Geoff Edwards
Sasakawa Fellow
Haas School of Business
University of California, Berkeley

Professor Michael Woods
Commissioner
Productivity Commission
PO Box 80
BELCONNEN ACT 2616

20 January 2001

Copy to

Professor Richard Snape
Deputy Chairman
Productivity Commission
Locked Bag 2
Collins Street East Post Office
MELBOURNE VIC 8003

Dear Professors Woods and Snape

Productivity Commission's review of Australia's telecommunications specific competition regulation

I refer to your invitation for written submissions to the Commission's review of Australia's telecommunications specific competition regulation.

Please find attached a paper I recently prepared independently of the Commission's review. Since the paper bears on issues raised in the review – the operation to date of Part XIC of the *Trade Practices Act 1974* and its application by the Australian Competition and Consumer Commission – I am submitting it in full to the review.

The paper begins by emphasizing the importance of promoting dynamic efficiency and innovative activities in a dynamic industry like telecommunications. The paper then argues that several aspects of the current United States and Australian telecommunications access regimes, in particular:

- excessive unbundling of local telephony networks;
- pricing network elements on a "most efficient" cost basis without regard to actual costs; and
- requiring that local calls be provided on a wholesale basis and at a "retail minus" price;

place excessive emphasis on the promotion of static efficiency concepts at the expense of the far greater long term benefits for users of telecommunications services that would flow from the promotion of dynamic efficiency if adequate incentives for innovation and

entrepreneurship were provided.

The paper includes recommendations of alternative policy directions that would provide a more appropriate weighting of dynamic over static efficiency. In particular, the paper recommends:

- the sunsetting of requirements to provide unbundled network elements and wholesale local calls, so as to provide clear incentives for investments in alternative infrastructure; and

- that access prices be determined with reference to non-inflated actual costs rather than hypothetical "most efficient" network costs, so as to send correct signals to entrants considering whether to build a more efficient network.

Thank you for considering this submission. If you have any queries, please contact me by phone or email as listed below.

Regards

Geoff Edwards
PhD Program
Haas School of Business
University of California, Berkeley
Ph: +1 510 666 8736
Email: edwards@haas.berkeley.edu

Going Long: Regulating Local Telecommunications for Dynamic Efficiency

Geoff Edwards
Sasakawa Fellow
Haas School of Business
University of California, Berkeley

Promoting efficiency in the telecommunications sector is fundamental for the promotion of economic welfare and international competitiveness in an economy. Not only are telecommunications services essential goods for almost every household, but they constitute significant inputs into the production of many high value goods and services produced in an economy. At the same time, the telecommunications industry is inherently dynamic, meaning great scope exists for innovations that will increase the variety, improve the quality and lower the cost of telecommunications services, and even revolutionize how communications occur. The significance of telecommunications services in the economy and the dynamic nature of the telecommunications industry combine to make it imperative for a nation's economic welfare and international competitiveness that regulatory policies promote dynamic efficiency and incentives for innovation in telecommunications.

This paper suggests that recent decisions by governments and regulators in relation to the telecommunications industries of both the United States and Australia demonstrate an excessive emphasis on standard micro-economic theory and the promotion of static efficiency concepts, and an under-appreciation of the nature of innovation and the imperative of dynamic efficiency. In particular, excessive unbundling of local networks, and wholesale pricing methodologies that fail to reflect the actual costs of providing wholesale services, risk discouraging investment in innovative telecommunications infrastructure to the detriment of the long term interests of end-users of telecommunications services, and economic welfare more generally.

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1 OVERVIEW

This paper argues that promoting dynamic efficiency and innovative activities should be the primary economic goal of regulators of dynamic industries, and that it is important for regulators to take long term views to industry performance. Indeed, promoting dynamic efficiency and investment in alternative facilities in the telecommunications sector is fundamental for the promotion of economic welfare and international competitiveness in an economy. Unfortunately, several recent regulatory decisions in both the United States and Australia have paid excessive deference to standard micro-economic theory and static efficiency optimization, at the expense of dynamic efficiency and innovation incentives in the telecommunications industry.

The organization of this paper is as follows. The next two sections discuss the fundamental importance of dynamic efficiency and innovative activities in telecommunications for the promotion of long term economic welfare. Section 4 reviews some key aspects of innovation and the innovation process that are of relevance to the discussion in this paper. Section 5 considers the nature of innovation in the telecommunications industry and emphasizes the importance of facilities based competition for optimal long term performance of the industry. Section 6 provides an overview of the telecommunications access regimes in the United States and Australia and briefly outlines the development of the following policies in each country:

- unbundling of local telephony networks;
- the pricing of these unbundled network elements on a “most efficient” cost basis; and
- requirements to provide local calls on a wholesale basis and at a “retail minus” price.

Sections 7, 8 and 9 consider these policies in turn and demonstrate that in each case, excessive weight has been placed on the promotion of static efficiencies in the provision of telecommunications services, whilst insufficient regard has been paid to the nature of innovation and the imperative of promoting dynamic efficiency. Each section concludes with suggestions of alternative policies that would provide a more appropriate emphasis on dynamic efficiency. Section 10 discusses the evidence available to date on whether these policies are discouraging efficient investment decisions, and the evidence available from other countries that have pursued different policy approaches. Three likely explanations for the continued preference of regulators for short term rather than long term approaches to regulation in the industry are presented in section 11. Finally, section 12 concludes this paper.

2 "GO LONG" – ON THE IMPORTANCE OF DYNAMIC EFFICIENCY AND INNOVATION

Where regulation of markets is considered necessary, the design of "efficient" regulatory policies is complicated by the need to balance different aspects of economic efficiency.

2.1 Static and dynamic efficiency

Economists commonly refer to three distinct aspects of economic efficiency.

First, neoclassical micro-economic theory has devoted much attention to the study of allocative efficiency. Allocative efficiency occurs when final product prices reflect the social cost of production. Putting this another way, an exchange of a product or service will be allocatively efficient as long as the purchaser values the product or service at least as much as the value of the best alternative use of the resources used to produce it.

Second, productive efficiency will be promoted by giving economic agents the correct incentives to produce products or services at least cost.

Third, dynamic efficiency – resulting from investments in innovative production methods and the development and commercialization of innovative products and services – will be promoted as long as the expected future value of these production methods, products or services are allowed to exceed the opportunity cost of the resources devoted to them.

2.2 The tradeoff

Unfortunately, it is rare that any regulatory policy can simultaneously promote all three aspects of economic efficiency. Usually a trade off must be made between the promotion of static efficiency and dynamic efficiency.

Both allocative and productive efficiency are static efficiency concepts. They involve making optimal use of society's resources at any one point in time. Dynamic efficiency, on the other hand, is concerned with the optimal use of society's resources through time. Whilst static optimization is important, gains from static optimization will be dwarfed by gains from the promotion of dynamic efficiency in an economy over the long run.[1]

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[1] See F. M. Scherer and D. Ross, *Industrial Market Structure and Economic Performance (3rd edition)*, Houghton Mifflin, Boston, 1990, pages 613-4 for a brief overview of the importance of compound productivity growth through technological innovation.

Innovation and its commercialization are the key factors driving productivity improvements in an economy. Over the long term, the greater the productivity improvements in an economy, the greater the advance in economic welfare, regardless of whether the economy achieves static efficiency at any point in time.

Once it is realized that dynamic efficiency and the promotion of innovation are central to enhancing long term economic welfare, it becomes clear that regulators of a dynamic industry should take a long term view to the performance of the industry, and adopt policies which adequately reward and encourage innovation, entrepreneurial activity and dynamic competition. In other words, for dynamic industries, the trade off should always be in favor of dynamic efficiency.

Just as the economics profession was slow to appreciate the importance of dynamic efficiency to economic progress,[2] competition regulation has traditionally had (and in most part continues to have) an unbalanced emphasis on static efficiency optimization.[3] It has proved very difficult for competition regulators to shrug this static focus borne of textbook neoclassical micro-economic analysis – it tends to remain implicit in many regulatory decisions in dynamic industries, even when the regulators, in the same breath, may explicitly acknowledge the importance of promoting dynamic efficiency.

In turn, the concept of static efficiency leads to a narrow view of competition embedded in neoclassical microeconomic theory – a concept of modest price competition in the provision of relatively homogenous products. Price competition may be important for analysis of mature and stable environments, but it can be next to irrelevant in the context of dynamic industries such as telecommunications. In dynamic industries, it is competition from new products or new processes

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[2] Until the 1950's and the work of Robert Solow (R. Solow, "Technical Change and the Aggregate Production Function", (1957) 39 *Review of Economics and Statistics*, 312-320) neoclassical economics emphasized the combination of labor and capital in essentially static production functions, and tended to ignore the significance of technological change.

[3] See T. Jorde and D. Teece, "Antitrust Policy and Innovation: Taking Account of Performance Competition and Competitor Cooperation", (1991) 147 *Journal of Institutional and Theoretical Economics*, 118-144 for a discussion of the how current antitrust laws fail to promote innovation and long term economic welfare.

