markets, most notably in two-sided networks and in markets involving common cost (eg: mobile network): See for example Julian Wright, 2004, “One-sided logic in two sided markets”, *Review of Network Economics*, 3-1:44-64.
- <sup>10</sup> Virgin Mobile's US host MNO, Sprint PCS, has said: “[Virgin's] focus on pay-as-you-go wireless service for young Americans under the age of 30 should allow Sprint PCS to quickly and cost effectively penetrate this market segment in a way that is complementary to our efforts.”: “Sprint and Virgin announce Joint venture”, *Sprint News Release*, 5 October 2001.
- <sup>11</sup> Shell Mobile's MVNO in Hong Kong provided mobile-enabled telematics services, such as traffic alerts, mobile concierge and route guidance. Shell intended that, if successful in Hong Kong, this MVNO model would be replicated globally. Shell closed its MVNO after less than six months, with no more than 50,000 subscribers – less than half of its target, and less than 0.5% of the total Hong Kong subscriber base.
- <sup>12</sup> In fact, a report by Enders Analysis (“UK Mobile Call Charge Trends”, September 2004) calculates that UK GSM prices have risen slightly in the last two years, despite the entry of “3” and the growth of Virgin Mobile.
- <sup>13</sup> See generally, “The Moment of Truth – A Portrait of the Discount MVNO/Mobile Operators' Success”, Strand Consult, [www.strandreports.com](http://www.strandreports.com).
- <sup>14</sup> “Virgin Mobile (mobile operator)”, Ovum Report, 2004.
- <sup>15</sup> For example, Ofta requires that the MVNOs “establish for themselves a large part of the infrastructure of a MNO (excluding the radio access network)”, including at a minimum “its own mobile switching and gateway infrastructure... and maintain its own Home Location Register...”. Office of the Telecommunications Authority, Hong Kong Third Generation Mobile Services Licensing, Information Memorandum, July 2001, para 2.2.4.1. The ODTR imposes similar requirements: see ODTR *Opening the Market for Third Generation Mobile Services (3G Mobile)*, Document No. ODTR 00/92, December 2000.
- <sup>16</sup> Under OFTA's Open Network Access Requirement, the MNO is required to make available up to 30% of its airtime capacity, and if capacity is limited, is required to upgrade cell sites (but not to split cells), in order to provide the MVNO with capacity: Office of the Telecommunications Authority, Hong Kong Third Generation Mobile Services Licensing, Information Memorandum, July 2001, para 2.2.1.
- <sup>17</sup> See Jerry A. Hausman, *Valuation and the Effect of Regulation on New Services in Telecommunications*, Brookings Papers on Econ. Activity: Microeconomics (1997).

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# Some conclusions on regulating access

## The rationale for access obligations: 'essential facilities'

Our authors have identified a number of reasons that have been advanced by regulators to justify access obligations in telecommunications. The first point to make is that all of these are *output focused*, by which I mean that regulators have identified specific outputs which they hope to produce as a consequence of their actions. This shows that regulators are either not concerned with interventions for other reasons (eg to prevent the recurrence of some past conduct or to rely *solely* on some 'essential facilities' or bottleneck rationale for intervention), or they have not felt that it is sufficient to justify interventions without specifying the beneficial consequences expected to result. This is probably because regulators are required to 'promote' particular outcomes which are regarded as meritorious – more innovation, more investment, lower prices – rather than simply constrain the abuse of market power.<sup>1</sup>

The absence of any firm anchor in the traditional anti-trust 'essential facilities/bottleneck' doctrine allows regulators to have a high degree of discretion when it comes to defining the boundaries of access obligations in fixed markets and determining which elements of the network might be included and which not. Part of the difficulty here is that the intervention itself is designed to make markets or assets 'replicable'. The 'ladder of investment' thesis, discussed later in this paper, is founded on the assumption that markets can become contestable through intervention but that they will not be in the absence of such intervention.<sup>2</sup> This rather circular argument has been a source of long standing controversy in the US courts in relation to fixed line unbundling where the FCC argued that the Telecommunications Act required the development of two different tests: a 'necessary' standard and an 'impairment' standard.<sup>3</sup>

So far neither courts nor regulators seem to have been able to develop any very clear decision rules to define what should be subject to regulation and what should not – in part because decisions about access and pricing terms determine what is or is not contestable in the first place. The boundary has appeared to move both as regulators changed their views as to what the attainable outcomes of the process might be and what was needed to achieve them. The regulatory outputs have changed

dramatically in most markets in recent years, either because of developing market circumstances or the apparent inability of previous decisions to yield the desired outputs, or as the result of litigation. This is probably inevitable when there is no robust standard against which decisions can be tested.

