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Competition and Regulation Policy in Antipodean Government-Funded UltraFast Fibre Broadband Markets

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Abstract

Both the Australian and New Zealand governments have committed to spend substantial sums in order to bring forward the nationwide deployment of ultra-fast fibre-to-the-home (FTTH) broadband networks. With deployment proceeding apace, two significant questions have arisen regarding the economic, commercial and political rationale for the Australian and New Zealand governments' decisions. The first is why the respective governments are assuming a central role in the design, financing, deployment and (in Australia's case) operation of a nationwide network of a specific technology type, given that such intervention is at significant variance with both recent international industry policy and practice advocated by international agencies such as the OECD and the ITU, and the recent policy and regulatory history in both countries. The second is how these new Government-funded networks will affect the nature of competitive interaction in the telecommunications (broadband) industry in their respective countries.

This paper addresses these questions. First it traces the development of the Australian and New Zealand fibre investment policies in the context of international competition policy orthodoxy. It then examines the competition and regulation policies that will govern the insertion of the respective government-funded fibre networks into environments where both legacy policies and technological developments have shaped, and will continue to shape, the evolution of the respective telecommunications sectors. The analysis finds that political, rather than economic imperatives have dominated the government investment decision in both countries. The Australian investment has been accompanied by a comprehensive set of competition and regulation policies aligned with maximising the likelihood of fibre uptake, but both the up-front costs and political risks are high. The New Zealand initiative is lower-cost initially, but lacks clear over-arching competition and regulation policy objectives to guide sector development. The result is a fragmented regulatory regime and a range of contradictory and confusing incentives for all sector participants that will inevitably increase the economic costs of the project and lead to delays in fibre network uptake.

Consequently, the Antipodean 'experiments' in government funding of fibre networks are unlikely to offer good models of either policy or process for other jurisdictions.

*“In geography, the **antipodes** (/æ'n'tɪpədiːz/; from **Greek**: ἀντίποδες, from anti- "opposed" and **pous** "foot") of any place on Earth is the point on the Earth's surface which is diametrically opposite to it. Two points that are antipodal (/æ'n'tɪpədəl/) to one another are connected by a straight line running through the centre of the Earth.*

*In Britain and Ireland, "the Antipodes" is often used to refer to **Australia** and **New Zealand**, and "Antipodeans" to their inhabitants. Geographically the antipodes of Britain and Ireland are in the **Pacific Ocean**, south of New Zealand."*

Wikipedia <http://en.wikipedia.org/wiki/Antipodes> (accessed August 9 2012)

Both the Australian and New Zealand governments have committed to spend substantial sums in order to bring forward the nationwide deployment of ultra-fast fibre-to-the-home (FTTH) broadband networks. The institutions and processes by which funds will be applied to, and services provided by, the Australian National Broadband Network (NBN)¹ and the New Zealand Ultra-Fast Broadband Initiative (UFB)² are well-established. Network construction is underway in both countries, and the first customers are already connected and receiving services.

In Australia, a new government-owned company, NBN Co, is constructing a G-PON fibre network to supply wholesale services to structurally separate retailers, who will ultimately supply retail services to between 90% and 93% of the Australian population. Key commercial terms have been agreed with incumbent provider Telstra under which, for consideration of A\$9 billion, NBN Co will assume ownership of key fixed-line infrastructures, such as exchanges, ducts and existing copper loops, over which existing copper-based voice telephony and broadband services are currently provided³. An agreement has also been reached between NBN Co and Optus, the major supplier of hybrid fibre coaxial network services on which voice and broadband services are provided in competition to Telstra, whereby for consideration of A\$800 million, cable customers will be migrated off the Optus network (which has already been substantially upgraded to DOCSIS 3.0 standard) onto NBN Co's fibre⁴. The Australian network was initially anticipated to cost up to A\$43 billion⁵. By mid-February 2012, the network had passed 18,200 premises, with 5,500 customers connected and consuming services⁶, whilst the revised corporate plan issued in August 2012 reveals an increase in peak funding of 7.7% over initial estimates⁷.

¹ http://www.dbcde.gov.au/broadband/national_broadband_network

² http://www.med.govt.nz/templates/ContentTopicSummary_41902.aspx

³ http://www.telegeography.com/cu/article.php?article_id=36123&email=html

⁴ <http://www.nbnco.com.au/news-and-events/news/nbn-co--optus-sign-binding-agreement.html>

⁵ http://www.minister.dbcde.gov.au/media/media_releases/2009/022

⁶ CommsDay, 3 August 2012.

⁷ CommsDay August 9 2012.

By contrast, the New Zealand network is being constructed under a series of public-private partnerships (constituted as Ultra-Fast Broadband Companies – UFBCos) between a government purchasing body, Crown Fibre Holdings Ltd (CFH) and successful private sector bidders in each of thirty three geographically distinct regions covering approximately 75% of the population. As with NBN Co, UFBCos must be structurally separated from retail activities, and build a government-specified G-PON fibre network. Initial plans were for construction to be funded by CFH, with partners buying shares in the UFBCo over time as new customers connected to the fibre network. Under these arrangements, the government would bear the financial risk associated with building the initial network elements (up to a cap of NZ\$1.35 billion committed to date). Capital ‘recycled’ back into the UFBCo from share purchases and surpluses from trading activities would then underwrite future network expansion. The rate of rollout would thus be contingent upon the rate at which end customers in the first regions to be serviced connected to the fibre network. The Government expected the total cost to build the network to be in excess of NZ\$3 billion⁸, perhaps as high as NZ\$3.5 billion⁹, whereas incumbent telecommunications provider Telecom New Zealand cited cost estimates between NZ\$4 billion and NZ\$6 billion, but “closer to \$4b than \$6b”¹⁰.

In practice, however, the government, via CFH, has entered into agreements over two stages with four partners to form UFBCos¹¹ serving the thirty three geographic regions. Chorus, the functionally separate network division of the former vertically integrated incumbent operator Telecom, was selected as the partner to provide services over most of the country¹². The Chorus contract was contingent upon full ownership (structural) separation from Telecom proceeding. This was achieved on November 30, 2011. However, the Chorus agreement with CFH differs substantially from the original proposals, as it is based upon interest-free government loans with repayment schedules contingent upon Chorus meeting predetermined targets for network deployment and service uptake¹³. Agreements consistent with the original arrangements have been signed with three other parties (rivals to Chorus) in respect of the remaining areas constituting around 30% of the proposed future customers (including Christchurch - New Zealand’s second largest city, which is one of three areas served by infrastructure competitor TelstraClear’s DOCSIS 3.0-enabled HFC network in addition to Chorus’s ADSL2+ network).

⁸ <http://www.crownfibre.govt.nz/news/press-releases/final-ufb-partner-announcements-.aspx>

⁹ <http://www.hawkesbaytoday.co.nz/business/news/telecom-says-ufb-deal-good-for-shareholders-and-co/3953131/>

¹⁰ <http://www.stuff.co.nz/business/industries/telecoms-it-media/4366771/Telecom-sees-life-either-way-with-UFB>

¹¹ http://www.med.govt.nz/templates/ContentTopicSummary_41902.aspx

¹² Around 70% of the population within the 75% of the country to be covered by the UFB network

¹³ Sadowski & Howell (2012)

The first fibres were laid in late 2010¹⁴. By June 2012, 76,311 premises had been passed, with 1233 users connected and receiving services¹⁵.

Whilst the fibre deployments are proceeding apace, two significant questions have arisen regarding the economic, commercial and political rationale for the Australian and New Zealand governments' decisions. The first is why the respective governments are assuming a central role in the design, financing, deployment and (in Australia's case) operation of a nationwide network of a specific technology type, given that such ownership is at significant variance with both recent international industry policy and practice advocated by international agencies such as the OECD and the ITU, and the recent policy and regulatory history in both countries. The second is how these new Government-funded networks will affect the nature of competitive interaction in the telecommunications (broadband) industry in their respective countries. In particular, the role of government in determining both the nationwide network architecture and the identity of forms operating those networks, and potentially using its superior legislative and financial advantages to inhibit the financial viability of competing infrastructure operators, challenges the role of both competition and regulatory policy as an effective means of governing industry interaction in order to further the long-term interests of end-users.

This paper addresses these two questions.

Section One traces the recent international industry context in which technological innovation – notably the emergence of increasingly more capable fibre-optic local access networks – has combined with the prevailing regulation based upon access regulation of incumbents' copper networks to challenge historic assumptions about the incentives of industry participants to invest in new ('frontier'¹⁶) network technologies in a timely manner. This section positions the Australian and New Zealand government policies as nationwide pre-emptive strategic responses to the dilemma of how frontier networks will be financed and who will deploy them.

However, government financing of the new networks will necessarily alter the nature of competitive interaction in the sector, and hence the appropriate policies under which it should be governed. Competition and regulatory policy must therefore address both the ways in which it is anticipated competitive interaction will play out when the new government-funded networks are fully deployed, and the ways in which competitive interaction will transition from the "old" industry state to the "new". The latter is of extreme importance, given it is anticipated that the

¹⁴ <http://www.crownfibre.govt.nz/news/press-releases/more-prioritised-bidders-announced-for-ufb-initiative-.aspx>

¹⁵ <http://www.beehive.govt.nz/release/ufb-exceeds-year-one-target>

¹⁶ Helpman & Trajtenberg (1996) describe the processes by which newer, more capable 'frontier' technologies replace older, less capable 'legacy' technologies.

new government-funded networks will operate for an extended period of time¹⁷ alongside existing privately-owned networks of varying technologies (copper, cable, mobile, wireless, satellite, private fibre) providing broadband access services that for the majority of customers in the foreseeable future at least are eminently substitutable. Section Two examines and compares the different approaches taken towards competition and regulatory policy governing the Australian and New Zealand industries. This section makes some predictions about the likelihood of the prevailing policies supporting either the long-term public benefit or the respective governments' agendas for their ultra-fast broadband networks. Some preliminary observations of the challenges that are emerging are offered.

In summary, the paper finds that Antipodean government investment has arisen in large part as a consequence of political rather than economic imperatives. Although a case can be made that legacy regulation and policy positioning has impeded the development of commercial fibre networks, and considerable economic rhetoric has been utilised to garner public support for the policies, in both countries government intervention is predicated predominantly upon replicating the nationwide fibre infrastructures of Asian trading partners such as Korea and Japan. The fear of getting 'left behind' in a technology 'arms race' has resulted in principled competition and regulatory policy being subordinated to the pursuit of strategic political imperatives.

Consequently, the competition and regulatory policies of both countries fall short of serving the long term economic interests of end users, even though this is ostensibly the primary objective of the competition authorities charged with overseeing industry interaction¹⁸. In both countries, industry structure has been determined by administrative fiat rather than evolving as a consequence of the interaction of technological and commercial forces. The focus on the regulation of specific technologies and their purchase by commercial customers comes at the expense of the development of a set of policies fostering competition in the markets for broadband access across multiple technologies in which end consumers make their ultimate purchase choices. In New Zealand, this plays out initially in the apparent lack of consistency in different geographic regions with regard to the ownership of the copper and fibre networks and how this will affect the nature of facilities-based competition. Whilst in Australia the competitive tensions between copper and fibre have been nullified by the agreements with Telstra and Optus resulting in a seamless substitution of customers and the closing of rival fixed line networks, there

¹⁷ Up to ten years in both countries.

¹⁸ In both countries, the telecommunications industry is overseen by a competition authority – in Australia the Australian Competition and Consumer Commission (ACCC) and in New Zealand the Telecommunications Commission within the Commerce Commission. Both are charged with ensuring that competition develops in the industry in order to further the long-term interests of consumers. These are interpreted in both cases to mean the pursuit of economic efficiency aggregated over all of its productive, allocative and dynamic dimensions. (Nicholls, 2011 – Australia; Telecommunications Commission, 2010 – New Zealand.

still is no clear policy regarding competition between fixed networks and others such as mobile and wireless. New Zealand policies are also mute on the effects of such inter-platform competition.

From the Antipodean experience, therefore, it would appear that Government financing of structurally separate ultra-fast fibre broadband networks is adding to, rather than reducing or eliminating, the complexities that must be addressed by competition and regulatory policy in telecommunications markets.

1. **Governments as Investors in Ultra-Fast Broadband Networks**

For the past thirty years, telecommunications policy internationally has been dominated by the privatisation of former government-owned firms, pursuit of increasing competition and the delegation of day-to-day operation of industry oversight from core government to autonomous regulators sitting at arms' length from political decision-making. International policy¹⁹ has focused on the pursuit wherever possible of technology-neutral competition between distinct privately-owned network infrastructures (generally termed 'infrastructure', 'facilities-based' or 'inter-platform' competition)²⁰ as the most effective means by which efficient investment, innovation and consumer choice can be facilitated, thereby enhancing the long-term benefit of end users²¹.