– "performance" or "innovation" competition – that stimulates rivalry and investment in innovation and really counts towards enhancing economic welfare over the long term.[4]

It follows that regulators of dynamic industries should be less concerned with current price levels and more concerned with promoting innovation and entrepreneurial activities that promise far greater efficiency gains and benefits to consumers over the long run. Admittedly, to "go long" is often the hard and the "courageous" thing for regulators to do. But in dynamic industries like telecommunications, for the promotion of the long term interests of consumers, and economic welfare generally, it is clearly the right thing to do.

3 ON THE IMPORTANCE OF INNOVATION IN TELECOMMUNICATIONS FOR THE PROMOTION OF ECONOMIC WELFARE

Ensuring appropriate incentives for innovation and entrepreneurial activity is perhaps nowhere more important than in the telecommunications industry. There are two key features of the telecommunications industry that combine to make innovation incentives in the industry fundamental to the promotion of long term economic welfare and international competitiveness.

First, technology in the telecommunications industry is inherently dynamic, making it an extremely fertile ground for product and process innovations and consequent welfare improvements. With the tendency in the telecommunications industry for new technologies (promising new services or lower costs of existing services) to be available for deployment and commercialization on a regular basis, stalling the innovation process for even a brief period could be very costly.

Second, telecommunications services are a fundamental input into virtually every sector of a nation's economy. The availability of new telecommunications services and existing services at lower cost has a significant impact on the costs of doing business in many high value sectors of an economy, benefiting both domestic consumers and a nation's international competitiveness. In addition, telecommunications services underpin innovations in high technology services that are also critical to the competitiveness of a nation's economy. If the right telecommunications platforms are not in place, much of the benefits of continuing innovations in high technology services could be lost.

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[4] "Performance" in this context is determined by innovations leading to the introduction of new products, new combinations of products, better service, enhancements in the quality and performance of old products, or new production processes which may result in the provision of old products at significantly lower prices.

Indeed, it is likely that no other industry (apart from possibly the high technology sector in the United States' economy) is as important for the advance of a nation's productivity. It is therefore critical that telecommunications regulators take long term views and make decisions that promote dynamic efficiency in the telecommunications industry.

4 INNOVATION – KEY FEATURES OF RELEVANCE TO TELECOMMUNICATIONS REGULATION

Innovation is fundamental to the competitive process. It leads to new products, better performance of old products, improved service, and the great bulk of reductions in production costs that in turn lead to significantly lower prices. As a result, it is the most fundamental factor for the enhancement of economic welfare.

Jorde and Teece give a useful characterization of innovation:

> Innovation is the search for, and the discovery, development, improvement, adoption and commercialization of new processes, new products, and new organizational structures and procedures.[5]

The term "innovation" then captures the full continuum from discovery (or invention) of a new idea to the commercialization or implementation of that idea. For the purposes of the later discussion in this paper, it will be useful to review some key aspects of innovation and the innovation process.

4.1 The innovation process is imperfect and iterative

The innovation process, like any process, is never perfect. It is rarely, if ever, possible to plan and budget a path to commercialization of an innovation ex ante with full confidence and ex post accuracy. Along the road from invention to commercialization, many mistakes are likely to be made, and additional costs incurred in correcting those mistakes. Innovation is also an iterative process, involving experimentation, testing, redesigning and re-testing. It will usually take many such iterations before a product is ready to market. In short, if one were to do it all again with the benefit of hindsight, the full process could be done in half the time at half the cost. Of course, in the real world, no innovator has this luxury.

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[5] T. Jorde and D. Teece, "Innovation and Cooperation: Implications for Competition and Antitrust", (1990) 4(3) *Journal of Economic Perspectives*, 75-96 at 76.

4.2 Innovation requires risk taking and the potential for supra-normal returns

If follows that the innovation process is necessarily an uncertain endeavor. By its very nature it is risky. In most cases it will not be known for sure whether investment in the development or commercialization of an idea will yield returns sufficient to reward the investment. Many attempts at innovation never reach the market, and many that do fail to recover their development costs.

Innovation therefore requires that risks be taken and that risk takers take them. For example, risks must be taken with investment dollars sunk in research and development that may never turn up a single idea, or never make a return. Risks must be taken with investment in infrastructure that may be mis-designed or may quickly become redundant. And risks must be taken with investment in marketing a new product in an uncertain market – or as is quite often the case with innovative products, a market that is yet to exist.

For firms to take these risks they must hope that the returns from successful innovations will recover not only the costs of those innovations, but also the costs of the many innovation attempts that are not successful. Normal market returns to capital (consistent with zero economic rents) will not be sufficient. Supra-normal returns are required, and it is the pursuit of supra-normal returns that can be made available by an innovative product that spurs firms to undertake innovation activities.

4.3 The concept of perfect competition is inimical to innovation

It follows from the above comments that the neoclassical micro-economic concept of perfect competition is inimical to innovation.

Whilst in general, the structure of a market (and in particular, the level of concentration) is less important for explaining innovation than many researchers have previously assumed,[6] perfect competition is certainly inconsistent with innovation. Innovation anticipates the ability to capture entrepreneurial rents above normal returns – to break free from the market for a time and exploit dis-equilibrium. If such rents are not possible, as is implied by a perfectly competitive market structure, innovation is unlikely to occur. It is the quest for supra-normal returns that encourages

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[6] See D. Teece, *Managing Intellectual Capital – Organizational, Strategic and Policy Dimensions*, Oxford University Press, forthcoming, Chapter 4; and T. Jorde and D. Teece, "Antitrust Policy and Innovation: Taking Account of Performance Competition and Competitor Cooperation", (1991) 147 *Journal of Institutional and Theoretical Economics*, 118-144 at 121, where it is argued that innovation is determined more by firm structure and organizational factors, and access to complementary assets, than market structure.

innovation and spurs innovation competition. If prices that can be achieved are insufficient to cover the development costs of both successful and unsuccessful innovative activities, innovations are unlikely to occur and technology will not progress.

Indeed, given the importance of innovation for economic progress, it is fortunate for us all that perfect competition is rarely anything other than a theoretical abstraction or else our economies would be characterized by stasis. It follows that a regulator that regularly imposes on an industry outcomes that would be expected in a perfectly competitive market will throttle innovation and entrepreneurial activity in that industry.

4.4 Autonomous, systemic and pioneering innovations

Innovations come in many varieties and there are many ways to categorize them. For the purposes of the later discussion in this paper it will be useful to distinguish between autonomous innovations, systemic innovations and pioneering innovations.

An autonomous innovation is an innovation that can be introduced independently of other products or processes and tends not to lead to further innovations. A simple example in the telecommunications industry would be an innovative retail pricing structure or a new style of handset.

Systemic innovations, by contrast, require adjustment to an entire system in order to be implemented, and tend to provide the scope for further innovations. The introduction of caller line identification (CLI) would be an example of a systemic innovation in the telecommunications industry as to commercialize CLI, modifications must be made to wire centers (switches) in the network.

Pioneering innovations are more akin to systemic innovations than autonomous innovations, but are more extensive, involving the contemporaneous introduction of a system of innovations, each dependent on the whole. The deployment of an entire local loop network would be an example of a pioneering innovation in the telecommunications industry.

Systemic and pioneering innovations tend to be far more powerful drivers of dynamic efficiency than autonomous innovations, as they have the potential to radically alter the landscape of an industry or create a new industry from dust.

Since systemic and pioneering innovations involve technological interdependencies, the commercialization of such innovations will usually require coordination of complementary assets in different parts of the industry. Either cooperation between firms will be required, or common

ownership is needed. Teece has argued that common ownership can make adoption and diffusion of systemic innovations more rapid by facilitating information flows and the coordination of investment plans, and by eliminating the risks of opportunistic hold up by a non integrated party.[7]

So systemic and pioneering innovations, requiring transactions among several industry levels, will often require vertical integration and the size that is concomitant with vertical integration. It follows that regulators should be particularly wary about excessively curtailing the returns that large vertically integrated firms can earn on their assets, since these firms are best placed to commercialize innovations that can have a significant impact on both the performance of the industry, and overall economic welfare.

5 THE NATURE OF INNOVATION AND INVESTMENT IN LOCAL TELECOMMUNICATIONS

5.1 Investment in innovative local network technologies

This paper is concerned with the effect of certain regulatory policies on incentives for investment in the later stages of the innovation process in local network technologies, particularly the adoption, deployment and commercialization of such technologies. The use of the term "innovation" in the rest of this paper is therefore more limited than the broader definition that captures the full continuum of the innovation process.

"Innovative local network technologies" are defined here as technologies other than traditional copper wire networks, including:

- fibre optic networks, as deployed by competitive access providers (CAPs) in downtown (CBD) and dense urban areas;
- the conversion of cable television networks to allow two way communication and hence telephony (as has occurred in the United Kingdom);
- the conversion of copper wire networks to enable the provision of XDSL type services;
- fixed wireless local loop networks; and
- the use of satellite technology to deliver local telephony services.

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[7] D. Teece, "Economic Analysis and Strategic Management", (1984) XXVI 3 *California Management Review*, 87-110 at 103-4.

Each of these technologies has the capacity to reduce the costs of local telephony and expand the range of services available.

