

The Allen Consulting Group

An integrated approach to developing competitive broadband

ULL pricing and targeting subsidies

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Report to Optus

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Executive summary

This report describes an integrated approach to developing competition in the provision of broadband services in all areas of Australia.

Thus far, the competition that has emerged continues to be heavily dependent on access and re-sale arrangements with competitors buying space on the Telstra network and competing on price rather than building their own facilities and offering different products and better service. In the absence of any significant national roll out of competing infrastructure, it has not been possible to fully realise the benefits of more sustainable competition across the entire telecommunications sector.

Increased infrastructure roll out would allow competitors to provide a much higher quality, and more diverse range of broadband and other services than is possible by simply reselling the Telstra wholesale DSL service. In particular, using the unconditioned local loop (ULL) compared to other facilities build options enables access seekers to provide truly competitive offerings to customers.

Regional and rural Australia, even more than metropolitan Australia, tends to miss out on the benefits that competition can normally be expected to bring (lower prices, better services and more innovation). The Government's *Connect Australia* initiative, which includes subsidies, reflects its continuing intention to encourage rollout of networks with broadband capabilities to significantly stimulate broadband take-up in regional and rural areas of Australia.

To develop a truly competitive nationwide network with broadband capabilities, this report argues that two critical elements are necessary conditions:

- *an unconditioned local loop (ULL) price based on sound regulatory principles.* In particular, a de-averaged (cost-based) ULL price facilitates competition as it provides access seekers with the right incentives to grow their customer base. Once that customer base is sufficiently large, carriers are in a better commercial position to increase their coverage; and
- *maximise the impact of subsidies under Connect Australia by allocating funds to those carriers with existing significant commercial rollouts.* Subsidies should be targeted to those carriers that have existing networks and credible rollout plans. Priority should also be placed on those carriers that have a track record of competing actively, as this is likely to encourage the development of competition and, therefore, broadband take-up in regional and rural areas. In this way, the rollout to regional and rural is likely to be even more accelerated and wider in coverage, than would be otherwise under current scenarios.

Combining the two elements — an appropriately set ULL price and targeted subsidies — is likely to encourage the creation of truly competitive voice and data offerings in all areas of Australia, not just in CBD and metropolitan areas.

Greater broadband investment has significant positive effects on the Australian economy. These positive effects, however, may be delayed and potentially not be attained without an appropriately set ULL price and making full use of regional subsidies, that accelerate broadband rollout to all areas of Australia. The effects of broadband investment are estimated using the TERM general equilibrium model. Based on Optus' estimates of the spending that would be required for a competitive nationwide rollout to 650 exchanges, the model estimates reveal that this spending would raise GDP by around 0.3 per cent of GDP i.e. by around \$3.5 billion by 2016–2017 (in 2005 prices). The increases in national output, which will be permanent, will arise because of the productivity-inducing benefits that increased broadband penetration will have for Australian businesses.

The net present value of consumption gains arising from the program is estimated to be \$22 billion. This figure is the amount by which national economic welfare is increased as a result of the productivity gains, and is a lower bound on the true size of national welfare benefit, as it does not include the benefits to households from increased access to, and take up of, competitively priced broadband services.

The economic benefits will be spread to all sectors of the economy and all regions.

Chapter 1

Introduction

This chapter introduces the issues discussed in this report. Broadband take-up has been slow in Australia, in large measure because of Telstra's dominance. Competition in broadband may be stimulated if Telstra's carriers can obtain access to the unbundled local loop at economically appropriate i.e. cost-based, prices. Broadband take-up in rural areas may be stimulated by well-targeted subsidies.

With the forthcoming full privatisation of Telstra, Australia has reached a cross roads with respect to one of the most important technological advances of our age— broadband, which provides high speed, high bandwidth access to the internet.

This Report describes a proposal to introduce meaningful competition into broadband services, competition that so far has been, at best, weak. The structure of the telecommunications industry in Australia, with Telstra the dominant player, together with shortcomings in the regulatory regime, has meant that broadband take-up in Australia is slow by world standards. This has negative consequences not merely for consumers who miss out on the benefits of high speed internet, but also businesses, who are deprived of the productivity benefits that broadband can bring. This problem is particularly acute outside the major metropolitan centres.

Competition in broadband has, to date, largely consisted of Telstra's rivals reselling DSL services over the customer access network (CAN) owned by Telstra. Because Telstra owns the only ubiquitous wired telecommunications network in the country (the historical legacy of Telstra once being the wholly government-owned monopolist), Telstra is uniquely positioned to dominate the broadband market for years to come, unless its competitors can provide competition based on their own facilities. Moreover, because Telstra owns 50 per cent of the dominant Pay TV provider, Foxtel, and owns all of the HFC cable used by Foxtel, there is no chance of Foxtel providing competition to Telstra in broadband services. This is in contrast to the United States, where the cable TV providers provide real competition in the broadband market to the incumbent telecommunications companies.

For various reasons described in this report, substantial and sustainable competition in broadband services will only come when Telstra's competitors are able to roll out their own broadband infrastructure, and not just re-sell Telstra's services. However, for this to occur, they will need access to the unconditioned local loop (ULL). Telstra is currently in dispute with the Australian Competition and Communication Commission (ACCC) over the regulated price of access to the ULL, with Telstra arguing that single price should exist throughout the country, even though the cost of providing this access varies greatly according to whether it is provided in capital city CBDs, other urban areas, semi urban areas or rural and regional areas. The ACCC, in contrast, argues for cost-based prices. As discussed in this report, broadband competition is likely to be significantly retarded if Telstra wins this argument.

Access to the ULL on reasonable terms is, and will remain the foreseeable future, the primary driver of competition in Australian telecommunications. Indeed, the case for such reasonable access was put eloquently by a subsidiary of Telstra, TelstraClear, in a submission to the New Zealand Commerce Commission in 2003.¹

In New Zealand, TelstraClear is the access seeker, and the dominant incumbent is Telecom New Zealand. Demonstrating the truth of the aphorism, “where you stand depends on where you sit”, TelstraClear submitted that

Unbundling has been delayed in New Zealand and without it customers are going to miss out. TelstraClear currently offers customers on its residential network a range of services that it cannot currently extent [sic] to the majority of New Zealand households. Local loop unbundling will directly assist in extending the availability, quality and price of these services to New Zealanders who have not been fortunate enough to live in a street where we have built network. Customers on the TelstraClear network can currently purchase pay television, tolls, local calling and Internet services. Other New Zealanders can receive pay television (via satellite), tolls, internet ... It is unbundling that will ultimately allow TelstraClear and other service providers to offer differentiate [sic] services in terms of speed, price, capacity and branding. Customers will be able to receive truly different products and services, not just rebranded versions of the limited offering provided by Telecom.²

As a policy matter, the Government has decided to promote the rollout of broadband in rural areas, and has provided an extensive program of subsidies in support of this policy. As argued later in this report, the impact of these subsidies would be optimised if competitive broadband networks were rolled out in rural areas, and the way to achieve this would be to target the subsidies to carriers that have an existing strong customer base, existing telecommunications networks with good coverage and commercial plans for further rollout, and a demonstrated track record of innovation. However, there would be a real danger that if Telstra received these subsidies, it could use them anti-competitively to cross-subsidise other services, and in so doing entrench in its dominant position outside the metropolitan areas.

The remainder of this Report is set out as follows. Chapter 2 describes the state of play in broadband in Australia, while Chapter 3 argues for an integrated approach to developing a nationwide competitive broadband network, which combines, critically, a cost-based access price to the ULL with carefully targeted subsidies. To illustrate the national benefits of broadband expansion, Chapter 4 provides estimates of the macroeconomic benefits to the nation of rolling out a hypothetical Optus broadband network.

¹ *TelstraClear Response to the Draft Report of the Commerce Commission on its Investigation into Unbundling the Local Loop Network and the Fixed Public Data Network Conducted Pursuant to section 64 of the Telecommunications Act 2001*, 29 October 2003.

² TelstraClear submission, paragraph 2.3, p11.

Chapter 2

The current broadband environment

This chapter considers the state of the broadband market in Australia, focusing on the extent of take-up and penetration of broadband in Australia relative to its OECD partners, and its overall performance against other developed countries. The degree of competition in the broadband market and the benefits from this competition are also discussed in this chapter. A closer examination of the provision of broadband services in regional and rural parts of Australia is also provided.

2.1 Broadband take-up in Australia

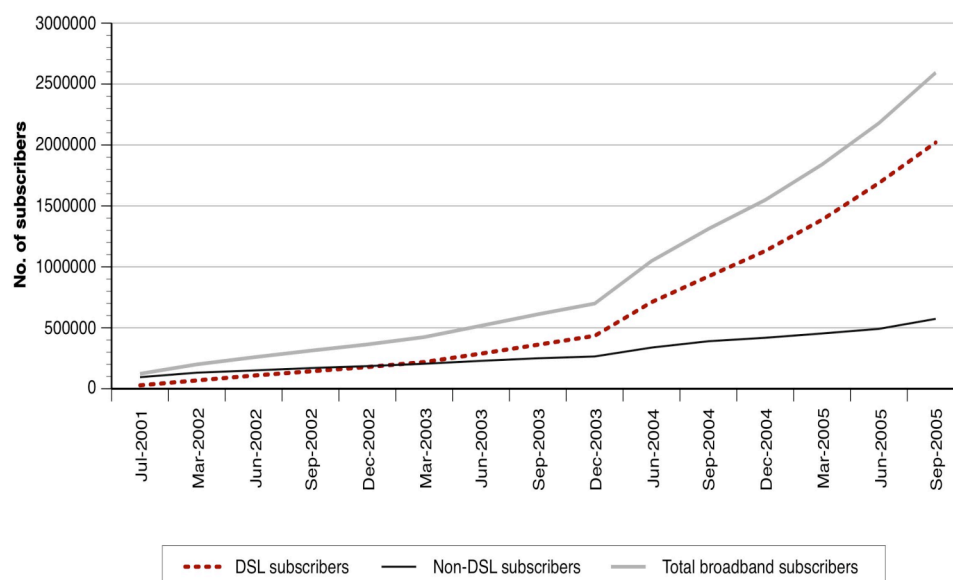
This section describes the broadband take-up in Australia that, while increasingly at a rapid rate, lags behind OECD countries in terms of take-up, and service offerings.

Growth in broadband take-up in Australia

Figure 2.1 demonstrates that DSL connections account for the majority of total broadband connections in Australia. It also reveals that growth in DSL subscribers accounts for most of the recent growth in broadband connections. Broadband provision using DSL technology seems to be the most popular form of broadband access for Australian households and businesses. In the 12 months to 30 September 2005, DSL subscribers increased by 98 per cent to 1 282 500 subscribers.

