A Regulatory background

This appendix provides an overview of the development of telecommunications policy in Australia in recent decades. It draws on a number of government policy statements and other reports to give some context to the issues discussed in the body of this report. The appendix ends with a brief overview of the main elements of the current regulatory regime. Their implications for competition regulation are examined in the main body of the report.

A.1 Introduction

Telecommunications services in Australia, a Commonwealth responsibility under the Constitution, have long been provided by a government agency on a monopoly basis. From Federation in 1901 until 1975, this was the responsibility of the Postmaster-General's Department.

In 1975, in response to the Vernon Commission of Inquiry into the Australian Post Office, the Government established the Australian Telecommunications Commission (which later became Telecom), and gave it responsibility for domestic telecommunications services. International telecommunications remained the responsibility of the Overseas Telecommunications Corporation (OTC), established by the Commonwealth in 1946. Nevertheless, telecommunications remained a government monopoly, albeit subject to price regulation and other constraints on operations.

This appendix provides a brief summary of the processes by which telecommunications in Australia has evolved in recent decades: from originally being supplied by a government monopolist; to the managed competition of the early-to-mid 1990s; to the situation today where greater competition prevails.

Key milestones were the policy changes which took effect in 1991 and 1997, and which continue to have a significant influence over the shape of the industry. The next section looks briefly at developments in the 1970s and 1980s and the lead-up to the 1991 policy changes, while section A.3 examines developments subsequent to 1997. The final section provides an outline of today's regulatory environment.

A.2 Policy changes in the 1970s and 1980s

During the 1970s and 1980s increasing attention was being given to the effects of technological developments — and in particular, advances in microwave, satellite and optical fibre technologies — on the relevance of any 'natural monopoly' conditions in the industry, and on the costs of new entry in some areas. At the same time, demand for reliable, high speed telecommunications services continued to rise.

Moreover, during this time, regulatory attitudes in many countries were being revised. Closer attention was being paid in areas such as aviation, land and sea transport, and finance to the capacity of a less heavily regulated and more competitive industry structure to generate a wider range of services, often at lower costs to users.

In the case of telecommunications, governments and regulators revisited the case for monopoly provision of facilities and services, and in the process, reassessed arguments about the claimed natural monopoly characteristics of parts of the network. In so doing, consideration was being given to the scope to introduce competition in areas such as the provision of handsets, PABXs and value added services such as fax and radio paging.

Government telecommunications providers

During this period, only three telecommunications carriers — all owned and operated by the Commonwealth — were permitted to operate in Australia. Each was limited to a prescribed market and required to complement, rather than compete with, the other carriers:

- **Telecom** had monopoly rights to provide and operate the domestic (non-satellite) network, to install, maintain and operate telecommunications infrastructure, and to attach lines or equipment to the system (or authorise others to do so). It was required to meet the 'universal service' objective of governments to provide reasonable access for all Australians to such services as standard telephones and payphones.
- **OTC** had exclusive rights to provide and operate services over the international network, using terrestrial and Intelsat satellite technologies. But it was prohibited from providing domestic infrastructure, and paid Telecom for the carriage of international traffic over the domestic network.

- **Aussat** was established in 1981 to exclusively own and operate Australia's domestic communications satellite capacity.[1] It was permitted to provide satellite based networks for broadcasting and private network services interconnecting with Telecom, but not permitted to compete with Telecom in the provision of standard telephone services, nor to seek access to international markets outside its prescribed footprint. (Consequently, it provided only marginal competition to OTC.)

Some milestones

Some key developments during this period included:

- the Davidson report of 1982, which recommended opening up the equipment market to allow competition in the resale of telecommunications capacity, permitting the installation of private networks and their interconnection with the public network, and requiring more transparent funding of social objectives (these recommendations were initially rejected, but were later reflected in the 1988 Ministerial Statement);
- the 1988 Ministerial Statement (Evans 1988a), which formalised a trend already underway to open competition in value added services and private networks (this was part of a wider agenda of reforms covering all transport and communications government business enterprises (Evans 1988b));
- the establishment in 1988 of a telecommunications-specific regulator, the Australian Telecommunications Authority (AUSTEL), to administer the new rules put in place in 1988, to protect carriers, consumers and competitors from unfair practices and to promote carrier efficiency and undertake technical regulation;
- changes to the corporate structures of Telecom, OTC and Aussat between 1988 and 1990 to better reflect their status as, respectively, a statutory corporation, a commercial operation and a private company. For example, Telecom was corporatised, and given greater operational freedom, clearer objectives and a more business-like structure;[2] and
- the emerging financial difficulties faced by Aussat.

[1] It was incorporated, and shares held by the Commonwealth (75%) and Telecom (25%).

[2] One such influence was the Commonwealth's 1989-90 Review of Ownership and Structural Arrangements, which looked at the relationship between the three carriers.

Box A.1 **Summary box: pre 1990**

1975	Telecommunications responsibilities were removed from the PMG Department and vested in a new statutory authority, the Australian Telecommunications Commission (Telecom).
1982	The Davidson report recommended opening up the equipment market to allow private networks and competition in the resale of telecommunications capacity.
1988	The May Economic Statement allowed for increased competition in cabling and wiring of customer premises, PABX maintenance and in the supply of the standard telephone.
	Telecom's service provider and regulatory functions were separated.
	AUSTEL was established as the independent industry regulator.

A.3 Initial liberalisation — 1990 to 1996

In November 1990, following considerable debate about the manner in which the long-standing monopoly arrangements for providing basic telecommunications services might evolve into more open competition, the Government announced a package of reforms to promote network competition in telecommunications (Beazley 1990).

Effectively, the *Telecommunications Act 1991* sought to move towards sustainable competition in telecommunications facilities and services by permitting limited infrastructure competition together with full resale of telecommunications services.

New carrier licences

To this end, the Government licensed a limited number of carriers, who were insulated from open competition by being granted certain exclusive rights.

A duopoly in fixed line carriage services was introduced:

- Telecom and OTC were merged in January 1992 to become the publicly owned Australian and Overseas Telecommunications Corporation (AOTC — later known as Telstra).[3]

[3] The two carriers were to continue as separate divisions within AOTC, to avoid any cross-subsidisation. To this end, OTC negotiated a transfer price with the Telecom division for provision of services and access to its domestic network.

- The loss-making Aussat was privatised and formed part of the package for the second carrier licence, awarded to Optus. Optus initially paid Telstra to carry calls on its behalf until its own domestic optical fibre network was operational.[4] AUSTEL arbitrated an initial interconnect price after unsuccessful negotiations between the carriers.

The Government licensed two new mobile carriers, Optus and Vodafone, who commenced operating in 1992 and 1993 respectively. Both initially interconnected to Telstra's mobile network while they established their own infrastructure. All three carriers were required to establish digital networks rather than replicate Telstra's analogue (AMPS) network.

An access regime

Where a carrier 'reasonably requested' another carrier to supply services necessary or desirable for the access seeker to supply its services to its customers, the access provider was obliged do so on terms agreed by the parties or, failing agreement, on terms determined by AUSTEL.

Nevertheless, certain carrier activities were exempt from the TPA, and they had preferential access rights compared to service providers, who:

- were permitted to provide value added services, but could only resell basic carriage services provided by the three carriers; and
- were accorded less regulatory protection than carriers with respect to provision of access necessary to conduct their operations.

The regulatory regime

During this period, the key regulators were AUSTEL (for telecommunications), the Spectrum Management Agency (for radiocommunications) and, to a lesser extent, the Trade Practices Commission (later, the ACCC). A range of reforms was introduced, including financial reporting requirements, price capping and 'ring-fencing' of carrier accounts.

- From July 1992, Telstra and Optus were made subject to a financial reporting regime developed by AUSTEL. This was intended to separate reporting of a carrier's different operations, to increase the transparency of their activities, and to assist AUSTEL in setting the interconnect price, price caps and so on.

[4] Optus was accorded 'rights of way' equivalent to those of Telstra, together with access to Telstra's ducting, towers and other infrastructure.

- Price capping was applied to Telstra, in order to promote affordability. This provided for further real price reductions to a wide range of services.[5]
- Telstra was required to file publicly available tariffs with AUSTEL and not depart from these. Its pricing and other activities were regulated on the basis of its dominance, without the need to show that any such behaviour diminished competition. (But where it was no longer dominant — for example, in mobile telephony after 1993 — this requirement did not apply.)
- From 1994, AUSTEL was empowered to disallow tariffs filed by a carrier dominant in the relevant market. And it could require carriers to unbundle specified services.
- From 1994 to 1999, AUSTEL (and later, the ACA) developed and implemented the new numbering plan for fixed line telephony.
- AUSTEL referred several matters relating to allegations of predatory pricing, refusals to deal, misleading advertising and unconscionable conduct to the Trade Practices Commission.
- Carriers were required to implement industry development plans to support equipment suppliers and value-added service providers. This could involve, for example, helping them to expand their international activities, generate exports and develop software and R&D skills. Later developments in the reform process included the development of guidelines for determining market dominance, and the preselection ballot.[6]

Telstra remained the universal service carrier, required to ensure that the standard telephone service and the payphone service remained reasonably accessible to all on an equitable basis, regardless of geographic location. Telstra's costs for this service were divided amongst itself, Optus and Vodafone on the basis of their share in timed traffic.

[5] This comprised an overall price cap, with sub-caps for international calls, and for a basket comprising connections, rentals and local calls. Moreover, charges for particular services were also constrained.

[6] In August 1991, the (then) Minister for Transport and Communications determined that preselection by subscribers of a carrier (with override codes for the other carrier) was essential to allow equal access to the carriers. AUSTEL determined that a ballot should be used to determine preselection after the two carriers failed to agree on a preselection process.

Box A.2 **Summary box: 1990 to 1996**

1990	Telecom's monopoly on provision of the standard telephone handset ended.
1991	*Telecommunications Act 1991* enabled limited infrastructure competition and full resale of telecommunications services; established a duopoly on the fixed line network until June 1997.
1992	Telecom and OTC were merged to become AOTC (later, Telstra).
	Optus started operation as the second fixed line carrier and as a mobile carrier.
1993	Vodafone commenced services as the third mobile carrier.
1994	A new telecommunications code specified national technical, design, safety, environmental and other standards; it facilitated a national rollout by establishing a uniform national regulatory regime.
1995	COAG signed competition policy agreements. TPA coverage was extended and complementary state legislation introduced.
	For telecommunications, the review of post-1997 arrangements confirmed that the duopoly would end in 1997.
1996	Telstra was floated and shares listed; one-third were sold.
	US Congress passed the *Telecommunications Act 1996*, which opened up local telephone markets and increased competition in long distance markets.