For the purposes of this paper, the term "investment" refers to expenditures on durable productive assets, including the purchase and installation of infrastructure and equipment. It follows that "investment in innovation", in the context of this paper, refers to expenditures on the deployment and commercialization of innovative local network technologies. Such investment may occur by incumbent local network providers or by entrants. Where the incentives for such investment differ according to the nature of the firm, these will be considered separately.

5.2 Modes of local service delivery

Provision of local telecommunications services can take many forms. For example, a local telephony customer may encounter:

- provision by an incumbent over traditional copper wire technology, or over "new" technologies such as cable telephony, XDSL technology, wireless local loop, and so on;
- provision by a more recent entrant over the entrant's own local infrastructure;
- provision by a firm using some of its own infrastructure and relying on access to unbundled network elements of another infrastructure owner to provide the rest of the service; or
- provision by a firm that resells or merely rebills local services of an infrastructure owner.

In some countries we observe a very dynamic telecommunications industry with competition between and within several of these modes of delivery. In others, we observe a much greater reliance on the facilities of an incumbent telecommunications supplier, and competition tends to take place purely at the retail level between an incumbent and resellers of the incumbent's local services. For example, in the United States, incumbent local exchange carriers (ILECs) still provide around 99 percent of active local loop and in Australia, the incumbent carrier, Telstra, continues to provide around 98 percent of local access lines.

5.3 The importance of facilities based competition

In an industry as dynamic as telecommunications, where new technologies can, in a relatively short time frame, significantly reduce costs and expand the range of available services, greater

facilities based competition is likely to be superior to access (also known as “service” or “resale”) based competition, in terms of long term industry performance and efficiency.

In a dynamic industry, the development of alternative facilities and competition between alternative network owners to provide better networks offer the opportunity for existing services to be provided at lower cost and prices than using the incumbent’s existing facilities. Competition between alternative network owners to provide better networks will drive down costs and prices.

Alternative facilities, and competition between alternative networks, will also drive the provision of new services that may not be available over existing networks, and create opportunities for the efficient bundling of traditional local telephony services with other information services such as cable television, interactive multi-media, and other features of the information super highway. The use of different technologies in alternative networks will also provide the scope for a far greater range of incremental innovations at both the network and retail levels that rely on the different technologies embedded in those networks.

None of these benefits are available under purely access based competition that relies on an incumbent’s existing facilities. Where only one network exists, competing service providers must accept the services and service quality that the incumbent network owner chooses to provide and accept the limitations of the technology that network can accommodate.

In short, without competition between alternative facilities, vigorous retail competition (effectively competition of the static, price variety) is the best that can be hoped for. With facilities based competition, competition at both the network and retail levels can deliver far greater benefits from innovation and dynamic competition in both network and retail services.

As an added benefit, competition between viable alternative networks will remove much of the need for future regulation of the industry. Once alternative facilities exist, the forces of competition at the network level should be sufficient to protect downstream firms and consumers.

It follows that in a dynamic industry like telecommunications, facilities based competition should be promoted wherever natural monopolies do not exist, as to deter investment in alternative facilities will sacrifice the great bulk of potential dynamic efficiency gains from innovation in the industry.

6 ACCESS REGIMES FOR LOCAL TELECOMMUNICATIONS IN THE UNITED STATES AND AUSTRALIA

6.1 United States

In the United States, the *Telecommunications Act 1996* (TA96) and the subsequent implementing orders of the Federal Communications Commission (FCC) have transformed the local telecommunications regulatory environment from one of government protected monopolies to open competition. The stated aim of TA96 was to open all telephony markets to competition and to encourage investments in privately owned communications infrastructure.[8] For local telephony, TA96 contemplates and aims to promote three types of competition:

- purely facilities based competition (which requires the incumbent to provide only interconnection and number portability);
- partial facilities based competition (which requires unbundling of incumbent local network elements and the provision of access to those elements so that an entrant's switches, for example, can be connected to an incumbent's lines); and
- resale (purely retail) competition (which requires the incumbent to provide local call services to entrants on a wholesale basis for the purposes of resale). In this instance, the main value adding activities provided by the reseller are marketing, billing and collection activities.

Therefore, under TA96 all Incumbent Local Exchange Carriers (ILECs) are required to

- provide non-discriminatory interconnection at rates "based on the cost" of providing the interconnection;
- provide unbundled access to network elements at "any technically feasible point" and to sell these elements at rates "based on the cost" of providing the network elements; and
- provide local calls (the bundled service) on a wholesale basis to resellers at discounts off the incumbent's retail price. Specifically, TA96 requires that the wholesale rates be

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[8] The Preamble to TA96 states that the law is designed to "provide for a pro-competitive, deregulatory national policy framework designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition … ".

determined on a retail minus basis (the incumbent's retail price minus the costs avoided by selling on a wholesale rather than retail basis).

The FCC's First Report and Order[9] subsequently considered what elements could be feasibly unbundled, and mandated access to a minimum of seven network elements,[10] namely: local loops, local and tandem switches (including all vertical switching features provided by such switches), interoffice transmission facilities, network interface devices, signaling and call-related database facilities, operations support systems functions, and operator and directory assistance facilities.[11]

The First Report and Order also promulgated various pricing rules to implement the Act. In relation to TA96's requirement for "cost based" pricing of interconnection and network elements, the FCC has specified a forward looking cost methodology based on the total element long-run incremental cost (TELRIC) of the element being priced. According to the First Report and Order, these costs are to be based on an ILEC's existing "wire center locations" (or "switches") using the "most efficient (new) technology" at and between those locations, regardless of the technology actually used by the ILEC.[12] This is known as a "scorched node" (or "brownfields") approach to forward looking costing. A "scorched earth" (or "greenfields") approach would optimize not only the technology used, but also the switch locations. The First Report and Order requires State Commissions to employ TELRIC to determine the price an ILEC may charge its competitors for the right to interconnect with the ILEC or use the ILEC's unbundled network elements to compete with the ILEC in providing services.

Under the FCC's rules, as costs are to be determined on the basis of the "most efficient technology", ILECs are not permitted to recover any portion of their actually incurred costs of providing unbundled network elements that exceeds the costs of the most efficient available technology.

A number of State public utility commissions and ILECs appealed the FCC's order to the 8th US Circuit Court of Appeals. The Court temporarily stayed controversial sections of the FCC order

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9 Federal Communications Commission, (FCC), *In the Matter of the Implementation of the Local Competition Provisions in the Telecommunications Act of 1996* (1996) FCC 96-325 (*First Report and Order*).

10 The States are free to determine additional elements that must be unbundled.

11 See FCC, *First Report and Order*, above n9, paragraph 27.

12 See FCC, *First Report and Order*, above n9, paragraph 685.

and in July 1997, determined that the FCC had acted beyond its jurisdiction in insisting that States apply specific pricing methodologies such as TELRIC and accordingly struck TELRIC down.[13] On appeal in 1999, the Supreme Court held that the FCC did have jurisdiction and remanded the case to the 8th Circuit to review on the merits the FCC's forward looking pricing methodology.[14] On remand, the 8th Circuit rejected TELRIC on the basis that it assumes a hypothetical, most efficient network provider whereas according to the 8th Circuit, TA96 requires the consideration of a network provider's actual costs.[15] Nonetheless, many States are continuing to use the FCC's TELRIC standard. The FCC has appealed this latest 8th Circuit decision.

6.2 Australia

Australia's approach to the liberalization of competition in telephony has been more evolutionary. The liberalization process began in 1991 with the licensing of a second telecommunications provider (Optus Communications, now Cable and Wireless Optus (CWO)) to install fixed line facilities in competition with the incumbent government owned provider, Telstra.[16] The clear aim at this time was the promotion of facilities based competition under a regulated duopoly.

In 1997, more radical legislation introduced full and open competition into all telephony markets in Australia. In combination with several recent decisions under this legislation by the Australian Competition and Consumer Commission (ACCC), regulation of Australia's local telephony market has now moved more or less into line with that of the United States. In fact, since 1991, the trend of regulatory decisions concerning local telephony in Australia has been from near complete reliance on facilities based competition, towards a greater reliance on retail and access based competition, at least as a stepping stone to facilities based competition.

In August 1999, the ACCC declared "unconditioned local loop services" (a partial unbundling of the local network) and "local carriage services" (wholesale local calls for the purposes of resale) as services that must be provided to entrants on request.

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13 *Iowa Utilities Board v FCC*, 120 F.3d 753 (8th Circuit 1997).

14 *AT&T Corporation v Iowa Utilities Board*, 525 U.S. 366 (1999).

15 *Iowa Utilities Board, et al. v Federal Communications Commission and United States of America*, No. 96-3321 (8th Circuit, 18 July 2000).

16 Two additional licenses to install mobile infrastructure in competition with Telstra were also awarded at this time, one to Optus and one to Vodafone.

In August 2000, the ACCC released a discussion paper on the approach to pricing of unconditioned local loop services it would apply in an arbitration or assessment of an access undertaking regarding the services. The ACCC proposes to use a Total Service Long Run Incremental Cost (TSLRIC) costing methodology, which is essentially identical to the FCC's TELRIC methodology.