1.1 **Competition, Access Regulation and Historic Role of Government**

To the extent that competition between discrete networks has not been economically feasible²², recourse to access regulation has, where mandated, enabled competitors to use bottleneck elements of the incumbent's network to deliver competing retail services to end consumers (generally termed 'services-based' or intra-platform' competition)²³. Access regulation and services-based competition have become the generally-accepted competition and regulatory orthodoxy amongst OECD countries, with the notable exception of the United States, where after initially being introduced for voice telephony in the Telecommunications Act 1996, it

¹⁹ Huigen & Cave (2008: 714) categorise OECD telecommunications policy into three empirical models: "distinctly deregulatory" as observed principally in the United States; an "interventionist approach" in Japan and Korea and the "third or middle way" "focused on regulatory intervention based upon competition analysis which is supposed to be devoid of any influence of industrial policy", as evidenced in the European Union. . De Streeel (2008: 726) identifies four roles of the state in telecommunications markets along a spectrum from a hands-off "Schumpeterian" paradigm protecting innovation and possibly allowing creative monopoly via "Neo-classical" (price regulation) and "Soft Industrial Policy" (promoting specific business model entry) to direct hands-on intervention where the government promotes specific operators or directly offers services itself, in a "Hard Industrial Policy" paradigm. Australia's recent policy can be best described as "third or middle way" (Huigen & Cave) or "soft industrial policy" (de Streeel). By contrast, New Zealand began the 1990s firmly at the "deregulatory" (arguably even "Schumpeterian") end of the spectrum, but transitioned in the 2000s through to a "third or middle way" "soft industrial policy". This progression has been driven in large part by a desire for international regulatory conformity rather than economic efficiency objectives (Howell 2010). In particular, the Telecommunications Act 2006 was very strongly influenced by the OECD endorsement of the European policy prescription (Howell, 2006).

²⁰ The 2004 OECD Council recommendation on Broadband called for (inter alia): Effective competition and continued liberalisation; • Encouragement of investment in new infrastructure, content and applications; • Technologically neutral policy and regulations; • Recognition of the primary role of the private sector; • Promotion of access on fair terms, irrespective of location • Assessment of market-driven availability and diffusion; and • Regulatory frameworks that balance the interests of suppliers and users. Recommendation of the OECD Council on broadband development adopted by the Council at its 1077th Session on 12 February

2004.www.oecd.org/document/11/0,3343,en_2649_34223_34238436_1_1_1_1,00.html

²¹ "Broadband uptake is normally best in competitive, dynamic markets with multiple fixed network connections" (OECD, 2010b: 4)

²² For example, where lack of scale economies or low population densities mean that it is economically feasible for there to be only one network operator.

²³ "Competition on the access network is a key requirement to facilitate choice for the consumer at the retail level when there is a single access provider" (OECD, 2010: 4).

was subsequently eschewed in favour of infrastructure competition for the rapidly-developing information transfer markets²⁴.

Access regulation has taken many forms, ranging from simple competitor resale of incumbents' products, through competitor leasing of local loops to more complex instruments such as local loop and sub-loop unbundling, where entrants can append their own infrastructure at various layers of the incumbent's network in order to provide differentiated services. The long-term efficacy of access regulation has been underpinned by the presumption (albeit contentious) that it will accelerate the development of the desired end of 'infrastructure competition'²⁵ by enabling competitors initially lacking the scale advantages of incumbents to 'climb successive rungs of the ladder of investment' to full independent competing network ownership²⁶.

Throughout most of this period, despite differing approaches to access regulation, the role of government financing of telecommunications networks in the majority of OECD countries has been confined principally to the pursuit of distributional and social objectives, such as ensuring widespread network coverage and affordable pricing in a subset of (principally rural geographic) markets which any operator (regardless of ownership identity) would find commercially unviable to serve without some form of subsidy²⁷. The most notable exceptions have been Korea, where the government provided direct underwriting, loans, favourable tax treatment and other types of financial support for the construction of high-capacity broadband networks²⁸ and Sweden and the Netherlands, where local municipalities have taken a leading role in financing the deployment of fibre broadband networks in many locations, including major cities such as Stockholm, Amsterdam and Eindhoven²⁹.

Restricting government financing to otherwise un-served or under-served markets minimises the likelihood of private sector finance being 'crowded out', with consequent distortions to the development of welfare-enhancing competition³⁰. In order to avoid such distortions to competition occurring, the European Commission has specified formal guidelines for differentiating, by market structure/market contestability conditions, between white (unserved) areas, grey (private monopoly served) and black (multiple private infrastructures) areas. As a general rule, public funding is acceptable for white areas, possibly acceptable for grey areas but

²⁴ See, for example, Hausman & Sidak (2005); Crandall & Ingraham (2004).

²⁵ OECD (2001; 2009).

²⁶ For a discussion of the distinction between the different types of competition, see Bouckaert, van Dijk & Verboven (2010). For the theory of the 'ladder of investment' model, see Cave (2006). A recent critique of the efficacy of the 'ladder' model can be found in Bourreau, Dogan & Manant (2010).

²⁷ OECD (2010a)

²⁸ Frieden (2005: 606).

²⁹ OECD (2010c: 48).

³⁰ OECD (2010c: 50); Sadowski, Nucciarelli & Rooij, (2009).

not allowed in black areas³¹. The OECD and the ITU have both strongly advocated a preference for private sector financing of networks wherever possible, with government intervention being reserved to use only when there is clear evidence that the private sector will not provide the requisite infrastructure and services.

1.2 The Antipodean Position on Privatisation and Deregulation

Until recently, Australian and New Zealand policies have largely adhered to the international orthodoxy of privatisation, market liberalisation and latterly, recourse to access regulation³². New Zealand was initially one of the world telecommunications policy reform leaders, with the 1987 corporatisation and deregulation of the government-owned incumbent Telecom and institution of a light-handed regulatory regime in governed principally by competition law³³. In 1990, the firm was fully privatised³⁴. Australia's regulatory reforms began later and privatisation moved more slowly than in New Zealand, but the regulatory framework was more pervasive. The government-owned incumbent was corporatized in 1988³⁵, with a gradual sell-down of the shares in three tranches³⁶ between 1997 and 2006³⁷.

A key point of difference, however, was Australia's reliance from the outset on industry-specific regulation, initially via the Australian Telecommunications Authority (AUSTEL), and subsequently in 1997³⁸ with economic regulation passing to the Australian Competition and Consumer Commission (ACCC) and residual regulatory oversight passing to the Australian Communications Authority (ACA)³⁹. As part of the 1997 reforms, access regulation was mandated for designated services. Local loop unbundling became a designated service in 1999⁴⁰. By contrast, in New Zealand, 'light-handed regulation' governed principally by the Commerce Act 1986 prevailed until 2001, when it was replaced by industry-specific economic regulation overseen by the Telecommunications Commission located within the Commerce Commission⁴¹. Initially, access regulation was confined to the wholesaling of Telecom services, but provision for bitstream unbundling was legislated in 2004, followed by full local loop unbundling in 2006.

³¹ OECD (2010c:50). In some cases, considerable artifice has been used in order to avoid such projects coming under the scrutiny of EU State Aid laws (see, for example, Sadowski, Nucciarelli & Rooij, 2009).

³² For a more detailed discussion of the industry in New Zealand, see Howell (2007; 2010). The history in Australia is summarised in Given (2010) and Chaivan and Raiche (2008).

³³ Boles de Boer & Evans (1996)

³⁴ Howell (2010).

³⁵ Gray (2009: 30)

³⁶ <http://www.apf.gov.au/library/pubs/chron/2003-04/04chr03.htm>

³⁷ <http://telstra.com.au/abouttelstra/company-overview/history/telstra-story/>

³⁸ Following the 1993 Hilmer report's strong endorsement of a single competition regulator covering all industries (Chavan & Raiche, 2008).

³⁹ Gray (2009: 32).

⁴⁰ OECD (2002: 16).

⁴¹ Howell (2007).

More recently, however, both countries have been at the forefront of mandatory operational⁴² and structural⁴³ separation of the former government-owned entity, even though these remedies have not yet received acceptance internationally as regulatory orthodoxy.

Consistent with international trends, until the most recent interventions the governments in both countries confined their financing of physical networks to regional and rural areas where investment had been eschewed by the private sector. As the economies of both countries rely extensively on primary production, telecommunications connectivity in rural regions has long been considered strategically important. In Australia, a sum of \$250 million from the sale of the first tranche of Telstra shares in 1997 was allocated to the Networking the Nation Trust (NTN). This same fund later incorporated various parts of the \$1 billion Social Bonus package allocated to NTN following the sale of the second tranche of shares in 1999. These funds were applied to a range of projects to increase telephony and internet access to rural and remote communities⁴⁴. In New Zealand, the Provincial Broadband Extension (PROBE)⁴⁵ and the Digital Challenge Fund⁴⁶ targeted the development of broadband networks in fourteen rural and remote regions, focusing first upon connecting schools and community facilities and thereby facilitating uptake by other stakeholders. In both countries strong egalitarian and rural equity policies have ensured that urban and rural subscribers have paid similar prices to access telecommunications services since the very beginnings of telephony services in the 1880s⁴⁷.

Given this history, the decision by both governments to re-enter the telecommunications market as active investors in nationwide infrastructures signals complete reversal of the direction of their telecommunications policies of the past thirty years. The respective governments have moved from a passive role of providing the legislative framework in which private sector firms operate and funding only disadvantaged fringe markets to seizing strategic control (and in Australia's case, full ownership) of fixed line telecommunications infrastructure. Government entities have assumed responsibility for network design and operation, specifying both the precise network technology and engineering that will be provided nationwide, the timing of the investment and either picking the firms who will supply it (New Zealand) or supplying the services itself (Australia)⁴⁸.

In most policy environments, radical changes resulting in government assumption of control of an industry's strategy are typically associated with significant distortions to the pursuit

⁴² Gray (2009: 37) – Australia; Howell (2009) – New Zealand.

⁴³ OECD (2010b).

⁴⁴ <http://www.apf.gov.au/library/pubs/chron/2003-04/04chr03.htm>

⁴⁵ <http://www.med.govt.nz/upload/30104/probenewsletter2.pdf>

⁴⁶ <http://www.beehive.govt.nz/?q=node/29095>

⁴⁷ Howell (2007); Gray (2009).

⁴⁸ This is a classic example of de Streeck's (2008) hands-on "hard industrial policy".

of increased total welfare. It begs the question, therefore, of what distortions might have been present in Australia and New Zealand to engender the governments' dramatic policy responses. At the core of the policies is the emergence of fibre-optic technologies as the frontier of fixed line data transmission.

1.3 Access Regulation and Diminished Incentives for Fibre Investment

Whilst there is considerable debate regarding the economic benefits available from widespread deployment of very fast fixed line broadband connections at the current point of time (given the increasing capacities of fixed line services on copper and HFC infrastructures and the range of applications currently only able to be accessed via local fibre connections, and hence the optimal time at which the new networks should be deployed to maximise their economic impact⁴⁹), it is generally accepted that in the fullness of time the greater capabilities of fibre-optic networks as the frontier technology will most likely result in them replacing their copper and HFC legacy predecessors⁵⁰. A consensus appears to have been reached that when this time comes, in most countries there will be only limited competition between fixed line high speed broadband providers even in the most densely-populated areas⁵¹, and likely a single provider (if there is one at all) in less densely-populated areas⁵². At the very least, this likely indicates an ongoing need for regulatory intervention to militate against the potential exertion of market power by firms with a dominant position⁵³. However, it also poses a challenge to governments aspiring to ensure that the competition and regulatory environments are conducive to the development of fibre networks in a manner (in terms of timing, location, technology, quantity and quality) that maximises societal welfare. The optimal time and form of government intervention, both in terms of regulation and investment (if indicated) are crucial to meeting the welfare objective.

Recent experience with access regulation has highlighted the need for a careful balance between on the one hand the use of tools such as access regulation to increase competition in the provision of downstream applications and services and on the other the incentives faced by network owners (including, increasingly, entrants investing more extensively and deeper into the incumbent's network as they 'climb the ladder of investment') to invest in enhanced upstream network technologies⁵⁴. Over-vigorous access regulation may result in the emergence of 'missing markets' for private sector investment, and particularly the investment necessary to deploy new

⁴⁹ For a discussion of these issues, see Howell & Grimes (2010), Kenny & Kenny (2011) and Middleton & Given (2011).