The Competition Principles Agreement

In the mid-1990s, impetus to examine the scope for further competition came from the debates leading up to the Hilmer report of 1993 and the intergovernmental competition principles agreement of 1995.

The Hilmer report questioned the blanket exemption of public monopolies (including those in the telecommunications industry) from trade practices law, calling for exemptions only where public benefit could be shown. It also recommended principles for an access regime for essential facilities that have since been incorporated into trade practices law. However, the report questioned the need for industry specific regulation, preferring general and consistent nationwide competition policy law.

In April 1995, Commonwealth, State and Territory Governments signed a number of agreements designed to broaden the scope of competition policy and extend it to

previously exempt sectors of the economy. In part, this involved amending the TPA and enacting complementary state legislation.[7]

During this period, benchmarking studies had consistently showed that Australia's technical performance in telecommunications services continued to fall short of international best practice against a number of indicators (for example, BIE 1992, 1995a and 1995b).

A.4 Main characteristics of the current regime

The current framework for regulating telecommunications was largely set in place in 1997, when further policy changes intended to enhance competition came into operation.

The *Telecommunications Act 1997* and Parts XIB and XIC of the TPA sought to build on the transitional measures legislated in 1991. The objective was to promote open competition, with an emphasis on services rather than facilities. At the time, the Government said it intended:

> ... that the competition rules for telecommunications will eventually be aligned, to the fullest extent practicable, with general trade practices law. Part XIB will apply for the period from 1 July 1997 until some future review determines that competition is sufficiently established that the Part or some provisions of the Part are no longer needed ... (Trade Practices (Telecommunications) Bill 1996, Explanatory Memorandum, p. 7).

While the 1991 Act licensed a small number of carriers who were insulated from open competition and given certain exclusive rights, the 1997 Act ended the arrangements by which only two players were permitted to offer fixed line communications and three to offer mobile telephony. The Act:

- removed all restrictions on the issue of carrier licences;
- removed or reduced many of the exclusive rights enjoyed by carriers, and made them subject to general competition law;
- put in place a telecommunications-specific access regime under the TPA;
- put in place a telecommunications-specific anti-competitive conduct code under the TPA;
- provided for greater industry involvement in determining codes and standards;
- introduced new administrative arrangements by which government agencies would regulate the industry; and

[7] The *Competition Policy Reform Act 1995* in each jurisdiction.

- tightened certain consumer protection measures, procedures to facilitate customers changing service providers, and price caps at the retail level.

At the same time, Telstra's special position as owner of most of the network led to some additional regulatory requirements being placed upon it, either in its licence conditions or under legislation. These included price controls and provisions relating to tariff filing and digital data capability.

Notwithstanding these arrangements, the presence in the market of a large incumbent which owns much of the telecommunications infrastructure (parts of which may be duplicated by competitors but parts which cannot in any economic way be duplicated) raises the potential for uncompetitive or predatory practices. For such reasons, telecommunications-specific regulations were introduced.

The rest of this appendix looks briefly at the main elements of the current regulatory regime, namely ease of entry, the access regime, the anti-competitive conduct regime, the role of government regulators, preselection and number portability, tariff filing and information requirements, and industry's role in determining codes and standards.

Ease of entry

The regulatory barriers to entry are now very low. While the 1991 legislation allowed for only limited infrastructure competition but full resale of services, the 1997 Act removed the regulatory barriers to becoming a carrier. Consequently, while there were only three licensed carriers between 1991 and 1997, there were 77 at the end of June 2001.[8]

The regulatory regime now distinguishes between:

- *carriers*, who own or operate network units[9] used to supply carriage or content services to the public; and
- *service providers*, being either:
  - carriage service providers (CSPs); or
  - content service providers.

[8] There are very few qualifying requirements to hold a carrier licence.

[9] Broadly, network units are line links exceeding 500 metres, or designated radiocommunications links, such as mobile service base stations, or satellite based facilities.

A carrier is identified only on the basis of its ownership or control of infrastructure.[10] There is no longer a distinction between general and mobile carriers, and only carriers are required to be licensed — service providers are not.

> Carriers ... provide the basic transmission infrastructure on which the supply of carriage and content services to the public rely. Carriers will be individually licensed and subject to charges that recover the costs of regulating the industry. They will also share the net losses incurred in fulfilling the universal service obligation (2nd reading speech).

Both carriers and CSPs require infrastructure, and may require access to someone else's infrastructure to supply a *carriage service* (for example, telephony) or a *content service* (such as pay TV or internet provision). So, for example, pay TV providers and on-line service providers are *both* CSPs and content providers, and in some cases — such as Telstra and Optus — may be carriers as well.[11]

Carriers and CSPs are subject to the access regime laid out in Part XIC of the TPA. Thus, all service providers, including carriers, have the same access rights to declared services. But in addition, carriers have access rights to network information and supplementary facilities.

Carriers have additional rights and obligations relating to ownership of infrastructure. For example, they pay an annual licence fee which includes a contribution to the regulatory costs of the ACA and the ACCC, and they are required to have an industry development plan.

Spectrum limitations

While regulatory barriers to entry are now minimal in many areas, in others such as mobile telephony, the capacity to establish a new network is influenced by the ownership of spectrum (to which rights of access apply), and the amount of new spectrum released by the Government.

- During 1998 and 1999, the ACA auctioned off 'spectrum trading units'[12] in the 800 MHz and 1.8 GHz bands. While it was permissible to use this for any purpose, it was recognised that most bidders were interested in establishing mobile networks to compete against existing mobile carriers.

[10] The owners of pay TV cable are required to be licensed as carriers.

[11] However, free to air broadcasters are expressly exempted.

[12] A right to use a particular bandwidth over a particular geographical area.

- Some spectrum in the 800 MHz band was reserved for new entrants, while there were limits on the amount of spectrum in the 1.8 GHz band that any one bidder was permitted to acquire.
- Other spectrum auctions have since taken place. For example, in 2000 the government auctioned spectrum in the 3.4GHz band, attracting two new entrants to the industry.

Spectrum suitable for 'third generation' (known as 3G or IMT-2000) mobile services and applications was sold by auction during 2001.[13] Broadly, users of such services may simultaneously conduct a voice conversation while accessing a corporate intranet or the internet at access rates of up to 2 Mbps. The spectrum being licensed for 3G services is in the 2 GHz band, consistent with determinations of the International Telecommunications Union. The ACA (2001a) said that:

> By aligning ourselves with most other countries in the world, Australians will gain a range of benefits including early access to equipment, equipment that is relatively cheap because of the economies of scale of worldwide manufacture, and roaming to most countries.

Industry-specific regulation: rights of access

Part IIIA of the TPA provides for a national access regime for a range of infrastructure such as certain rail networks, electricity grids, and water and gas pipelines. It provides an avenue by which an access seeker may use certain infrastructure owned and operated by others. For example:

> ... an electricity generating company may be able to gain a legal right to have its electricity transmitted through another company's electricity grid, in competition with the grid operator and/or other users (NCC 1996, p. 1).[14]

In 1997 a telecommunications-specific access regime (under Part XIC) was established. DCITA said that the need for 'any-to-any' connectivity, and the Government's intention to promote diversity in the carriage and content services available to users:

> ... requires that regulated access rights be established to prevent those owning and controlling networks from taking advantage of this powerful position (2000d).

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[13] The International Telecommunication Union has determined which frequency bands should be made available for third generation mobile telephony. Member nations will then decide upon the allocation of this spectrum.

[14] An access regime provides access not to the infrastructure but to the services it provides. For example, were the electricity generating business to gain a right of access to a grid, this would not allow it to physically operate the grid (NCC 1996, p. 1).

The basic approaches of Parts XIC and IIIA are similar. Both apply to telecommunications, although Part XIC has priority.[15] Part XIC is based on Part IIIA, with some additional measures specific to the telecommunications industry. In part reflecting this, the ACCC said that its approach:

> ... is to give full effect to the provisions of Part XIC, but wherever possible adopt an approach which is consistent with the provisions of Part IIIA. This approach avoids unnecessary inconsistencies and fosters greater certainty as to how the legislation will be interpreted and applied. Furthermore, it recognises Parliament's desire to align telecommunications regulation more closely with general competition regulation (ACCC 1999b, p. 10).

However, unlike Part IIIA, the primary object of Part XIC is to promote *the long-term interests of end-users* of carriage services or of the services they provide.

Services must first be declared

There is no general right of access to telecommunications infrastructure. In the absence of obtaining access to services through successful commercial negotiation, access will only be made available if the service is first 'declared' by the ACCC to be the subject of regulated access. Access obligations apply to carriers and to CSPs (but not content providers).

The ACCC generally undertakes a public inquiry to help judge if declaration is in the public interest. The ACCC must have regard to the objectives of:

- promoting competition in markets for listed services;
- achieving any-to-any connectivity in relation to carriage services that involve communication between end-users; and
- encouraging economically efficient use of, and investment in, the infrastructure by which listed services are supplied. This requires consideration of the technical feasibility of supplying and charging for particular services, the commercial interests of the supplier or suppliers and the impact on incentives for investment in infrastructure.

As part of the transition to the post 1997 regulatory arrangements, 11 services — including originating and terminating access services for PSTN, AMPS and GSM — were deemed to be declared. Another seven have since been added, including:

- ISDN interconnection services over fixed line and mobile networks; and
- the unconditioned local loop.

[15] s. 152CK of the TPA.

Already-declared services which were varied in 1998 after public inquiry were the digital data access service and the domestic transmission capacity service. For example, the ACCC decided to declare intercapital transmission routes, except for those between Sydney and Melbourne, as there could be several competing networks on that route, and regulated access could provide a disincentive to operators to build facilities.

However, after completion of public inquiries, the ACCC refused to declare:

- domestic inter-carrier roaming on digital mobile networks, as it judged that the three existing operators have sufficient incentive to compete against one another;
- long distance mobile originating services; and
- technology-neutral subscription TV service limited to line links.