The ACCC has for some time held a preference for TSLRIC pricing for declared services that are "well developed, necessary for competition in dependent markets, and where the forces of competition or the threat of competition work poorly in constraining prices to efficient levels".[17] For example, the ACCC has previously used this methodology in relation to assessing the appropriateness of charges for the declared Public Switched Telephone Network (PSTN) originating and terminating access services. The discussion paper on the pricing of unconditioned local loop notes illustrates the similarity between the United States and Australian pricing approaches:

> where there are different production technologies and network configurations – either available or in use – there are alternative ways of evaluating the cost components of TSLRIC. Broadly, costs could be based on the actual technology in use, the best-in-use technology or on forward-looking technology (as if the most efficient technology available were used). …
>
> In practice, the ACCC has tended to take a "scorched node" forward-looking approach using *best in use* technology. This amounts to a hybrid approach that combines the *best technology currently available* commercially with the existing network infrastructure.[18] (Emphasis added.)

In November 2000, the ACCC released a final report on pricing principles it will be likely to apply in arbitrations or assessments of undertakings regarding the declared local carriage services. Mirroring the position under TA96 in the United States, the ACCC has decided to use a retail minus pricing methodology to calculate wholesale prices for these services. Significantly, the ACCC specifically rejected the use of TSLRIC in this situation even though the service is clearly a well developed service. In making the decision, the ACCC stated:

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17 Australian Competition and Consumer Commission (ACCC), *Access Pricing Principles – Telecommunications: A Guide*, July 1997.

18 Australian Competition and Consumer Commission (ACCC), *Pricing of Unconditioned Local Loop Services (ULLS) and Review of Telstra's Proposed ULLS Charges – Discussion Paper*, August 2000, pages 14-15.

> The retail-minus approach will promote competition for, and efficiency in, the retail provision of local calls. …
>
> The Commission considers that the retail-minus methodology should promote productive efficiency by allowing access seekers who are more efficient than the access provider at retailing to compete with the access provider. In doing so, resale entry can act as a "stepping stone" to facilities-based competition. In this way, the retail-minus approach can help facilitate an expeditious and efficient step-up to facilities-based competition and delivers the benefits of inter-firm rivalry to the consumer at the earliest possible stage.[19]

It is important to note that as internet call holding times have increased demand in the local network, and aggressive pricing strategies by entrants such as AAPT, OneTel and GlobalOne have resulted in loss leading of local calls in order to sell bundled long distance and other services, retail prices for local calls in Australia are now likely to be well below both retail and wholesale costs.

The ACCC has commendably acknowledged the risk of a progressive ratcheting down of wholesale local call prices under a retail minus methodology (that is, loss leading of local calls by entrants will force the access provider to also lower its retail price of local calls below cost when sold as part of a bundle, resulting in demands by entrants for a correspondingly lower price for wholesale of local calls). The ACCC has determined that it will use the access provider's unbundled local call prices as the benchmark retail prices from which retail costs will be deducted, in order to circumvent this calculation problem.[20]

6.3 Summary

Following the recent decisions by the ACCC to declare unconditioned local loop services and local carriage services and to price these on TSLRIC and retail minus bases respectively, local telephony access regulation in the United States and Australia are now very much in line.

Under both regimes, unbundling of the local loop and wholesale provision of local calls are required and the pricing methodologies to be applied for each of these wholesale services are roughly identical. In particular, the TELRIC methodology based on "most efficient" or "best in use" technology in combination with a scorched node approach to wire center locations, has been

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19 Australian Competition and Consumer Commission (ACCC), *Access Pricing Paper – Local Carriage Service, Final Report*, November 2000, page 26.

20 ACCC, *Access Pricing Paper – Local Carriage Service, Final Report*, above n19, pages 21-3.

adopted by both agencies for the pricing of unbundled network elements (and interconnection), and the retail minus approach has been adopted for the pricing of wholesale local calls.

The United States came somewhat late to the liberalization party, but quickly overtook Australia in terms of promoting retail competition. Arguably, following very recent ACCC decisions, Australia has now caught up. But to what extent do the policies now in place in each country discourage facilities based competition? This question is considered in the following sections with respect to each of these policies.

Significantly, neither country has chosen to include sunset provisions limiting the length of time these policies favoring retail competition over facilities based competition will continue. This is despite claims by both the FCC and the ACCC that the policies are designed as transitionary mechanisms to provide entrants with a retail "step-up" to the later deployment of facilities.

7 UNBUNDLING POLICIES

Unbundling of telecommunications networks constitutes quite a severe form of economic regulation. It imposes on the market a break up of elements that the market may not naturally impose on itself, and regulators must consider the significant risk that such policies will discourage future investment in new networks by both entrants and incumbents.

7.1 Unbundling is only necessary for "essential" facilities

Requiring that a firm's facilities be made available to competitors is generally only advisable where the facilities are "essential" to downstream production. For a facility to be an "essential facility" it must be central and necessary to the production of a downstream product or service, and it must exhibit natural monopoly characteristics that make it incapable of efficient duplication.

There may be aspects of local telecommunications networks, such as rural local loops, that remain essential facilities, although even this may be debated.[21] However, the unbundling requirements

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[21] The development of new local loop technologies threaten the existence of any natural monopoly in local loops. For example, Rosston and Teece (G. Rosston and D. Teece, "Competition and Local Communications: Innovation, Entry and Integration", in E. M. Noam and A. J. Wolfson, (Editors) *Globalism and Localism in Telecommunications*, Elsevier Science B.V. (1997)) argue that if there ever was a natural monopoly in local networks, the introduction of fibre technologies in densely populated urban areas, and wireless technologies in suburban and rural areas now challenge this existence. Spiller and Cardilli (P. Spiller and C. Cardilli, "The Frontier of Telecommunications Deregulation: Small Countries Leading the Pack", (1997) 11(4) *Journal of Economic Perspectives*, 127-138 at page 128) argue that once interconnection is assured, local telecommunications lose their natural monopoly characteristics, as the average costs of serving a local exchange do not increase greatly once a small minimum efficient size is reached.

imposed by the "at any technically feasible point" prescription of TA96 (and the subsequent FCC orders) apply to facilities that are clearly not essential and are capable of efficient duplication. For example, elements such as switching, transport and operator and directory assistance are clearly capable of duplication. As for local loops, unbundling should not be required where entrants have demonstrated that these can be efficiently duplicated, as Competitive Local Exchange Carriers (CLECs) have done for downtown (CBD) areas.

Overly broad unbundling requirements extending to non-essential facilities, risk discouraging investment by entrants in facilities that entrants could efficiently duplicate, as entrants gain the option of purchasing the unbundled elements rather than building extensive networks of their own.

7.2 Discouraging investment by incumbents

Unbundling of an incumbent's network can diminish the incumbent's incentives to invest in future innovative infrastructure technologies, as the incumbent becomes acutely aware of the risk that it will be forced to make the new infrastructure available to competitors, usually at cost or below cost prices.

A more subtle point also needs to be made. Unbundling of an extensive vertically integrated telecommunications network ignores the fact that there was most likely a need for vertical integration and the access vertical integration can provide to the full range of complementary assets necessary to develop the network in the first place. In an unchanging world, opening up an incumbent's facilities to access seekers would be a sound policy to improve static efficiency and maximize both static and inter-temporal economic welfare. In a dynamic environment, however, unbundling and other heavy handed regulatory policies send discouraging signals to firms that have the potential to commercialize systemic and pioneering innovations in the industry. These firms will be less likely to invest in large pioneering infrastructure like telecommunications networks if they are aware of a risk that after significant funds have been invested, the anticipated returns will be appropriated by regulation that makes the facilities available to competitors at low prices. Since the rapid adoption and commercialization of new and enhanced telecommunications technologies is likely to lead to substantial advances in economic welfare, regulators should be particularly wary of over-regulating networks in this industry and perpetuating the reliance on inefficient infrastructure.

7.3 Discouraging investment by entrants

A major policy intention behind the unbundling requirements in TA96 is that access to unbundled network elements, presumably including non-essential facilities, will expedite both price based

(static) competition and dynamic facility based competition by allowing entrants to generate a customer base and brand recognition from which they will then be able to more confidently invest in their own facilities. In addition, unbundling is designed to spur competition by allowing entrants to purchase access to those parts of a network the entrant may not have built themselves, and providing the flexibility for different forms of entry. For example, a CLEC may purchase unbundled local loop and combine this with its own switching and transport systems, or a cable company may purchase access to unbundled switches and combine this with its own cable lines converted to provide telephony as well as traditional cable services.

In the United States, potential entrants into the local call market such as AT&T, MCI and Sprint hardly need assistance developing brand recognition and lack nothing in financial resources for large scale investment. Similarly, in Australia, many entrants are large, vertically and horizontally integrated affiliates of global telecommunications giants. In particular, Cable and Wireless Optus (CWO) has had nearly ten years to develop healthy brand awareness. For smaller entrants, there is no evidence that targeted assistance of this kind achieves the desired long term results, and evidence from other contexts, such as the protection of infant industries under international trade policies, is that sheltered firms tend come to rely on assistance rather than outgrow it.