⁵⁰ Van Gorp & Middleton (2010); Middleton (2010);

⁵¹ That is, no more than two discrete providers

⁵² OECD (2001c).

⁵³ OECD (2010a).

⁵⁴ OECD (2010b).; Bourreau, Dogan & Manant (2010);.

fibre-optic technologies. Such an outcome increases the likelihood that governments might respond to the missing market by investing themselves (with the larger the missing market problem', the more extreme the intervention that might be expected), although this is not the only strategy available⁵⁵ by which to facilitate the achievement of coverage and pricing policy objectives. Yet lightly-regulated firms with market power may use their advantage to hinder the development of competition in the provision of 'ladder elements' and downstream products and services, even though the same light regulation militates against the disincentives for these firms invest in upstream network capability enhancements.

Empirical evidence is beginning to mount that, where it has been enacted, access regulation has very likely lowered the level of infrastructure investment relative to what might have been achieved had it not been utilised, in large part because investment by unbundling entrants on the incumbent's network has crowded out even larger investment that would have occurred in competing network infrastructures⁵⁶. In the context of new (frontier) fibre-based local access networks for the provision of higher quality broadband services than are achievable in the (legacy) copper networks⁵⁷, the foregone dynamic efficiency gains arising from delays in deployment of more capable fibre technologies may be significant. The foregone gains will accrue regardless of whether the delays are in the deployment of fibre in either the 'middle mile' connecting local points of data aggregation to points of interconnection with other providers (that is, 'fibre to the node' or kerb - FTTN) or in the 'last mile' connecting end user premises to the local aggregation points ('fibre to the home' or premise – FTTH).

This suggests that a case could be made for government investment if there is evidence of a missing market for investment in fibre networks, which can be attributed to access regulation distorting private sector investment incentives. If such an intervention was to occur, then government ownership of the ensuing networks might potentially offer an avenue whereby many of the more costly by-products of access regulation – notably three-way strategic gaming between

⁵⁵ For example, a regulatory holiday, as proposed by Gans & King (2004) could be used to address the missing market if regulation is indeed the underlying cause.

⁵⁶ For example, but not limited to, Waverman, Meschi, Reiller & Dasgupta (2007); Grajek & Roller (2009); Bourreau, Cambini & Hoernig (2012); Inderst & Peitz (2012).

⁵⁷ In the usual context of a legacy technology being superseded by a frontier technology, if end consumers value the benefits conferred by the new technology sufficiently at a price that reflects its cost of production (taking account of any adjustment costs), they will substitute from the legacy to the frontier as long as it is made available to them. Private sector providers will respond to these (anticipated) consumer demands by making the technology available, as it is profitable for them to do so. In the case of broadband networks, a customer purchasing a standard connection still receives benefits from its purchase, so may reasonably eschew purchase of the frontier even if it is offered at cost, simply because there are insufficient benefits available to offset the higher price. This is because the purchase is valued at the margin (faster broadband versus standard) not at the average, as would occur with the first purchase of broadband. As the demand for broadband is derived ultimately from the demand for applications utilising broadband capabilities, then unless the time savings are very large or the consumer's valuation of time is extremely high, purchase of the frontier technology will usually require that the consumer has a high valuation for applications that can only be used on the frontier technology (Howell, 2008; Howell & Obren, 2002).

the incumbent, entrants and the regulator - could be reduced, if not avoided⁵⁸. However, this would require a careful assessment of the wider benefits and drawbacks of such a response. The drawbacks include many of the well-documented problems of government ownership of monopolies that underpinned the reforms of the 1980s and 1990s, such as reduced responsiveness to technological change, lower levels of productive efficiency in the absence of direct accountability to shareholder-owners and the prioritisation of network deployment in order to meet political objectives rather than in response to the differing economic priorities of a wide range of consumers⁵⁹. It also necessitates a careful assessment of the effects of the radical change in government investment policy on private sector participants – both incumbents and entrants – who have responded in good faith over the past thirty years to a government policy of privatisation and arms-length regulation rather than overt market participation.

1.4 The Timing of Fibre Investment

Furthermore, simply because a new technology exists, it does not follow automatically that the long-term interests of end consumers will be best served by nationwide deployment (by either government or private sector actors) immediately the technology becomes available. This is especially true in the case of infrastructures with very high levels of fixed and sunk costs, such as telecommunications networks.

As the value of telecommunications networks lies not in the networks themselves, but in the value derived by end users from using applications that take advantage of the network capabilities, unless a range of new applications exists that cannot operate on the legacy networks, the benefits that accrue from substituting an application from the legacy to the frontier technology are only the marginal benefits arising from the new technology (in the case of fibre broadband, only the faster transmission speed available relative to using the legacy copper network). If these marginal benefits are small relative to the cost of the new network, then investing too soon will reduce rather than increase welfare⁶⁰. Moreover, over-early deployment may also result in two networks, neither operating at an efficient scale, running together for a longer time than is optimal. This may be avoided by decommissioning the legacy network as soon as the frontier is deployed. However this leads to a further potential decrease in welfare. The marginal benefits arising from operating existing applications on the more costly frontier technology may not be valued by all end users as highly as the marginal costs of deployment of the frontier relative to the legacy

⁵⁸ Carlton & Perloff (2005).

⁵⁹ Howell (2007); Laffont & Tirole (2002).

⁶⁰ Howell & Grimes (2010); Howell & Obren (2002).

network, yet these individuals have no choice but to use the new network if they wish to continue participating in the same activities as before.

For these reasons, it is more typical to see an incremental deployment of the new infrastructures, first to high-valuing customer segments where the higher costs can be justified by higher valuations (e.g. commercial and industrial users) and subsequently to lower-valuing consumers (e.g. residential), rather than opting in the first instance for a nationwide rollout. This pattern is clearly evident in those markets where private investment (without government subsidies) is leading fibre deployment, even in the Antipodes⁶¹. It is also the same pattern observed when telephony networks were first deployed in the 1880s⁶². In addition, investing too early may prove to be very costly if (in a technologically dynamic environment) an even newer and more welfare-enhancing technology may subsequently be developed that supplants the current ‘frontier’, thereby stranding the substantial investments made in the now-intermediate network.

Thus, when there is uncertainty regarding either the nature of the applications from which benefits will be derived, or the stability of the technological and regulatory environment into which the network will be deployed, it may be prudent to delay investing until such time as there is more information available from which to assess the viability of the proposed investment⁶³.

1.5 The international Race for Fibre Deployment

Whilst it may ultimately be desirable for fibre technologies to replace copper networks on a nationwide basis, the preceding two subsections suggest that, at the current point in time, two sets of forces – a legacy of access regulation and genuine technological uncertainty – are potentially acting to put a brake on the rate at which fibre networks are currently being deployed. This leads to three questions for policy-makers and regulators:

- What is the ‘correct’ rate at which fibre networks should be deployed?
- Is either of the delaying factors having a material effect on the deployment rate observed? and
- If so, is there a feasible intervention that will improve the welfare outcome?

The first of these questions is very difficult to answer, as the dynamic nature of technological innovation means that the optimal deployment rate is constantly changing. Furthermore, the value of infrastructure investment is doubly difficult to assess when both the network and application

⁶¹ See Howell (2010a).

⁶² Howell (2007); Wallsten (2005).

⁶³ Guthrie (2006).

technologies are in a state of constant and rapid development. This has already been exhibited in the copper broadband market, where innovation continues to deliver new hardware and software to increase the speed and capability of data transfer, at the same time as new applications to take advantage of that capacity are deployed.

Nonetheless, in lieu of any better answer, and despite a large literature cautioning against such an approach (including from the OECD, whose statistics are typically employed for the purpose), benchmarking against the performance of comparator countries has become the default response for policy-makers seeking to determine the ‘correct’ rate of fibre network deployment on which to base their policy assessments and interventions⁶⁴. Benchmarking can be a useful tool to measure relative performance against a particular target, but it assists the development of good policy only if the target selected is a good proxy for the broader policy objectives being pursued. It has become something of an article of faith that if some fibre broadband deployment is a ‘good’ thing, then more of it must necessarily a ‘better’ - and hence more desirable – outcome. Likewise, more connections to the network (per capita or per some other metric) are presumed superior to fewer. Yet, questions remain about the efficacy of using fibre broadband investment and connections as sound proxies for increased welfare⁶⁵.

Just as was found with the Solow Paradox regarding investment in computers, the link between more broadband investment (or more connections) and economic welfare is highly complex, and is contingent upon a range of complementary investments that may vary between market segments in different economies. Furthermore, the reasons why some countries or regions exhibit different levels of investment and/or connectivity may be due to factors that are not present in the countries whose benchmark performances they seek to emulate. A risk exists that if benchmarks set by, or the policies adopted in, ‘winning’ countries become the targets and strategies applied in other jurisdictions without fully understanding how the contextual differences have affected the original observations, then the outcome may be less than satisfactory for the mimicking country. If many countries simultaneously adopt the same response, but the link between the targets/policies and social welfare is very weak, or worse, based upon flawed assumptions, then the outcome will be a very costly ‘arms race’ where pursuit of the benchmark or policy artefacts becomes the widely-accepted ‘best practice’ strategy at the expense of increases in welfare.

At the current point in time, Japan and South Korea, as the leading OECD countries in terms of households passed by FTTH infrastructure, have become the ‘gold standard’ countries

⁶⁴ See, for example, Boyle & Howell (2008); and Ford, Koutsky & Spiwak (2008).

⁶⁵ For a discussion, see Howell & Grimes (2010) and Kenny & Kenny (2011).

whom others seek to emulate in respect of ‘last mile’ fibre broadband infrastructure deployment. In South Korea, the rapid and early deployment of fibre networks was achieved as a result of substantial government incentives facilitating the development of a comprehensive information economy policy predicated in large part on supporting new and existing high-technology companies building extensive new export markets⁶⁶. Widespread fibre deployment has been associated with high levels of broadband uptake per capita in South Korea. Success has bolstered support for government-funded incentives as a replicable policy for increasing both rollout and uptake in other countries. Yet by far the most significant effect of broadband upon the country’s economic fortunes has come from the production and export of telecommunications equipment (including computers and smart phones, as well as fibre broadband technologies)⁶⁷ rather than internal services using the deployed networks. Indeed, South Korea languishes in the bottom quartile of the OECD in statistics such as the number of secure servers and domain name registrations per capita that are generally presumed to be correlated with high levels of the use of the internet for commercial activities⁶⁸. In Japan, NTT’s government-incentivised investment in FTTH followed a fierce price war based on access to unbundled copper loops at economically unsustainable prices⁶⁹. Whilst this has led to widespread FTTH uptake amongst those buying fixed broadband connections (62.8% of connections in Q4 2011)⁷⁰, Japan ranks in the middle of the OECD for broadband uptake per capita (16th in Q4 2011, and only one place ahead of New Zealand at 17th)⁷¹.

These observations draw into question the widely presumed nexus between the quality of broadband and the number of connections per capita, as well as the simple extension from the quality and number of connections to economic growth. This is not to say that there are no effects, but it serves to highlight the complexity of the ways in which any effects may be garnered.

It is far from clear whether the costs of building either the Japanese or South Korean infrastructures will ever be recovered, or that the policies adopted were predicated upon a presumption of addressing either a missing market for investment or an intention of furthering economic welfare as a consequence of network deployment. Yet the levels of uptake achieved

⁶⁶ As these countries produce electronic componentry for fibre-optic networks, their governments might be expected to take a different strategic view towards the benefits of supporting the first nationwide deployments of such network technologies (e.g. as reference sites) than the governments of countries that are customers and not suppliers of the technology (Porter, 1990).

⁶⁷ OECD (2011) p 358

⁶⁸ OECD (2011) pp 176; 180 respectively. For a discussion of the merit of these statistics as indicators of economic relevance of the technology, see Howell (2003).

⁶⁹ Set at 140 yen per month (US\$1) (Huigen & Cave, 2008:715).

⁷⁰ OECD Broadband Statistics [http://www.oecd.org/internet/broadbandandtelecom/11-PctFibreToTotalBroadband-2011-12-\(NL\).xls](http://www.oecd.org/internet/broadbandandtelecom/11-PctFibreToTotalBroadband-2011-12-(NL).xls) retrieved August 9 2012.