Figure 2.1

NUMBER OF BROADBAND SUBSCRIBERS



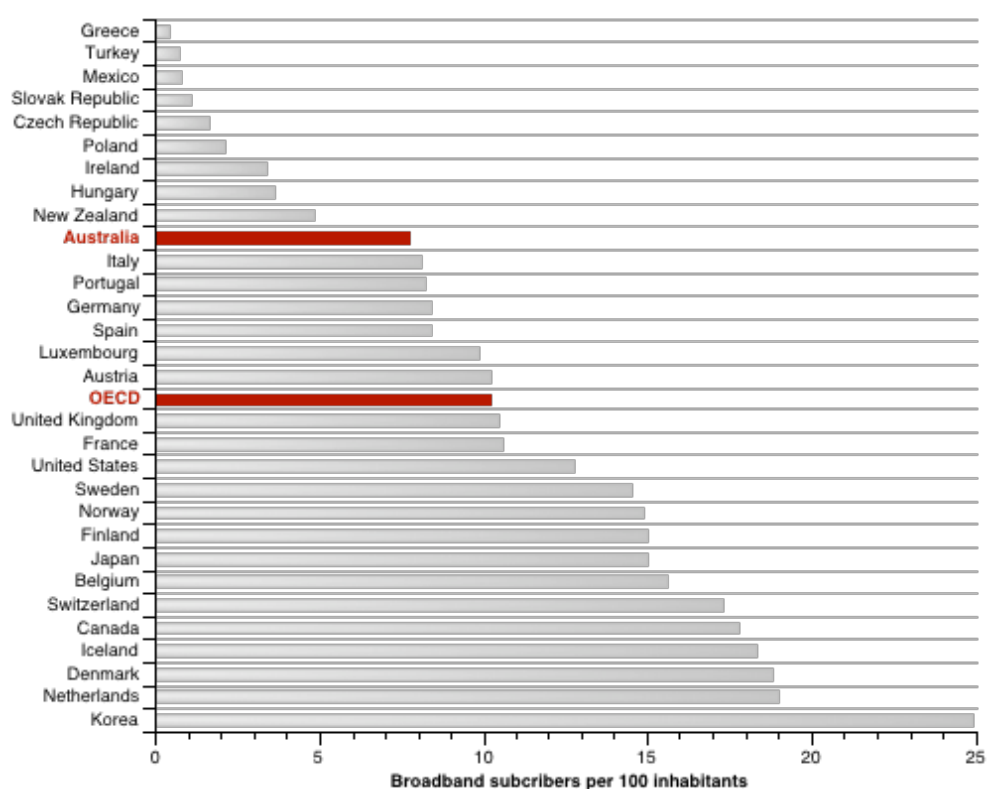
Source: ACCC, 2005, *Snapshot of Broadband Deployment as a 30 September 2005*, September

International market comparisons

Despite growing take-up of broadband over the last year, Australia has not kept pace with other developed countries in its rate of broadband take-up. Figure 2.2 illustrates the growth in broadband subscribers in the OECD.

Figure 2.2

BROADBAND SUBSCRIBERS PER 100 INHABITANTS IN OECD COUNTRIES, DECEMBER 2004



Source: OECD

Figure 2.2 shows that broadband take-up in Australia is below the OECD average. In particular, Australia was ranked 21 out of 30 OECD countries in the number of broadband subscribers per 100 inhabitants, down from 20 in December 2003, and down further from 18 in June 2002. Figure 2.2 also reveals that the penetration rate in Australia was 7.7 subscribers per 100 inhabitants in December 2004, compared to the OECD average of 10.2 subscribers.

While it could be argued that there are difficulties in stimulating growth in broadband take-up in Australia due to low population densities, Canada is ranked fifth in Figure 2.2, despite similar geography and population patterns to Australia.³

³ It is interesting to note that in Canada, broadband competition is facilities based, not resale-based, with competition primarily a battle between cable TV and telephone companies.

Other international broadband market comparisons

A recent report by Ovum, commissioned by the UK Department of Trade and Industry, demonstrates the extent to which the Australian broadband market lags behind eleven other developed countries based on several success indices, measuring price, choice, regulation, and availability. The results of the Ovum report are provided in Table 2.1, with a higher score representing good performance.⁴

The 'choice of supply' index endeavours to measure three parameters: infrastructure competition,⁵ infrastructure choice⁶ and retail competition.⁷ The price index is calculated as the price of the top 5 retail ISPs, weighted by market share. Prices are used for mainstream residential products and include connection fees amortised over a three-year period and are adjusted for purchasing power parity. As the market for broadband becomes more competitive, prices are expected to fall. The regulation index compares and contrasts the broadband market actions taken by regulators in each country. The index is based on binary scores for the presence (or absence) of regulatory provision for wholesale DSL, wholesale cable, ULL, access to upstream of the main distribution frame (MDF), line sharing, and separation of network ownership. The availability index is a measure of the percentage of the population with access to a terrestrial broadband solution (value between 0 and 1).

Table 2.1

THE PERFORMANCE OF THE AUSTRALIAN BROADBAND MARKET COMPARED WITH DEVELOPED COUNTRIES

Country	Choice Index		Price Index		Regulation Index		Availability Index	
	Q3 2004	G7 rank Q3 2004	Q3 2004	G7 rank Q3 2004	Q3 2004	G7 rank Q3 2004	Q3 2004	G7 rank Q3 2004
Japan	0.90	1	0.99	1	0.67	4=	0.92	3
Canada	0.83	2	0.71	3	0.83	3=	0.86	5
US	0.77	3	0.49	9	1.00	1=	0.81	9
Korea	0.70	4	0.51	8	0.83	3=	0.97	1
Sweden	0.67	5	0.63	5	0.67	4=	0.85	6
UK	0.66	6	0.70	4	1.00	1=	0.94	2
Australia	0.58	7	0.58	6	0.67	4=	0.80	10
France	0.53	8	0.80	2	0.67	4=	0.83	8
Germany	0.50	9	0.36	10	0.67	4=	0.90	4
Ireland	0.32	10	0.54	7	0.83	3=	0.60	11
Italy	0.31	11	0.29	11	0.67	4=	0.85	6

Source: Ovum, *International Broadband Market Comparisons Update December 2004*, A Report for the Department of Trade and Industry, 27 January 2005. Notes: Weightings were attached to these different indices to produce a competitiveness index. All indices are calculated based on the situation at the end of September 2004.

⁴ See Ovum, *International Broadband Market Comparisons Update December 2004*, A Report for the Department of Trade and Industry, 27 January 2005.

⁵ Sum of the square of the top three infrastructure players market shares.

⁶ Proportion of households with a choice of terrestrial infrastructure operator.

⁷ Sum of square of the top five retail ISPs market shares.

Table 2.2

COMPETITIVENESS INDEX

Competitiveness index		
Country	Q3 2004	G7 rank Q3 2004
Korea	0.64	7
Canada	0.78	2
Japan	0.90	1
Sweden	0.66	6
US	0.68	4
France	0.67	5
UK	0.73	3
Australia	0.59	8
Italy	0.35	11
Germany	0.46	10
Ireland	0.49	9

Source: Ovum, 2005, *International Broadband Market Comparisons Update December 2004*, A Report for the Department of Trade and Industry, 27 January.

For all four indices — choice, price, regulation and availability — Australia lags behind the other 10 countries in the report. In fact, for the third quarter in 2004, Australia ranks:

- Seventh out of eleven in terms of choice of supply for the consumer; and
- Sixth out of eleven in terms of price.

Furthermore, it ranks equal fourth alongside six other countries in the regulation index – the lowest ranking possible under this index, and also ranks tenth in the availability index.

As illustrated in Table 2.2, these stark results feed into the competitiveness index, where Australia ranks eight out of eleven in terms of overall competitiveness in the broadband market. The competitiveness index is a composite measure of the regulation, choice and price indices, weighted according to importance (regulation ranked as one, and the other indices, ranked the same).

It is noteworthy that the least competitive markets are those with the strongest incumbents. Deutsche Telecom (Germany), Telecom Italia (Italy), Telstra and Eircom (Ireland) all continue to dominate a large majority of the telecommunications markets in their respective countries and are considered to wield considerable market power. Ovum notes developments that have encouraged ULLS take-up in France, and that large price cuts have improved competition in that country.

2.2 Current state of broadband competition in Australia

While the take-up in broadband is growing in Australia, albeit at a rate behind most OECD countries, this is not necessarily reflective of a competitively buoyant market.

This section describes the current state of competition in the provision of broadband services where, at present, competitors provide broadband services largely on the basis of reselling the incumbent's wholesale product.

Stimulating broadband take-up

Competition is an important catalyst in stimulating broadband take-up and its use. The threat to an operator's market share creates incentives for it to maintain and increase its customer base by competing actively in the form of lower prices and improved service offerings. In turn, competition in broadband is likely to increase broadband take-up, and also improve the efficient provision of the broadband service. Importantly, this competitive threat must be credible, particularly in the case of telecommunications markets that are characterised by high sunk costs. As the ACCC has noted on several occasions, it is much more likely that favourable competitive outcomes will result from facilities-based competition, rather than resale-based competition.

ACCC Chairman Graeme Samuel, in a speech to ATUG in March 2005, noted

... the competition that has emerged ... continues to be heavily dependent on access and re-sale arrangements with competitors buying space on the Telstra network and competing on price rather than building their own facilities and offering different products and better service.

In the absence of any significant national roll out of competing infrastructure, it has not been possible to fully realise the benefits of more sustainable competition across the entire telecommunications sector. As a result, maintaining competition has required an even greater reliance on access regulation – instead of the winding back that was envisaged when telecommunications was opened up to full competition. ...

Increased infrastructure roll out would allow competitors to provide a much higher quality, and more diverse range of broadband and other services than is possible by simply reselling the Telstra wholesale ADSL service. There is clear potential, for example, for full video services to be provided over DSL technologies. It is imperative, therefore, that Telstra's competitors have timely and efficient access to exchanges in order to enable them to roll out services to the mass market.

Facilities-based competition is therefore likely to also result in more efficient outcomes (provided this competition does not result in uneconomic duplication of infrastructure).

Facilities-based competition

In Australia, broadband is generally delivered in one of two ways:

- *Own facilities*: this results from providers building their own network infrastructure to compete either as a wholesale or as an integrated retail provider. Operators that compete at this level can use alternative technologies such as HFC and optical fibre, wireless, and satellite to provide broadband services, with either no reliance on, or reliance for limited and defined specific components of Telstra's network;
- *Resellers*: providers that compete in retail markets by reselling the services offered by facilities-based providers.

At present, broadband is supplied via reselling Telstra's wholesale broadband product. In particular, the vast majority of Australian internet service providers (ISPs) providing broadband services do not operate their own infrastructure and only participate in the retail market. Most resell Telstra's ADSL services, with 47.2 per cent of Telstra's 803,000 broadband subscribers being wholesale.⁸ This is further evidenced by the fact that in March 2005, there has not yet been large scale ULL take up by any competitor.⁹ The ACCC observes that:

ULLS uptake to this date has been disappointing. ACCC figures suggest that, as at December 2004, only around 30 000 ULL¹⁰ services had been taken up by access seekers, and that these are mostly in the business market.

This position has not substantially improved since that date. This is indicative of slow growth in facilities-based competition. The ULL, in particular, makes the rollout of new infrastructure (e.g. DSLAMs for xDSL provision) a potentially economic and practical option, thereby promoting more facilities-based competition. The benefits of ULL, and the importance of its pricing structure, are discussed further in Chapter 3.

The state of competition in the broadband market has significant implications for the maintenance or stimulation of competition in other related telecommunications markets. This is because the decision to take up broadband plays an important role — increasingly so with bundling of services — in encouraging customers to move to new service providers for potentially all of their telecommunications purchases. The ACCC concludes that:

In addition to being an important market in its own right offering a plethora of benefits to Australia consumers and business, the importance of broadband to the broader telecommunications market should not be underestimated. ...

Consumers that decide to investigate a broadband connection are likely to take that opportunity to reassess all of their telecommunications purchases; especially in a market where there is competitive bundling.¹¹

2.3 Implications for rural and regional Australia

This section describes the take-up of broadband in regional and rural areas of Australia. There is very little competitive infrastructure build outside of the capital cities. Regional and rural Australia, to an even greater extent than metropolitan Australia, tends to miss out on the benefits that competition can normally be expected to bring (lower prices, better services and more innovation). The discussion in this section provides context to subsequent chapters, which describes strategies to stimulate rollout that is accelerated and has greater coverage than would otherwise occur.