Whilst limited unbundling (both in scope and time) may be desirable, excessive and perpetual unbundling requirements can stifle innovation and entrench resale and retail price competition as the dominant mode of competition in an industry, particularly for residential and small business (lower margin) markets. The greater the number of elements that must be unbundled, the greater the risk that entrants will focus on exploiting inefficiencies in the regulated unbundled rates and invest in a "cherry picking" manner, or use below cost unbundled rates to purely resell incumbent services, rather than contributing to investment in the industry.

In addition to the incentives bundling confers on entrants to "buy" rather than "build", firms considering entering the industry by making significant investments in facilities must also be conscious of the risk of appropriation of the returns from *their* investments by similar regulation.

7.4 Recommendation

Neither TA96, nor the recent ACCC decision to declare access to unconditioned local loop, have imposed time limits on the unbundling requirements. Participants in these industries are therefore likely to hold expectations that unbundled network elements will be available in perpetuity. In the absence of sunset provisions, it would seem most likely that a policy of extensive unbundling of local networks will result in persistent free riding by entrants on incumbent's facilities and retail competition becoming the dominant mode of competition in the industry. Investment in

innovative telecommunications technologies by both entrants and incumbents will be discouraged. Entrants will prefer to buy unbundled elements rather than build complete networks of their own, and the requirement to provide access to network elements at cost based rates will deprive incumbents of the necessary incentives for further facilities investment, including pioneering infrastructure investment.

It follows that each regulatory regime could be improved by limiting unbundling only to those elements that, at least debatably, exhibit natural monopoly characteristics. In the alternative, unbundling requirements that are imposed on non-essential facilities should be clearly limited in time so that firms in the industry have a date by which to aim to have developed their own alternative facilities or secured supply from others. Spiller and Cardilli note the interesting experiment conducted in Guatemala where coarse and purely transitory unbundling was used to facilitate a rapid transition to a competitive market.[22] As these authors note, some evidence on the merits of such an approach should be available shortly.

8 TELRIC PRICING

Regulators in both the United States and Australia are currently using TELRIC pricing approaches to set access prices for interconnection and unbundled network elements. Unless used appropriately, there is a great likelihood that this approach to access prices will discourage both incumbent and entrant firms from investment in innovative local network infrastructure.

8.1 Overview of TELRIC pricing approaches

TELRIC (or TSLRIC as it is called in Australia) is the incremental or additional costs[23] a firm incurs in the long term (long enough for all costs to be variable) in providing the whole of a service, assuming all of the firm's other production activities remain unchanged. Alternatively, it can be viewed as the costs the firm would avoid in the long term if it ceased to provide the whole service. These costs comprise the operating and maintenance costs the firm incurs in providing the service, as well as a return on and of capital. When applied by regulators, the return on capital used in providing the service is usually interpreted as a "normal" return on capital.[24] Whilst a strict interpretation of TELRIC would not permit the recovery of common costs causally related to

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22 P. Spiller and C. Cardilli, "The Frontier of Telecommunications Deregulation: Small Countries Leading the Pack", (1997) 11(4) *Journal of Economic Perspectives*, 127-138 at pages 133 and 137.

23 These are usually calculated on an annual basis and unitized.

24 For example, see ACCC *Access Pricing Principles – Telecommunications: A Guide*, above n17, page 28.

the service (as by definition it is an incremental cost concept), in practice, when applied by regulators, a share of common costs causally related to the service is generally included.

According to the FCC and ACCC, TELRIC is based on forward looking costs, which the ACCC defines as:

> the ongoing costs of providing the service in the future using the *most efficient means possible and commercially available*. In practice this often means basing the costs on the *best-in-use technology and production practices* and valuing inputs using current prices.[25] (Emphasis added.)

Whilst the ACCC includes "most efficient" and "best in use" technology concepts in its definition of "forward looking" costs, it is possible to adopt a forward looking approach to costs (that is, the ongoing costs into the future) that is based on the costs of technologies that are not the "most efficient" or "best in use". In particular, the costs of the technology a firm actually has in place could be used to calculate a different, and arguably more appropriate, forward looking TELRIC estimate.

TELRIC pricing, as applied by the FCC and ACCC, scores pretty well for the promotion of static efficiency concepts. It is probably as near as possible one can get to an allocatively efficient price in the context of fixed and common costs where two-part pricing is not feasible, and it promotes productive efficiency by not permitting an access provider to recover costs above the lowest cost method of production. However, it scores very poorly for the promotion of incentives for future investment in infrastructure and dynamic efficiency.

8.2 TELRIC and dynamic efficiency

When access regimes require access to be provided at prices that generate returns below the returns investors are able to achieve from other equivalently risky investments, the likelihood of a dampening of incentives to invest in new infrastructure technologies is obvious. This is a real possibility when pricing methodologies such as TELRIC are employed. It is not TELRIC *per se* that is a concern, but its tendency to be applied by regulators with regard to the forward looking costs of a hypothetical (somewhat perfect) access provider, rather than with regard to a commercially realistic model. In particular, the use of a TELRIC standard that is based on "most efficient" or "best in use" technology does not permit a firm to recover the actual costs it incurs in

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[25] ACCC, *Access Pricing Principles – Telecommunications: A Guide*, above n17, page 29.

developing a network, let alone the supra-normal returns over actual costs that investors typically require for investments in innovative projects.

In addition, prices based on the costs of "most efficient" or "best in use" technology will give entrants every incentive to buy access and no incentive to build alternative networks.

Failing to reflect the actual costs of investments in infrastructure

Several factors contribute to the under-recovery of actual costs under the FCC and ACCC's approaches to TELRIC.

First, and most obviously, in an industry where optimal technologies change regularly, the actual infrastructure a firm may have in place today is unlikely to be the "most efficient" or "best in use". It follows that a "most efficient" or "best in use" approach to access pricing will provide access revenues that are less than the actual costs to the firm of providing the access service. This allows access seekers that are equally efficient at the retail level to lower the retail price below the actual costs to the access provider of servicing the retail market. The result is that the access provider is denied the ability to recover the actual costs of its existing technology over all units of sales.

Second, in an environment of rapid technological change, the "most efficient" replacement costs of providing services are declining rapidly. Even if a firm decides to scrap its existing infrastructure and deploy today's state of the art technology, it will likely be "inefficient" tomorrow, and the recovery of the difference over the life of the new infrastructure will be denied by a "most efficient" or "best in use" approach.

Third, as discussed earlier in this paper, the development of new technology is an inherently imperfect and iterative process. TELRIC estimates based on "most efficient" or "best in use" technologies typically estimate the costs of hypothetical, somewhat perfect, access providers that are imagined to deploy their optimal technology in a smooth and ex post efficient manner, without making mistakes or iterations. It follows that, even if an access provider already has in place the "most efficient" or "best in use" technology (or chooses to put this technology in place in response to regulatory pricing pressure), this pricing approach is likely to underestimate the actual costs of developing the infrastructure (to the extent that these costs will in all likelihood overrun the costs of a "most efficient" deployment of the infrastructure).

Discouraging investment by incumbents

Not permitting firms to recover their actual infrastructure costs will inevitably discourage investment in innovative network infrastructure.

In effect, the FCC and ACCC approaches to TELRIC pricing constitute a confiscation of assets that may not occur in a competitive market. It is important to realize that competitive markets do not adjust so that prices go to "most efficient" replacement costs. Rather, in unregulated competitive markets, prices tend to be set on the basis of actual incremental costs.[26] Faced with the risk of confiscation of the returns of investments in infrastructure, firms will obviously be less likely to make such investments.

As previously discussed, innovation is, by its nature, uncertain. The full costs of an innovation and whether it will be a success will not be known until after commercialization. To engage in risky investments in innovation projects such as the deployment of new local network infrastructure technologies, investors typically seek returns well in excess of normal commercial returns. Only supra-normal returns reflect the value of investments in assets that cannot be easily imitated.

According to the ACCC:

> Dynamic efficiency will … be promoted by an access price that provides a *normal* commercial return on investments … . To encourage efficient investment in infrastructure (in the long term), an access price should be sufficient to cover the prudently incurred costs of providing infrastructure including a *normal* commercial return on investment.[27] (Emphasis added.)

And specifically in relation to TSLRIC:

> TSLRIC encourages economically efficient investment in infrastructure. As TSLRIC provides for a *normal* commercial return on efficient investments in infrastructure (in the long term) it provides the appropriate incentives for future investment.[28] (Emphasis added.)

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[26] See A. Kahn, *Letting Go: Deregulating the Process of Deregulation, or: Temptation of the Kleptocrats and the Political Economy of Regulatory Disingenuousness*, Institute of Public Utilities and Network Industries, Michigan State University, East Lansing, Michigan, 1998, page 96.

[27] ACCC, *Access Pricing Principles – Telecommunications: A Guide*, above n17, page 8.

[28] ACCC, *Access Pricing Principles – Telecommunications: A Guide*, above n17, page 29.