In two areas, the ACCC decided not to hold a public inquiry to help inform a judgment about declaration. Further details are provided in the main body of this report.

Obligations on access providers

While declaration under Part IIIA only gives rise to a right to negotiate (albeit backed up by compulsory arbitration), once a service is declared under Part XIC, carriers and CSPs supplying that service must supply it (and ancillary services) to requesting service providers:[16]

- on commercially agreed terms and conditions;
- as detailed in an access undertaking; or
- as determined by the ACCC through arbitration.

They are also required to comply with 'standard access obligations', including that:

- the technical and operational quality of the service supplied to the access seeker is equivalent to that which the access provider provides to itself; and
- the access seeker receives the same level of fault detection and rectification that the access provider provides to itself.

[16] This means, for example, that matters which might be left to arbitration under Part IIIA need to be considered in the context of a declaration. For example, the ACCC is required to consider technical feasibility issues and the legitimate commercial interests of the access provider (ACCC 1999b, p. 9).

Access providers may stipulate the terms on which they will give third parties access, by way of an access undertaking which must be assessed by the ACCC to determine whether the terms and conditions it proposes are reasonable (s. 152AH).

The access provider must also provide sufficient information to enable the access seeker to bill its customers. And if a declared service is supplied using 'conditional access customer equipment' (such as a set top box or a smart card), the access provider must supply other services needed to enable the second provider to supply services within the equipment.

Industry-specific regulation: anti-competitive conduct code

In accordance with the competition policy agreements signed by all Australian governments in 1995, the policy changes introduced in 1997 repealed the exemption from Part IV of the TPA which carriers had enjoyed, and brought the regulation of competition in this industry more closely into line with general trade practices law.

Even so, a new, industry specific regime for regulating anti-competitive conduct (Part XIB) was introduced, to operate in addition to Part IV. In its second reading speech, the Government expressed concern about the:

> ... scope for incumbent operators generally to engage in anti-competitive conduct because competitors in downstream markets depend on access to the carriage services controlled by them ... Total reliance on Part IV ... to constrain anti-competitive conduct might, in some cases, prove ineffective given the still developing state of competition in the telecommunications industry (p. 2).

Part XIB specifies that:

> A carrier or carriage service provider must not engage in anti-competitive conduct.

Broadly, a carrier or CSP which has a substantial degree of power in a telecommunications market will be in breach of Part XIB if it takes advantage of that power with the *effect, or likely effect,* of substantially lessening competition in a telecommunications market. (This approach may be distinguished from Part IV of the Act, which requires conduct to be judged with respect to the *purpose* of the carrier or carriage service provider engaging in the conduct.)

Part XIB is implemented by way of 'competition notices' issued by the ACCC, with substantial penalties for non-compliance.

The role of the Government regulators

Until 1989, Telecom provided and operated the network, and regulated interconnection to it.

From that date until 1997, the industry was regulated by a telecommunications-specific body, AUSTEL. But in 1997, responsibilities were reallocated, AUSTEL closed down, and some of its functions transferred to the ACCC. At the same time, the Spectrum Management Authority was subsumed into the newly-formed Australian Communications Authority (ACA).

Today, there are three government agencies which have specific responsibilities with respect to telecommunications:

- the ACCC (competition issues);
- the ACA (consumer, technical and spectrum issues); and
- the Telecommunications Industry Ombudsman (TIO) (which provides a complaints mechanism).

The ACCC has general responsibilities with respect to anti-competitive conduct, together with some that are specific to this industry, namely Parts XIB and XIC of the TPA and certain provisions of the *Telecommunications Act 1997*. Primary among these are to:

- undertake investigations to decide if services should be declared under the access regime;
- seek information from parties in the course of investigations;
- review undertakings;
- arbitrate when disputes arise;
- administer the anti-competitive notices regime;
- bring enforcement action; and
- provide ex ante advice on pricing rules to guide the regulatory process (for example, total service long run incremental cost for determining interconnection access pricing).

Moreover, while the ACA has particular responsibilities (see box A.3), it is required to consult with the ACCC and must comply with its directions in making any decisions which may have an impact on competition. The ACA also has a pivotal role with respect to industry codes and standards (see below).

The TIO was established by the Commonwealth in 1993 to resolve disputes between telecommunications companies and residential and small business customers. In 1997 its jurisdiction was extended to include ISPs. All carriers and service providers are required to be members, and they fund it on the basis of the number of complaints made about them.

Pre-selection and number portability

The *Telecommunications Act 1997* provides for both number portability and carrier pre-selection. These requirements are intended to promote competition by facilitating choice and reducing switching costs for consumers. With number portability and pre-selection, customers can change carriers without having to change telephone number of dialling extra digits each time they make a call.

Box A.3 **The regulators and their responsibilities**

ACA	Management of the radiocommunications spectrum (including allocation of licences, preparation of spectrum plans, auctions)
	Technical regulation (eg management of interference, technical codes and standards)
	Consumer safeguards
	Management of the numbering plan
ACCC	Telecommunications anti-competitive conduct regime (Part XIB of the TPA)
	Telecommunications access regime (Part XIC)
	General competition law and consumer protection responsibilities
TIO	Resolves disputes between telecommunications companies (including ISPs) and residential and small business customers. Arbitrates on the basis of what is fair and reasonable, rather than from a strictly legal perspective.

Tariff filing directions and record keeping rules

Access to information on market conduct is important to enable the ACCC to administer its responsibilities. It may:

- require Telstra to file tariffs with the regulator in regard to its basic carriage services, unless the ACCC exempts it from this obligation;
- direct any carrier or CSP with a substantial degree of market power to file tariff information; and
- set rules regarding the way carriers or CSPs keep records.

This information can be used to identify the costs of providing services, and assist in assessing access undertakings and arbitrations. The ACCC may also determine that disclosure of certain reports, or extracts from them, may occur on the grounds that it would foster competition or enhance the operation of Parts XIB or XIC of the TPA or relevant parts of the *Telecommunications Act 1997*.

Retail price controls

Price controls have been a feature of the regulatory environment since 1989. While many are specific to Telstra, some apply to all carriers (for example, a requirement to provide untimed local calls for voice and data to residential and charity customers, and for local voice calls to business customers).

Telstra is subject to a range of price-capping and price control arrangements until 30 June 2002.[17] For example, it must not charge more than 40 cents for untimed local calls made from public payphones nor more than 22 cents for untimed local calls made from private telephones.[18] Telstra also faces a cap of CPI minus 5.5 per cent on a basket of eight services.[19] Moreover:

- it cannot increase prices beyond the annual increase in the CPI for a basket of line rentals and local calls and a basket of connection services;
- a cap of CPI minus 1 per cent applies to a basket of fixed line services for residential customers;[20] and

17 These arrangements have been reviewed by the ACCC, which recommended substantial changes. The Government extended existing price controls to 30 June 2002 to provide time for further consultation on the ACCC's recommendations.

18 And Telstra must ensure that the average price for untimed local calls provided in non-metropolitan areas in a fiscal year does not exceed the average price levied in metropolitan areas in the previous fiscal year.

19 Namely, digital mobile phone services, fixed line connections, domestic leased lines, international leased lines, line rentals, local calls, trunk and international calls.

20 Namely, connections, line rentals, local, trunk and international call services, with revenue weights set at the average for the bottom 50 per cent (by bill size) of Telstra's preselected residential consumers. Telstra is also required to satisfy the ACCC that it has made arrangements to ensure the bottom 10 per cent of its residential customers will not face real increases in their bills before it can increase the line rental charge by more than the CPI.

- line rentals for the bottom 10 per cent of residential customers must not increase by more than the CPI in one year.[21]

Telstra also requires ministerial approval to impose or alter a charge for directory assistance services.

Box A.4 **Summary box: 1997 to date**

1997	*Telecommunications Act 1997* came into force on 1 July.
1998	Telstra estimated that the cost of providing universal services was $1.8 billion. The Government capped the USO cost at $253 million.
	The ACCC issued its first competition notice — against Telstra over access provider services for the internet (May).
1999	Auction of mobile telephony spectrum.
	Sale of second tranche of Telstra shares.
	AMPS mobile service phased out (with minor exceptions).
2000	Final ACCC determination on Telstra's undertakings on wholesale charges to competitors using its domestic PSTN originating and terminating services.
	The Government announced it would put the USO out to tender.
	Public inquiry into telecommunications service provision (Besley 2000).
	65 carriers licensed by the end of the year.
2001	Auction of 3G mobile telephony spectrum (3.4GHz).
	Auction of datacasting licences (7 MHz bandwidth in television broadcasting bands; two licences in each of eight geographical areas) cancelled due to the small number of bidders.
	The Government announced it will amend the TPA to streamline procedures under the telecommunications access regime (Part XIC), primarily to speed up arbitration processes.

A greater role for industry in determining codes and standards

The current regulatory framework seeks to promote greater industry involvement through industry initiated and developed codes of practice. It makes use of:

- requirements embodied in legislation (generally in licence conditions);
- *technical standards* determined by the ACA;

[21] Unless the ACCC is satisfied that products or arrangements are in place to ensure that these customer bills do not, on average, increase by more that the CPI.

- *industry standards* determined by the ACA; and
- *industry codes* determined by the industry, in consultation with consumers, the public and the regulators.

Regulators supervise, approve and in some cases direct the processes for developing industry codes and standards, and retain 'safety net' powers where these fail.

Broadly, the ACA may make technical standards with respect to such matters as protecting the integrity of a network or facility and protecting the health or safety of operators and users. To this end, it works with industry (through the Australian Communications Industry Forum and Standards Australia).

The ACA is permitted to make technical standards about the interconnection of facilities, but only if it has been directed to do so by the ACCC (s. 373 of the *Telecommunications Act 1997*).

Industry has primary responsibility for developing industry codes about such matters as customer information, privacy, complaints handling and reporting and 'churning' and disconnection of customers. When agreed upon, an industry code may be registered with the ACA, which needs to satisfy itself that it meets public interest considerations without imposing undue financial and administrative burdens on the industry.