Broadband rollout in regional and rural Australia

The provision of broadband services to regional and rural areas has progressed at a considerably slower rate than metropolitan and inner city areas. This is of particular concern given one of the key findings from the Esten report that:

⁸ ACA, *Telecommunications Performance Report 2003–04*, March 2005, p.85.

⁹ ACCC, *Local Service Review 2005*, An ACCC Discussion paper, April 2005, p. 21.

¹⁰ ACCC, *Telecommunications Safeguards report 2003–04*, March 2005, p.17.

¹¹ ACCC, *Telecommunications Safeguards report 2003–04*, March 2005, p.30.

Access to higher bandwidth services is becoming vital for the economic and social development of regional, rural and remote Australia.¹²

The report notes that, for regional, rural and remote Australia, higher bandwidth services offer some key benefits, including:

- services such as online banking — which assists communities where other banking services have been withdrawn;
- government services and information;
- online education and health services; and
- the ability to exchange detailed information between people and organisations, quickly and relatively cheaply.¹³

However, the Estens report found that there are regional and rural areas that do not have access to broadband services, and/or competitive broadband offerings, sometimes relying on the limited dial-up product. The Estens report took the view that dial-up technology is not able to deliver the performance and service ‘richness’ that consumers are increasingly seeking, noting the continuing consumer frustration with dial-up services in regional, rural and remote areas, as reflected in submissions to the Inquiry.¹⁴

Satellite and wireless technologies can also be used to provide broadband services to regional and rural areas of Australia, but the Estens report found that areas serviced using these platforms tend to pay much higher prices for the service relative to metropolitan areas, and the quality of the service is not equivalent to what is provided on a DSL network. Overall, the competitive viability of these technologies is not yet proven, except in the case of satellite, for those who are beyond the DSL distance limit from an exchange.

The significance of providing equitable access to broadband services in regional and rural areas has also been recently highlighted by the report of the Broadband Advisory Group.¹⁵ The Group recommended that investment in broadband services needs to be encouraged in regional and rural areas:

The Government should consider initiatives, investment incentives and public-private partnerships to develop services that may not be commercially viable, but which could potentially deliver significant benefits. These should be predominantly but not exclusively focused on rural and regional Australia...¹⁶

Most recently, the ACCC has also identified that significant benefits accrue to regional areas through the provisioning of broadband:

¹² D.Esten, *Connecting Regional Australia: The report of the Regional Telecommunications Inquiry*, November 2002, p. 163.

¹³ D.Esten, *Connecting Regional Australia: The report of the Regional Telecommunications Inquiry*, November 2002, p. 163

¹⁴ D.Esten, *Connecting Regional Australia: The report of the Regional Telecommunications Inquiry*, November 2002, p. 163

¹⁵ Broadband Advisory Group, *Australia's Broadband Connectivity*, 2003.

¹⁶ Broadband Advisory Group, *Australia's Broadband Connectivity*, 2003, p.19.

Arguably, the potential for broadband to deliver benefits for local businesses has always been greatest in regional areas. However, it is also becoming increasingly clear that broadband is no longer a discretionary luxury, but an essential tool for conducting business in all parts of Australia.¹⁷

Connect Australia

In responding to Esten's report, the Government announced a National Broadband Strategy encompassing three major funding programs: the Higher Bandwidth Incentive Scheme (HiBIS), the Metropolitan Broadband Blackspots Programme (MBBP) and the Coordinated Communications Infrastructure Fund (CCIF).¹⁸

More recently, in 2005, the Australian Government announced a \$1.1 billion communication package — Connect Australia — that extends and improves on these programs, along with other measures intended to improve broadband access in regional and rural Australia. In particular, HiBIS will evolve into Broadband Connect, and CCIF will evolve into Clever Networks. Further information about Connect Australia is provided in Box 2.1.

Box 2.1

CONNECT AUSTRALIA

Connect Australia will rollout affordable broadband to people living in regional, rural and remote areas, extend mobile phone coverage, build new regional communications networks and set up vital telecommunications services for remote Indigenous communities.

- Immediate up-front funding of more than \$1.1 billion over the next four years for Connect Australia including:
 - \$878 million for Broadband Connect to provide all Australians with affordable broadband services,
 - \$113 million for Clever Networks to rollout new broadband networks for innovative applications to improve the delivery of health, education and other essential services,
 - \$30 million for Mobile Connect to extend terrestrial mobile coverage to areas where they can be commercially maintained and continue satellite handset subsidies for other areas, and
 - \$90 million for Backing Indigenous Ability to deliver a comprehensive package addressing phones, Internet and videoconferencing in remote Indigenous communities and improved Indigenous radio and television;
- Legislated regular reviews with the first review to occur three years after the sale of Telstra or sooner if the Minister directs.
- A \$2 billion dedicated Communications Fund will be established and will be administered by an independent board. The \$2 billion of capital in the fund will be invested to deliver an income stream to fund Government's responses to the recommendations made by legislated regular reviews of regional, rural and remote telecommunications services; and
- Local presence requirements for Telstra.

Source: DCITA 2006, http://www.dcita.gov.au/tel/connect_australia, Accessed 24 January 2006.

¹⁷ Speech by Michael Cosgrave, General Manager of the Telecommunications Group of the ACCC, 'ATUG 2005 Regional Conference', Canberra, 11 May 2005.

¹⁸ The total value of the funding for this strategy is \$192.8 million over a four-year period, commencing in 2003–04. Other programs that will receive funding under this strategy are the Demand Aggregation Broker Programme, Launceston Broadband Project, Consumer Representation and Research Grant, IT Training in Very Remote Communities, Satellite Phone Handset Subsidy Scheme and the Expansion of Terrestrial Mobile Phone Programme.

Broadband Connect

Broadband Connect is an \$878 million program designed to give regional Australians access to affordable broadband services over the next four years.

Broadband Connect will evolve from HiBIS in two stages. The first stage commenced on 1 January 2006 with only minimal changes to the current guidelines for HiBIS. These changes include a reduction in the price that HiBIS providers can charge customers to ensure that the Scheme follows market trends in metropolitan areas. There are also restrictions on the time period that providers can make claims after installing or upgrading terrestrial infrastructure and connecting services in any particular service area.

The second stage of Broadband Connect will commence on 1 July 2006. A discussion paper was released on 17 November 2005, to consider what aspects of HiBIS should be improved or removed to facilitate the provision of sustainable broadband in regional Australia.

Specific features of Broadband Connect/HiBIS are provided in Box 2.2.

Box 2.2

BROADBAND CONNECT

Coverage

Infrastructure and services subsidised by Broadband Connect is expected to benefit 1.6 million premises in regional, rural and remote Australia.

Customer eligibility

It operates in regional, rural and remote areas where broadband is unlikely to be provided commercially in the immediate future and targets residential users, small business and not-for-profit organizations.

As at 25 November 2005, more than 72,000 customers were connected to HiBIS broadband services.

Technology neutral

Any technology platform may be approved for delivery of Broadband Connect services. The policy allows the market to determine the best technology to suit needs and business cases.

The majority of HiBIS customers are connected by ADSL (61.28 per cent), 26.81 per cent use satellite, 10.87 per cent use wireless and the remaining 1.04 per cent use cable.

Providers

ISP can apply to be a 'HiBIS provider'. The scheme operates through registered service providers receiving an incentive payment for each registered HiBIS service provided to an eligible customer. Providers of broadband services must use these incentive payments to reduce the price of services or to help fund the cost of providing cheaper service to new regional areas.

HiBIS has now 44 registered retail providers and five 'wholesale only' providers since the Scheme was launched in April 2004.

Source: DCITA, 2006.

http://www.dcita.gov.au/tel/higher_bandwidth_incentive_scheme_hibis/hibis_news, Accessed 24 January 2006.

In the interests of encouraging competition, a provision within the HiBIS Guidelines state that no one provider receive more than 60 per cent of available funds in any one financial year or over the life of the program. Telstra has reached its 60 per cent cap for HiBIS, and ceased offering HiBIS services.

Clever Networks

The \$113 million Clever Networks program will support the rollout of new broadband infrastructure networks and innovative applications to improve the delivery of health, education and other essential services in regional, rural and remote areas. Clever Networks will also support Broadband Connect by developing infrastructure and generating demand to extend the reach of competitive broadband solutions to regional, rural and remote communities.

It will combine elements of the CCIF and the Demand Aggregation Broker (DAB) program. Under CCIF, competitive backbone networks have been, or are being, constructed in South Australia, Tasmania and NSW. Clever Networks will provide additional connectivity into communities in competition to Telstra, providing opportunities for other service providers to establish services. The DAB role includes, state brokers, national sectoral brokers for the health and education sectors, and community-based brokers. These brokers facilitate infrastructure deployment and service delivery, assisting communities and sectors to identify opportunities and demand, and to initiate investment. Clever Networks intends to develop the broker role even further.

Clever Networks will strategically focus funding to attract significant support from commercial partners and others, including state governments, and will be targeted at areas of demonstrated demand. The program will seek to at least match funding for any Australian Government contributions and projects brought forward from carriers, State and Local Governments and other institutions. Importantly, a significant increase in funding provides scope to widen coverage and stimulate the innovative use of broadband in the delivery of regional, rural and remote services.

Chapter 3

An integrated approach

This chapter sets out the strategy to developing a nationwide competitive broadband network.

3.1 Introduction

Critical elements to develop a truly competitive nationwide network with broadband capabilities are:

- *an unconditioned local loop (ULL) price based on sound regulatory principles.* In particular, the price for ULL must be set appropriately to justify commercial roll-out; and
- *maximise the impact of subsidies under Connect Australia by allocating funds to those carriers with existing significant commercial rollouts.* Subsidies should be targeted to those carriers that have existing networks and credible rollout plans. Priority should also be placed on those carriers that have a track record of competing actively, as this is likely to encourage the development of competition and, therefore, broadband take-up in regional and rural areas.

Each of these elements is discussed, in turn, below.

3.2 An appropriately set ULL price

This section describes the way that ULL provides the best means for meeting growing broadband demand in a way that stimulates competition. Importantly, this essential wholesale product must be priced appropriately otherwise the potential benefits — lower retail prices, quality of service and range of offerings — may not eventuate. In this context, Telstra's proposal to change the pricing structure of the ULL has serious implications for competition in data and voice services.

An effective wholesale product

ULL (and LSS) can be thought of a wholesale product that enables facilities-based competition through new entrants accessing the local loop by bypassing large sections of Telstra's network. In its *Declaration of Local Telecommunications Services, July 1999*, The ACCC describes (at page 13) the ULL as

...the service for the use of copper-based communications wire between the boundary of a telecommunications network and a point where the copper terminates.

The ULL involves the use of unconditioned cable, mainly twisted copper pairs, between end-users and an access provider's (i.e. Telstra's) telephone exchange. The cable runs from a customer's premises to a main distribution frame, and then is connected to Customer Access Module (CAM) Equipment. The CAM equipment belongs to the access seeker and includes remote switching units or stages ('RSUs/RSSs'), remote (and integrated remote) multiplexers ('RIMs/IRIMs') or remote customer multiplexers ('C-MUXs').

There are several reasons for the ULL being the preferred option for carriers to deliver competitive data and voice services. It offers:

- access seekers the ability to provide a truly competitive offering;
- an effective means of facilitating the rollout of networks with broadband capabilities; and
- better service offering possibilities than other technologies, that cannot currently provide the same level of price and quality packages.

Competitors can provide a truly competitive offering

The ULL enables access seekers to deliver both high-speed internet services and voice services. The ACCC observes that:

The ULLS allows quasi facilities-based competition in the local market. As such, entrants are able to compete across more aspects of the price/product/service package.¹⁹

From the customer's point of view, there would be more choice – of taking internet access and voice telephony from Telstra, or from another competitor. Access to the ULL enables competitors to provide customers a much more diverse range of broadband services, than through simply reselling voice and data services. Over time, as broadband penetration increases, this may include the use of new and emerging technologies like VoIP for local and other call services as a substitute for switched voice services.