These statements demonstrate the discrepancy between current regulatory approaches and the fundamentals of innovation and dynamic efficiency incentives. Whilst the FCC and ACCC approaches to TELRIC pricing may work well for static industries, they will cause long term damage in dynamic industries with the potential for significant innovation competition. If normal returns at best can be earned in an industry and there is a likelihood that even actual costs will not be recoverable, firms and investors will quickly realize that it does not pay to innovate in that industry (or that country) and divert their resources elsewhere. It follows that by failing to reward innovators appropriately for their investments, the TELRIC pricing methodology applied by the FCC and ACCC will discourage the optimal level of innovation in the industry.

Put another way, TELRIC changes the risk profile of investments in new technology by truncating the upside returns to such investment. If the technology turns out to be unprofitable, or is quickly superseded, investors must wear the consequences. On the other hand, if the technology is a success, the FCC and ACCC pricing methodologies cap the returns the investors can earn at normal rates. It follows that incumbents are discouraged from upgrading their networks, as they face both the full downside risks and the likelihood of losing all potential upside benefits of cost savings to competitors.

In defending its approach to TELRIC pricing, the ACCC has stated

> by penalizing bad decisions and rewarding good ones, a forward looking approach provides stronger incentives for efficient investment decisions.[29]

This statement is a further illustration of the mis-alignment of current regulatory approaches and the reality of innovation, the risks involved and the returns required. As previously discussed, innovation is an uncertain and risky process, and for innovation to proceed, firms need to know that they will have the ability to earn sufficient returns from successful innovations to cover the risk that the innovation is not a success.

Discouraging investment by entrants

Many commentators and regulators claim that TELRIC pricing using the costs of "most efficient" or "best in use" technology promotes efficient "build or buy" decisions by entrants.[30] In the

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[29] Australian Competition and Consumer Commission (ACCC), *ACCC Issues Pricing Principles for Telstra Local Loop Services*, Media Release, 4 August 2000.

[30] See, for example, FCC, *First Report and Order*, above n9, paragraph 685; and ACCC, *Access Pricing Principles – Telecommunications: A Guide*, above n17, pages 29-30.

author's view, such claims have little to no merit and derive from very simplistic economic analysis of stylized markets. On the contrary, by the combination of several factors, the FCC and ACCC approaches to TELRIC access pricing distort the "build or buy" decision of entrants firmly towards "buy" and will lead to sub-optimal investment in the industry.

First, by definition, access prices based on the forward looking costs of "most efficient" or "best in use" technology can be no greater than the costs an entrant would incur in developing its own network. Since the FCC and ACCC methodologies consider the costs of the "most efficient" or "best in use" technology, it follows directly that no entrant could develop an alternative network at lower cost. At best, if our analysis stopped here, TELRIC pricing as applied by the FCC and ACCC could leave an entrant indifferent between building an alternative network and purchasing access. Unfortunately, several further factors must be considered by entrants.

Second, given the inherently imperfect and iterative nature of technology development, it is a fair bet for any entrant that the costs incurred in developing an alternative network will exceed the costs of a hypothetical "most efficient" access provider that, by assumption, does not face these contingencies. It follows that TELRIC pricing as applied by the FCC and ACCC (assuming local networks can be instantaneously and ex post efficiently constructed with "best in use" technology) is almost certain to result in an access price below the true ex-post cost to an entrant of building an alternative network.

Third, in an environment of rapid technological change, the costs of an alternative network deployed by an entrant today are likely to exceed the costs of the "most efficient" or "best in use" technology tomorrow. A commitment by regulators to TELRIC pricing on the basis of the costs of "most efficient" or "best in use" technology makes buying access in perpetuity the best strategy for any entrant. It will always make more sense for an entrant to buy access at prices that track the costs of the most efficient means of providing services through time rather than build an alternative network that will quickly be superseded. Indeed, this pricing approach should also give entrants incentives to argue for further reductions in access prices based on "best in use" technology when new technologies become available, rather than adopting and deploying those technologies themselves. It follows that the FCC and ACCC approaches to TELRIC pricing effectively insure entrants for decisions to "buy" rather than "build".

Finally, any entrant considering investing in an alternative network must also take into account the risk of appropriation of the returns of the investment by regulation, including requirements to provide access to the alternative network at prices that may fail to recover the actual costs of the network let alone provide the supra-normal returns required to justify the investment.

It follows that if a pricing methodology based on the forward looking costs of the "most efficient" available technology is applied, entrants have every incentive to buy access and no incentive to build their own networks. Entrants will come to rely on the regulated access rather than investing in new technologies, investment in network infrastructure will be sub-optimal and competition will focus on resale of services over the incumbent's (most likely inefficient) network.

Again, it is the setting of access prices based on the forward looking costs of "most efficient" or "best in use" technology rather than the costs of the access provider's actual technology that causes the distortion. Appropriate price signals should reflect commercial realities. Access prices based on the access provider's actual costs will send the correct signals to entrants to promote efficient duplication of facilities. If the actual technology the access provider has in place is more efficient than technology an entrant could deploy, the entrant will buy rather than build. On the other hand, if the entrant can build a more efficient network, access prices based on the higher costs of the (inefficient) incumbent network will send the correct signal to the entrant to build the alternative infrastructure.

A recent statement by the ACCC in defense of its approach to estimating TELRIC neatly illustrates this discussion:

> For the access seeker, an access price based on the actual cost of the access provider's network is inefficiently high because it reflects a cost above that of *the network the access seeker would actually build*. This would result in an artificial stimulus for the access seeker to 'build' (facilities based competition) rather than to 'buy' (access based competition). Basing it on the 'forward-looking' cost places the access seeker in a 'knife-edge' situation, providing precisely the right build/buy incentive.[31] (Emphasis in original.)

First, an access price based on the actual costs of the access provider's network is, on the contrary, *efficiently* high as it sets a target at which entrants can aim to better if they believe they can deploy a more efficient network. If they can do better than the incumbent, there will be the potential for gains to be made from investing in alternative infrastructure. This passage suggests that the ACCC wants infrastructure deployment by entrants only if the infrastructure deployed will be the "most efficient" possible. If any less efficient infrastructure were encouraged, the ACCC would view this as "artificially stimulated". Yet any infrastructure more efficient than the incumbent's network should be encouraged, whether "most efficient" or not, particularly given the concomitant

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31 Australian Competition and Consumer Commission (ACCC), *Supplementary Submission to the Productivity Commission Review of Telecommunications Specific Competition Regulation*, November 2000, Attachment 3, page 9.

gains to be made from engendering facilities based competition. Regulators should be wary of implicitly requiring entrants, or any industry participant, to achieve perfection.

Second, the ACCC suggests that by placing the access seeker in a "knife-edge" situation, its approach to TELRIC pricing provides the right incentives for entrants' "build or buy" decisions. As discussed above, no such "knife-edge" exists. Such pricing makes an entrant's decision quite clear – it can never do better than to "buy".

8.3 Imitating perfect competition

TELRIC pricing based on the costs of "most efficient" or "best in use" technology is a clear example of the current regulatory emphasis on static over dynamic efficiency, and the tendency of regulators to seek to achieve outcomes that mimic perfect competition.

The emphasis of this pricing approach is on forcing the incumbent access provider to be productively efficient and to achieve prices as close to marginal costs as reasonably possible in the context of technology with fixed and common costs. However, by failing to adequately reward access providers for investments in infrastructure, and by distorting entrants' "build or buy" decisions, this approach discourages investment in alternative or replacement technologies, sacrificing the potentially far larger gains from dynamic efficiency.

The FCC and ACCC approaches to TELRIC pricing are instructed (whether consciously or not) by a neoclassical focus on equilibrium and the concept of perfect competition. Prices based on the costs of "most efficient" or "best in use" technology are essentially the prices that would exist under a perfectly competitive market structure. In addition, only in a hypothetical, idealized, perfectly competitive market would firms be able to instantaneously and ex post efficiently deploy replacement technologies without making mistakes and incurring additional unforeseen costs along the way. This neoclassical focus on perfection also generates misconceived statements like the one reviewed in the immediately preceding sub-section, discouraging any investment that is anything less than perfectly efficient.

The FCC and ACCC claim that their approaches promote both static and dynamic efficiency. However, their claim regarding dynamic efficiency is based on a fallacy that greater competition will always lead to greater innovation and dynamic efficiency. This is most likely true to a point, but beyond that point, greater competition will deny the scope for firms to earn the entrepreneurial rents required to engage in innovative activities. The fallacy is that perfect competition is optimal for dynamic efficiency. As previously discussed, on the contrary, perfect competition is inimical to dynamic efficiency.

Since perfect competition rarely, if ever, exists, it makes little sense for regulators to seek to mimic its outcomes. Instead, regulators should seek to approximate outcomes in workably (or "effectively") competitive markets where the scope exists for competitive advantage (some freedom from market pressures) for innovative and differentiated products, and innovation competition is as important, if not more so, than static price competition. In workably competitive markets, prices are set on the basis of actual costs, and where firms achieve a level of product or process differentiation that can not rapidly be imitated, supra-normal returns can be earned for a time.