Other matters

Other planks of the current regulatory regime include:

- *Industry policy*: carriers are required to lodge industry development plans, which are intended to assist the development of the Australian telecommunications industry by encouraging them to undertake activities which contribute to the growth of the industry in Australia through strategic commercial relationships, research and development activities, export development plans, and employment opportunities and training;
- *Powers and immunities*: the immunity from state and territory planning laws once enjoyed by carriers has been removed, and immunities are now generally confined to construction of facilities considered to be 'low impact' in nature. Carriers must comply with Ministerial code of conduct and statutory conditions.
- *Universal service arrangements*: the universal service regime has been extended to include the digital data service obligation which aims to ensure that a 64 kbps data capability be available under the scheme. Both the universal service obligation and the digital data service obligation are funded through a levy on carriers (and in the future also carriage service providers) on the basis of their

respective share in total 'eligible' telecommunications revenue. To date, Telstra remains the sole universal service provider and it remains to be seen whether the newly introduced contestability arrangements will see entry into universal service provision (see chapter 18).

B Participation

The Commission received its terms of reference on 21 June 2000. The inquiry was advertised, and an issues paper was distributed widely. During the inquiry the Commission and/or its staff held informal discussions in person with a range of organisations (24 in total — section B.1) and held public hearings, both before and after the draft report (section B.2). In addition, a total of 121 submissions were received (section B.3) — 57 of these were received subsequent to finalisation of the draft report. The Commission is grateful to all those who participated in the inquiry.

On 3 January 2001, the Government added two items to the inquiry's terms of reference. On 7 January, the Commission released a second issues paper on these matters, inviting submissions. It also undertook further discussions with interested parties. Submissions received on these matters are included in the following list.

A draft report was released in March 2001. Submissions commenting on the draft were invited and public hearings were held.

All public documents, including the issues papers, the draft report, submissions and transcripts of public hearings, were made widely available, and the inquiry website has been heavily visited.

B.1 Informal discussions

AAPT
Australian Subscription Television & Radio Association
Austar
Australian Communications Authority
Australian Communications Industry Forum
Australian Competition and Consumer Commission
Australian Telecommunications Users Group
Cable & Wireless Optus
Crown Castle Australia
Department of Communications, Information Technology and the Arts
Ericsson Australia
Foxtel
Hutchison Telecommunications
Macquarie Corporate Telecommunications
The Movie Network
Neighborhood Cable

Network Economics Consulting Group
New Zealand Government representatives
PowerTel
SaskTel
Service Providers Industry Association
Telstra
TransACT Communications
Vodafone

B.2 Participants in the public hearings

Sydney, 14 August 2000

Telstra
Vodafone
Cable & Wireless Optus
AAPT

Sydney, 15 August 2000

Macquarie Corporate Telecommunications
Consumers' Telecommunications Network
Australian Telecommunications Users Group
Davnet Telecommunications
Institute of Public Affairs
FlowCom

Sydney, 16 August 2000

One.Tel
Austar
PowerTel
Primus Telecom

Sydney, 14 May 2001

Telstra
Cable & Wireless Optus
AAPT

Sydney, 15 May 2001

Paul Budde Communication
Institute of Public Affairs
Fox Sports
PowerTel
Primus

Sydney, 16 May 2001

Vodafone
Network Economics Consulting Group
Consumers' Telecommunications Network
Austar
Australian Telecommunications Users Group

B.3 Submissions

Note: Submissions indicated as 'DR' were received subsequent to finalisation of the draft report in March 2001.

Participant	Submission no.
AAPT	7, 41, 58, DR73, DR100
Austar United Communications	19, 60, DR79, DR110, DR118
Australian Broadcasting Authority	59
Australian Business Limited	31

Participant	Submission no.
Australian Communication Exchange	61
Australian Communications Authority	10, DR99
Australian Competition and Consumer Commission	16, 40, 57, 62, DR98, DR113, DR114
Australian Consumers' Association	30, DR89
Australian Football League	DR83
Australian Information Industry Association	DR104
Australian Security Intelligence Organisation	37
Australian Telecommunications Users Group	4, 52, DR69, DR87, DR94
Balanced State Development Working Group	55, DR93
BHP Billiton	DR103
C7 Pty Ltd.	DR107, D121
Cable & Wireless Optus	8, 25, 54, 63, DR72, DR81, DR95, DR111
Communications Law Centre	DR116
Consumers' Telecommunications Network	17, DR76
Crown Castle Australia	DR88
Davnet Telecommunications	13
Department of Foreign Affairs and Trade	46, DR84
Geoff Edwards (University of California, Berkeley)	47
Ericsson Australia	23, DR86
FlowCom	12
Fox Sports	DR77
Foxtel	DR92, DR120
Gilbert, R. S.	28, 51, 64
Hutchison Telecommunications	6
iiNet	5
Institute of Public Affairs	20, 29, 48, DR68, DR96
KPMG Consulting Australia	50
Legg, Michael	DR85
Lloyd, R.	27
Macquarie Corporate Telecommunications	11, 34, 44, DR97
Network Economics Consulting Group	DR75, DR80, DR108, DR119
News Ltd	DR105
Northern Territory Government	22
Omnicall	1
One.Tel	18

Participant	Submission no.
Paul Budde Communication	3, 49, DR67
Perkins, Brian	DR91, DR112
PowerTel	14, 35, 53, DR74, DR102
Primus Telecom	DR109
Queensland Government	39
SaskTel International	DR65, DR90
Service Providers Industry Association	9, DR78
Standards Australia	32
Tasmanian Government	36
Tedicore	DR82
Telstra	2, 21, 24, 38, 42, 43, DR66, DR71, DR101, DR115, DR117
Small Enterprise Telecommunications Centre	33
Vodafone	15, 45, DR70, DR106
Western Australian Department of Commerce and Trade	56
Windham, Deidre	26

B.4 Research team

The following staff assisted in the preparation of this report:

Ralph Lattimore	Assistant Commissioner
John Williams	Inquiry Research Manager
Ross Wilson	Inquiry Research Manager
Jim Roberts	Inquiry Research Manager
Graham Blinman	Research Manager
Robert Phillips	Senior Research Economist
Claudia Leslie	Research Economist
Cath Knox	Research Economist
Dominique Lowe	Research Economist
Salim Mazouz	Research Economist
Lynette Williams	Administrative Support Officer

C Networks deployed by carriers

The infrastructure in place or being deployed by incumbent and new carriers differs in many dimensions, such as:

- *network segment* — long-haul networks between major capital cities, backbone networks in CBDs and metropolitan areas, customer access networks;
- *transmission technology* — fibre optic cable, hybrid fibre coaxial (HFC) cable, fixed wireless (local multipoint distribution service, LMDS), cellular mobile, satellite; and
- *geographical coverage* — national, inter-city, CBD, metropolitan, regional.

This appendix looks at the main players in the following market segments — long-haul backbone networks, CBD networks and metropolitan customer access networks, regional and rural networks, and cellular mobile networks. The full list of licensed carriers (at end June 2001) is provided in box C.1.

Since this appendix was initially compiled for the Commission's draft report, a report on telecommunications infrastructure in Australia prepared by BIS Shrapnel for the ACCC has been published (BIS Shrapnel 2001). That report offers a comprehensive description of existing and planned telecommunications infrastructure, classified by the type of technology employed. This appendix should be viewed as a broad overview of networks deployed or planned by carriers, with greater detail available from the BIS Shrapnel report.

C.1 Long-haul backbone networks

The carriers currently operating domestic trunk infrastructure and others that are building trunk networks are listed in table C.1. The most extensive network is that of the original incumbent Telstra, which has fibre optic and microwave networks linking all capital cities and main regional centres. Optus, the second largest network owner, has a national fibre optic backbone stretching from Brisbane to Perth via Sydney, Canberra, Melbourne and Adelaide. PowerTel, the third major infrastructure owner, completed its fibre optic link between Melbourne, Sydney and Brisbane in June 2000 and has also rolled out fibre optic networks in these three capital cities.

Box C.1 List of licensed carriers — to end June 2001

Date granted		*Carrier name*
1 Jul 1997	1	Telstra Corporation Ltd
1 Jul 1997	2	Optus Networks Pty Ltd
1 Jul 1997	3	Optus Mobile Pty Ltd
1 Jul 1997	4	Vodafone Pacific Pty Ltd (formerly Vodafone Pty Ltd)
1 Jul 1997	5	AAPT Ltd (formerly AAP Telecommunications Pty Ltd)
1 Jul 1997	6	Primus Telecommunications Pty Ltd
1 Jul 1997	7	Optus Vision Pty Ltd
1 Jul 1997	8	Telstra Multimedia Pty Ltd
25 Jul 1997	9	Horizon Telecommunications Pty Ltd
19 Aug 1997	10	OMNIConnect Pty Ltd
27 Aug 1997	11	Uecomm Ltd (formerly Ue Comm Ltd)
4 Sep 1997	12	Windytide Pty Ltd
3 Dec 1997	13	Northgate Communications Australia-Ballarat Pty Ltd **a**
18 Dec 1997	14	Macrocom Pty Ltd
2 Mar 1998	15	Oz Telecom Pty Ltd
24 Mar 1998	16	WorldCom Australia Pty Ltd
2 Apr 1998	17	Iridium South Pacific Pty Ltd **b**
1 May 1998	18	PanAmSat Asia Carrier Services Inc
6 May 1998	19	PowerTel Ltd
15 May 1998	20	Agile Pty Ltd
2 Jun 1998	21	NewTel Networks Pty Ltd (formerlyXinhua News Telecommunications Pty Ltd)
28 Jul 1998	22	Amcom Telecommunications Pty Ltd (formerly Amcom Pty Ltd)
1 Sep 1998	23	Davnet Telecommunications Pty Ltd (formerly Davnet Pty Ltd)
22 Sep 1998	24	SCCL Australia Ltd
30 Sep 1998	25	Hutchison Telecommunications (Australia) Ltd
26 Feb 1999	26	TransACT Carrier Pty Ltd
19 Mar 1999	27	Soul Pattinson Telecommunications Pty Ltd
25 Mar 1999	28	One.Tel GSM 1800 Pty Ltd
29 Jun 1999	29	Cable and Telecoms Pty Ltd (formerly Commcord Pty Ltd)
1 Jul 1999	30	Ozitel Network Pty Ltd (formerly Communications Site Rentals Pty Ltd) **c**
6 Jul 1999	31	Datafast Carrier Services Pty Ltd (formerly Wideband Access Pty Ltd)
17 Dec 1999	32	ACN 008 889 230 Limited (formerly Neighborhood Cable Ltd)
22 Dec 1999	33	West Coast Radio Pty Ltd
7 Jan 2000	34	Pulsat Communications Ltd
17 Feb 2000	35	Global Dial Pty Ltd
8 Mar 2000	36	Chime Communications (formerly iiTel Pty Ltd)
8 Mar 2000	37	Swiftel Pty Ltd
3 Apr 2000	38	Smart Radio Systems Pty Ltd
3 Apr 2000	39	Ipera Pty Ltd
2 May 2000	40	Broadband Access Pty Ltd
1 May 2000	41	Central Exchange Ltd
2 May 2000	42	Request DSL Ltd
2 May 2000	43	AirNet Commercial Australia Pty Ltd
1 Jun 2000	44	Opentec Pty Ltd
23 Jun 2000	45	XYZed Pty Ltd

a Licence surrendered on 8 March 2000. **b** Licence surrendered on 16 June 2000. **c** Licence surrendered on 31 March 2001.