Well-suited to facilitating rollout

ULL provides a much more effective means to build a competitive network quickly and with wide coverage, than other technologies. For instance, an access seeker, by installing its own DSLAMS into Telstra exchanges and building fibre from the exchange back to the centre of its network, can build out a network with national reach.

Utilisation of the ULLS would also not involve inefficient duplication of another access network.

Other technologies cannot currently provide the same level of broadband

Other technologies with broadband capabilities such as wireless and satellite technologies are not well suited to offering voice and some data services to the same extent as DSL. These technologies, therefore, do not have the same potential for providing a competitive offering to customers as DSL does.

ULL pricing

A necessary condition for the ULL to provide access seekers the means to offer competitive offerings is an appropriately set ULL price. Retailers of DSL services often need to build a sufficiently large retail customer base using Telstra's wholesale services, in order to make a successful transition to providing broadband services based on the ULLS (or LSS). This is because the network-based local loop service is characterised by significant economies of scale and density. Unless the ULL is set at a price that does not discourage the build decision for the access seeker, access seekers cannot justify moving from a reselling to an own-facilities strategy.

¹⁹ ACCC, *Telecommunications safeguards report 2003–04*, March 2005, p.17

The pricing structure of the ULL reflects difference in cost of servicing a particular location of lines in accordance with four ‘bands’, delineated on the basis of line density. This delineation into four bands is often referred to as geographic de-averaging.

In December 2005, the ACCC issued its final decision to reject Telstra’s 2004 ULL monthly charge undertaking. The monthly charges per line proposed by Telstra are set out in table 3.1.²⁰

Table 3.1

TELSTRA’S PROPOSED MONTHLY CHARGES FOR 2004-05 AND 2005-06

Bands ^a	Telstra’s proposed charges
Band 1	\$13
Band 2	\$22
Band 3	\$40
Band 4	\$100

(a) Band 1: CBD areas of Sydney, Brisbane, Adelaide, Melbourne and Perth; Band 2: Urban areas of capital cities, metropolitan regions and large provincial centres (including other CBD areas not already included in Band 1; Band 3: Semi-urban areas including outer metropolitan and smaller provincial towns; Band 4: Rural and remote areas.

Source: ACCC, 2005, *Assessment of Telstra’s ULLS and LSS monthly charge undertaking, Final Report*, December, p.5.

The ACCC took the view that Telstra’s proposed monthly charges are not reasonable. It considered that reasonable prices for the monthly access charges for both services should still be lower (around 13 per cent lower, on average, for the ULLS in the main city-metro areas) in the current period than those previously considered by the ACCC and proposed in Telstra’s undertaking.

At the time of its consideration of the undertaking, the ACCC was considering three arbitrations relating to ULLS and LSS charges, including two that specifically deal with monthly rates. The regulator has accordingly not made any decision to determine ULLS or LSS charges.

Most recently, Telstra withdrew its 2004 ULLS connection charge undertaking, and submitted a new undertaking for monthly charges in January 2006. Telstra’s new undertakings for the ULL monthly charge proposes a uniform geographically-averaged price of \$30 a month for the ULLS.²¹

Maintain de-averaging of the ULL price

The issue of whether to use a de-averaged approach to ULL pricing is not a new one. In the ACCC’s report on *Pricing of unconditioned local loop services*, the regulator explains the reasoning behind why it ‘supports Telstra’s de-averaged pricing approach for this service.’²² No submissions were received that took issue with the proposed geographically de-averaged approach.

²⁰ These replaced its November 2003 ULLS undertakings,

²¹ The ACCC is preparing a discussion paper on the new undertaking.

²² See ACCC 2002, *Pricing of the unconditioned local loop services, Final Report*, March, p. 19.

While average wholesale pricing is adopted in for some markets, for example, the electricity market, the particular unique characteristics of telecommunications in Australia, namely, economics of density and the higher cost for servicing regional and rural areas, mean that a geographically de-averaged approach is an appropriate for the Australian telecommunications market. The ACCC also observes that:²³

De-averaging of access pricing at the network level is accepted in the market, despite price controls that promote averaging of prices at the retail level, and where there is potentially a much greater impact in terms of the number of end-users affected.

This statement recognises that a de-averaging approach may result in better outcomes for more end-users. The lower cost of servicing retail customers in the metropolitan areas, and density of population in these areas means more retail customers benefit from a de-averaged pricing approach. This increases broadband intake, through increased competition, in metropolitan areas. As the customer base for access seekers increases over time, further rollout to regional and rural areas is commercially more viable. Therefore, the ULL price allows competitors to purchase the ULL based on sound commercial decisions that will lead to more sustainable outcomes.

The ACCC also put forward convincing reasons for applying a de-averaged pricing approach to the ULL. It observed that:

- *de-averaging promotes investment efficiency.* Geographic de-averaging is less likely to distort the build-buy decision. In contrast, average prices will distort this decision because, for example, competitors will prefer to purchase the wholesale product in rural and regional areas (where the wholesale product is lower than cost) and therefore make smaller rollout investments;
- *de-averaging is consistent with the ACCC's standard approach to access pricing* that relates to the direct costs of service supply and promotes economic efficiency of infrastructure use and investment; and
- *an averaged approach to pricing the ULL will lead to more cherry-picking.* This is contrary to general statements made by Telstra that *de-averaging* will lead to more cherry-picking, but Telstra's argument is wrong. With an average ULL price, the wholesale price will be lower than cost in rural areas. Competitors would therefore be likely to opt to purchase the wholesale product. The implications of this are that Telstra will lose revenues, with its own customers possibly bearing the cost differential. Importantly, less infrastructure build in rural areas and more in city areas is contrary to the government's current policy of promoting more broadband rollout and take-up in regional and rural areas.

Alternatively, in CBD areas, competitors may choose to not purchase the ULL that is priced above cost, which may result in inefficient duplication of the CAN to bypass Telstra's network. Access seekers may also choose to continue to compete only through resale, which will tend to delay the emergence of facilities-based competition in not just the provision of broadband services but also other telecommunications services. This final point requires further discussion to understand the serious implications for competition of accepting an averaged priced approach.

²³ ACCC, 2002, *Pricing of the unconditioned local loop services, Final Report*, March, p.18.

The implications for competition of an averaged approach to ULL pricing

Adopting an averaged pricing approach to the ULL can potentially have an effect on competition in other telecommunications markets than just the broadband market.

The immediate competition effects on the broadband market were discussed above; that an artificially high ULL price in metropolitan areas may result in access seekers finding it difficult to commercially justify a move beyond a reselling strategy, and step up to building their own facilities. This prevents the entry of effective competition in broadband services, and other telecommunication markets, given the capabilities of ULL to provide innovative voice and data services offerings.

The serious consequences for competition in broadband and other telecommunications services are heightened by the fact that a higher ULL price may encourage the continued use of reselling activity, the successful commercial pursuit of which is hampered by a problematic wholesale local call resale (LCR) price, as regulated by the ACCC. An inappropriate wholesale LCR pricing approach makes it difficult for access seekers to develop a customer base in local calls, which also impacts the growth of its customers in other telecommunications market including broadband services. This is due to increasing bundling of telecommunication services, with local calls often being a required service within a bundle. A recent survey by the ACA states that more than 99 per cent of all bundles selected by customers include a fixed-line telephone service.²⁴ An inappropriately set wholesale LCR price could potentially affect competition in different telecommunication markets, including the market for broadband services. Further detail on the problems with the existing wholesale LCR pricing approach is discussed in Appendix B.

An inappropriately average price for ULL access, as sought by Telstra, would place Telstra's competitors in an anti-competitive bind. They are unable to resell Telstra's broadband profitably because of the structure of the wholesale LCR price; an averaged ULL wholesale price would foreclose their prospects of competing with Telstra by using their own facilities.

3.3 Maximise the impact of 'Connect Australia' subsidies

Without government intervention, broadband roll-out in rural areas is likely to be slow and small. For all carriers other than Telstra, this is because small populations and particularly low population density, in these areas, make rolling out broadband networks unviable commercially. Telstra, on the other hand, as the ubiquitous provider of telecommunication services in rural areas and recipient of the USO subsidies may rollout broadband networks to these areas to deliver bundles of telecommunication services to rural customers.

²⁴ ACA, *Telecommunications Performance Report 2003–04*, March 2005, p.11.

Incentives need to be put in place to encourage investment in rural areas. Government intervention to encourage investment in broadband networks, and stimulate take-up in regional and rural areas has been tried, with success, overseas. OFCOM observes that, in July 2001, the French Government announced measures to increase investment in providing high-speed internet access to remote rural areas in France. The plans included funding for the provision of fibre-optic network deployment to non-commercially viable areas. Further funding is also provided through the availability of 1 billion pounds worth of cheap loans to help fund broadband rollout for less densely populated areas. OFCOM notes that local loop unbundling was unsuccessful in France for a long period, but there has been very significant progress in recent times.²⁵

As noted in Chapter 2, the best way to promote broadband take-up is through encouraging competition. The threat to the incumbent's market share is likely to create incentives for it to compete actively by offering more and better service offerings, than without the entry of competitors.

The subsidies offered under Connect Australia, particularly Broadband Connect and Clever Networks, offer carriers the opportunity to increase their customer base, and coverage, and therefore the ability to compete more vigorously in the provision of voice and data services. In effect, the subsidies have the potential to act as a pro-competitive spur to the broadband market, encouraging broadband take-up in areas that would not normally reap the benefits of competition.

While the effect of these subsidies is undoubtedly positive benefits to regional and rural areas, the way these subsidies are allocated will determine whether the full potential of these subsidies is realised. To maximise the full impact of subsidies, targeted subsidies should be given to carriers that have:

- a existing strong customer base;
- existing networks with good coverage, and commercial plans for further roll-out; and
- a demonstrated track record of competing actively and providing technological innovative solution to consumers.

Providing targeted subsidies to carriers displaying these features is likely to accelerate and expand the coverage of the rollout of broadband networks in regional and rural areas.

However, extreme care should be taken before giving Telstra any (more) subsidies for the provision of broadband in rural areas. As the ubiquitous, dominant, telecommunications service provider in these areas, Telstra could use these subsidies to cross-subsidise other services, and place its potential competitors in a price squeeze. If Telstra is able to use subsidies, aimed at stimulating broadband take-up, to lower the price of its bundled telecommunications services, this could be profoundly anti-competitive, as competing carriers would find it extremely difficult to enter the market. In this respect, these broadband subsidies might give Telstra the same kind of advantage it currently receives from its USO subsidies, where these subsidies enable Telstra to promote its brand in rural Australia.

²⁵ OFCOM, *Strategic Review of Telecommunications, Phase 2 consultation document*, Appendix O, 2004, p. 22

3.4 Combining the two elements

Combining the two elements — an appropriately set ULL price and targeted subsidies — is likely to encourage effective and sustainable competition.

A de-averaged ULL price facilitates competition as it provides access seekers with the right incentives to grow their customer base. Once that customer base is sufficiently large, carriers are in a better commercial position to increase their coverage.

Targeted subsidies accelerate a carrier's decision to rollout further, and when allocated to carriers demonstrating characteristics designed to promote competition, the rollout to regional and rural is likely to be even more accelerated and wider in coverage, than would otherwise be the case under current scenarios. The implication of this is the creation of truly competitive voice and data offerings in all areas of Australia, not just in CBD and metropolitan areas.