⁷¹ OECD Broadband Statistics [http://www.oecd.org/internet/broadbandandtelecom/1h-BBPenetrationHistorical-Top5-2011-12-\(NL\).xls](http://www.oecd.org/internet/broadbandandtelecom/1h-BBPenetrationHistorical-Top5-2011-12-(NL).xls) retrieved August 9 2012.

have become benchmarks towards which policy-makers in many countries would appear to aspire⁷², and government-funded incentives have been identified as a policy instrument via which these outcomes can be emulated. It cannot be discounted that countries adopting these benchmarks and policies are exposing themselves to an escalating ‘fibre arms war’ fuelled by fear that they will get ‘left behind’ if they do not follow suit. As the links between the South Korean and Japanese policies and increases in welfare are quite nebulous, the outcome could be a systemic over-early investment in fibre technologies driven by pursuit of artefacts rather than the anticipated economic performance outcomes.

If policy-makers are to avoid costly over-early investment in a fibre arms war, it is important that the second and second and third questions posed above are addressed in conjunction with the first – specifically, is there a feasible intervention that will improve the welfare outcome. The Japanese and South Korean exemplars demonstrate that government financial incentives do lead to faster deployment and uptake of fibre broadband connections (but not necessarily broadband connections per se) than if they were not present. But unless the connections between deployment, uptake and increases in welfare are unequivocally positive, and the magnitude of the gains will exceed the costs of implementing the policy, then a cautionary approach to government investment would be indicated. It is noted that whilst there are many studies suggesting a link between broadband and economic growth, the direction of causation is often unclear and the magnitude of the effect is both highly variable and (amongst later studies and in particular those studies employing robust econometric analysis) much smaller in magnitude than the sums postulated in the early ‘hype’ surrounding broadband technologies⁷³. Very few studies have examined the link between faster connections and economic growth, but overall their findings are equivocal⁷⁴.

⁷² The New Zealand proposal is claimed “to create a step-change in broadband services by delivering on an aspirational goal of achieving ultra-fast broadband for the majority of New Zealanders. This is a key part of the government's wider strategy to increase New Zealand's global competitiveness, particularly compared to other OECD countries.” http://www.med.govt.nz/templates/MultipageDocumentPage_42114.aspx

⁷³ For a literature review, see Howell & Grimes (2010).

⁷⁴ Grimes, Ren & Stevens (2009) was the first to explicitly test the effect of speed, and finds that at the firm level in New Zealand, there is no evidence of increased productivity from purchasing faster broadband connections. Rohman & Bohlin (2012) finds doubling the speed leads to an increase in growth of 0.3% compared to growth in the base year. However the authors note that due to the linear nature of their model, the impact would be greater for countries that start with lower growth. This may be an artefact of the greater potential effects observed in low-income countries lagging behind in their investment, or that the bulk of the benefit comes from speed increases at the low end of the spectrum, but not as speed gets ever-higher (see Obren & Howell, 2010). Furthermore, they have not discounted the fact that reverse causality may be responsible for their observation – that is, higher GDP growth leads to faster broadband deployment. This suggests that considerable caution needs to be taken with respect to generalising the findings of this paper.

1.6 The Antipodean Policy Case

It is informative to now examine the policy case supporting government intervention in Australia and New Zealand. The common link in the policy processes of both countries is the absence of both a clearly-articulated policy case for intervening in the first place, and a rigorous cost-benefit analysis of the options chosen. In Australia, a ‘business case’ has been produced, but it falls far short of a comprehensive cost-benefit analysis⁷⁵. In New Zealand, whilst details of the contracts between CFH and the successful UFB partners have been released, most of the costing information remains out of the public domain as it is deemed to be commercially sensitive. A further common element is that the decisions to intervene have been driven by politicians in large part seeking to differentiate their parties in the competition for control of government in their respective countries, rather than being based upon the reasoned analysis of regulators and policy advisors seeking to foster an industry underpinned by an institutional infrastructure conducive to welfare maximisation. The extreme polarisation engendered by politicisation has resulted in some bitter conflicts, not least of which has surrounded the paucity of policy analysis undertaken prior to the interventions occurring. In Australia, in particular, the debate has been at times quite heated⁷⁶. Nonetheless, it is possible to draw some inferences by examining the historical record.

In Australia, the ‘sea-change’ away from the historic arms-length government engagement in the telecommunications sector came to the fore in 2007⁷⁷. An impasse had developed between the management of the formerly government-owned incumbent operator Telstra and the government over Telstra’s investment in upgrading the copper network by installing fibre-to-the-node (FTTN). There is little doubt that investment incentive issues associated with access regulation lay at the heart of the confrontation. Telstra’s position was that the firm would not invest in upgrading the copper network unless changes were made to reduce the intensity of the access regulations under which it was required to supply services to its competitors. The regulatory authority (the ACCC) was not satisfied that a relaxation in regulatory intensity was warranted. The resulting ‘investment standoff’ led to Australia ‘falling behind’ comparator countries (notably in Asia, but also New Zealand) in the quality of broadband services that could be offered to consumers. The matter escalated into the political domain when the opposition Labour Party campaigned in the 2007 national general election that it would intervene to ensure the FTTN network was built if it was elected. The justification given for political involvement was that access to faster broadband was a matter of ‘nation building’ in

⁷⁵ Ergas (2012).

⁷⁶ See, for example, CommsDay August 13 2012.

⁷⁷ Discussion on the Australian situation is summarised from Given (2010) and Gray (2009).

which the (Labour) government would take the lead⁷⁸. Upon winning the election, in 2008 the (Labour) government sought competitive tenders from private sector firms to build a government-specified FTTN network. None of the tenders received met the specifications, so in 2009 it was announced that instead, the government would establish NBN Co to build and operate the substantially more ambitious FTTH network described in the opening paragraphs of this paper. The AU\$43 billion required for the project made it the most expensive government infrastructure project entered into in Australian history.

The context in which the New Zealand sea-change towards government investment occurred differed, but was nonetheless political in its origins, and manifested itself contemporaneously with the Australian intervention⁷⁹. Political activism in the New Zealand telecommunications market became established earlier in New Zealand than in Australia. The terms under which the Telecommunications Commission was established in 2001 limited the role of the Commissioner to one whereby on substantive issues of regulatory practice, advice could be given to the Minister but action could be taken only when specifically provided for in legislation. Thus, the most contentious issues – such as local loop unbundling (2003; 2006), functional separation (2007) and mobile termination (2006-8) – became inherently political decisions rather than regulatory ones⁸⁰. The Commissioner could advise the Minister, but the Minister was under no obligation to heed the Commissioner's advice, but instead could legislate (subject to parliamentary majority) or enter into commercial arrangements regardless of the views of the Commission⁸¹. In 2007, the (Labour-led) government entered into undertakings with Telecom⁸² to build a nationwide FTTN network connecting all communities with more than 500 lines with broadband with a minimum download speed of 20Mbps by the end of 2011⁸³. Thus, unlike Australia, at this point New Zealand did not have a 'missing market' for faster broadband investment, albeit that government negotiation was a direct consequence of access regulation affecting the incentives for Telecom to invest. However, in November 2008, New Zealand held a general election. The opposition National party campaign, most likely learning from the electoral

⁷⁸ The implication being that their political opponents, when in government, had allowed the impasse between Telstra and the ACCC to develop because they had failed to demonstrate leadership on the matter.

⁷⁹ Material in this subsection is drawn predominantly from Howell (2010).

⁸⁰ Howell (2010).

⁸¹ Indeed, with regard to mobile termination, Ministers twice rejected the Commission's recommendations to mandate price regulation in favour of a privately brokered agreement with the relevant firms – Howell (2010).

⁸² Albeit after an investment standoff similar to Australia's, which lasted from the announcement of the intention to impose local loop unbundling in May 2006 until the resolution announced in the undertakings in late 2007. See Howell (2010) for a discussion.

⁸³ This was most likely associated with a relaxation of regulatory obligations (as within one month of the undertaking being announced, the Commissioner announced a revision of regulated prices that was substantially more favourable to Telecom than had prevailed previously). However, as this was done as a political rather than regulatory action, neither the process nor the substance of how the decision was arrived at is transparent.

successes of the Labour party in Australia in 2007 when adopting an interventionist approach, included a commitment to invest \$1.5 billion by way of public-private partnerships to build a nationwide FTTH network.

The New Zealand initiative, like Australia's, was also claimed to be an exercise of assuming leadership in a nation-building exercise. In addition, the New Zealand investment was positioned as a means of increasing the country's international competitiveness – or more specifically, saving its businesses from being 'left behind' by comparator nations with faster broadband networks. As Australia has typically been the main benchmark against which New Zealand performance in any dimension is typically compared, it is most unlikely that the sea-change towards government investment in an FTTH network in New Zealand was unrelated to the changes occurring in Australia. Upon election, the (National-led) government proceeded to deliver upon its election commitment, as described in the opening paragraphs.

A notable feature bolstering political activism in telecommunications was the perception created in both countries that the privatised telecommunications firms had failed to undertake 'necessary' investment, and as a consequence both countries were 'underperforming' in broadband delivery relative to their OECD rivals. Government intervention was posited to draw its legitimacy from these apparent 'failures' of the privatisation processes. The principal statistics offered to support the claim of 'failure' were carefully selected to reinforce this perception – for example, poor rankings in broadband uptake per capita, slow 'headline' speeds of local offerings (compared to FTTH in Japan and South Korea, and VDSL services offered in much more populous cities in Europe) and high prices. Japan and South Korea are both geographically much closer to Australia and New Zealand than Europe and North America, and both feature prominently in trade relationships, so there is a natural tendency for Antipodean policy-makers to look towards those countries (as fellow members of the OECD) when benchmarking and assessing likely future economic consequences.

Although substantial evidence existed that other plausible explanations (not least, access regulation and greater uncertainties in the deployment of new networks in countries with small populations and low population densities⁸⁴) existed for many of the benchmarked artefacts, claims made during the political processes (such as those about network speeds available and the prices

⁸⁴ New Zealand's population is 4.4 million, with an average population density of 15 per square kilometre. It is the world's most isolated developed economy. Its most densely populated centre (Auckland – population 1.4 million) has a population density of 316 per square kilometre, compared to Sydney (Australia) with 362 and Tokyo with 6703. Auckland is Australasia's fifth largest city, after Sydney, Melbourne, Brisbane and Perth. The 6th largest city – Adelaide – has a population of 1.3 million. Australia's population is 22.6 million, with an average population density of 2.91 per square kilometre. Sydney's population is 4.6 million. Sources – Statistics New Zealand; Australian Bureau of Statistics.

for equivalent services) were often either factually incorrect⁸⁵, misleading⁸⁶ or provided without sufficient context to allow an informed interpretation⁸⁷. As ultimately the mandate to act was derived from political processes, there were few incentives for the various protagonists to explore or discuss the complexities of broadband markets in the public domain. As noted by one observer of the New Zealand processes, it was a “matter of winning over the hearts and minds of New Zealanders”⁸⁸ rather than conducting a reasoned, evidence-based policy development process. The situation in Australia was very similar.

1.7 Summary

In summary, therefore, available evidence appears to support the contention that the dramatic reversal of policy direction in Australia and New Zealand that has led to the respective governments assuming strategic control of the telecommunications industry by becoming the principal investors in FTTH broadband networks is a political response rather than the reasoned development of a broadband policy based upon economic principles. Whilst there is some evidence that a missing market for investment may have been developing in Australia, there is no reason to presume that this was the case in New Zealand following the 2007 undertakings⁸⁹. Moreover, even if there was evidence of an investment problem, there was still room for doubt to exist as to its origins, as a case can be made that technological and sunk cost risks associated with a new technology may be a plausible explanation for the observation of delays in private investment in FTTH, especially in the presence of aggressive access regulation. This is especially so in New Zealand, where fibre is being deployed in a small, sparsely populated market where alternative technologies (such as mobile, satellite and enhanced ADSL via FTTN) already exist and might prove satisfactory for most consumers in the interim, at least until demand for products only viable on fibre is proven, especially in residential markets.

⁸⁵ Whilst they may have been slower and more expensive than those in Japan and Korea, there is no evidence that New Zealand broadband connections were out of line with other OECD countries. The principal complaints were the absence of flat-rate tariffs. However, OECD data over many years confirms that New Zealand tariffs are amongst the fastest and lower-priced in the OECD when taking account of the quantities of data actually transported and the widely available best available network services (see footnote 86). . Thus claims of high costs were factually incorrect.