(Continued next page)

Box C.1 **(Continued)**

Date granted		*Carrier name*
9 Aug 2000	46	Netcare Telecommunications Pty Ltd
9 Aug 2000	47	ARBT Pty Ltd
11 Sep 2000	48	Cable and Telephone Ltd
11 Sep 2000	49	TransACT Capital Communications Pty Ltd
11 Sep 2000	50	Nextgen Networks Pty Ltd
11 Sep 2000	51	Third Rail Australia Pty Ltd (formerly AMX Communications Pty Ltd)
20 Sep 2000	52	Victorian Rail Track (trading as VicTrack)
11 Oct 2000	53	Uecomm Operations Pty Ltd
18 Oct 2000	54	NetComm Ltd **d**
13 Nov 2000	55	ntl Telecommunications
27 Oct 2000	56	Macquarie Corporate Telecommunications Network Carrier Services Pty Ltd
13 Nov 2000	57	ETSA Utilities
17 Nov 2000	58	Pacific Telco Australia Ltd
21 Nov 2000	59	Agility Networks Pty Ltd
27 Nov 2000	60	Telecasters Communications Pty Ltd
27 Nov 2000	61	AARNet Pty Ltd
27 Nov 2000	62	Boeing Australia Ltd
11 Dec 2000	63	Australia-Japan Cable (Australia) Ltd
20 Dec 2000	64	Eftel Radio Pty Ltd (trading as Radiowan)
21 Dec 2000	65	QALA (Australia) Pty Ltd
9 Jan 2001	66	Australian Network Company Pty Ltd
16 Jan 2001	67	eCOM Communications Pty Ltd
25 Jan 2001	68	Chariot Internet Ltd
25 Jan 2001	69	National Power Services
9 Feb 2001	70	Pahth Communications Ltd
15 Mar 2001	71	Powercor Australia Telecommunications Pty Ltd
19 Apr 2001	72	TPG Telecom Pty Ltd
30 Apr 2001	73	Nava Networks Pty Ltd
11 May 2001	74	IP1 (Australia) Pty Ltd
21 May 2001	75	Great Southern Energy
23 May 2001	76	NetComm Broadband Pty Ltd
29 Jun 2001	77	Highlands Internet Pty Ltd

d Licence surrendered on 29 June 2001.

Source: Australian Communications Authority, http://www.aca.gov.au/licence/carrier/carriers.htm

Amcom is undertaking 'last mile' fibre optic rollouts in the CBDs of Perth, Adelaide, Darwin and Hobart, and has commenced construction of a fibre optic link between Melbourne and Adelaide (at a capital cost of around $25 million) as the first stage of a fibre optic backbone between Melbourne and Perth. The vehicle for this project, IP1 (Australia), has recently been awarded a carrier licence. In September 2000, Amcom and PowerTel announced access agreements to each other's networks which, given the complementary coverage of their networks, will allow both companies to deliver end-to-end telecommunications services nationally.

Nextgen Networks has started rolling out a national fibre optic network of approximately 8400 km stretching from Brisbane to Perth, involving an estimated expenditure of $850 million.

Table C.1 **Trunk network carriers (current and planned networks)**
by network type

Type of network	*Carrier*	*Network details*
Fibre optic	Telstra	A fibre optic network in all states and territories, on all major traffic routes.
	Cable & Wireless Optus	Over 8600 km fibre optic backbone linking Brisbane, Sydney, Canberra, Melbourne, Adelaide and Perth.
	PowerTel	2400 km fibre optic backbone from the Gold Coast to Brisbane, and from Brisbane to Melbourne via Newcastle, Sydney and Canberra.
	Amcom	Rolling out a fibre optic backbone between Melbourne and Adelaide as the first stage of a Melbourne-Perth link. Also Perth-Fremantle fibre optic link completed and Perth-Bunbury link planned.
	Nextgen Networks	Rolling out an 8400 km national fibre optic network stretching from Brisbane to Perth.
	Nava Networks	Plans to build a link from Perth to Melbourne as part of a system linking Singapore, Jakarta, Perth and Melbourne.
Wireless	Telstra	A microwave backbone network in all states and territories.
	Macrocom	Microwave network linking Melbourne-Sydney and Sydney-Brisbane. Planning to extend its infrastructure to Melbourne-Launceston-Hobart and Melbourne-Mt Gambier-Adelaide by early 2001.
	Soul Pattinson	Microwave network linking Sydney and Brisbane, with spurring to regional centres; and planning to extend its network north to Cairns and south to Melbourne.
	Horizon	Microwave networks in Victoria.
	ntl Telecommunications	Planning to build a microwave network stretching from Cairns to Hobart.
	Telecasters Communications	Planning to build a microwave network from Brisbane to Cairns.
International connectivity	SCCL Australia	Southern Cross Cable project — a fibre optic submarine cable system connecting Australia, New Zealand and the US west coast. Participants in the consortium are Cable & Wireless Optus, Telecom NZ and WorldCom.
	Australia-Japan Cable (Australia)	Proposing to construct a fibre optic submarine cable system between Australia, Guam and Japan. Shareholders are Telstra, Japan Telecom, Concert NTT Communications, Teleglobe and WorldCom.

Sources: Carriers' websites, carriers' Industry Development Plans (http://www.dcita.gov.au), *exchange* (various issues).

While the most extensive trunk networks are fibre optic, three carriers (Macrocom, Soul Pattinson and Horizon) have constructed microwave backbone networks linking capital cities and some regional centres in Victoria, NSW and Queensland.

Reef Networks has recently completed an 1800 km fibre optic link stretching from Brisbane to Cairns, with the network's capacity to be leased by Cable & Wireless Optus.

Two newer carriers have also announced plans to build microwave networks:

- *ntl Telecommunications* — a joint venture company formed by ntl Australia, WIN Television and Southern Cross Broadcasting. It plans to build a $140 million wireless and fibre network stretching from Cairns to Hobart (http://www.ntl.com.au/australia/press).
- *Telecasters Communications* — planning to construct a carrier grade synchronous digital hierarchy (SDH) broadband network from Brisbane to Cairns using microwave radio technology (*exchange*, 12/25, p. 7).

Some of the newer carriers are deploying networks on major regional routes. For example: AAPT has rolled out fibre optic links on the Melbourne-Geelong and Brisbane-Gold Coast routes; and Amcom has rolled out a fibre optic Perth-Fremantle link and plans to roll out a Perth-Bunbury link.

The AIEAC (1999, p. 62) noted in its inquiry into the supply of bandwidth:

> The majority of carriers that provide national and international long-distance services are leasing capacity rather than investing in their own infrastructure. This situation is unlikely to change in the period 1999-2004.

However, since that inquiry many more licences have been awarded to new carriers planning to build infrastructure in particular segments of the trunk network and other announcements of new networks have been made. If these planned network deployments come to fruition, there will be eight backbone network providers on the heaviest traffic routes — Sydney-Melbourne and Sydney-Brisbane. However, it would also mean five facilities-based carriers on the Melbourne-Perth route, four on the Brisbane-Cairns route, and at least two providers of connectivity between the mainland and Tasmania. While such deployments clearly provide scope for considerable facilities-based competition, the viability of the new networks is based upon predictions of very substantial growth in demand for bandwidth.

C.2 CBD infrastructure

The most intensive deployment of networks by new carriers has been in CBDs, mainly to provide bandwidth for corporate users of data and internet services. Just

as most backbone infrastructure has centred on the Melbourne-Sydney-Brisbane corridor, similarly many new carriers have built infrastructure in the CBDs of these cities (table C.2). But the less populous cities of Adelaide and Perth have also attracted eight or more CBD network providers, and the network deployments of Amcom in the CBDs of Hobart and Darwin provide some competition to Telstra and Cable & Wireless Optus.

Table C.2 **Carriers with networks in capital city CBDs (inc. planned)**

Type of network	*Carrier*	*Sydney*	*Melb*	*Bris*	*Adel*	*Perth*	*Hobart*	*Canb*	*Darwin*
Fibre optic	Telstra	✓	✓	✓	✓	✓	✓	✓	✓
	C & W Optus	✓	✓	✓	✓	✓		✓	✓
	AAPT	✓	✓	✓	✓	✓		✓	
	Primus	✓	✓						
	PowerTel	✓	✓	✓					
	Amcom				✓	✓	✓		✓
	WorldCom	✓	✓						
	Uecomm	✓	✓	✓					
	Swiftel					✓			
	TransACT							✓	
	Macrocom	✓	✓	✓				✓	
Mixed networks (fibre/wireless)	Agile				✓				
	Chime					✓			
Wireless	OMNIConnect		✓						
	Davnet	✓	✓	✓		✓	✓		
	Pulsat [a]	✓	✓	✓	✓	✓			
	AirNet				✓				
	AAPT	✓	✓	✓	✓	✓			
	Datafast		✓						

a Announced on 13 July 2001 that it was planning to sell its telecommunications assets.

Source: Carriers' websites.

The coverage and technology of the CBD networks deployed differ between carriers. For example, some carriers have rolled out fibre optic rings in one or more CBDs, others have wired individual buildings, while others have built LMDS (microwave) or mixed (fibre and microwave) networks to service CBD customers.

Some new carriers that have deployed CBD networks are continuing to expand these networks with intra-city links and extensions into metropolitan areas:

- PowerTel is expanding its Sydney CBD network with links to North Ryde, Parramatta, North Sydney, St Leonards and Chatswood; and its Melbourne CBD network is being extended to St Kilda Road;
- Amcom is extending its Perth, Darwin and Adelaide CBD networks with fibre optic rollouts to most suburbs (it already has 220km of fibre deployed in Perth); and

- Uecomm has fibre optic cable not only in the Melbourne CBD but also covering significant parts of the metropolitan area.