Chapter 4

Benefits to the economy of broadband investment

This chapter estimates the benefits to the Australian economy from broadband investment using the TERM general equilibrium model. Estimates are based on an assumed rollout to all band 1 and band 2 involving about 650 exchanges.

4.1 Introduction

Greater broadband investment has significant positive effects on the Australian economy. These effects are estimated using the TERM (The Enormous Regional Model), a general equilibrium model of the Australian economy, developed by the Centre of Policy Studies at Monash University. TERM can potentially distinguish 166 sectors and 58 regions. In the model, all the sectors and regions are linked so that the effects of, for example, spending on telecommunications in one region, flows through to all industries in all regions. The speed and extent of the flow through depends on the economic linkages between the regionally-based sectors. Thus, an increase in the productivity of telecommunications sector will have a large impact on industries that are intensive in their use of telecommunications, such as finance. This in turn will affect sectors that are strongly linked to the finance sector, and so on.

Anticipating the conclusions, the modelling estimates are that broadband investment will increase real aggregate consumption spending, which is a rigorous measure of economic welfare – by \$22 billion over the period 2005/6 to 2016/17, in NPV terms. From an investment spend of \$360 million over the next five years, such an investment would increase GDP by an estimated 0.31 per cent higher by 2016/17, or by around \$3.5 billion in today's prices. This gain in national output will be permanent.

These economic gains will be shared across a broad range of Australian industries and regions. However, these economic gains may be delayed and potentially not be attained without an appropriately set ULL price and making full use of regional subsidies, that accelerate broadband rollout to all areas of Australia.

4.2 Model Inputs

This section describes the inputs to the TERM model. The inputs are of two types:

- An estimate of the investment that would be required to roll out a national competitive DSL network to all 650 exchanges in bands 1 and 2; and
- the expected gains in business productivity as broadband take-up in Australia becomes much more widespread than currently.

Increased take up of broadband by households does not enter into the calculations of the effect on the Australian economy. This does not mean that households will gain no benefit from broadband; on the contrary, the benefits are likely to be very large, in terms of faster web access, ability to access content not currently available, and so on. However, to keep the analysis conservative, it is assumed that extra household spending on broadband will substitute for other types of household spending, and that the greater quality of broadband access available to households is not measurable in terms of conventional economic aggregates, like GDP.²⁶

Increased take-up of broadband by businesses, on the other hand, will affect the economy, in ways which are described below.

Expansion of the telecommunications sector

The construction of a competitive DSL network, offering a bundled product offering of voice and data services, throughout metropolitan and regional Australia will necessarily entail an expansion of the telecommunications industry. Important elements of this impact include:

- infrastructure development;
- geographic reach of the network;
- subscriber take up of the network;
- expenditure on end-user equipment;
- industry operating costs; and
- source of capital.

Each element is discussed below.

Infrastructure development

The capital expenditure required to rollout a competitive DSL network throughout metropolitan and regional Australia and the expected timing of this expenditure is detailed in table 4.1.

²⁶ Analogously, if a household spends, say \$5000, on a plasma television, economic analysis would normally assume that that spending has substituted for something else, since households cannot (sustainably) spend more than their income. The plasma television might give that household more enjoyable TV watching than previously, since the picture is clearer than they had before, but that greater enjoyment does not have a measurable effect on the economy.

Table 4.1

CAPITAL EXPENDITURE FOR A COMPETITIVE DSL NETWORK (\$ MILLION 2004–05 PRICES)

	Capital Expenditure	Proportion of total (%)
2005/06	40.0	11
2006/07	40.0	11
2007/08	93.3	26
2008/09	93.3	26
2009/10	93.3	26
Total	\$360.0	100%

Source: Optus

Table 4.1 indicates a total capital expenditure program of \$360 million over a period of 5 years. It assumes a roll out to all band 1 and 2 that involves approximately 650 exchanges. This would be undertaken in two distinct phases. The first phase would involve a rollout to 200 exchanges and would be completed by March 2007. The second phase would rollout DSL to an additional 442 exchanges at a total cost of \$280 million. Such an investment would be highly significant considering that, to date, the largest competitive DSL investment announced has been Optus' \$150 million investment to roll out to 340 exchanges over two and a half years.

These costs serve as a capital expenditure input into the TERM model and are analysed in real terms.²⁷

Geographical reach

Upon completion of carrier's DSL rollout, the network will reach up to 80 per cent of Australian households.

Subscriber take up

As noted in Chapter 1, most broadband customers in Australia subscribe to a DSL technology. The dominance of DSL is not unique to Australia, but is a feature of many telecommunications markets throughout the OECD. As noted in a recent speech by Ed Willet of the ACCC:

Recent work by the OECD confirms that DSL is the source of the majority of growth in broadband markets, accounting for on average of 60 per cent of the market. Again, the copper CAN continues to show its dominance.²⁸

As noted in Chapter 1, Australia's take up of broadband services can be accelerated by stimulating competitive entry into the DSL market. Australia has relatively high PC penetration rates by world standards, and under the right conditions could similarly have a high broadband penetration rate.

²⁷ The modelling is conducted in real terms. That is, the effect of inflation is removed from the data providing estimates in constant dollar terms to facilitate monetary comparison with today's dollars.

²⁸ Ed Willet, 2005, *The state of competition in the telecommunications industry*, Presentation to the National Telecommunications Summit 2005, Melbourne, 30th May 2005.

End user access equipment

To access the DSL networks end-user equipment is required at the consumer's premises. This involves capital expenditure on items such as modems and Ethernet cards. While the consumer could meet this expense, it is current industry practice for retailers to either partially or fully subsidise these costs. In turn these costs are recovered from the overall package price charged to consumers over time.

Industry operating costs

To assess the full range of direct impacts associated with the ongoing operation of a competitive DSL network throughout metropolitan and regional Australia, an accounting approach for the network has been used. This approach assumes that the network is simply an extension of the existing telecommunications industry and expands revenue, costs and margins in line with the average already observed and forecast for Australia's telecommunications industry. This is achieved by using the detailed inputs – output tables that underpin the TERM model.

The intent of this approach is not to assess the economic viability of the proposed competitive DSL network (i.e. identify its chances of obtaining an economic rate of return). Instead, the analysis reveals the economic implications likely to arise from the proposal, assuming that the resultant network has similar cost, revenue and margin characteristics to current telecommunications activity.

Source of capital expenditure

The economy-wide impacts of an increase in investment are not straightforward to estimate. Given a predominantly fixed pool of domestic savings in Australia an increase in investment in Australia is likely to result in an increase in foreign borrowing. The cost of this is not the capital itself, but the cost of paying foreigners for the use of their capital.

The costs of finance is normally project specific and varies according to underlying characteristics and the level of risk associated with the specific investment. However when taking an economy-wide perspective debt servicing costs do not vary a great deal between projects. Data from the Australian Bureau of Statistics (ABS) balance of payments data indicate that currently the average cost of capital seems to be around 6 to 7 per cent per annum (nominal).

To evaluate the cost of capital for the rollout of a competitive DSL network throughout metropolitan and regional Australia the TERM model was configured to allow the additional investment funds to be financed from foreign savings. This approach applies the cost of capital as an annuity, allowing for the matching of costs and revenues over time.²⁹

²⁹ Spreading the costs out over time, even where it adds to the overall cost of the proposed network, is a consistent feature of infrastructure finance in the Australian economy.

Business users' productivity gains

There is substantial evidence, which suggests that Australian businesses obtained a significant benefit from upgrading their Internet connection from narrowband to broadband. In particular, a study undertaken by The Allen Consulting Group provides considerable insight.³⁰ The study, based on the collection and analysis of detailed information obtained from a representative sample of Australian businesses,³¹ found that businesses with broadband access:

- have a higher level of Internet 'intensity' in their business (i.e. give a higher proportion of their employees access to the Internet) compared to those with dial-up access;
- make greater use of Internet applications in their day-to-day operations;
- have made greater progress towards networked engagement through the use of intranets and extranets in their business;
- have made significantly more progress in comprehensive 'enablement' in terms of making use of the Internet to receive and place orders and to receive and make payments online; and
- obtain a significantly higher proportion of their revenue from the Internet than their non-broadband counterparts.

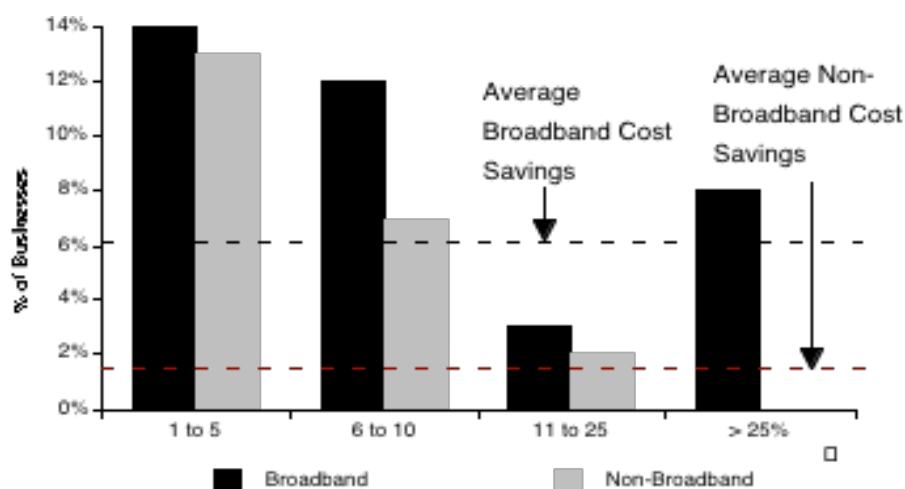
The study argues that moving from narrowband dial up Internet access to broadband Internet access (i.e. increasing bandwidth) is accompanied by a greater use of e-commerce and a greater integration into the Internet economy.

The Allen Consulting Group study also estimates what increased bandwidth (i.e. moving from a dialup narrowband connection to a broadband connection) means for businesses in terms of productivity and cost savings. Specifically, businesses were asked what cost savings were attributable to their use of the Internet. Reported findings reveal that businesses with narrowband Internet access on average obtain cost savings of 1.5 per cent while those with broadband access reported savings of 6.3 per cent. That is, businesses can achieve additional cost savings, equivalent to 4.8 per cent, by upgrading from a narrowband Internet connection to a broadband connection. The results of this study are illustrated in figure 4.1.

³⁰ The Allen Consulting Group, 2002, *Built for Business II: beyond Basic Connectivity, The Internet Economy and Australian Business in 2002*, Cisco Systems, Sydney.

³¹ Firms were selected randomly and included firms that did not use the Internet, those that had a narrowband connection and those that had broadband access.

Figure 4.1

COST SAVINGS FROM USE OF THE INTERNET — BUSINESS REPORTED SAVINGS

Source: The Allen Consulting Group

The dark bars in figure 4.1 reflect cost savings from use of the Internet reported by businesses with a broadband Internet connection. The lighter bars reflect cost savings reported by businesses with a narrowband connection. The dotted lines across the bars reflect the weighted average cost saving reported by each category of Internet connection.³²

For the purpose of estimating the extent to which the rollout of a competitive DSL network will deliver a productivity gain to individual regions, and Australia as whole, it is necessary to adjust the above cost saving to reflect the expected take-up of the network by businesses as a proportion of the total number of businesses in Australia. Doing this suggests an average cost saving of 0.19 per cent across the economy as whole.

Table 4.2 provides an estimate of the cost savings enjoyed by businesses based on reported cost savings (as detailed above) and the time taken to rollout a competitive DSL network through metropolitan and regional Australia.

³² The weighting takes into account those businesses that report no cost savings.