In the mobile case, where no reliance could be placed upon a conventional 'essential facilities' analysis in the presence of competing infrastructure providers, the position is even more ambiguous. Some regulators begin by suggesting that spectrum scarcity has produced oligopolistic markets in which mobile operators will engage in collective boycotts of access seekers.<sup>4</sup> The obvious means of addressing oligopoly concerns in mobile telecommunications is to promote entry through licensing additional firms or other reform of spectrum management policies.<sup>5</sup> What we find is that instead of regarding access regulation and the licensing of new entrants as *alternative* responses to concerns about vertical restraints, regulators have introduced access obligations *in conjunction* with the licensing of new facilities-based entrants. Both the Irish and Hong Kong regulators introduced access obligations as part of the licensing of new entrants, whilst regulators in markets such as Ireland, Sweden, Norway and France have advocated access regulation whilst spectrum licences remain unallocated.

Those regulators who have pursued access regulation have made no attempt to explain why access seekers would not be able to secure access in a competitive market of vertically integrated firms such as we find in mobile. Even if monopolists have incentives to foreclose downstream markets to competitors – itself a controversial thesis in economics – there appears to be no serious attempt to make a similar case for 'market failure' when we have upstream oligopolies. Economic theory suggests that strong complements and efficient substitutes will secure access terms without regulatory intervention. Indeed, Vodafone has argued elsewhere that the very prospect of regulation in these markets can create 'hold up' problems.<sup>6</sup> The study undertaken by Ergas and Waters finds growing evidence to support the view that mobile access seekers who offer complementary capabilities can be expected to obtain access terms without regulatory intervention – and that those who do so on commercial terms have proven to be more sustainable than those who result from regulatory intervention.

## The rationale for access obligations: innovation and investment

There are several output-related claims that are advanced by regulators (and by access seekers themselves) to justify access obligations in both fixed and mobile markets. These can be categorised in different ways, but for our purposes the first of these is that access seekers will contribute something additive in network or technology terms. The claim is that access seekers will invest in and deploy technologies in which the incumbent network providers may not otherwise invest, and this will in turn drive innovation and lower costs in downstream markets. This might be the case, for example, if an incumbent were reluctant to deploy a new technology that would cannibalise revenues from existing services, whereas a competitive access seeker would have no such inhibitions. Delays in SDSL deployment, for example, have often been attributed to a reluctance to cannibalise existing ISDN services in Europe.

These propositions can be tested either by examining the investment activities of the access seekers themselves or by considering their outputs. Investment activities during the late 1990s are subject to some exceptional capital market conditions, but our general conclusion is that access seekers in both fixed and mobile markets have made relatively modest incremental network capital expenditures.<sup>7</sup> Firms have incurred high costs in renting facilities from access providers and high costs in marketing, customer management and related activities, but *incremental* investment in technology platforms seems to have been modest – and have been almost entirely focused upon broadband DSL technologies.<sup>8</sup> Evidence from mobile markets suggests that, if anything, technological innovation and investment thrives in markets such as Japan and Korea, which have *avoided* access regulation.

## The rationale for access obligations: investment, replication and wholesale competition

The second justification advanced by regulators imposing access obligations is that this will prompt market entry by firms who, having acquired sufficient scale, will replicate the facilities that are provided under regulation. On this view access regulation is a transitory phenomenon that is necessary to secure the long-term development of infrastructure and full competition in the upstream market. This 'ladder of investment' or 'stepping stone' thesis is clearly only relevant to access regulation in the fixed market – at least whilst spectrum scarcity remains unexamined and a barrier to facilities-based replication of existing mobile networks. Mobile Virtual Network operators (MVNOs) cannot readily transform themselves into full facilities based providers through investment (other than through acquisition of – or more often in practice by – an existing operator).<sup>9</sup>

Investments in network capex are, on this view, directly *substitutable* to the regulated facilities rather than being, as discussed above, complementary. The thesis is testable by examining the investment profiles of the firms. Hausman and Sidak find that there is little evidence of such substitution having occurred in fixed markets in the United States or Canada.<sup>10</sup> US CLECs such as Z-Tel or Citizens Communication spent \$55m and \$270m respectively on renting unbundled loops in 2003 whilst incurring less than \$20m in capital expenditure between them.<sup>11</sup> In other markets such as Canada, the capex/sales ratio of the incumbent fixed operators has exceeded that of the access seekers. Such results are not consistent with the 'stepping stone' hypothesis.