8.4 Recommendation

Properly applied, TELRIC access pricing is able to mimic prices which would result in a workably competitive market that might include several differentiated facilities based network providers competing in the provision of unbundled network elements to retail service providers or partial facilities based competitors. As it is a cost based measure, it can achieve the policy goal that an owner of monopoly infrastructure is unable to earn monopoly rents (distinct from Schumpeterian or entrepreneurial rents that accrue temporarily from product or process innovations). This can be achieved by a measure of TELRIC based on the costs of an access provider's actual technology.[32]

Prices based on actual costs will also promote facilities based competition by entrants with more efficient technologies, and provide some certainty to firms considering investing in new infrastructure that the actual costs of their investments will be recoverable. Setting access prices on the basis of the costs of "most efficient" or "best in use" technology will distort the investment incentives of both incumbents and entrants to the detriment of dynamic efficiency and long term economic welfare.

As an added benefit, an actual network approach to TELRIC pricing would remove much of the complications and delay inherent in the current FCC and ACCC approaches to TELRIC pricing, since there is no need to debate and design a hypothetical "most efficient" network.

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[32] If a regulator wishes to prevent the incumbent firm including "cost padding" inefficiencies in the cost estimates, this can be dealt with directly in the selection of costs to include in actual network TELRIC calculations, rather than designing a hypothetical "most efficient" network.

9 LOCAL CALL RESALE AND THE RETAIL MINUS PRICING METHODOLOGY

9.1 Local call resale

Residual pricing of local services in the United States has lead to the subsidization of local calls keeping residential local services below cost. In Australia, a combination of increasing internet call holding times and loss leading pricing structures in the industry has led to retail prices for local calls also falling below cost.

Despite this, in both countries, retail competition in local services has been promoted by requirements that incumbent networks provide local calls on a wholesale basis for the purposes of resale by entrants. That is, entrants can now purchase wholesale local calls at discounts off the incumbent's retail price and resell these to retail customers by adding their own billing and collection activities. It may be worth considering whether this is competition worth facilitating when prices are already below costs.

Whilst resale requirements can promote modest price competition at the retail level, they diminish incentives for innovation at the network level. Resale limits the ability of network owners to appropriate returns from developing innovative services as each new service must be made available immediately to competitors at the retail level, usually at below cost prices.

In addition, regulatory resale requirements tend to delay or discourage facilities based competition, as entrants need not build their own facilities to provide local services whilst low cost access to an incumbent's facilities is available.

9.2 Retail minus pricing of local call resale

Under TA96, wholesale of local calls must be provided on a retail minus basis (a discount off the incumbent's retail price to reflect the costs the incumbent avoids by selling on a wholesale basis rather than at retail). In Australia, the ACCC has recently indicated that it will also be likely to apply a retail minus pricing approach in arbitrations or assessments of undertakings regarding wholesale of local calls.

Since retail prices are below cost in both countries, it follows that wholesale prices determined on a retail minus basis will likewise be below wholesale cost.

Retail minus pricing promotes price competition for local calls at the retail level. However, as with requirements for below cost provision of unbundled network elements, below cost provision of wholesale local calls helps to stifle innovation and entrench resale and retail price competition

as the dominant mode of competition in an industry. Incumbents will have little incentive under such a regime to invest in new infrastructure, and if the retail minus pricing approach results in wholesale prices below the costs to entrants of building alternative networks, entrants' "build or buy" decisions will again be distorted towards "buy".

In Australia, where an inability to recover long term costs of local calls is not recoverable as part of an "access deficit" to be funded through interconnection and other charges, retail minus pricing of wholesale local calls also denies competitive neutrality between the incumbent firm and resellers. Since retail prices of local calls are not sufficient to recover the costs of providing these calls, a firm must hope to recover the loss from sales of other services sold in combination with local calls, such as long-distance and fixed to mobile services. Bundling of local, long-distance and fixed to mobile services is a feature of fixed telephony packages in Australia. If Telstra is required to provide wholesale local calls on a retail minus basis, it will effectively subsidize every local call made in the market without any means to recover the losses through the bundled sale of other services. It is can not be sensible competition policy to require one firm to subsidize its competitors on every sale. To achieve competitive neutrality, Telstra should be permitted to recover the actual costs of providing wholesale local calls. This would place all participants in the industry on the same footing – each firm would make an identical loss on each local call that must be recouped through concomitant sales of other services.

As discussed earlier, the main justification for a retail minus pricing methodology for wholesale local calls is to provide entrants with the scope to build market presence before committing to infrastructure investment – a "stepping stone" to facilities-based competition.[33, 34] However, as noted in the earlier discussion of unbundling policies, many potential entrants into the local call markets in the United States and Australia need no assistance developing brand recognition and lack nothing in financial resources for large scale investment, and for smaller entrants, there is no evidence that targeted assistance of this kind achieves the desired long term results. Indeed, in the United States, the evidence so far is that despite four years of mandatory resale at retail minus prices, little or no transition has yet occurred to facilities based.

9.3 Recommendation

To preserve competitive neutrality, and to provide appropriate incentives for future infrastructure investment, an incumbent should be permitted to recover its actual costs in providing wholesale local calls. In particular, the TELRIC pricing methodology based on the costs of the actual technology used to provide the access service would be an appropriate approach to the pricing of wholesale local calls, as suggested for the pricing of unbundled network elements. Once again, a price assessed on this basis would send correct signals to both incumbents and entrants to encourage investment in innovative local network infrastructure. Incumbents can be confident that at least the actual costs of investments in local network infrastructure will be recoverable, and entrants will invest in alternative infrastructure if the alternative infrastructure promises to be more efficient than the incumbent's network.

Alternatively, if local call resale and retail minus pricing of wholesale local calls is to be retained on the basis of the argument that entrants require a step-up to facilities based competition, sunset provisions should be included in order to establish a firm date for entrants to aim to make the transition to facilities based competition. Unfortunately, in both the United States and Australia, resale and retail minus pricing requirements are not currently sunsetted and are likely to be part of each industry for some time, giving entrants incentives to free ride on below cost access to the incumbent's facilities in perpetuity.

10 EVIDENCE

10.1 Retail and network competition in the United States and Australia

Whilst resale competition at the retail level in local telecommunications is very strong across both business and residential segments in the United States and Australia, to this point, investment in alternative infrastructure and competition at the network level is extremely limited in both countries. In the United States, four years since TA96, the ILECs still supply around 99 percent

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[33] For example, see ACCC, *Access Pricing Paper – Local Carriage Service, Final Report*, above n19, page 26.

[34] In fact, it is worth questioning the legitimacy of the brand name that entrants acquire through resale of local calls. Much of that brand name should properly be attributed to the incumbent to the extent that the quality of the incumbent's wholesale service leads to an attribution of quality service by the reseller. Resale therefore can allow entrants, when building their brand names, to free ride on the incumbents' investments in quality facilities.

of local lines. In Australia, nearly ten years since Optus was first licensed to build alternative infrastructure and three years since open entry was liberalized, Telstra continues to supply around 98 percent of local lines.

Local infrastructure investment that has occurred in both countries has been limited to the "cherry picking" variety – entrants have targeted CBD areas and large business customers for their high margin business. Little to no investment in alternative networks has occurred outside these areas.

In the United States, among those entrants that have taken up reselling local calls following TA96, there has been little or no transition to investment in facilities outside business centers. The significant failure of cable television companies (with networks passing more than 90 percent of residences in the United States) to upgrade their networks to enter local telephony nationwide following the passage of TA96 is well documented. Harris and Kraft suggest that the cable companies are focusing on their unregulated cable television markets rather than the highly regulated local telephony market due in part to the requirements of TA96 for local telephony network owners to grant access to resellers, and the FCC's First Report and Order requiring this access to be provided on terms highly favorable to those resellers.[35] To the extent the resale and retail minus stipulations of TA96 have caused cable companies to stay out of local telephony, this is a clear example of the potential such regulatory policies have to discourage facilities based competition.

In Australia, under the duopoly regime in place from 1991 to 1997, Telstra's refusal to make available a commercially viable wholesale local call offering during this period was apparently a significant factor in the decision by Optus (now CWO) to become an alternative local access provider through rollout of the Optus Vision hybrid fibre-cable (HFC) network.[36] This propelled Telstra to respond with a rapid roll out of the Foxtel cable network. Had Telstra been required to provide wholesale local calls to Optus over this period, these investments may have been delayed significantly. No roll out of facilities on anywhere near this scale has occurred since Telstra began to provide wholesale local calls in 1997.

CWO's HFC network is the only alternative local network in Australia that extends beyond the CBD areas of the major capital cities. Whilst this network (passing around 2.2 million homes)

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35 R. Harris and C. J. Kraft, "Meddling Through: Regulating Local Telephone Competition in the United States", (1997) 11(4) *Journal of Economic Perspectives*, 93 at 101-2.

36 P. Leonard, "Footprints Down a Narrow Path #2: Lessons of Australian Telecommunications Regulation, 1991 to 1997", (July 1997), Gilbert and Tobin Lawyers, published at www.gtlaw.com.au/pubs/footprints.html.

was originally designed to provide both cable and telephony services, for technical and other reasons only around 170,000 customers had been directly connected for local telephony by July 1999.[37]

As in the United States, investment in local infrastructure by entrants in the Australian industry other than CWO has been limited so far to high margin CBD areas. Recent decisions by the ACCC discussed earlier in this paper are likely to slow even this limited form of infrastructure investment.