Table 4.2

BUSINESS COST REDUCTIONS (PER CENTAGE CHANGE COMPARED TO BASE CASE)

Year	Average cost reduction (%)
2005–06	0.07
2006–07	0.10
2007–08/	0.15
2009–10	0.19
2010–11 onwards	0.19

* Estimated take up of broadband services by Australian businesses as reported by the ABS, see ABS 2005, Business Use of Technology 2003–04, Canberra.,
Source: The Allen Consulting Group

The forecast cost savings detailed in table 4.2 are considered to be conservative and are based on the following assumptions:

- over the period the take-up of broadband services by business will increase from around 35 per cent currently to just over 50 per cent in 2010–11. This equates to an annual average growth rate of around 6.5 per cent;
- of the businesses that obtain a broadband connection over the period (i.e. upgrade from narrowband to broadband) 50 per cent will subscribe to the competitive DSL network; and
- 80 per cent of businesses throughout Australia will be able to access the competitive DSL network.

As detailed in table 4.2, the expected costs savings will increase in line with increased take-up of broadband services by business. Expected cost savings are reported on an annual basis and therefore occur in each year of the simulation.

4.3 Modelling results

Macroeconomic impacts

Figures 4.2 – 4.8 show the national macroeconomic impacts of the proposed investment of \$360 million for a nationwide network. Real GDP rises relative to forecast gradually between 2006 and 2017. Initially, the direct impact of the initial investment and productivity changes explains the increase: productivity increases in 2006 are only 0.03 per cent, while aggregate employment rises slightly through the effect of direct investment, so that real GDP increases by just over 0.03 per cent relative to forecast.

Gradual pervasive productivity impacts over successive years induce investment in industries other than telecommunications, in which we impose direct investment shocks as given above. This raises employment in two phases. Between 2006 and 2008, employment rises slightly relative to forecast (0.004 per cent in 2008, equivalent to 390 jobs) in response to the direct investment impact. Thereafter, investment elsewhere drags employment up, by as much as 0.055 per cent (5,000 jobs) above control in 2015 before steadily rising real wages start to bring employment back towards forecast.

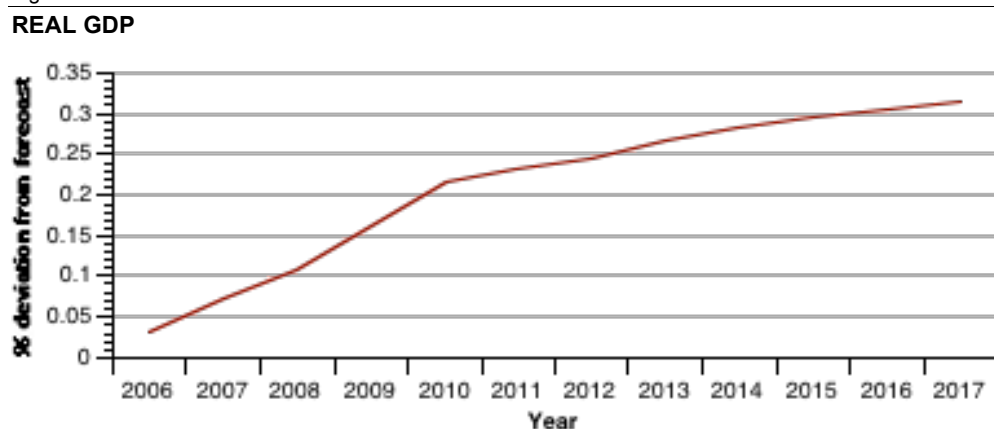
Continuing increases in investment increase aggregate domestic spending, bringing export supplies of output slightly below forecast in most years. Consequently, there is a weakly positive terms-of-trade in most years, as export demands are finitely elastic and import supplies are assumed to be infinitely elastic. The export price index shown in figure 3.6 is equal to the terms of trade impact in each year, since import prices are unchanged relative to forecast.

The discounted net present value of the deviation in national aggregate consumption from forecast is our measure of welfare. This amounts to \$22 billion over the period 2006 to 2017 in 2005 dollars. To put this in context, the assumed economy-wide productivity gain of 0.19 per cent by 2010 is equivalent to over \$2 billion annually.

By 2017, real GDP is 0.31 per cent above forecast. In addition to the productivity impact of 0.19 per cent, aggregate employment is still above forecast by 0.023 per cent, accounting for a further 0.01 per cent (labour's forecast share of GDP has fallen around 40 per cent in 2017), while the contribution of increased capital is 0.08 per cent ($=0.17 \text{ per cent} \times 0.5$). The remaining 0.03 per cent of the increase in real GDP arises from indirect tax contributions.

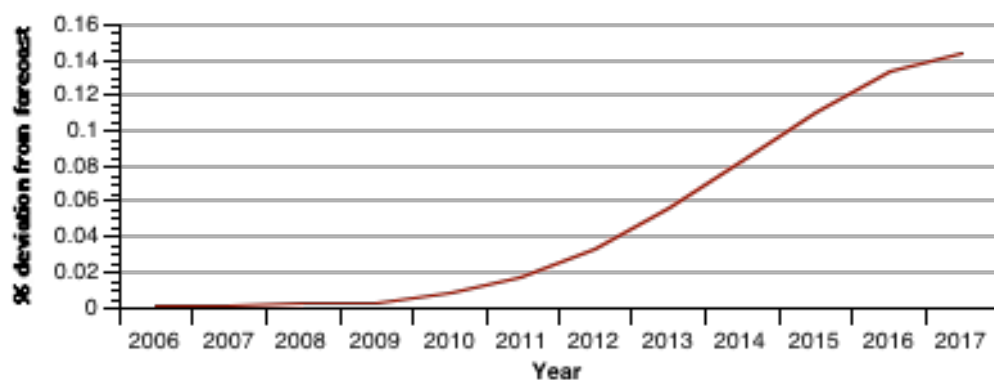
The productivity gains arising from this project are mixed for aggregate employment in that the initial rises fall away in later years. This is because part of the adjustment to higher returns in the labour market is via real wage increases rather than employment. By 2017, when national employment is returning to forecast levels, real wages are rising relative to forecast and are 0.17 per cent above forecast. By assumption, in the long run, changes in the labour market are expressed via changes in real wages rather than changes in aggregate employment.