⁸⁶ Unlike other countries, the incumbent New Zealand copper operator was required to offer connections to competitors at the ‘best available effort’ speeds regardless of location or price paid. Thus all New Zealanders received the fastest speeds available in their geographic locations. Thus the average speed offered to all New Zealanders was higher than in most other OECD countries, but the peak speed observed in a small number of urban locations in other jurisdictions were not observed, except in the small number of areas where copper and cable networks competed.

⁸⁷ For example, after a visit to South Korea, Prime Minister Helen Clark remarked that she “felt like a poor country cousin having seen the far superior range and quality of services that were available there at such affordable prices.” http://www.islandsbusiness.com/islands_business/index_dynamic/containerNameToReplace=MiddleMiddle/focusModuleID=15850/overrideSkinName=issueArticle-full.tpl accessed August 10 2012.

⁸⁸ Ibid

⁸⁹ Indeed, the 2007 undertakings agreed between Telecom and the government are very similar to the arrangements pursued in many European countries for FTTN development.

An analysis of the history of the interventions reveals that the policies have been underpinned in large part by a desire to replicate the benchmarks and policies of ‘rival countries’, notably Japan and South Korea. When assessed against the theoretical considerations in sections 1.3 to 1.5 above, it appears plausible that in the politicising of the process, the pursuit of benchmarks of dubious merit has supplanted pursuit of economic welfare as the overriding policy objective in Australia and New Zealand. Whilst not excusing the lack of principled analysis, this potentially explains why a more rigorous approach might have been sacrificed. Clearly, the intention existed amongst politicians that the overriding objective was to win (or at least not be ‘left behind’) in the ‘race’ to deploy fibre broadband. Although delaying whilst more information was gathered or more analysis undertaken might have been prudent, it would have increased the risk of losing the ‘fibre arms race’. It would appear that losing the race was not a risk the governments were prepared to tolerate, even though in winning (or not losing) the battle for OECD leadership in specific fibre network artefacts, the ultimate objective of increased economic welfare might be compromised.

2. Competition Policy in the Antipodes

For the balance of this paper, it is assumed that government intervention in the Antipodean telecommunications markets was governed by the desire to have a nationwide FTTH network, regardless of the direction in which the industry was developing prior to the interventions occurring. However, the reality is that government investments have been overlaid on an industry where over thirty years of privatisation and deregulation, substantial developments have occurred. Not the least of these has been the introduction of a substantial degree of competition to the former government-owned incumbents. Competitors have been active in both co-investing with the incumbents on the existing copper network (via resale and unbundling) and deploying their own stand-alone infrastructures. Furthermore, this competitive environment has developed at the same time as the ‘convergence’ of many applications (audio, print, video etc.) onto a single digital format and the divergence of network typologies (fixed and mobile; copper, fibre, HFC, radio, wireless, cellular, satellite, etc.) over which digital images can be transported.

Whereas when Telstra and Telecom were deregulated in the 1980s they were the only providers of a single set of voice telephony based applications, the networks that have emerged from them currently face real infrastructure competition from a variety of different networks. Some of the competing networks provide complementary services, but increasingly, as the new technologies become more capable and costs fall, the range of customers and applications which can be served equally well by two or more networks is increasing substantially. This is especially true for customers whose data transfer needs are not large, or who are prepared to pay a premium for some data transfers⁹⁰. Almost without exception, these new services are provided by private sector firms who must compete in the markets for capital to undertake their activities at the same time as they compete in the market for the delivery of products and services⁹¹.

Whilst the common presumption is that in the fullness of time, due to their greater capacity for data transmission fibre broadband connections – and notably FTTH – will replace copper connections, it is not obvious yet that there is sufficient willingness amongst the vast majority of broadband consumers to pay substantially more for the greater capabilities offered by fibre connections than they are paying currently for less capable copper and HFC fixed line connections, given the current range of applications available and routinely used⁹². Low willingness to pay is likely exacerbated by flat-rate tariffs, which encourage internet usage to the

⁹⁰ Howell (2006) describes the New Zealand situation – it is similar in Australia.

⁹¹ The notable exception in New Zealand is State-Owned-Enterprise Kordia, which owns an extensive backhaul infrastructure built upon the legacy of terrestrial television broadcasting, and its downstream retail operation Orcon. Orcon has a share of around 5% of the New Zealand internet service provision market, and has been a prominent entrant in the retailing of residential VoIP connections. It is also the most aggressive unbundling entrant, with DSLAMs in almost all of the exchanges that have been required to be opened to competitors.

⁹² Horrigan (2010); Commerce Commission (2012).

point where marginal benefit of an additional data transfer is zero rather than its marginal cost⁹³, with the greatest use being made by those individuals with the lowest marginal valuations of (leisure) time⁹⁴. Arguably, speed differentiation has been used in large part as a means of discriminating between those with higher and lower willingness to pay for broadband in the presence of flat-rate tariffs, as it separates those with higher valuations of time (and therefore prepared to pay higher prices to avoid having to wait on congested networks) from those with lower marginal valuations of time (and fewer resources with which to pay for a faster connection). It is noted that in Australia and New Zealand, the use of data caps (initially in order to ration scarce international bandwidth efficiently) has served to differentiate between customers with different valuations based on the quantity of data transferred. This has led to the implicit need for end users to assess the relative and actual value of each byte transferred, and therefore, arguably, more efficient use of network resources, than occurs in the presence of flat-rate pricing.

Furthermore, demand for mobile broadband connections is currently growing faster than demand for fixed connections⁹⁵. As most consumers have a fixed budget constraint, this would appear to suggest that many consumers are choosing to spend their discretionary budgets for data communications that might have otherwise been used for faster fixed line connections on mobile broadband connections that increase their flexibility and ability to access applications at any time from any place. .

These observations serve to confirm that the government-funded FTTH networks in Australia and New Zealand are being overlaid into a market where there is already some degree of real infrastructure competition, where consumers have already established patterns of use and preferences for different technologies and service providers, and where a real range of choices exist, at least in the present. The ‘ladder of investment’ model upon which access regulation was predicated presumed that the deployment of competing infrastructures would be driven by retailers ‘climbing the ladder’ as they gained a critical mass of customers in order to justify the investment. Services competition was thus a precursor to full infrastructure competition, but importantly was driven by economic imperatives. Likewise, competitive ‘greenfield’ private infrastructure investments (such as HFC) were presumed to be predicated upon an operator already having a business case that justified investment. These factors are presumed to have underpinned the investment in competing networks in those jurisdictions where there has been no government investment. The government-funded networks, however, have been inserted into a market where presumably none of the existing operators – either infrastructure or services-based

⁹³ Howell (2008).

⁹⁴ Goldfarb & Prince (2011).

⁹⁵ OECD (2011).

– faced sufficient economic incentives to invest in these infrastructures themselves. Thus, it constitutes a severe (and potentially dislocating) shock to the patterns of competitive interaction that have emerged over the preceding thirty years.

It would normally be expected that such a sudden shock to the competitive environment as the government investments represent would be accompanied by a comprehensive set of policies to guide the industry through the ‘shock’ of fibre network insertion. At the very least, it might be presumed that a position would be taken on whether the government funded networks were predicated upon providing the existing network operators with genuine infrastructure competition, or substituting for the failure of the incumbent (or indeed any unbundling entrants) to make the progression from services delivered over a monopoly legacy copper network to services delivered over a monopoly frontier fibre network. Those provisions would also have to take cognisance of the fact that the legacy of regulation had been predicated principally upon the use of access regulation to stimulate services competition, but that in each country, in certain markets at least, effective infrastructure competition was either already present or potentially capable of emerging without government intervention. Only if both of these were given due consideration would it be possible that an appropriate competitive policy position could be developed and supported with a range of regulatory instruments to guide the transition of the broadband market to the state that was anticipated to prevail once the new networks had become ‘bedded in’.

2.1 Competition Policy in Action: Australia

To this end, the competition policy position in Australia is unequivocal. Both the government and the ACCC have been clear in their statements that fibre will become a nationwide natural monopoly. Consequently, significant provisions have been made to ensure that this transition will occur as smoothly as possible, even if this means that actions that might be construed as anti-competitive have to be undertaken.

First (and most obviously), provisions have been made for NBN Co to ‘buy out’ the existing major fixed line infrastructure operators Telstra (copper) and Optus (HFC). This ensures that there will be no effective infrastructure competition to the government’s network from these two operators, who currently control nearly all of the fixed line broadband market. The buy-out accounts for around a quarter of the cost of the project. The preference for a single fixed line network stems from an assumption that to have two fixed line networks deployed in a single location is inefficient duplication. Whilst this may be true in the static sense for technologically identical networks (as was observed in Australia the late 1990s, when two firms battled each other to lay HFC networks in the five main cities), it does not take account of the dynamic

benefits that may be available from having two fixed line networks with different technological capabilities competing in the same location (for example, Copper and HFC, or HFC and optical fibre).

Second, regulatory provisions have been made to limit the extent to which localised infrastructure competition will develop. Any other operators laying fibre networks must supply the same range of wholesale services on the same terms as NBN Co. Furthermore, they must demonstrate that their services will cost no more to produce than comparable NBN Co services. The latter provision is required to prevent inefficient entry by more costly providers in lower-cost urban areas on the basis of margins available as a consequence of NBN Co being required to sell services at geographically averaged prices over the entire country⁹⁶. Moreover, the fact that the government is subsidising NBN Co, expects only a modest return on the capital invested, and has access to taxpayer funds to act as a buffer against variations in financial returns from year to year will likely deter investment by potential competitors as they cannot hope to match the same terms as NBN Co and still make a return sufficient to justify the diversion of capital from other activities.

Third, customer switching from the copper to fibre networks is effectively mandatory if customers wish to continue purchasing fixed-line internet services. Copper connections will be decommissioned when fibre is laid. To facilitate this, the revised business plan of August 2012 has replaced the option for consumers to have fibre laid to their premises when fibre is deployed in a street with an ‘opt out’ provision. That is, fibre will be laid and provision to connect established for every premise passed, unless the owner expressly elects for the connection not to be laid. The owner will not be required to actually purchase services (e.g. some may choose to become ‘mobile only’), but copper services will no longer be available as an option to Australian consumers. The ‘opt out’ strategy has been adopted following experience in pilot locations revealed the owners of fewer than 50% of premises passed by the fibre network opted to have fibre laid from the kerb to their premises, even though there was no charge to them for this provisioning (noting that during the trial, copper connections were left in place so ongoing copper connectivity remained an option). The ‘opt-out’ strategy is presumed to reduce rollout costs relative to ‘opt-in’.

Finally, structural separation of NBN Co from retail activities has been established as the pillar upon which services-based competition will develop (although there is still some confusion about whether an exception has been carved out to allow government entities to contract directly

⁹⁶ See Heatley & Howell (2010) for a discussion of the ramifications of geographically averaged prices in the presence of infrastructure competition.

with NBN Co, thereby potentially removing a substantial proportion of commercial custom from the purview of the downstream (privatised) structurally separate retailer market). Separation provisions stem principally from a perception that much of the historic tension that arose between Telstra, the ACCC, and the government was due to Telstra being a vertically integrated firm with both network and retail operations. Prior to deregulation and privatisation, the policy option of separating Telstra had been considered (as it was also in New Zealand), but ultimately it was rejected. However, many critics of privatisation and deregulation have continued to speculate about what might have occurred if separation had been undertaken at that time. Speculation has been supported by a body of thought that the burden of regulating in a market where a structurally separate network operator has no incentives to discriminate against downstream rivals may be lower than has been observed for integrated operators⁹⁷. Although there is not yet any compelling empirical evidence to support this stance, and a growing literature that suggests the dynamic efficiency costs of structural separation may be much higher than originally estimated, especially where the separated operator faces real infrastructure competition⁹⁸, at this point in time, there is clarity in the minds of the Australian government and regulators as to why they have adopted the separated network model.

2.2 Competition Policy Implications: Australia

The Australian competition policy will undoubtedly result in a rapid substitution from copper to fibre fixed line internet connections. It will also lead to the least possible length of time for which two networks will operate in tandem, thereby minimising efficiently losses through network duplication.. However, significant questions still remain about whether the policy will deliver sufficient welfare gains to justify its costs.

The most significant competitive threat to NBN Co comes from the rapidly burgeoning mobile broadband markets. Whilst fibre may be seen as the most capable technology, it will not necessarily have market power in the ‘last mile connection’ markets that might once have been presumed for it. Just as mobile voice telephony has become a viable competitor with fixed line voice, so may mobile and other wireless technologies come to compete with fixed connections, at least for some applications and users. Furthermore, not all of the applications which have been cited as key uses to which the NBN can be put are actually highly time-critical or data transfer-intensive. The benefits of many may be achieved cost effectively on other extant networks (e.g.