Regulators have been remarkably unconditional in dealing with entrants. Claims are made about future investments but regulators do not attempt to ensure that these are subsequently realised. There are important exceptions to this. For example, the Dutch regulator suggested that prices for fixed unbundled elements should increase over time in an attempt to ensure that access seekers had incentives to invest in substitutable facilities. The Canadian regulator, the CRTC, similarly sought to 'sunset' access obligations after a five-year period, although this was subsequently extended. Perhaps most interestingly, an access seeker in the guise of AT&T have themselves proposed a similar approach by suggesting that prices of Unbundled Network Elements provided by ILECs should rise over time 'so as to impose a financial penalty on competitors that continue to rely on UNE-P...'.<sup>12</sup> Such approaches are consistent with the view that access regulation should be a small step on the ladder of investment, but they have been few and far between.

## The rationale for access obligations: retail price competition

Another justification advanced by regulators for access regulation is that it applies downward pressure upon retail margins. In many respects this is a more modest objective than those discussed above, not least because it is far from clear whether it is necessary to pursue unbundling in order to accomplish it. Resale, or other forms of more direct intervention, may deliver price benefits without the costs associated with more intrusive access regulation.

The study of fixed network access regulation suggests that access seekers have been very responsive to regulatory interventions that alter retail margins. The balance of investment between resale products and fully unbundled products has shifted quickly in response to changes in the pricing of each element. Contrary to the 'ladder of investment' thesis where different inputs *complement* each other as access seekers climb in one direction, resale and unbundled inputs appear to have been consumed as *close substitutes*. Although the migration

from resale to unbundling could be regarded as the first step in the 'ladder of investment', access seekers do not in fact appear to have regarded unbundled elements as providing additional non-price benefits but instead have simply arbitrated between resale and unbundled options depending in which offers the most attractive short term margin. The terminological difficulties in distinguishing between MVNO and 'resale' models may reveal exactly the same issue: 'MVNOs' have exploited definitional ambiguities to try to secure better margins than conventional resellers whom they, in fact, closely resemble.

Whilst access seekers appear to have chased retail margins, our authors find ambiguous evidence as to whether the competition they have then provided has resulted in lower retail prices in the downstream market. In the case of MVNOs and mobile resellers, we observe initial price effects at the time of entry in some markets (such as the UK and Australia) but more sustained effects in some Scandinavian markets. The evidence in fixed markets is very difficult to assess in the absence of a robust counterfactual and given the presence of retail pricing constraints that are imposed on the incumbents by regulators. Comparison of price trends in New Zealand with those in the United States or other European markets where access regulation has been pursued does not suggest that significant retail pricing effects can be attributed to access interventions.

### The consequences of access obligations: unsustainable entry

I have already noted that Ergas and Waters find MVNOs who enter on commercial terms to be more durable than those entering under regulated terms. There are good reasons to suppose that regulatory intervention will produce outcomes that would simply not occur at all in a competitive market. Competitive markets do *not* allow every prospective entrant to enter, much less prosper. Competition will allow strong firms to prosper but may 'impair' weak substitutes. Access regulation may have the effect of allowing weak substitutes to enter as well. In competitive wholesale markets, many access requests ultimately fail to come to fruition as both parties discover that the business economics or technological issues are insurmountable. Some regulators appear to consider this to be evidence of 'market failure'. This suggests they are applying a rather naïve 'competitive benchmark' which is never observed in practice.