Figure 4.2



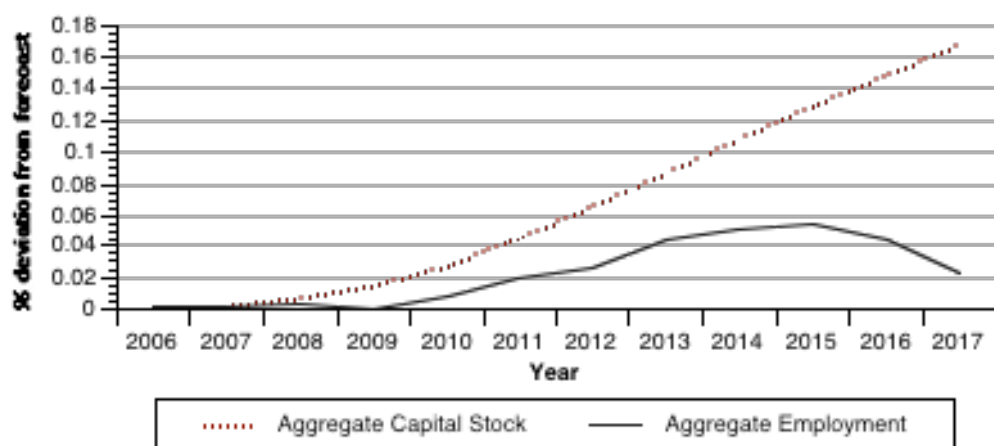
Source: TERM estimates

Figure 4.3

AVERAGE REAL WAGES

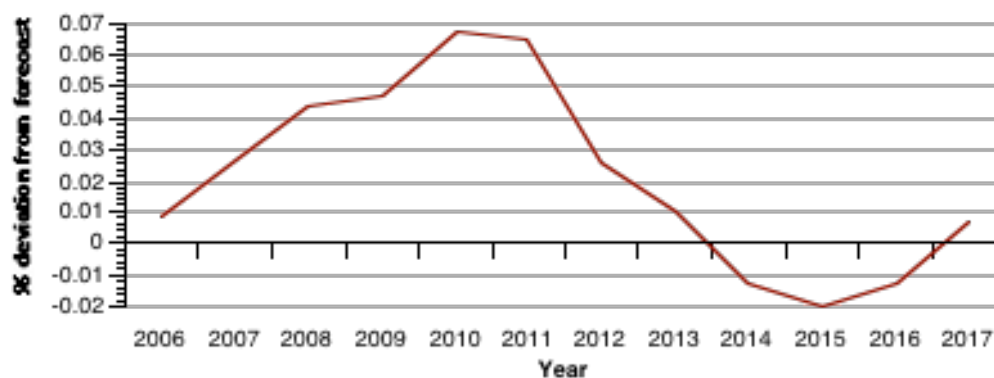
Source: TERM estimates

Figure 4.4

EMPLOYMENT AND CAPITAL STOCK

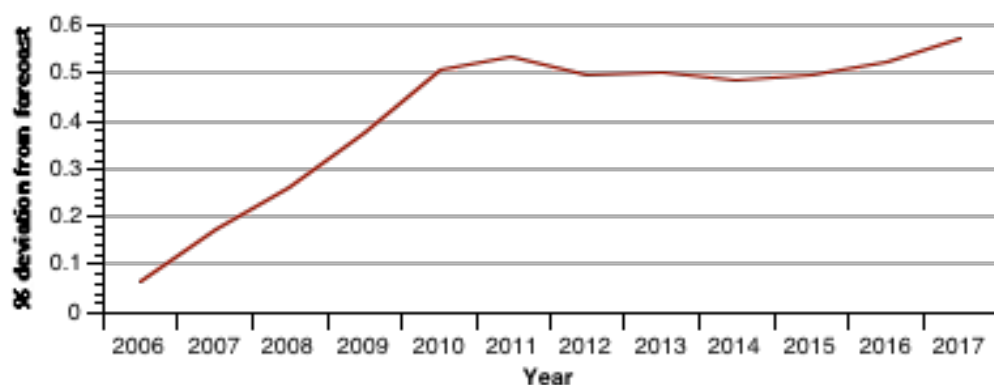
Source: TERM estimates

Figure 4.5

EXPORT PRICES

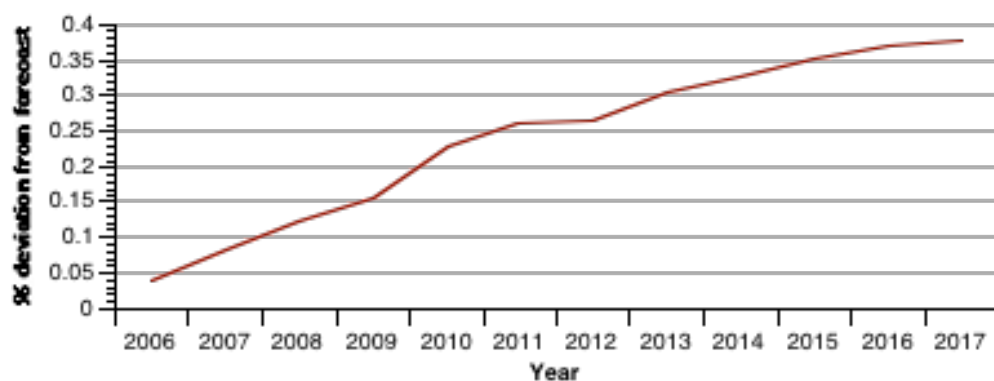
Source: TERM estimates

Figure 4.6

REAL CONSUMPTION

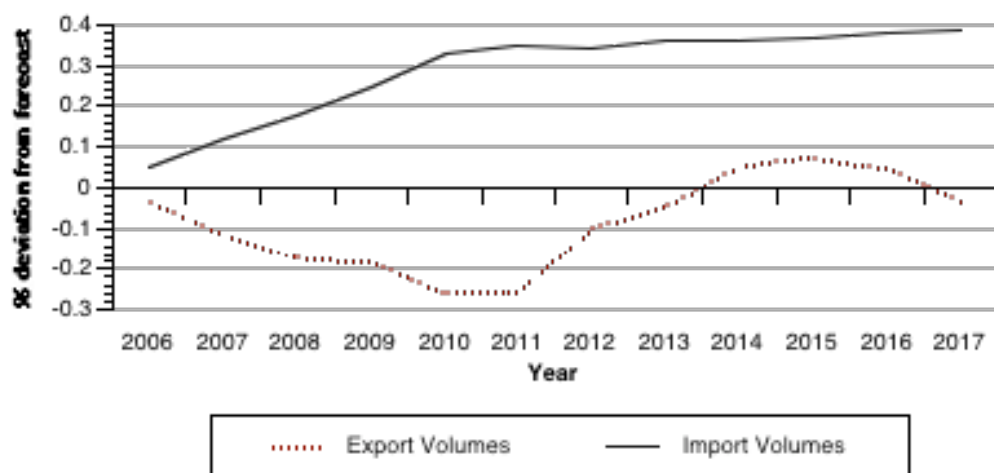
Source: TERM estimates

Figure 4.7

REAL INVESTMENT

Source: TERM estimates

Figure 4.8

EXPORT/IMPORT VOLUMES

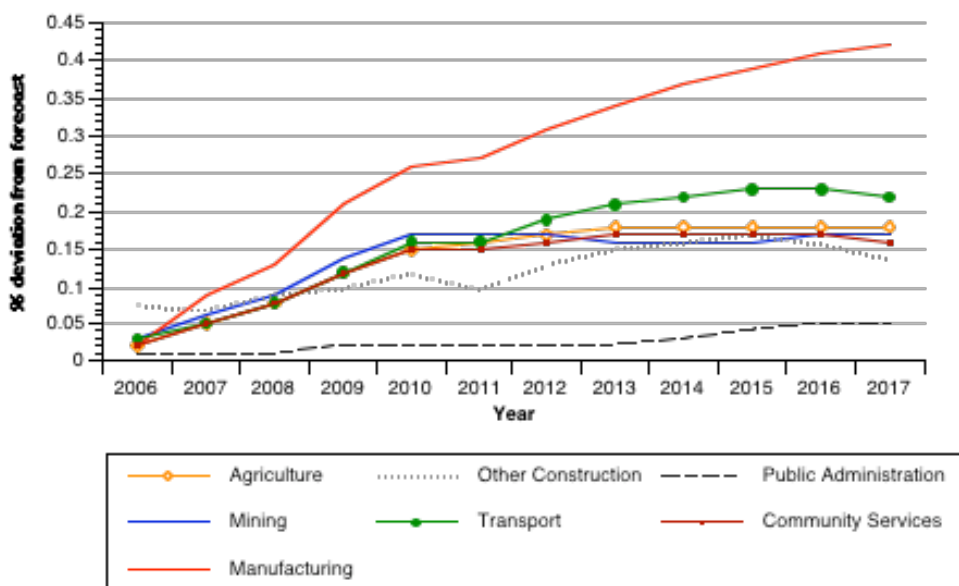
Source: TERM estimates

Industry output impacts

Figures 4.9 and 4.10 show the industry output impacts of the project. Output grows strongly in most industries. Above-average output growth occurs in the Manufacturing, Residential Building, Wholesale and Retail Trade, Communications Services, Ownership of Dwellings, Finance and Business Services, and Entertainment and Other sectors

Figure 4.9

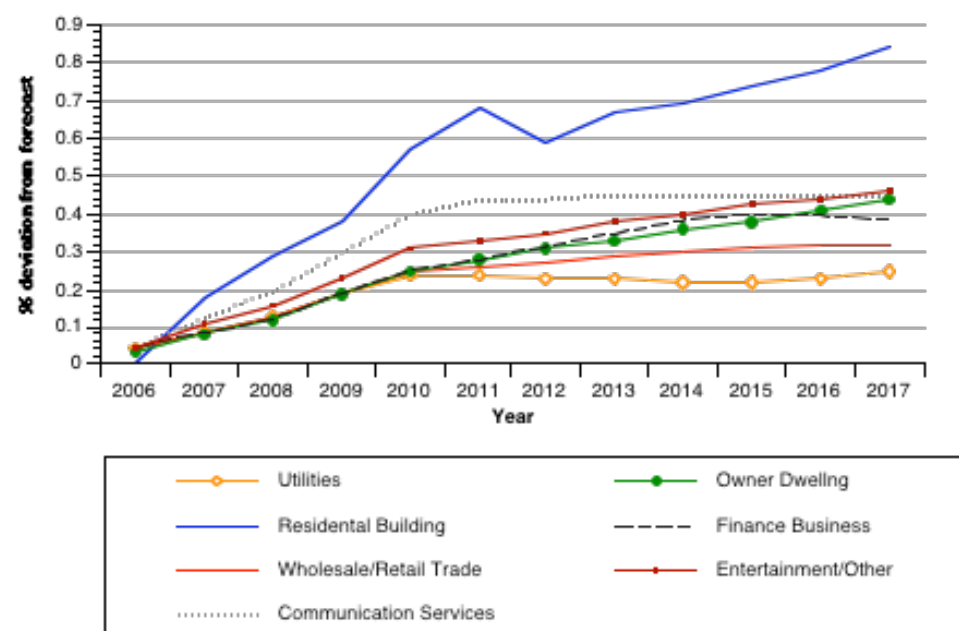
INDUSTRY OUTPUT



Source: TERM estimates

Figure 4.10

INDUSTRY OUTPUT



Source: TERM estimates

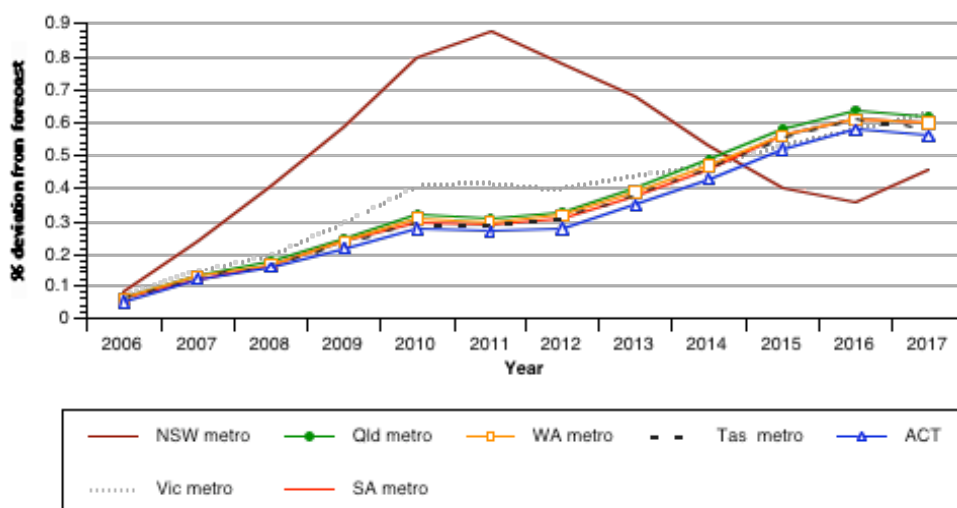
Regional impacts

Figures 4.11–4.12 show deviations in regional aggregate consumption from forecast as a consequence of the productivity gains arising from the project. Gains are experienced in all regions. What is interesting to note is that while there is some variation between the states (for example, Victoria does particularly well), there is very little variation within each state between metropolitan and non-metropolitan regions. The differences between the states are largely due to the different industry compositions within each state. The states that do especially well tend to be intensive in the industries that do especially well from this project.

Overall, though, the picture that emerges is that the proposed spending on a nationwide competitive DSL network reaching all 650 band 1 and 2 exchanges will benefit the Australian economy throughout all regions and sectors.

Figure 4.11

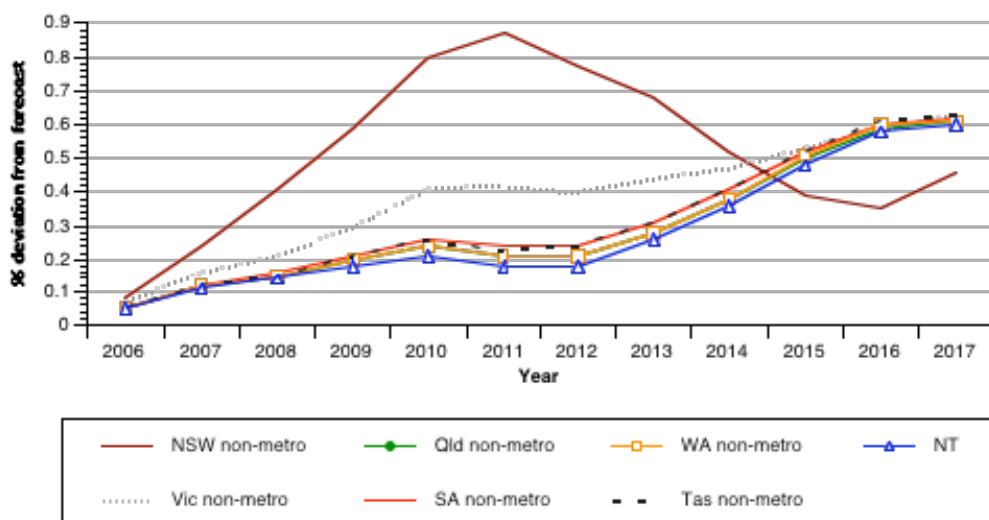
REGIONAL AGGREGATE CONSUMPTION – METROPOLITAN



Source: TERM estimates

Figure 4.12

REGIONAL AGGREGATE CONSUMPTION – NON-METROPOLITAN



Source: TERM estimates

Appendix A

The TERM Model

A.2 The model

TERM (The Enormous Regional Model) is a dynamic, multi-regional CGE model of Australia (Horridge *et al.* 2003). This is a new multi-regional model, in the style of the Monash Multiregional Forecasting (MMRF) model (Naqvi & Peter 1996; Adams *et al.* 2002). Potentially, it can distinguish 166 sectors and 58 regions. In applications, it is computationally convenient to aggregate the model with the choice of aggregation determined by the focus of the study. Horridge *et al.* (2003) describes the preparation of the master database.

The theory of TERM is much the same as that in national dynamic CGE models such as MONASH (Dixon and Rimmer 2002). Each industry in TERM selects inputs of labour, capital and materials to minimise the costs of producing its output. The levels of output are chosen to satisfy demands and demands reflect prices and incomes. Investment in each industry reflects rates of return and capital reflects past investments and depreciation. However, instead of a commodity being produced by a single national industry, in TERM model the commodity is produced by an industry in each region. Instead of having two sources of supply (domestic and imported), in TERM commodity users have many sources of supply (each region in the chosen aggregation plus imports). Instead of having a single government and a single household, TERM has a national government, state governments and a household in each region. Since TERM contains sub-state regions, state government revenues and expenditures, together with behavioural equations, are mapped from the sub-state to the state level.

TERM can be run in two modes: forecasting and policy. In forecasting mode, it takes as inputs forecasts of macro and trade variables from organisations such as Access Economics (2003) and ABARE, together with trend forecasts of demographic, technology and consumer-preference variables. It then produces detailed forecasts for industries, regions and occupations. In policy mode, it produces deviations from forecast paths in response to shocks such as changes in taxes, tariffs, technologies, world commodity prices and, in agriculture, disease outbreaks.