Apart from the main capital city CBDs, Ipera (a Newcastle-based ISP which has acquired a carrier licence) is deploying a broadband network in the CBD of Newcastle (Budde 2000a, p. 118).

C.3 Customer access networks in metropolitan areas

Telstra's ubiquitous fixed copper wire network serves virtually all Australian homes and most Australian businesses. To provide for the uptake of broadband services (such as high speed internet, video on demand, and pay TV), infrastructure providers are deploying a range of cable-based and wireless networks in capital cities and major regional centres (table C.3).

Both Telstra and Cable & Wireless Optus have rolled out HFC cable networks, which are now being used to deliver services other than pay TV, such as telephony and high speed internet:

- Telstra's HFC network carries pay TV services for Foxtel, Australia's largest pay TV provider. Cable modem high speed internet services are available in Melbourne, Sydney and Brisbane, and planned for Adelaide and Perth in 2001 (*exchange*, 12/40, p. 6).
- Cable & Wireless Optus' HFC network provides pay TV (Optus Television), high speed internet services (Optus@Home) and also telephony.

In Canberra, TransACT is rolling out a fibre optic network which is planned to pass approximately 100 000 homes and 14 000 businesses throughout the ACT and Queanbeyan. The planned network offers advantages in several key areas (box C.2).

One new WA-based carrier (West Coast Radio) has rolled out an HFC network in the new housing estate of Ellenbrook in Perth — which will eventually have 10 500 homesites and 30 000 people in the next fifteen years.

In Darwin, Windytide (the carrier licence holder of Austar) has rolled out an HFC network in Darwin, currently offering pay TV services.

AAPT has obtained spectrum in the 28-31 GHz range, and is building a wireless LMDS network to provide high speed data services in major metropolitan areas where buildings are difficult to access and deployment of fibre is uneconomic. Most recently, Agility Networks (a subsidiary of Cable & Wireless Optus) acquired spectrum in the 27GHz bandwidth and is rolling out a LMDS customer access

network across Australia, focusing on the business districts of most capital city metropolitan areas and many regional centres.

Table C.3 **Customer access infrastructure in capital cities**

Type of network	*Carrier*	*Network summary*
Copper wire	Telstra	A ubiquitous fixed wire local loop network in all capital cities and regional towns.
Hybrid fibre coaxial (HFC)	Telstra	Cable network passing 2.5 million homes including most of Sydney, Melbourne, Brisbane, the Gold Coast, plus parts of Adelaide and Perth.
	Cable & Wireless Optus	Cable network passing 2.2 million homes in Sydney, Melbourne and Brisbane.
	Windytide (Austar)	Cable network in Darwin (including the adjacent town of Palmerston) passing 30 000 homes.
	West Coast Radio	Rolling out a cable network in WA's largest new residential development (Ellenbrook in Perth).
	Chime	Plans to jointly develop cable networks in Perth residential estates with West Coast Radio (Broadcast Engineering Services).
Fibre optic	TransACT	Rolling out a fibre optic network in Canberra, with 'fibre to the curb' (FTTC) network architecture and VDSL technology, passing 100 000 homes.
Wireless	AAPT	Rolling out a LMDS network in major metropolitan and regional areas.
	Agility Networks	Deploying a national LMDS network.
	Datafast Carrier Services	Deploying a wireless backbone throughout the Melbourne metropolitan area, and plans for a wireless local loop.
	Netcare	Planning to install microwave links in metropolitan area of Perth and in the south-west region of WA.
	Third Rail	Deploy a nationwide microwave network, using wireless local loop (WLL) technology for last mile delivery.
DSL and related broadband networks	Telstra	Rolling out national ADSL services from August 2000, targeting wholesale and retail markets.
	XYZed (Cable & Wireless Optus)	Planning a national DSL rollout offering wholesale DSL services.
	Primus	Launched ADSL services during 2000 to business (BizJET) and residential (HomeJET) customers.
	Agile	Trialing ADSL in Adelaide and Port Augusta.
	requestDSL	Rolling out DSL services in Perth and ultimately nationwide.
	Macquarie Corporate	Planning to roll out DSL services in selected markets.
	NetComm	Planning a network rollout involving IP switching and routing capabilities and DSL access nodes. The network will be deployed nationally, with capital cities and major rural towns being served.

(Continued next page)

Table C.3 **(continued)**

Type of network	*Carrier*	*Network summary*
DSL and related broadband networks	QALA (Australia)	Planning to build its own xDSL and cable networks, with POPs in Sydney, Melbourne and Brisbane.
	eCOM Communications	Planning to roll out a VoDSL (Voice over DSL) network initially in Sydney, with Melbourne and Brisbane to follow.
	Pahth Telecommunications	Planning to roll out DSL services initially in the Perth metropolitan area, with Adelaide and other cities to follow.

Sources: Carriers' websites, carriers' Industry Development Plans (http://www.dcita.gov.au), *exchange* (various issues), trans., p. 256.

Box C.2 **TransACT network**

The TransACT network has three key features:

- *Advanced network architecture* — it has a 'fibre to the curb' architecture, with fibre taken deep into the network and a dedicated high grade copper wire final link to the user. Very high speed digital subscriber line (VDSL) technology will be used over the final copper segment, with a useable available bandwidth of 36 Mbps downstream and 1 Mbps upstream. The network design does not suffer from disadvantages associated with the shared bandwidth architecture of HFC networks.
- *Full range of services* — services to be provided include permanent high speed internet connection, pay and free-to-air TV, video on demand and telephony.
- *'Open' network* — the TransACT network will be a completely 'open' network, offering carriage services to any company wishing to provide broadband content services.

Source: Eckermann 1999.

Other new carriers such as Datafast Carrier Services (formerly Wideband Access) and Third Rail (formerly AMX Communications) are also deploying wireless networks. In June 2000, Third Rail announced it was trialing Australia's first broadband wireless local loop network (with the assistance of Soul Pattinson Telecommunications and PSINet) as a preliminary to deploying a nationwide wireless network to provide point-to-multipoint transmission of voice, video and data.

Telstra and a number of other carriers are in the process of rolling out DSL networks to provide high speed services over the existing Telstra copper local loop. But not all DSL service providers are targeting the same markets — the most extensive deployments are planned by Telstra, XYZed and requestDSL.

C.4 New networks in regional and rural areas

While most of the new network infrastructure has been deployed in inter-capital backbone routes, CBDs and metropolitan areas of the capital cities, some newer carriers have targeted regional and rural areas to build infrastructure (table C.4).

Several carriers are either in the process of rolling out, or planning to roll out, HFC or fibre optic customer access networks to deliver broadband services. Most notable is Neighborhood Cable, which is rolling out HFC networks in Mildura and Ballarat (as well as the smaller centres of Irymple, Red Cliffs and Ouyen). At end June 2001, its cable networks had passed approximately 42 000 sites with about 120 000 people (Neighborhood Cable 2001a). In what Neighborhood Cable describes as Australia's 'largest regional telecommunications infrastructure deployment', HFC networks are also planned for Geelong, Bendigo, Albury and Wodonga, resulting in an overall customer reach of more than 400 000 people (Neighborhood Cable 2001b).

Also, there some examples of plans to deploy wireless networks and wireless local loop solutions to deliver broadband services — for example, Heartland Communications and Third Rail. Some other organisations not yet granted carrier licences have announced plans to roll out services in regional Australia, including:

- *COMindico* — is deploying Australia's first pure IP network by installing nodes in all 66 Telstra call charging areas throughout Australia, to provide converged voice, data and multimedia services (*exchange* 12/36, p. 3).
- *Bush Telegraph (BushTel)* — plans to use non-line-of-sight wireless local loop equipment interconnected to the COMindico pure IP backbone network to provide telephony and high speed internet access to regional centres in WA and the NT (*exchange* 12/36, p. 2).
- *BinCom Satellite Systems* — based in Perth, BinCom is planning to use a satellite-based network and VSAT (very small aperture terminal) equipment to provide telephony and broadband services to rural Australia (*exchange* 12/36, pp. 6–7). Bincom recently announced that it had cancelled its initial public offering because the minimum subscription amount it was seeking to build the rural VSAT network had not been received by the offer close date (*exchange*, 12/46, p.14).
- *Advanced Cellular Technologies (ACT)* — has acquired the wireless communications infrastructure of NCSS Australia and 90 per cent of Victorian Communications, to offer a broadband wireless network servicing Melbourne and south-eastern Victoria (*exchange* 12/40, pp. 2–3 and 15).

Table C.4 **Some network providers in regional Australia**
by network type

Type of network	*Carrier*	*Network summary*
Copper wire	Telstra	Fixed wire local loop networks in all regional cities and towns.
Cable	Neighborhood Cable	HFC cable networks in Mildura and Ballarat and plans for other regional Victorian cities, including Geelong, Bendigo, Albury and Wodonga.
	Smart Radio Systems	Rolling out a fibre optic network in Cooma using a fibre-to-the-home (FTTH) architecture.
	Cable & Telephone	Planning to roll out an HFC network initially in Kalgoorlie, then expanding to other regional centres in WA and eventually to the Perth metropolitan area.
Wireless	OMNIConnect	Microwave link from Melbourne to Mornington Peninsula.
	Soul Pattinson	Microwave network linking Sydney and Brisbane, with spurring to regional centres along the route.
	Pulsat	Building a nationwide wireless network to provide high quality services to regional Australia.
	Agile	Deploying a microwave network to provide broadband services to the Coorong region, south-east of Adelaide.
	Chime	Deploying mainly wireless technologies to deliver services in remote, regional and suburban centres in WA.
	Swiftel	Plans a wireless network to service regional areas of WA and a fibre optic rollout in Perth.
	AAPT	Plans to target regional and other users with a new LMDS network.
	Netcare	Planning a microwave rollout in rural and regional areas of WA.
	Third Rail	Planning to deploy a nationwide microwave network, using a wireless local loop for last mile delivery.
Satellite or combined satellite/wireless	Cable & Wireless Optus	B3 satellite is dedicated to TV broadcast. Commenced construction of C1 satellite to provide TV, internet, telephony and high bandwidth data communications.
	Austar	Offers a customer access network based on satellite and wireless technologies to deliver pay TV and internet services to regional Australia.
	AirNet	Offers an integrated satellite/wireless network (via a strategic alliance with Auspace) to deliver high speed internet and other services to rural Australia.
	ARBT (Heartland Communications)	Plans to provide telephony and broadband services to rural and regional Australia using satellite technologies.
	Pacific Telco	Planning to provide services to rural and remote areas of Australia using the VIP SatNet (voice over internet protocol satellite network) satellite communications system.