⁹⁷ Xavier & Ypsilanti (2004).

⁹⁸ De Bijl (2005); Howell, Meade & O’Connor (2010).

smart electricity meters on fixed wireless or copper), or deliver even greater benefits if made available on mobile rather than fixed technologies (e.g. remote health care monitoring)⁹⁹.

Rapid developments in the capabilities of mobile technologies such as LTE open up new opportunities for both operators and consumers. The comparatively low population densities in Australia, even in suburban environments, mean that mobile technologies may provide a real challenge to the ability of the fibre infrastructure to attract the level of connections assumed in the business case. The NBN is a very long-term investment, but mobile networks have much shorter life cycles. Falling costs and increasing capabilities of mobile networks may have a significant influence on the shape of the industry in the medium and long term that is not obvious presently. As a consequence of the 'buy-out' of their fixed line customers, Telstra and Optus (who both operate mobile networks) have non-trivial sums which they can apply to the deployment of mobile infrastructure to compete with NBN Co. The Telstra war-chest alone is over AU\$9 billion. As they are also retailers, rival infrastructure owners ultimately control the relationship with end users. As vertically-integrated network operators, they will face strong incentives to steer customers towards purchasing connections to their own infrastructures in preference to NBN Co, if there is the potential for customer needs to be met using that technology¹⁰⁰. This suggests that the proportion of mobile-only households may be much larger than envisaged, initially as low-volume broadband users are offered cost-effective mobile packages and also in the future when more capable mobile networks may lead to even moderate users to substitute away from fibre.

The second major threat to the NBN in Australia arises because of the lack of effective competition for ownership of the firm. NBN Co is currently constituted as a government-owned entity. Although the possibility of selling down some shareholding into the private sector in the future has not been ruled out, at the present point in time it has been indicated that this possibility will not be addressed until at least 2018. Consequently, the firm is now subject to all of the problems of productive efficiency associated with public sector firms lacking takeover disciplines. This suggests that it is highly likely that lax financial and managerial controls will lead to budget blowouts, targets will begin to be missed, conflicts will begin to emerge between political and managerial stakeholders as political futures will rest upon project milestones being achieved on time and within budget, and objectives will start to be rewritten in order to manage the political consequences. Furthermore, the 'monopoly problems' of poor customer service are likely to arise. Moreover, simply replacing a private monopoly with a government one does not eliminate the

⁹⁹ Kenny & Kenny (2011).

¹⁰⁰ Howell, Meade & O'Connor (2010).

incentives for the party with market power to engage in strategic gaming with the regulator in order to either advance its own position or avoid having to comply with obligations placed upon it.

It is not surprising, therefore, that evidence of each of the above ‘problems’ has come to light since NBN Co was created. As at August 6 2012, the rollout is running substantially behind the targets scheduled in the original proposals. The revised corporate plan issued at that date indicates that 10% more government equity than originally planned for will be required. Revenues are also substantially below those projected, in large part because many fewer connections are being sold than was anticipated. To address the rollout shortfalls, the targets for the June 2013 year have been revised downward by nearly two-thirds, from the original 1.72 million premises passed to 661,000. NBN Co management has expressed confidence that the revised targets will be met¹⁰¹. Retailers have begun to express concerns about poor communication between themselves and NBN Co, and the suggestions have been made that NBN Co may have endeavoured to use its influence to seek preferential consideration in some ACCC decisions. At the very least, it submitted strongly against the ACCC’s decision that it was more economically efficient (based upon the use of legacy investments by both Telstra and backhaul providers to require 121 points of interconnection to the NBN rather than the originally proposed 9¹⁰². There appears to be a great deal of confusion about who bears the responsibility to lay fibre in ‘greenfield’ developments that are not part of the NBN rollout schedule, and how fibre rollouts by third parties will be treated when the NBN rollout reaches their areas. And, ironically, for the first time in many years, it has been reported (anecdotally) that in some areas there are waitlists for fixed line telephone connections. The quite plausible reason suggested for this is that there are limited incentives for Telstra to deploy additional capacity in exchanges that are on the short term list for replacement by the NBN. But as NBN deployment is running so far behind schedule, in areas where demand for connections is growing fastest (for example, the satellite towns surrounding major state capitals) the inevitable consequence is that the limited number of available connections must be rationed. Waiting lists are the preferred rationing method.

Consequently, a third major threat to the NBN now exists. The FTTH project has been politically very controversial from its origins. It is a flagship policy of a Labour-led government which has become increasingly unpopular in a number of policy areas. A general election is due to be held in 2013, and on current trends, it is likely that the government will be defeated. The opposition shadow communications minister has begun articulating his policies for the next election, which include a substantial downscaling of the FTTH-based NBN to a network based

¹⁰¹ CommsDay 9 August 2102; NBN Co Corporate Plan 2012-15 downloaded August 13 2012 from <http://www.nbnco.com.au/assets/documents/nbn-co-corporate-plan-6-aug-2012.pdf>

¹⁰² Nicholls (2011).

upon predominantly FTTN architecture. The experiences of AT&T in the United States and BT in the United Kingdom are cited as exemplars. The shadow minister has opined that he would like to see a return to infrastructure competition, but concedes that it is unlikely the current infrastructure-based competitor Optus will rescind its deal with the government to close down its HFC network. Whilst he does not rule out a nationwide FTTH network in the future, the shadow minister contends that his FTTN proposal would deliver acceptable speeds (in the vicinity of 50 to 70 Mbps downloading) for a very much lower cost (he has estimated about one quarter of the cost per connection that has been cited for the NBN) to the vast majority of Australians. He also envisages a much greater competitive role to be played by wireless and cellular technologies, especially in rural Australia¹⁰³.

2.3. Competition Policy in Action: New Zealand

Whilst there is a clearly-articulated and consistent competition policy in Australia (albeit not necessarily delivering the most efficient outcome), the position in New Zealand is substantially more opaque. First, no definitive statement has been made with respect to the competitive positioning of the fibre network. Neither has it been possible to infer what the default position might be from the actions of any of the government, Crown Fibre Holdings (CFH) or the Telecommunications Commission. CFH has let the UFB contracts to four different parties: the incumbent copper operator Chorus and three regional operators. The only consistent positioning statements have been from the Telecommunications Commission. Both the previous and current Commissioners have stated that competitive forces will drive the development of FTTH in New Zealand. However, it is unclear whether it is intended that these forces are predicated upon infrastructure competition or services competition, and whether the government's investment was predicated upon providing infrastructure competition for the existing copper network, or accelerating the timeframe under which a frontier natural monopoly infrastructure (fibre) will replace the legacy (copper).

2.3.1 Government-Funded Network to Accelerate Infrastructure Competition?

If the intention was that New Zealand government investment in the fibre network was to provide infrastructure competition to the incumbent copper operator, then it might be expected that the contracts for the most densely populated areas where it was economically feasible for infrastructure competition to exist – notably larger urban areas – would be let to competitors to the incumbent copper network operator. Infrastructure competition for the copper network in

¹⁰³ Malcolm Turnbull, Speech to the American Chamber of Commerce lunch in Sydney, as reported in CommsDay 13 August 2012.

Auckland would likely be economically feasible¹⁰⁴, but did not develop largely because access regulation provided a less risky means of market entry for Telecom's competitors¹⁰⁵. The need for government-facilitated infrastructure competition is lower in the next two biggest cities, Wellington and Christchurch, due to the DOCSIS 3.0-enabled HFC network owned by TelstraClear (the market leader in broadband connections sold in these cities, investment having taken place prior to the implementation of access regulation in 2001)¹⁰⁶. Wellington also has significant competition in the commercial and government market due to the dark fibre operator CityLink, which was the country's first provider of commercial fibre services¹⁰⁷. By comparison, given the problems of scale and density it might be questionable whether infrastructure competition is viable in some parts of provincial New Zealand (for example, rural towns with populations less than 50,000).

Unfortunately, it is impossible to ascertain what the policy position on infrastructure competition might be from the contracts let by CFH. The copper incumbent Chorus was given contracts for 70% of the addressable market, including both Auckland, where there was no extant infrastructure competition, and Wellington, where there were already two fibre-based networks competing with initially copper and ultimately fibre supplied by Chorus. The contract for Christchurch was let to a new market participant, the City Council-controlled Enable. Thus, following the UFB deployment, Christchurch, like Wellington, will likely have three competing infrastructure firms (assuming Chorus and its unbundling partners continue to aggressively sell FTTN-based connections in these cities). However, Auckland, with more than four times the population of Wellington and Christchurch, would appear to have no such prospects, as a single firm will supply both copper and fibre connections.

Furthermore, UFB contracts were let to new firms¹⁰⁸ in the provincial areas of Northland and the Central North Island. This necessitates infrastructure competing with Chorus being deployed in Hamilton (population 206,000), New Plymouth (70,000), Whangarei (50,000) and Hawera (11,100). Yet Chorus got the contracts for other areas such as Napier-Hastings (131,000) Dunedin (118,000), Palmerston North (82,000) and Oamaru (13,000) – meaning that there will be no infrastructure competition in these towns. Arguably, Hamilton is likely sufficiently large that

¹⁰⁴ It is noted that Optus invested in city-wide CATV infrastructure in Australian cities such as Sydney, which have similar population densities to Auckland.

¹⁰⁵ Howell (2007) cites the CEO of entrant TelstraClear welcoming the start of access regulation in 2001 as it meant the firm no longer had to lay its own infrastructure in order to compete with Telecom.

¹⁰⁶ Howell (2012).

¹⁰⁷ Howell (2010a)

¹⁰⁸ It is noted that given the requirement that UFBCos be structurally separate from retail operations, there were no incentives for existing unbundling entrants to tender to become fibre operators. Not surprisingly, none submitted tenders. Other than Chorus, the other tenderers were predominantly local electricity lines companies. However, one foreign infrastructure company submitted a tender.

infrastructure competition could be economically viable. However if infrastructure competition was considered to be viable in New Plymouth, Whangarei and Hawera, then it is puzzling that the same argument could not be applied to the comparatively more populous Napier-Hastings, Dunedin, Palmerston North and Oamaru. Alternatively, if Chorus was awarded the contracts for Napier-Hastings, Dunedin, Palmerston North and Oamaru because infrastructure competition was not considered viable, then why were contracts awarded to a rival of Chorus in New Plymouth, Whangarei and Hawera – where there will inevitably be infrastructure competition developing as a consequence of the copper and fibre firms having different owners?

2.3.2 Government-Funded Network to Accelerate Copper Substitution Rate?

Likewise, it is equally difficult to ascertain if the intention was to invest in a fibre network in order to accelerate the rate at which fibre connections will replace copper, relative to what would have been achieved had the intervention not occurred. There is no requirement in the New Zealand proposals for copper to be decommissioned when fibre is laid, as will occur in Australia. Rather, Chorus is required to maintain copper connections for as long as its wholesale customers require it to do so. Even if Chorus operates both networks, it is at the mercy of its wholesale customers rather than its own cost trade-offs to determine the time at which the switch-over occurs. A small number of customers holding out can require two networks to operate for an extended period of time, thereby rendering the New Zealand scheme relatively less efficient than the Australian scheme, where copper is decommissioned as fibre is laid. Furthermore, as unbundling entrants have invested in equipment on the copper network and face the stranding of these assets if customers switch to fibre before the costs have been recovered, it is plausible that some may find it worthwhile to discourage early customer switching, exacerbating the customer hold-out problem. The option for customers to switch back to copper after moving to fibre may also lead to even more investment occurring on the copper network (e.g. sub-loop unbundling). Indeed, in those areas where Chorus is not the chosen UFB operator, there is an incentive for Chorus to facilitate its unbundling customers to compete aggressively with the fibre operator on both price and service quality in order to prevent end user substitution and thereby loss of revenues to another operator. And just as in Australia, operators of competing networks can utilise pricing arbitrage to favour their own networks, whilst utilising the option that ongoing copper access remains. Delays to, rather than acceleration of, copper replacement thus appears to be the most likely outcome of the New Zealand arrangements.

Moreover, all of the provisions that were put in place to increase the competitiveness of the copper network have been retained. The Telecommunications Commissioner is required to regulate the copper network on a cost basis as if it is still a monopoly, even though government

fibre investments will provide real infrastructure competition. As the price is set using international benchmarking, any falls in the cost of copper service provision internationally will lead to lower copper access prices (in real terms), thereby making copper connections more financially attractive and undermining the ability of the fibre network to attract customers¹⁰⁹. The Commissioner therefore has neither the tools nor the mandate to alter the copper price to accelerate fibre uptake – his statutory obligations are still to facilitate competition on the copper network alone. Consequently, he bears no responsibility for outcomes on the fibre network beyond enforcing the terms agreed between CFH and the UFB Cos.