A.3 The key assumptions

CGE models such as TERM can be run under many different sets of assumptions concerning macro- and micro-economic behaviour. The key assumptions underlying our simulation of the effects of the proposed rollout of a competitive DSL network to all 650 band 1 and 2 exchanges on further broadband network roll out, are as follows.

Public expenditure and taxes

We assume that the project makes no difference to the path of real public consumption with changes in budgetary balances arising from changes in the level of economic activity.

Labour market

The regional labour market adjustment mechanism, in levels, is given by:

$$(1) \quad \left(\frac{W_t^r}{Wf_t^r} - 1 \right) = \left(\frac{W_{t-1}^r}{Wf_{t-1}^r} - 1 \right) + \alpha \left(\frac{EMP_t^r}{EMPf_t^r} - \frac{LS_t^r}{LSf_t^r} \right)$$

The interpretation of equation (1) is that if the deviation shock weakens the labour market in region r and period t relative to forecast, real wages W_t^r in deviation will fall relative to forecast Wf_t^r . In addition, there will be an initial enlarged gap between labour market demand EMP_t^r and supply LS_t^r , relative to forecast levels $EMPf_t^r$ and LSf_t^r . In successive years, the gap between demand and supply will gradually return to forecast through a further decline in real wages. The speed of labour market adjustment is governed by α , a positive parameter.

The regional labour supply equation is:

$$(2) \quad \frac{LS_t^r}{LSf_t^r} = \frac{(W_t^r)^\gamma}{\sum_q (W_t^q)^\gamma S_t^q} \bigg/ \frac{(Wf_t^r)^\gamma}{\sum_q (Wf_t^q)^\gamma Sf_t^q}$$

The deviation in regional labour supply from forecast depends on the deviation in regional relative to national real wages from forecast. In (2), $\sum_q (W_t^q)^\gamma S_t^q$ is a measure of labour responsiveness to real wages summed across all regions, where γ is a positive parameter and S_t^q the share of region q in national employment. This equation implies that should the deviation in real wages in a region fall relative to the deviation in national real wages from forecast, its labour supply will fall, while that in other regions will rise. Combining (1) and (2), adjustment in the labour market in a given region will initially occur via a combination of additional unemployment and lower real wages. Unemployment will eventually return to forecast rates, with lower real wages. As real wages fall relative to control, the region's labour supply will also fall. Within this theory, long run labour market adjustment occurs as a combination of inter-regional labour migration and changes in regional real wage differentials.

Rates of return on industry capital stocks

In simulations of the effects of shocks, TERM allows for short-run divergences in the ratios of actual to required rates of return from their levels in the base case forecasts. Short-run increases/decreases in these ratios cause increases/decreases in investment. Movements in investment are reflected with a lag in capital stocks. These adjustments in capital stocks gradually erode initial divergences in the rate of return ratios.

Production technologies

TERM contains variables describing: primary–factor and intermediate–input–saving technical change in current production; input–saving technical change in capital creation; and input–saving technical change in the provision of margin services (e.g. transport and retail trade). In our simulation, all these variables are held on their base case forecast paths except for telecommunications productivity.

A.4 References

Adams, P., Horridge, M. Wittwer, G. (2002), *TERM–Green: A dynamic multi–regional applied general equilibrium model of the Australian economy, based on the MMR and MONASH models*, prepared for the Regional GE Modelling Course, 25–29 November 2002.

Dixon P.B. and Rimmer, M.T. (2002), *Dynamic General Equilibrium Modelling for Forecasting and Policy: a Practical Guide and Documentation of MONASH*, Contributions to Economic Analysis 256, North–Holland Publishing Company, Amsterdam.

Horridge, M, Madden, J. and Wittwer, G. (2005), “Using a highly disaggregated multi–regional single–country model to analyse the impacts of the 2002–03 drought on Australia”, *Journal of Policy Modelling* 27(3):285–308, May.

Naqvi, F. and Peter, M. (1996), ‘A Multiregional, Multisectoral model of the Australian Economy with an Illustrative Application’ *Australian Economic Papers*, 35, 94–113.

Appendix B

Problems with wholesale LCR pricing

B.1 Key principles for determining the wholesale LCR price

The wholesale service for the provision of local call resale (LCR) is the local carriage service, which was declared in August 1999.³³

The key principles identified by the ACCC for determining a suitable LCR price are:³⁴

- The use of a retail minus retail cost (RMRC) pricing methodology. Under this methodology, the access price is determined by deducting the access provider's retail costs from the retail price for a given service;
- The use of Telstra's average retail costs estimated by the ACCC rather than its retail costs actually avoided.³⁵
- The application of the RMRC in two ways – at least one of the options is to be provided by the access provider. Under each option, wholesale local call and wholesale basic access prices are calculated as follows:

Option 1 If no retail discount on line rental is forthcoming, a further retail discount on the local call price (equal to line related retail costs expressed on a per call basis) should be applied:

$$1a) \text{ Wholesale local call price} = \text{Unbundled retail local call price} \\ \text{minus local call retail cost minus} \\ \text{basic access retail costs (in per} \\ \text{call terms)}$$

$$1b) \text{ Wholesale basic access price} = \text{Unbundled retail basic access} \\ \text{price}$$

Option 2 The subtraction of average retail costs from *unbundled* retail local call prices that are associated with particular line rental offerings:

$$2a) \text{ Wholesale local call price} = \text{Unbundled retail local call price} \\ \text{minus local call retail cost}$$

$$2b) \text{ Wholesale basic access price} = \text{Unbundled retail basic access} \\ \text{price minus basic access retail} \\ \text{cost}$$

³³ ACCC, *Declaration of Local Telecommunications Services*, July 1999.

³⁴ See ACCC, *Final Determination for model price terms and conditions of the PSTN, ULLS and LCS services*, October 2004.

³⁵ Retail costs are the costs corresponding to the retail activities associated with the supply of local calls to end-users. They include the cost of billing, marketing, and providing customer support and other retail functions;

While both pricing options are considered appropriate by the ACCC, Telstra has made a wholesale LCR Undertaking with reference only to Option 1, and only with respect to the per call wholesale price i.e. a price of 13.61 cents per call, for both residential and business customers, for 2003–04 and 2004–05. This Undertaking has been accepted by the ACCC.³⁶ Telstra did not make an Undertaking with respect to the wholesale price of line rental, which, despite Telstra being the monopoly provider, is not a declared service, and so the price is not regulated. As discussed below, this provides Telstra with the opportunity to act anti-competitively vis à vis its competitors, who are its wholesale customers for LCR.

The ACCC has indicated that the RMRC methodology for determining the LCR access price is used to ensure competitive neutrality between access seekers and Telstra where the cost of a local call is greater than the retail price.³⁷ In this regard, the retail price must be consistent with the retail price controls faced by Telstra and in particular may not be greater than 20 cents per call (or 22 cents including GST).

B.2 Problems with application of the RMRC methodology

There are three particular inadequacies with the way in which the ACCC applies the RMRC to price the wholesale LCR. These directly affect the ability of an access seeker to compete effectively in the provision of the LCR and other related telecommunications markets. The concerns are:

- the level at which the access price is set does not allow competitors to break-even, and therefore, reduces their ability to build their own facilities; and
- under the current application of the RMRC, Telstra is able to potentially price squeeze its competitors, that is, act in an anti-competitive manner.

Each of these issues is discussed, in turn.

Competitors cannot break-even, reducing their incentive to invest in their own facilities

The ACCC states that:

Since the implementation of [LCR] pricing principles, it has been clear that competitive entrants are not able to break even reselling [local calls] alone, nor by bundling [local calls] and line rental.³⁸

This is because, according to the ACCC, Telstra resells local calls at a price below the current access cost due to the imposition of retail price cap on the local call price of 22 cents.

The ACCC is aware that the access price set under RMRC, while allowing entry into the LCR market, is not attractive in terms of encouraging efficient investment in facilities for the provision of local calls. In particular, the ACCC concedes that:

³⁶ ACCC, *Assessment of Telstra's undertakings for PSTN, ULLS and LCS Final Decision*, December 2004, p13.

³⁷ ACCC, *Local Service Review 2005*, An ACCC Discussion paper, April 2005, p.7.

³⁸ ACCC, *Local Services Review 2005*, An ACCC Discussion Paper, April 2005, p.3.

If Telstra is required to price below TSLRIC++ for local calls by the retail price control, new investment by either Telstra or its competitors may be discouraged. It does not appear that the use of TSLRIC++, or retail-minus pricing for that matter, will overcome this potential problem.³⁹

However, the ACCC believes that, nonetheless, resale entry may provide an expeditious step-up to facilities-based competition:

... resale entry reduces the risks associated with network investment due to significant sunk costs and acts as a 'stepping stone' to facilities-based competition. Consequently, the retail-minus pricing methodology may in fact promote facilities-based investment.⁴⁰

The ACCC's line of logic, however, fails to recognise the basic steps involved in the transition from a resale strategy to an own facilities-based strategy. Importantly, the level at which the access price for the LCR is set is a fundamental component to the possibility of an eventual roll-out of new and alternative networks. The reason for this is that economies of scale are significant in the provision of telecommunications services; therefore, a sufficiently large customer base needs to be established in order to justify further expansion. The level at which the access price for LCR is set will determine the extent, and speed at which a profitable customer base can be established.

Once the customer base has reached a sufficient size, it becomes profitable for the operator to build new infrastructure, and to eventually migrate customers across from the incumbent's network to their own network. In this regard, the ACCC's reasoning does not account for the fact that the access price for the LCR – the initial and fundamental starting point for an entrant – must be set correctly in order for a competitive outcome to result.

Therefore, while the wholesale provision of LCR may create an *incentive* for a competitive entrant to build its own DSL network, the *ability* to build such a network will be hampered by the slow growth of that entrant's customer base, where that slow growth is caused by inappropriately determined high wholesale LCR price.

Potential anti-competitive behaviour

Telstra can act in an anti-competitive manner by creating an environment where access seekers' unbundled offerings are relatively less attractive than its bundled offering by:

- Decreasing its bundled local call price relative to the unbundled local call price, without any corresponding increases in the prices of other services in the bundle;
- Bundling other services with fixed-line telephony (this allows Telstra to, indirectly, further reduce bundled local call or line rental prices); and
- Increasing the price of line rental on its unbundled offering relative to the bundled offering.

³⁹ ACCC, *Local Carriage Service pricing principles and indicative prices, Final Report (revised)*, April 2002, p.18.

⁴⁰ ACCC, *Local Carriage Service pricing principles and indicative prices, Final Report (revised)*, April 2002, p.18.

The first two effects result in making the Telstra bundled offering more attractive to consumers relative to the competitors' bundled offering, given that the access price of the LCR is based on the *unbundled* local call price. The third effect makes unbundled service offerings, whether provided by Telstra or access seekers, less attractive relative to a bundled offering. These three effects, therefore, create a situation where a consumer will tend to prefer not only a bundled service offering (which is not, in itself, anti-competitive, but compounds the anti-competitive behaviour), but also views the Telstra bundled offering as the more attractive service offering (which is potentially anti-competitive).

The potential for Telstra to act anti-competitively exists because the ACCC, in its application of the RMRC methodology, has chosen Telstra's unbundled retail price as the basis for the wholesale price of local calls. The problem lies in the fact that the unbundled price does not accurately reflect Telstra's pricing structure at the retail level. Telstra can profitably offer lower retail local calls in its bundled packages, but its competitors cannot because the wholesale LCR price is based on Telstra's now higher unbundled local call price.