Sources: Carriers' websites, carriers' Industry Development Plans (http://www.dcita.gov.au), *exchange* (various issues).

C.5 Mobile networks

With the closure of the analogue network at the end of 2000, there are two types of cellular digital mobile networks operating — the global system for mobiles (GSM) network and the newer code division multiple access (CDMA) network, which is the replacement for the analogue network (table C.5).

Table C.5 **Cellular mobile network operators (current and planned)**

Type	*Carrier*	*Network summary*
GSM	Telstra	National GSM mobile network covering 95 per cent of the population.
	Cable & Wireless Optus	National GSM mobile network covering 94 per cent of the population.
	Vodafone	National GSM mobile network covering 92 per cent of the population. Globalstar integrated mobile/satellite network providing 100 per cent coverage of Australia.
CDMA	Telstra	Nationwide CDMA mobile network covering 97 per cent of the population.
	Hutchison	CDMA mobile network in and around Sydney and Melbourne.
3G	Qualcomm	Planning to deploy a nationwide CDMA network to provide 3rd generation mobile phone services.
	CKW Wireless	Purchased spectrum in all capital cities.
	Telstra	Purchased spectrum and announced it will choose the appropriate time to build a network having regard to customer demand, international developments and handset availability.
	Cable & Wireless Optus	Purchased spectrum and has yet to announce its rollout plans. In April 2001, announced it had entered into a seven year, $900 million 3G partnership with Nokia.
	Vodafone	Purchased spectrum and announced it expects to provide 3G services in 2004.
	Hutchison	Purchased spectrum to augment previously purchased 1.8GHz spectrum and expects to be an early entrant in the delivery of 3G services.

Sources: Carriers' websites, *exchange*, 13/12, p. 4, http://www.aca.gov.au/media/2001/01-35.htm.

Telstra has virtually completed its new national CDMA mobile network, which has achieved coverage of 97 per cent of the Australian population. Hutchison launched its CDMA network services in June 2000, but is focusing on coverage only of Sydney and Melbourne (a population base of around 8 million people). Hutchison has negotiated a commercial agreement with Telstra under which users can roam on to Telstra's CDMA network outside Hutchison's spectrum licence areas.

Following the collapse of One.Tel in late May 2001, its 'Next Generation' mobile network is now controlled by Lucent Technologies (which had built and funded the network). As of July 2001, there was a possibility that One.Tel's rights to the 1.8GHz spectrum would be bundled with Lucent's network for sale as a package of complementary assets (Lacy 2001c).

AAPT had spent more than $125 million on its own CDMA network up until 31 December 2000. However, Telecom New Zealand (the parent company of AAPT) announced on 3 May 2001 that AAPT and Lucent Technologies had agreed to close down the roll out 'in view of changes now occurring in the Australian mobile telecommunications market' (Telecom New Zealand 2001a).

There were six successful bidders at the Australian 3G spectrum auction held in March 2001 (http://www.aca.gov.au/media/2001/01-20.htm):

- Telstra 3G Spectrum Holdings — paid $302 million for a national 3G licence (all capital cities and regional areas);
- Optus Mobile — paid $249 million for a national 3G licence;
- Vodafone Pacific — paid $254 million for a national 3G licence;
- Hutchison Telecommunications (Australia) — paid $196 million for licences in Sydney, Melbourne, Brisbane, Adelaide and Perth;
- 3G Investments (Qualcomm) — paid $159 million for spectrum in all capital cities; and
- CKW Wireless — paid $9 million for unpaired spectrum in all capital cities.

On 11 May 2001, Hutchison Australia and Telecom New Zealand announced the formation of a strategic alliance for the construction of a network to deliver 3G wireless services from late 2002–early 2003 (Telecom New Zealand 2001b). In April 2001, Cable & Wireless Optus announced it had entered into a seven year, $900 million 3G partnership with Nokia. Qualcomm has announced that it expects to be an early entrant in the delivery of 3G services (some time in 2002).

D Access pricing approaches

D.1 Introduction

This appendix examines and analyses some of the specific access pricing approaches used by the ACCC, with an emphasis on the TSLRIC method.

This appendix explains the concept of TSLRIC (section D.2) and then investigates the major criticisms of the application of TSLRIC (section D.3) — but at a relatively low level of detail, given the extraordinary complexity of the models underlying TSLRIC.

While TSLRIC has been the dominant paradigm for access pricing in Australia, two other approaches have also been used for specific telecommunications services, and these are also discussed briefly (section D.4 and D.5). Finally, section D.6 examines the potential for distortions to arise when the regulator applies different access pricing methods for substitute services.

D.2 The concept of total service long run incremental cost (TSLRIC)

Bottoms-up cost-based access pricing approaches, such as TSLRIC, attempt to estimate the costs of an efficient network — and use this as the basis for access pricing. They are widely applied around the world by regulators. For example, the FCC (the United States) and Oftel (the UK), apply similar bottoms-up methods (Cave 1997 and Melody 1997b).

In an Australian context, many participants supported the TSLRIC approach adopted by the ACCC.

For example, Cable & Wireless Optus (sub. 8, p. 109) argued that:

> Long-run incremental cost models, in line with world's best practice, are appropriate [for] setting interconnection prices for the fixed local loop.

AAPT also argued for cost-based access pricing approaches:

> In AAPT's view, the regulatory environment, by emphasising cost-based pricing of access, is already appropriately structured so as to allow efficient recovery of all reasonably incurred long-term investment costs, while encouraging competition in both access and downstream markets (sub. 7, p. 17).

However, such cost-based access pricing arrangements have been criticised on conceptual grounds (Laffont and Tirole 2000, pp. 7ff; Kahn et al. 1999), for practical reasons and because of concerns about the biases that emerge in their application by regulators. As Melody (1997b, pp. 228–9) notes:

> … it lacks the theoretical precision to permit any claims about optimising resource allocation even under the artificial conditions assumed by the theory.

In an Australian telecommunications context, TSLRIC has been criticised by Telstra (sub. 42, appendix D and sub. 24, pp. 20ff) and Ergas (1998b,c). Their main concern is that the ACCC's application of TSLRIC underestimates the access prices required to provide an adequate commercial return on investment.

How is it defined?

TSLRIC is the change in the long run cost of providing a service, assuming that all other production activities remain unchanged. Thus (based on Baumol and Sidak 1994, p. 57) TSLRIC for a service x is:

$$\text{TSLRIC}_x = \text{TC}(x, y, z\ldots) - \text{TC}(0, y, z\ldots)$$

where TC is the long-run total cost of producing all the services (x,y,z …). The long-run approach means that all of the inputs, including capital, specifically used for producing the service are avoidable — and therefore included in the cost estimate (box D.1).

In a pure TSLRIC framework, common costs are not included, since by definition common costs are in both TC(x,y,z …) and TC(0,y,z …). The term 'total service' indicates that the relevant increment is the entire quantity of the service that a firm produces, rather than a marginal increment above a given level of production.[1] It is the cost the firm would avoid in the long term if it did not provide the service.

[1] In contrast, TELRIC is the incremental or additional cost a firm incurs in the long run to provide a network *element*, assuming all of its other production activities remain unchanged. The US FCC coined the term TELRIC to describe its version of the TSLRIC methodology. TELRIC prices discrete network elements or facilities like the local loop and switching, that have associated functions. The US FCC saw this as easier than directly pricing the functions themselves, as per TSLRIC (FCC 1996, First Report and Order, FCC 96-325). The distinction is somewhat arbitrary. For example, the ACCC has adopted the TSLRIC methodology but has costed network elements (for example, in the case of the local loop).

Box D.1 TSLRIC components — operating, common and capital costs

According to the ACCC, costs that can be included in TSLRIC can be separated into operating costs, capital costs and common costs.

Operating costs are the ongoing operational costs of providing a service, including the labour and materials costs causally related to the provision of the service.

Capital costs often comprise a large proportion of total costs. Asset valuation, rates of return and depreciation are relevant.

- Assets should be valued at their replacement cost, using the best commercially available technology.
- The cost of capital is the opportunity cost of the debt and equity funds to finance the operations of the firm. A weighted average cost of capital can be calculated separating the debt and equity components of capital.
  - The cost of debt financing can be determined by the current effective interest rate of debt held by the firm.
  - The starting point for determining the cost of equity financing can be found from the risk-free rate of return (or from a proxy such as the return on government bonds). If the equity investment involves risk, an increase in the rate of return will be required to cover that risk.
- Depreciation represents the change in economic value of assets used to provide access services.

Common costs are the costs incurred in the provision of a group of services. These costs are incurred if one of any of the services within a sub group are produced and are not avoided unless the production of all the services cease. Such common costs are often incurred when different services use the same network element. For example, the costs of (non-usage based) maintenance of the customer access network (CAN) are common to the provision of local and national calls.

Two types of common costs exist:

- Access related common costs — such as a switch that is used to direct different types of telecommunications traffic; and
- Non access related common costs — such as retail and marketing costs.

TSLRIC costing of a network service includes a contribution to such common costs, although a pure TSLRIC measure would not cover such costs (hence the ACCC's term, TSLRIC+).

The Access deficit is the shortfall in revenue associated with the regulated price of local call rentals. The ACCC includes recovery of a portion of the access deficit for terminating and originating PSTN access — terming the TSLRIC methodology that achieves this as TSLRIC++.

Source: ACCC 1997b, 2000u.

The role of common costs

A pure TSLRIC approach would not provide the access provider with revenue to fund common costs across the aggregate of services. Setting such a regulated price would be inimical to long run supply and, therefore, highly detrimental to economic efficiency. The ACCC has recognised this limitation in the pure TSLRIC approach.