In sum, therefore, it appears quite bizarre that if the government was investing in a fibre network to accelerate the rate at which the frontier technology supersedes the legacy that it would instruct the Commissioner to persist with a set of regulatory tools that militate directly against the achievement of the primary objective of the investment. If the need for government to invest in the first place was assumed to derive from the failure of access regulation to result in the timely investment in fibre by private sector operators, and in particular the failure of the ‘ladder of investment’ to lead to infrastructure competition as predicted by the theories, then it seems even more puzzling that all of the legacy regulations that had presumably resulted in that apparent ‘failure’ have been left unchanged.

2.3.3 Political Pragmatism Trumps Policy Coherence?

A pragmatic (and likely more probable) explanation for the observed allocation of the contracts by CFH and the competition and regulation regime that has emerged in New Zealand was that very little thought was actually given to extant competition when either determining how the ‘winners’ of the government contracts were chosen or designing the competition and regulatory regime under which they would operate. The contract negotiations were undertaken behind a veil of commercial secrecy, so the process cannot be verified. However, anecdotal comments suggest that the primary consideration for CFH was getting the ‘best’ (i.e. least cost?) deal for the government from the tender respondents. As the negotiations took place within CFH at arms-length from those most likely to be cognisant of and capable of advising on the competition implications - the Telecommunications Commission and the policy advisors in the competition policy divisions of the Ministry of Economic Development - it is quite plausible that coherent competition policy was not a paramount consideration during the process.

¹⁰⁹ It is noted that in the recent review of access prices, the proposed access price for copper connections even after the correction for geographic averaging is practically the same as the current prevailing nominal price for urban local loops. The rural price falls under averaging to this same price – approximately two-thirds of the de-averaged price. <http://www.comcom.govt.nz/telecommunications-media-releases/detail/2012/commerce-commission-releases-draft-price-for-the-unbundled-copper-local-loop-for-consultation>

An examination of the actions and outcomes from both CFH and Ministry of Economic Development processes over the period tends towards the conclusion that the overriding imperative was to deliver the political objective of settling contracts and having at least some fibre connections laid and operational as quickly as possible – specifically, within the 2008-11 electoral cycle. In delivering this objective, coherent competition and regulatory policy development appears to have been sacrificed for realpolitik.

The economic reality was that due to existing FTTN investments, Chorus would always have a cost advantage over other potential investors. Whilst ordinarily under efficiency-based principles this would have favoured CFH entering into a single agreement for Chorus to build the network nationwide, it exposed the government to the risk that the bargaining advantage held by Chorus may have led to the firm appropriating a greater share of the gains from trade than was politically acceptable¹¹⁰. It was also most likely politically untenable given the prevailing popular anti-Telecom/Chorus sentiment for all of the contracts to be awarded to the (privatised formerly government-owned, even if separated) incumbent, even if a ‘good’ price could be negotiated. It was thus pragmatic to award at least one of the contracts to another firm. Timing of the release of information about successful tenderers then became critical. Pre-emptive awarding of a non-trivial share of the contracts to a non-Chorus tenderer would send a credible signal to Chorus that the firm could not rely upon its low-cost bargaining position to negotiate a lucrative deal. Rather, it would have to ‘sharpen the price’ at which it entered the bargaining if it wished to avoid a significant risk of stranding of its existing assets (bearing in mind that the FTTN – costing around \$1.5 billion – was not due to be completed until late 2011). The up-front costs for the government (given its original bargaining disadvantage vis-a-vis Chorus) could be minimised, at the same time as signalling to the voting public its ‘strength and leadership’ in not being prepared to recreate an unpopular national monopoly infrastructure provider like the former Telecom.

¹¹⁰ Noting that in the process of regulating Telecom, there has been a clear intention that the firm is required to supply regulated services on a cost basis. The strict way that this has been interpreted presumes that the firm is not entitled to any of the normal division of the gains from trade that would have accrued if the transaction for access to the regulated services had taken place between two unconstrained commercial parties in a competitive environment. Indeed, it was in part a residual dissatisfaction with the outcome of court cases under the Commerce Act which were adjudicated in favour of Telecom being able to approach a bargaining situation with another firm as if it was an ordinary firm in a competitive market that led to the introduction of industry-specific regulation in 2001. An underpinning reasoning behind this re-regulation was that firms with a dominant position in the market could not be treated the same way as a hypothetical competitive firm, but instead should supply their products and services at the prices that would prevail in a (static) perfectly competitive market – that is, at no more than the cost of production. This translates into the practical interpretation that has prevailed in Commission decision-making since 2005 that the regulatory process must be decided on the basis of the net gains to consumers arising from intervention, not the change in total welfare. Thus, transfers from the regulated firm to consumers are treated as a benefit of the regulatory process. See Howell (2007) for a discussion.

Although the government's bargaining strategy might have reduced up-front costs, the consequence was a very messy contracting process which took place in isolation from the development of the competition policy which would prevail in the market after the contracts were let. This approach will most likely lead to higher costs in the long run. The initial calls for proposals to partner the government were based on a set of specifications that was changed after the initial round of tenders had closed. Only the respondents to the original tender documents were invited to resubmit, even though the revised specifications differed substantially from the original ones¹¹¹. Successful tenderers were announced for one region (Northland) a significant time before the announcements were made regarding the remainder of the successful applicants. Furthermore, when Chorus was announced as the successful tenderer for 70% of the market, the terms agreed varied substantially from both those contained in the second round of specifications and those negotiated with the three other parties.

Furthermore, a request for submissions on the likely shape of competitive interaction in the sector was called by the Ministry of Economic Development part way through the contract negotiation process, after the first of the successful tenderers had been announced. The main theme of the request was to seek the views of market participants what the regulatory implications for the copper network might be if structural separation of the copper network from the retail arm of Telecom proceeded. Yet at the time the call for submissions was made, no announcements had been made as to whether Chorus had won any of the remaining contracts. Structural separation provisions would be triggered only if Chorus was successful in winning at least one contract.

The discussion document supporting the decision process reveals some interesting information about the prevailing thinking amongst policy-makers about the relationship between the fibre network and competition and regulation policy development. Largely it confirms the lack of co-ordination between the political desire for a nationwide fibre network and the realities of governing competitive interactions in the sector that would emerge following its insertion. The discussion document implies that the locus of the successful tenderers for the UFB contracts would have little effect of the shape of the regulation governing the copper operator. This suggests that the policymakers were of the view that regulation of the copper network could proceed independently of either the ownership of, or the terms and conditions negotiated for, the fibre network companies - that is, regulatory activity could be separated and ring-fenced according to technology type. It appears implausible that such a view could be held by policy-makers who were cognisant of the strong interdependencies between the copper and fibre

¹¹¹ See Heatley & Howell (2010b and c).

networks in the market for broadband connections and charged with optimising the policy settings for the broadband market as opposed to the markets for discrete and independent networks.

As the terms agreed by the successful tenderers with CFH were pivotal to the speed of fibre uptake, and as fibre customers would be almost certainly substituting from copper connections, it is astounding that the competition and regulation policy-making processes for the two networks were firstly taking place in complete isolation from each other¹¹², and secondly that there was apparently no awareness that there was any need for copper regulation to be informed by fibre regulation and vice-versa in the first place. However, when considered in the context of the political imperatives driving the deployment of the fibre networks, as a political shock to rather than a development arising from the ‘natural’ evolution of the market given the regulatory framework under which it had been operating, it is possible to understand why these views might have prevailed. They might not have resulted to the most principled process, or even one that would have yielded the most efficient outcome (in the dynamic context, at least) but it was the most pragmatic way of delivering all of the political objectives.

Furthermore, these views are consistent with the historic pattern of regulation in New Zealand (arising from the history of light-handed regulation based upon the Commerce Act). The focus of past regulation had been to constrain a single firm with a dominant position demonstrated ex post from exercising that dominance in a manner that might harm competition in the future. The Telecommunications Act actually specifies Telecom/Chorus as the target of fixed line regulation. Industry-specific regulation in New Zealand has arisen in large part from the perceived inability of the Commerce Act to deliver perfectly competitive outcomes in markets where a single firm holds an (apparently intractable) dominant position (predominantly infrastructure firms with high fixed and sunk costs). Insofar as it was presumed that actual infrastructure competition was infeasible, there was no apparent need to develop a regulatory regime that provided (ex ante) for the emergence of competitive interaction in an oligopolistic infrastructure market where the identity of the firm(s) with dominance is a secondary consideration, or where market-based interactions may result in the identity of the dominant firm changing over time. Indeed, access regulation emerged precisely because it was presumed that Telecom’s copper monopoly was intractable (even though localised infrastructure competition existed at the time in was introduced). The focus of regulatory effort was therefore on the diminution of Telecom’s dominance in the downstream retail market – which was to be achieved by regulated access to wholesale products.

¹¹² Heatley & Howell (2010a)

Consequently, regulatory intervention in New Zealand telecommunications post 2001 has been predicated upon the assumption that dominance attends to a specific identifiable firm (or firms, in the case of mobile termination), is derived directly from that firm's ownership of a (natural monopoly) infrastructure and is enduring. Without having had the benefit of observing the transition of a dominant position either between firms or across networks as end-consumers alter their purchase of broadband services, policy-makers appear to have drawn on their past experiences. Having presumed that the fibre firms are (or will be) dominant (as there is presumed to be no competition in the provision of fibre) they can be regulated specifically and individually, by way of contractual agreements with CFH, specifically in relation to the infrastructure they control. If Chorus (or any other operator) owns two infrastructures, it is subject – separately – to two separate regulatory regimes, one for each type of infrastructure. Consequently, at the level of the wholesale transaction on a specific infrastructure, the question of the substitutability of a copper connection for a fibre one is irrelevant. The decision has already been made by the consumer to purchase a given technology (network connection), so from that point onward, the market power of the (chosen) infrastructure (network) operator vis-à-vis the end consumer is established. A (structurally separate) retailer simply stands as a proxy for the end customer who has made the infrastructure (network) choice. The same reasoning applies in the presence of oligopolistic network competition – for example, in respect of interconnection, each of two (or more) alternative networks is presumed to have market power with respect to its own customers.

Using this type of reasoning, it is plausible that policy-makers might have considered there to be no substantive reason why they needed to consider the regulation of access to wholesale products on fibre to be in any way interdependent upon the regulation of access to wholesale products on copper (and vice-versa). As the 'problem' with the infrastructure operator's market power was presumed to be its use to foreclose downstream retail markets, then structural separation is deemed to address the problem, so long as all retailers are treated equally. The principal regulatory problem now becomes setting the appropriate terms and access price for each network. If the assumption was that the purpose of the fibre investment was to promote infrastructure competition, and that structural separation of retailers and infrastructures was a given for both fibre and copper, then it might be plausible to consider that the terms and conditions for access could be set independently for each infrastructure (as indeed is the case for mobile operators, who separately agree the terms with virtual operators selling their connections). However, that process presupposes that the separate networks have emerged as a consequence of commercial decisions in response to customer preferences, and not imposed by governments whose reasons for the investment are quite unclear.

If these were indeed the assumptions underpinning the policy development process, then it is quite conceivable that the apparently bizarre observations above could have emerged from a number of individual actors each responding to their own specific mandates. The government wanted a fibre network, and charged CFH with delivering one (including its contractually-managed regulatory constraints). To the extent that there was any need to address access and pricing on the fibre networks, structural separation and prices agreed between the operators and CFH appear sufficient to constrain the market power of these operators vis-à-vis their end consumers. The Telecommunications Commission has been charged with regulating the copper network, and so long as this mandate is confined to wholesale products, there is no reason why the implications for the retail broadband market need to be considered¹¹³. The relevant policy ministry¹¹⁴ appears to have seen its role as supporting the Commission and CFH with policy for carrying out their respective duties. The consequence is that no-one appears to have had responsibility for considering what the implications would be for the (technology-agnostic) broadband market.

2.4 Competition Policy Implications: New Zealand

The collateral damage arising from the fragmented process by which the fibre contracts were let is an at best incoherent, and at worst contradictory, set of competition policies and regulatory provisions governing the New Zealand broadband market. This will undoubtedly lead to significant unexpected costs in the long run, in terms of both static and dynamic efficiency.