### The consequences of access information obligations: investment

The bankruptcy of the ladder of investment thesis means that instead of the facilities-based competition emerging from the entrants who have been supported by access regulation, competition is emerging from other unexpected sources instead. In fixed markets, for example, the emergence of coaxial cable networks as competitors in both fixed broadband and, with the advent of VOIP, voice markets was not anticipated by regulators when they embarked upon access regulation. In mobile, infrastructure competition may in future be provided by WiFi and WiMAX technologies.

The development of these technologies challenges the assumptions which are commonly held by critics of access regulation: that interventions will crowd out investment in rival infrastructures as well as dampening the investment incentives of the incumbent firm on whom regulation bites directly. This is a difficult proposition to test in the absence of a robust counterfactual but our authors suggest that the impact of access regulation upon investment in rival technology platforms has been, at most, marginal.<sup>13</sup>

### The consequences of access obligations: sales and marketing

This leaves us with a challenge of explaining how the retail margin that is available as a result of access regulation is being competed away. We have already argued that it does not appear to have been applied to investments in complementary technologies, which might provide the basis for non-price differentiation. Nor does it appear to have been applied to substitutable networks that reduce dependency upon the regulated networks over time and which might offer some prospects of wholesale competition in the long term. To the extent that it is possible to determine from financial statements how margins have been redeployed by the CLECs in the United States, for example, it appears that a substantial element of any operating margin is reinvested in marketing activity that is intended to develop a brand or a franchise within the market.

One argument that might be advanced by the regulators themselves is that this is to be expected at the early stage of the investment cycle. Access seekers need to build brands and franchises before moving on to invest in tangible assets. On this view it is simply too early to conclude whether the stepping stone thesis is viable or not – or how many steps these firms will eventually take.

Another theory is that access regulation tends to attract ‘hit and run’ entrants who are typically not already in the business of building or running networks and are reluctant or unable to sink large fixed investments into network assets.<sup>14</sup> These entrants truly understand the ‘option value’ of access interventions, even if regulators do not. On this view, brand extenders such as Virgin or Seven Eleven will seek to build franchises or distribution capabilities in mobile and fixed markets with a view to subsequently exiting the market via an IPO or some other means (including sale back to the incumbent in the case of Telmore and CBB Mobile in Denmark).

## Some concluding lessons for regulators

The first part of this paper argued that there is a difference between regulation that is anchored in a theory of market failure and regulation that is justified by the delivery of some set of future outputs. Whatever the rhetoric, access regulation favours the latter.

If these outputs are desired but are not being delivered by a competitive market, regulators should ask why not. It may simply be that they are not desirable or sustainable.<sup>15</sup> If this is the case then there needs to be explicit recognition that regulators are engaged in something other than seeking to mimic competitive markets. Regulators should be particularly wary of imposing access obligations at precisely the same time as they licence additional entrants.

Output focused regulatory interventions should include mechanisms that make them conditional upon the realisation of these objectives (or at least upon the access seeker taking steps in the right direction). If regulation fails to secure these objectives then there needs to be a mechanism whereby it is voided (typically ‘sunset’ provisions which are credible and not subject to renegotiation). Outputs need to be more precisely specified than appears to have been the case in the past.

Regulators need to develop much more sophisticated assessments of the competitive dynamics of telecommunications markets: simply considering the number of actors on the market should not be regarded as a measure of either competitive intensity or regulatory success.

Regulators seem to have struggled to design regulatory inputs that are complements which encourage firms to ascend the ladder of investment over time. In practice, access seekers have regarded these as close substitutes and chased the highest margin.

Regulation has had a major impact on investment and buying behaviour of access seekers and can dramatically alter the distribution of risk in markets with sunk costs.

Regulators appear, at least to date, unable to calibrate their interventions to account for option values, even if the access seekers themselves seem to understand this well.

Access regulation seems to have been good at bringing forth investments in marketing activities. It is unclear whether these are sustainable in the long term or would be expected in normal competitive markets.