The intention in both countries is to promote retail price competition as a transition mechanism to facilities based competition, however it seems likely that the current pattern of resale competition and minimal, targeted infrastructure investment will continue as long as the current regulatory policies remain in place.

10.2 Lessons from other countries

There is some evidence that greater investment in facilities has occurred in the United Kingdom where mandatory resale requirements do not exist.

In Canada, the Canadian Radio-Television and Telecommunications Commission (CRTC) emphasizes the promotion of facilities based competition. CRTC has required only essential facilities (determined on an antitrust type standard) to be unbundled on a permanent basis.[38] In particular, CRTC has required ILECs to unbundle access to telephone numbers, directory listings, and low density rural loops permanently, and all other local loops and transport for five years only. The CRTC ruled that urban loops, local and tandem switching, transport, rights of way, signaling networks, directory assistance databases and directory assistance services are not essential facilities.[39] By contrast, the FCC has required the unbundling of all these elements, and no sunset provisions have been specified.

Whilst incumbents must make retail local services available to entrants for resale, CRTC has decided against requiring incumbents to provide these services to resellers at discounts off the

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[37] See Australian Competition and Consumer Commission (ACCC), *Declaration of Local Telecommunications Services*, July 1999, page 57.

[38] Canadian Radio-Television and Telecommunications Commission (CRTC), *Telecom Decision CRTC 97-8, Local Competition*, May 1997.

[39] CRTC, *Telecom Decision CRTC 97-8, Local Competition*, above n38, paragraphs 66-118.

incumbent's retail prices.[40] The policy view in Canada is that mandating provision to resellers at retail minus prices is likely to discourage facilities based competition.

The Chilean regulatory regime offers an even more interesting contrast. In Chile, incumbents have neither been required to unbundle nor provide wholesale local calls to resellers. Constructing alternative facilities is therefore the only way for entrants to provide local services. Spiller and Cardilli report that Chile has experienced an enormous amount of facilities based competition, and the incumbent's share of local lines is likely to now be well below 75 percent.[41]

Spiller and Cardilli also note that the telecommunications industry in Guatemala will before long provide us with evidence on the effectiveness of limited and sunsetted unbundling requirements for promoting facilities based competition. Seeking instant competition, the Guatemalan government implemented transitory unbundling in 1996, to expire in 1999.

These alternative approaches to telecommunications regulation, particularly limited and sunsetted unbundling and wholesaling requirements, are far more like to promote facilities based competition than the policies currently in place in the United States and Australia. Over the next few years it may be possible to gather evidence from these and other countries to test this prediction.

11 AN EXCESSIVE FOCUS ON STATIC EFFICIENCY

As the previous sections have demonstrated, telecommunications regulators in the United States and Australia continue to be preoccupied with price competition and static efficiency concepts, and myopic with regard to the role of innovation in the competitive process and the imperative of promoting inter-temporal efficiency. It is interesting to explore why this shortsighted focus persists. Three factors are identified below.

In the grip of neoclassical economics

Competition regulators have traditionally been informed by neoclassical micro-economic analysis that emphasizes static theories of market performance. Unfortunately, neoclassical theory has been shown to be deficient in explaining dynamic effects.

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40 CRTC, *Telecom Decision CRTC 97-8, Local Competition*, above n38, paragraphs 237-257.

41 P. Spiller and C. Cardilli, "The Frontier of Telecommunications Deregulation: Small Countries Leading the Pack", above n22, at pages 135 and 137.

Neoclassical microeconomics creates a highly stylized view of competition characterized by the zero economic profit condition and instantaneous adjustments to equilibrium under the price system. It makes bold assumptions about markets and economic agents, such as that markets are characterized by perfect information, economic agents are hyper-rational and technology is uniformly available to all firms. Yet only by relaxing these assumptions can dynamic effects be properly understood.

Micro-economic theory can still be a useful tool for explaining commodity markets that approximate either perfect competition or pure monopoly, and probably does least damage in analysis of mature and stable industries subject to little change. However, in the presence of dynamic effects it offers few insights, and an unquestioning application of neoclassical theory is likely to throttle the dynamic process of innovation. A student of neoclassical theory could be forgiven for believing perfect competition is both attainable, and a desirable goal of regulation, for perfect competition will in most cases maximize static efficiency. However, as previously discussed, perfect competition is inimical to innovation and dynamic efficiency as it denies the ability to earn entrepreneurial rents.

Whilst the understanding of dynamic imperatives and the centrality of innovation to the advance of economic welfare has improved among economists over the last half century, competition regulation tends to remain instructed to a great extent by neoclassical textbook analysis. In this sense, by its pervasiveness in economic teachings and its very simplicity, static neoclassical micro-economic analysis has a stranglehold on the regulation of competition that is proving difficult to release.

Risk aversion and political pressure for immediate results

In fairness to the economic integrity of competition regulators, two further factors help explain the continued emphasis on static over dynamic efficiency. The tendency for regulators to excessively discount potential long term dynamic efficiency gains is in part due to the greater tangibility of effects in the present and the uncertainty of future events, and in part due to political pressure for immediate results.

To appease constituents, policies that promise to deliver short term results, even if small, tend to dominate those that may not come to fruition until after the decision maker has departed the arena. Where the choice is between having an immediate, although minor, impact with certainty, and the chance of having a larger impact, but with unknown odds and at some uncertain point in the future, risk averse regulators will tend to choose the more certain route.

For example, unbundling incumbent networks and setting low access prices will most likely deliver immediate results of entry by numerous firms into the retail market and lower prices for consumers. On the other hand, refusing to unbundle or set access prices below actual costs will promote facilities based competition and significant dynamic efficiency benefits, dwarfing the alternative static gains, although these results may take several years to be revealed.

Adding to the bias against long term approaches is the fact that it will always be very difficult to demonstrate the long term costs of short term approaches, since there will be no counter example for comparison. The regulator is somewhat immunized from criticism for failing to promote long term approaches, but not from criticism for failing to deliver short term results.

Together, these factors lead to excessive regulatory time discounting of dynamic efficiency gains. If the long term interests of end-users of telecommunications services, and economic welfare more broadly, are to be truly advanced, then promoting innovation and dynamic efficiency needs to take precedence over static efficiency optimizing. This will require an appreciation of the importance of dynamic over static efficiency, not just by regulators, but by politicians and their constituents.

12 CONCLUSIONS

This paper has suggested that several recent regulatory decisions in the United States and Australia have placed an excessive emphasis on static efficiency concepts and short term results at the expense of dynamic efficiency and innovation incentives in the telecommunications industry. In particular, excessive unbundling of local networks, and wholesale pricing methodologies that fail to reflect the actual costs of providing wholesale services, risk discouraging innovation in telecommunications networks to the detriment of the long term interests of end-users of telecommunications services and economic welfare more generally.

Promoting dynamic efficiency in telecommunications involves promoting investment in alternative facilities wherever natural monopolies do not exist. It follows that unbundling policies should be limited to truly essential facilities, so that entrants are encouraged to develop extensive alternative infrastructures wherever economically sensible. Alternatively, if this represents too great a policy shift, unbundling of non-essential network elements should at the very least be limited in duration, so as to set a clear timeframe for entrants to develop alternative facilities.

Requiring incumbent firms to provide wholesale local calls to resellers constitutes another form of excessive regulation likely to discourage valuable facilities based investment by both incumbent and entrant firms over the long run. Again, if wholesale of local calls is considered necessary to

provide a “step up” for entrants to develop alternative facilities, this policy justification should be reflected by specific time limits on the assistance.

As for the pricing of unbundled network elements and wholesale local calls, only prices based on an access provider’s actual costs will send the correct signals for investment in an industry. In particular, TELRIC based on the costs of the access provider’s actual network comes as close as possible to promoting all three aspects of efficiency. As it is based on costs rather than revenues, this pricing approach offers reasonable allocative efficiency. When combined with direct measures such as the disallowance of identified cost padding and CPI-X price caps, cost based pricing can also promote productive efficiency. But most importantly, this pricing approach sends appropriate signals to both incumbent and entrant firms to encourage investment in infrastructure in the industry, promoting dynamic efficiency and long term economic welfare. In particular, this pricing approach provides the scope for entrants capable of deploying lower cost technologies to enter the industry and drive costs and prices down.

At the moment, no single network technology stands out as optimal for the future provision of local services. With significant growth in demand for local services, various technologies including cable, wireless local loop, satellite and enhanced copper network technologies such as XDSL are being considered. Appropriate incentives for firms to take the risks involved with deploying these technologies are required to allow optimal efficiency in the provision of local services to emerge over time. Whilst the current approach of regulators in the United States and Australia may lead to short term gains in terms of entry by numerous firms at the retail level and modest retail price competition, this will occur at the expense of far greater long term benefits from network competition.

Since promoting dynamic efficiency and innovation in the telecommunications industry is central to the promotion of a country’s economic welfare and international competitiveness, it is essential that telecommunications regulators resist temptations to prefer policies that promise only short term results and take long term views to industry performance.