The Telecommunications Commission is bound to regulate the copper market as if there is no fibre network applying competitive pressures on the copper sector. This includes continuing to apply cost-based principles for setting access prices to elements of the copper network. The Commission's regulatory priorities remain the promotion of competition on the copper network by means of the access regulations that have prevailed since 2006. The terms and conditions under which the fibre networks operate are governed by the terms and conditions negotiated with CFH. These include rollout targets for all operators, and uptake and usage targets for Chorus. Whilst the Telecommunications Commissioner is charged with monitoring and enforcing the terms of the agreements between CFH and the UFBCos (including Chorus in its fibre capacity), the only instruments available to him directly in order to calibrate broadband sector performance

¹¹³ Although it is noted that the previous Commissioner, under his powers to investigate, instigated an inquiry into the demand side of the broadband market in light of the UFB developments. This suggests an awareness of the problem exists, but as the Commission has no mandate to create policy, this inquiry stands only as a means of informing any subsequent policy-making process. Indeed, it is surprising that the Commission, and not the relevant policy ministry, led this inquiry. One could speculate that the Commission might have been responding to a 'missing market' for research and debate on this important policy matter, using the only means available to it.

¹¹⁴ The Ministry of Economic Development, subsequently the Ministry of Business, Innovation and Employment.

as it currently stands are the copper access regulations. Even in respect of mobile broadband, the powers of the Commission are tightly constrained.

Each set of regulatory activities occurs in isolation from the others. No overarching framework exists for considering how regulatory activities pertaining to any one of these networks may affect the incentives governing the provision of the others, even though all networks compete for broadband customers in at least some market segments. Although the Telecommunications Commissioner has been given powers of monitoring the sector, no guidance has been given regarding how he should treat any potential conflicts between his own specific objective of increased competitiveness of the copper network and the political imperative of the acquisition of customers (and the rapid achievement of scale economies) on the fibre networks. The current incentives tend towards the Commissioner favouring increased copper competitiveness over all other considerations.

As increased competitiveness on the copper network can be expected to make the copper network more attractive to both retailers and end consumers (including opening up the potential for sub-loop unbundling so that increasingly faster copper connections are made available), it will inevitably reduce the rate at which fibre broadband connections are sold. It seems somewhat perverse to spend a vast sum to accelerate the rate at which fibre is deployed, but then persist with a regulatory policy that militates directly against early uptake and use of that technology by end consumers by making copper connections even more attractive than they were even before the competition from (subsidised) fibre connections.

This illustrates yet again the costs of confusion about New Zealand's competition policy. If accelerating uptake and use of fibre was the objective (because fibre would become a natural monopoly anyway), then this end will be best served by making copper either more expensive (for example, by removing any access regulation requirements entirely) or eliminating the possibility of competition from it impeding the objectives of making the fibre transition as quickly as possible (as is occurring in Australia). If the purpose of the investment in fibre was to provide real infrastructure competition for copper, then there would be no need for access regulation on copper because the desired end – infrastructure competition – had actually been achieved with the government investment creating the fibre network. Commercial offers by both the fibre or copper operators seeking to maximise their market shares would likely be sufficient to underpin a quasi-competitive wholesale access market that could be regulated with a relatively light-handed touch. Furthermore, there would be little point in creating an environment predicated upon entrants climbing the ladder of investment if the successor network has actually been built – they can simply skip the rungs by buying directly from the fibre operator. Either way, the need

for aggressive access regulation of the copper network would appear to be lessened, rather than intensified, as a consequence of the government fibre investment.

A further complication has arisen in practice as a consequence of the historic focus on regulating (nationwide) infrastructure-owning firms at the wholesale level rather than specific geographical or consumer-focused markets. This has been exacerbated by a long-standing distributional policy of equalised pricing between urban and rural residential telecommunications connections. Historically Telecom/Chorus has been required to supply most regulated services at a single nationwide rate, regardless of supply cost differences. The principal exception was the supply of unbundled local loops, where until recently, a two-step price differential existed depending upon the number of connections at the unbundled exchange (connections at high-density exchanges were priced lower than low-density ones).

A single nationwide set of regulatory arrangements for access to Chorus' copper connections makes no allowance for the fact that, as a consequence of the way in which the fibre contracts have been allocated, Chorus faces a different set of competitive forces in the areas where it is the copper and fibre supplier from those where its copper network faces infrastructure completion from either the government fibre operator or any other network. This was already an issue prior to the UFB, as TelstraClear appears to be the market leader for broadband connections in the areas where it has had HFC infrastructure (an artefact arising from diminishing the dominance of an infrastructure-owning incumbent rather than a more market-centric approach dominating regulatory practice). However, the arrival of the UFB has exacerbated the problem.

It is no longer tenable for there to be one universal set of regulations covering the country when the competitive scenarios in the competition for broadband customers are inherently different in different geographical locations. Yet so far, there is no evidence that the regulatory environment can take account of the distinctions. If the access terms and prices for copper are set so as to optimise competition in the regions where Chorus is both the copper and fibre provider, then it limits the scope for the firm to respond competitively to aggressive practices in those areas where it is not the fibre provider. Whilst this may accelerate fibre uptake, it violates the principles of competitive neutrality, as Chorus is disadvantaged. It also negates the claims of the respective Commissioners that 'competitive forces' will determine the fibre uptake levels, at least in those areas where Chorus is not the fibre provider. For example, if Chorus does respond as any competitive firm might to competitor aggression in those areas where it is not the fibre provider (and may indeed be losing both market share and dominance), will it be deemed to have violated the regulations predicated upon its (non-existent) dominance in the relevant market,

simply because it happens to have dominance in another? In either case, the outcome will further reduce the net benefits available from the investment.

The issue of averaged prices also now stands as a problem in the competitive landscape. Competitor investment in local loop unbundling has been predicated upon de-averaged pricing. Consequently, almost all investment is in urban exchanges, where the lower rental prices prevail. As the UFB is predicated upon averaged national pricing, in an endeavour to ‘level the competitive playing field’ between copper and fibre, in November 2011 the Commission announced a set of prices aimed to ultimately return copper access prices to geographic averages¹¹⁵. This caused a predictable outrage on the part of unbundling entrants, who perceived that they were having their margins ‘squeezed’ as the urban price would rise in real terms substantially as a consequence of the re-averaging. Their concerns were potentially legitimate, as it could have resulted in some being left with stranded assets, notwithstanding the initially projected three-year lead-in period for the new prices. However, following an extensive submission and review process, the Commission announced a revised recommended average price on May 4 2012 that was virtually identical to the prevailing urban price¹¹⁶. Whilst this was welcomed by the unbundling entrants, it generated negative comments from UFB advocates, as a low copper price will inhibit UFB uptake. . Nonetheless, it confirms that the Commission is taking seriously its obligation to regulate the copper network in a manner that will promote competition, as the low rural copper price greatly enhances the attractiveness of unbundling in lower-populated and lower-density locations – such as Hawera and Oamaru. Indeed, it may spur another round of investment in copper unbundling, further negating the benefits of an early investment in fibre

Moreover, the extent to which the ‘infrastructure silo’ arrangements and the legacy of regulating companies and infrastructures and not markets has governed New Zealand practice has been drawn into sharp relief by a recent merger announcement. In June 2012 Vodafone - the largest mobile operator and third-largest broadband retailer in New Zealand – entered into heads of agreement to purchase TesltraClear – the second-largest broadband retailer and owner of the HFC network in Wellington and Christchurch. The merger creates a fully vertically integrated operator with both fixed and mobile network infrastructures. In respect of the fixed line infrastructures, the new firm will have a dominant position in the broadband market in both Wellington and Christchurch. This creates a curious problem for the competition policy

¹¹⁵ <http://www.comcom.govt.nz/review-to-average-ucll-sub-loop-ucll-and-uba-prices> The price suggested was \$24.46, compared to the existing price of \$19.84.

¹¹⁶ <http://www.comcom.govt.nz/telecommunications-media-releases/detail/2012/commerce-commission-releases-draft-price-for-the-unbundled-copper-local-loop-for-consultation>

principles governing the telecommunications sector. Telecom was required to structurally separate from Chorus precisely because its vertical integration was deemed to be a problem for both the copper and fibre markets. Yet the proposed merger is in effect creating a vertically integrated company with both extant market power in mobile and a dominant market position in some geographically-defined broadband markets – that is, precisely what Telecom was NOT allowed to be under the ‘nationwide’ New Zealand arrangements. For the merger to proceed, clearance must be given by the Commerce Commission. The merger processes allow the Commerce Commission to determine what the relevant markets for consideration might be. It is quite possible that the Commerce Commission (using retail and geographic dimension) will decide that the relevant markets for the assessing the merger are very different from the markets defined for the purpose of telecommunications regulation (wholesale and infrastructure-based). Such a contradiction would beg the same questions that have been posed in this discussion about the overarching objectives of competition and regulation policy in New Zealand.

3. Conclusion

The governments of the Antipodean countries – Australia and New Zealand – are in the midst of a ‘great experiment’ in telecommunications policy as they turn their backs on thirty years of privatisation and deregulation in favour of a pre-emptive return to government control of sector strategy, funding, and in the case of Australia, owning, the principal fixed line network infrastructures. With this strategy, they stand in stark contrast to the balance of the non-Asian members of the OECD. Whilst it might have been presumed that extensive government intervention was predicated upon principled economic analysis supporting the need for government intervention to address a market failure, this paper demonstrates that the cases for intervention rely very little upon economic justification. Rather, political objectives – notably, the desire to replicate the nationwide fibre infrastructures of Korea and Japan, and a fear of getting ‘left behind’ in the ‘international fibre arms race’ unless the respective governments assumed industry leadership – dominate the decision-making.

Consequently, it is far from clear what the consequences will be for the development of broadband markets will be in the two countries, and whether the vast sums of government funding committed will generate the desired returns. What is apparent is that although the interventions adopted are superficially similar, considerable differences exist in the competition and regulation policies that have governed the design of the government-funded networks and the will prevail as they are deployed. The fibre network deployment patterns and expected outcomes will therefore be very different. Whilst this allows for some interesting analysis of a ‘natural experiment’, it provides little reassurance that the intervention models adopted will provide a useful template for other jurisdictions.

The Australian ‘experiment’ is predicated upon a clear competition policy of rapid replacement of both the existing copper network and the incumbent operator’s market power with a government-owned and operated network structurally separate from retail operations but as a consequence of a clear policy buying out competing operators and constructively frustrating infrastructure competition, will face very limited fixed line competition. It is a very costly policy, and is associated with significant risks. Whilst the Australian plan reduce static inefficiencies arising from network overbuilding, it exposes the network to productive inefficiencies arising from monopoly government ownership, and risks of dynamic efficiency consequences if rival infrastructures such as mobile experience rapid development, or if the applications presumed to utilise the capacity of the fibre networks do not materialise at the rates required to justify the

investments in fibre at the current point in time. It is also, given its magnitude and origins, highly susceptible to local political risk.

By contrast, it is far less clear what competition principles govern the New Zealand ‘experiment’ in creating public-private partnerships between government and network operators. There is no clear single vision of what the government is trying to achieve by its investment in the sector, beyond having a network. Whilst the partnerships with the private sector have led to much smaller government contributions, and therefore less up-front political risk than in Australia, much greater reliance is placed upon the private sector market participants and the regulatory arrangements to shape the direction in which the industry develops. However, in the absence of clearly articulated government objectives for the development of competition in the sector, and as a consequence of the fragmented regulatory arrangements associated with the insertion of a competing infrastructure into an environment where past experience has been restricted to natural monopoly, contradictory and confusing outcomes are inevitable. The current arrangements will inevitably result in significant costs to static and dynamic efficiency, manifested notably in delays to the rate at which fibre connections are adopted and prolonged simultaneous operation of two less than efficient networks. Evidence of some of these consequences is already beginning to emerge.

The most important early lesson emerging for other countries from the ‘Antipodean Experiment’ is that government intervention into telecommunications markets is fraught with difficulty. The more sophisticated the development of competition has been as a consequence of privatisation and deregulation beginning in the late 1980s, the more complicated the intervention will be. Technological innovation means that the markets that governments are re-entering are not dominated by the simple natural monopolies which they divested. Any intervention must be accompanied by a clear set of objectives, and competition, regulation and investment policies must all be co-ordinated towards the achievement of that objective. If it is to be economically justified, then it must also be accompanied by a rigorous cost-benefit analysis. These measures will not guarantee that the decision to intervene will be correct, but they serve as a set of checks and balances that will minimise the risks of perverse outcomes arising.

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