## Notes

- <sup>1</sup> We should be careful not to overstate the distinction between a traditional anti-trust rationale of intervention to 'constrain' or 'deter' abusive conduct and a regulatory approach that seeks to 'promote' particular outcomes. In practice anti-trust authorities intervene against bottlenecks because they have some specific detriment in mind which they want to alleviate, whilst regulators sometimes adopt the tools, or at least the rhetoric, of anti-trust authorities. But it is notable that none of the regulators in fixed markets where there is a fixed incumbent operator in the local access market appear to have felt that a traditional 'essential facilities' analysis is a sufficient condition for the imposition of access obligations. All have felt obliged to rely upon other outcomes as justification. And of course none of the regulators in the mobile markets, where there are competing networks, appear to have felt that the 'essential facilities' analyses was even a necessary condition for intervention.
- <sup>2</sup> This may be one reason why the 'essential facilities' argument is rarely relied upon by regulators. The case for intervention to promote infrastructure competition (a primary rationale often made on behalf of access interventions) becomes a difficult one to sustain if the market is genuinely a natural monopoly (and there is no expectation of change). The better regulatory response in such circumstances would be to promote competition through resale but to abandon ambitions of inefficient duplication.
- <sup>3</sup> See para 107 and 108 of FCC's Triennial Review: 'a significant cost disadvantage that hinders the ability of competitors to enter may be sufficient to trigger a finding of impairment but may not qualify the facility as essential'.
- <sup>4</sup> This appears to have been the view of OFTA, the Hong Kong regulator and of ComReg, the Irish Regulator, which has referred to pent up demand in the mobile access market (without publicly disclosing the evidence on which this view is based), see ComReg consultation No. 04/118.
- <sup>5</sup> Spectrum management reform is now gaining momentum in some markets – the US and the UK being notable leaders in this area. But these reforms have not tended to be driven by an explicit concern to promote entry (although this may be a by product) so much as a concern to increase the efficiency incentives of existing users. Also, spectrum reform has tended to be driven by Government action, rather than being the sole prerogative of the telecoms regulator. It may be for such institutional reasons that regulators have tended to pursue access regulation in preference to spectrum reform.
- <sup>6</sup> See Vodafone Ireland response to ComReg consultation no. 04/118, January 2005. Clearly more work needs to be done on theories of oligopolistic market failure, particularly to understand differences between unilateral incentive and coordinated effects.
- <sup>7</sup> Analysis of selected CLECs suggests capex/sales ratios for US CLECs such as Covad and Earthlink averaged around 5-6% in 2001/2, compared to ratios of 20-25% for ILECs such as Verizon, SBC and BellSouth (see form 10Ks SEC filings for respective years for respective companies, unpublished analysis undertaken by Criterion Economics for Vodafone).
- <sup>8</sup> As our authors show, there are important differences between the aims of regulators for DSL/broadband deployment, both over time and between markets. US regulators initially adopted unbundling policies to stimulate undifferentiated voice competition, but subsequently adapted these to the pursuit of 'broadband' objectives. European regulators, who adopted unbundling policies later than the US, have tended to focus on broadband outputs, and have adopted alternative resale strategies (such as Europe's recent 'Wholesale Line Rental' initiative) for voice services.
- <sup>9</sup> Some MVNO entrants are full infrastructure operators in adjacent markets (eg Telenor and Tele2 into Sweden and Norway respectively, Smart into Hong Kong). These MVNOs are being used by firms to 'step down' the ladder of investment in order to enter new geographic markets whilst in Denmark, MVNOs such as Telmore and CBB Telecom have moved up the ladder of investment by being acquired by an existing MNO.
- <sup>10</sup> Hausman and Sidak find that US CLEC investments in facilities-based lines remained broadly flat (at around 6m lines) since 2001 and that CLECs are have become more reliant, not less, upon Unbundled Network Elements during the period 1999 to 2003.
- <sup>11</sup> Criterion Economics analysis for SEC Form 10-Ks.
- <sup>12</sup> AT&T Press Release 'AT&T Proposes Roadmap To Facilities-Based Local Telecom Competition', 29 April 2004.
- <sup>13</sup> MVNO activity has not, for example, 'crowded out' H3G entry in Australia and the UK, although neither of these MVNOs resulted from regulatory intervention.
- <sup>14</sup> Exceptions to this rule appear to arise in Canada, where ILECs with facilities in one region have used unbundled elements to venture into adjacent regions; and in some recent MVNO developments in Europe where some infrastructure based MNOs have used MVNOs to enter adjacent markets (e.g. Telenor into Sweden, Tele2 into a number of Northern European markets).
- <sup>15</sup> Either because they would not survive in a competitive market and are essentially 'parasitic' or because the regulator is seeking to shoehorn competition into a natural monopoly.



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