As noted in a World Bank handbook on telecommunications regulation (Intven and Tetrault 2000, p. B14), the versions of TSLRIC and TELRIC (the US alternative) applied by regulators are effectively the same as fully distributed costs. Some criticisms of TSLRIC (for example, by Sidak and Spulber 1998, pp. 404ff) that suggest it is not able to recover common costs are aimed at the theoretical version of TSLRIC, rather than its applied version.

The ACCC incorporates a number of common costs in TSLRIC (box D.1):

- a portion of the common costs that are causally related to the access service — though strictly these would not be included in a pure TSLRIC measure. Accordingly, the ACCC defines an extended cost measure, TSLRIC+; and
- a portion of the line rental deficit arising from regulated line rental prices — the 'access deficit'. The ACCC incorporates both the contributions to common costs and the access deficit in a further extended cost measure, TSLRIC++.

Nevertheless, once TSLRIC includes common costs, then these have to be allocated to particular services. As the ACCC has acknowledged:

> As common costs are not directly attributable to the production of any one service, the allocation of these costs across services is somewhat arbitrary (1997b, p. 31).

A standard approach is the 'equi-proportionate mark-up over directly attributable costs' (ACCC 1997b, p. 31). This involves measuring the directly attributable costs (which exclude common costs) of each service within the group and allocating common costs based on each service's proportion of the total directly attributable costs. This approach is tractable, but arbitrary and inefficient from an economic perspective:

- it may favour rivals (box D.2).
- as noted in chapter 11 and by the ACCC itself (2000g, p. 39) such markups, by ignoring demand conditions, tend to discourage efficiency of use. Its fundamental problem is indicated by the following example. Suppose that two services, A and B, use some common infrastructure and that the directly attributable costs of A is double that of B, as is the demand price elasticity. The ACCC's approach would imply that two-thirds of the common costs should be allocated to A. Yet Ramsey pricing suggests that it is more efficient to allocate

more of the common costs to B than A. This is what a business would have an incentive to do if it were free to allocate its common costs.

Box D.2 Equi-proportional and additive markups to recover common costs

Suppose there are 3 services, q_0, q_1 and q_2, which respectively are local calls and long distance calls supplied by the incumbent, and long distance calls supplied by a rival (or a competitive group of rivals). Let $Q= q_0+q_1+q_2$. For ease of exposition, assume that all directly attributable costs are marginal costs, and that the relevant marginal costs are $2c_0$, $2c_0+c_1$ and $2c_0+c_2$ for the local call, incumbent long distance and rival long distance services respectively. Let *k* denote the common costs to be allocated, and *a* the access charge per unit of output for rivals. In that case, under the additive method for marking up access prices:

$$p_0 = 2c_0 + k/Q;\ p_1 = 2c_0 + c_1 + k/Q;\ a = 2c_0 + k/Q;\ and\ \ p_2 = 2c_0 + c_2 + k/Q;$$

It is clear that with this allocation system, the operator's total costs, including common costs are fully recovered *and* that the ECPR is met, since $a=p_1-c_1$.

In contrast, consider the case where marginal costs are given a uniform markup under the equi-proportional method:

$$p_0 = \beta 2c_0;\quad p_1 = \beta(2c_0 + c_1);\quad a = \beta(2c_0)\quad and\ \ p_2 = \beta 2c_0 + c_2$$

The factor β is selected so that the total revenue equals total cost:

$$\beta 2c_0q_0 + \beta(2c_0 + c_1)q_1 + \beta 2c_0q_2 = 2c_0q_0 + (2c_0 + c_1)q_1 + (2c_0)q_2 + k$$
$$\Rightarrow (\beta - 1)(2c_0q_0 + (2c_0 + c_1)q_1 + 2c_0q_2) = k$$

Now, however, the ECPR is not met since:

$$p_1 - c_1 = \beta(2c_0 + c_1) - c_1 = \beta 2c_0 + (\beta - 1)c_1 = a + (\beta - 1)c_1 \Rightarrow a = p_1 - \beta c_1\ and\ \beta > 1$$

This stems from the fact that under an equi-proportional markup, the marginal cost of the incumbent's downstream business contributes to the recovery of the common cost, but the rival's marginal cost in the downstream business does not. Thus, the equi-proportional approach favours the rival by leading to excessive markups on the incumbent's downstream business.

The ACCC has not used a pure equi-proportional approach (ACCC 2000g, p. 39), since some costs are allocated on a per minute basis. However, overall the approach is not likely to meet the ECPR, which for conditions in which no excess profits have been made, provides a useful rule-of-thumb for competitive neutrality.

Source: Laffont and Tirole 2000, pp. 142–3 and ACCC 2000g, p. 39.

Furthermore, there is an important question about how such common costs are measured in the first place. A major difficulty here is the potential for cost shifting. Cost shifting may arise when some services of the bottleneck facility are regulated,

while others are not. If the carrier cannot keep all the profits from a cost reduction for the regulated service, as it presumably can for the unregulated service, then it faces an incentive to shift costs from the unregulated segment to the regulated one. Regulators then try to stifle such cost shifting through rigid accounting rules (Laffont and Tirole 2000, p. 53). The ACCC's elaborate record-keeping rules are, among other things, intended to achieve this purpose (chapter 6). In particular, the ACCC (2000l, p. 15) has indicated to carriers that they may not allocate more than 10 per cent of total costs to common unattributable costs without justification. One of the advantages of a global cost rule (chapter 11) — if feasible — is that it overcomes the incentives to shift costs in this way, and thereby reduces the need for arbitrary regulatory rulings on where costs can be attributed. On the other hand, it may involve widening the net of regulation to services that are sold in reasonably competitive markets — which may be seen as regulatory overreach.

Efficient forward-looking costs

The feature that most complicates TSLRIC is that regulators cannot base access prices on the observed costs of the incumbent because this creates incentives for inefficiency or cost shifting. If the regulator uses actual costs, then it may have to monitor and limit the record keeping, investment and operational decisions of the incumbent — with all the costs and risks imposed by regulatory command and control.

Accordingly, TSLRIC in practice is based on the total service costs of a *hypothetical efficient* network operator. The imperative to create cost minimising incentives requires the regulator (or its agents) to simulate a notionally efficient virtual network and to use this to estimate the disaggregated costs of the ideal telecommunications network. This involves great detail and its informational requirements are correspondingly large. This also leaves significant scope for disagreement by competing stakeholders over the level of appropriate detail and the settings for key parameters.

The ACCC applies a partially forward-looking approach when estimating costs. Two types of network assumptions are often distinguished in estimating forward-looking costs. First, there is a 'scorched earth' assumption, which calculates costs as if the configuration of the complete network was optimised, taking none of the characteristics of the existing network as given. Second, there is a 'scorched node' approach, which takes much of the existing configuration of the network as given (for example, the location of local exchanges), and seeks to optimise within that configuration. The ACCC costing approach adopts the latter.

Furthermore, there are two assumptions about the 'best' technology. First, the 'best-in-use' technology may be used to estimate costs. Second, an alternative is to base costs on forward-looking technology — the most efficient technology commercially available (but not necessarily in use). The ACCC uses the first approach.

Accordingly, the ACCC's approach can be characterised as a weak form of the forward-looking approach. It estimates costs based on best-in-use technology applied to a network configuration that takes as given the location of the higher-level network nodes, but otherwise optimises the network configuration. While there are many assumptions and difficulties in assessing optimal costs in this context, the approach does not require speculation by the ACCC about future evolving technologies or substantially altered network design.

The ACCC argues that this approach facilitates efficient buy-build decisions by access-seekers:

> For the access seeker, an access price based on the actual cost of the access provider's network is inefficiently high because it reflects a cost above that of the network the access seeker would actually build. This would result in an artificial stimulus for the access seeker to 'build' (facilities-based competition) rather than to 'buy' (access-based competition) (sub. 40, Attachment 3, p. 9).

However, it suggests that the inclusion of the access deficit contribution in access charges will provide some incentives for inefficient bypass. As noted in chapter 11, there is a tradeoff between bypass incentives and recovery of the access deficit, where access pricing is the only regulatory instrument.

In any case, while the forward looking approach is intended to encourage cost minimisation, it may be difficult over the long run, as in the case of price caps, for a regulator to sustain best practice costs if that threatens the viability of an inefficient incumbent — creating pressure for some accommodation of actual costs — and creating imperfect incentives for cost minimisation.

D.3 Specific problems with TSLRIC

The implications of parameter instability

A striking premise underlying TSLRIC is that it presupposes that the regulator knows how to run an efficient network, and may know this even better than the

incumbent.[2] This premise is suspect — and the risk of regulatory error is high. NERA's (1999) modelling of TSLRIC costs associated with the PSTN have relatively wide bands of uncertainty. This uncertainty over efficient costs needs to be accommodated in access pricing determinations.

Telstra contends (sub. 42, p. 31) that TSLRIC estimates are sensitive to assumptions about certain key parameters. On the basis of this uncertainty, Telstra argues that TSLRIC should only be one of a number of inputs into determining access prices, with other information — such as international interconnect charges and Telstra's actual replacement costs — being used to test the plausibility of these estimates.

NERA (1999), the consultant for the ACCC's costing exercise, has found that costs vary significantly with different assumptions. One way of at least revealing the level of uncertainty is for the ACCC to publish upper and lower bounds that represent some confidence interval around the mean of TSLRIC-based access prices.

The ACCC has reflected uncertainty in some of its TSLRIC estimates of originating and terminating PSTN access prices, but in an inconsistent manner:

- In its draft report into Telstra's first undertaking, the ACCC published a single estimate of the appropriate access price, with no range reflecting uncertainty. This was despite the fact that NERA, the consultant that developed the model on which the ACCC based its estimate, took account of uncertainty over line costs[3] and call conveyance costs. The ACCC also did not take into account the uncertainty over whether call ends or call minutes should be employed when allocating the access deficit among different uses of the PSTN — simply allocating the access deficit to all minutes and using this per minute rate as a component of the access price.[4]
- In its final report into Telstra's first undertaking, the ACCC published a range for its estimate. It took into account uncertainty over line costs and conveyance costs, but did not take into account the uncertainty over the allocation method for the access deficit. On the basis of NERA's and ACCC's assessments of the first undertaking, the average band of uncertainty around the midpoint for

2 It may seem that there is a risk that this presumption, combined with the inevitable detail underpinning TSLRIC models, partially evolves into implicit command and control regulation — a feature TSLRIC is intended to avoid. Thus, the question is to what extent does the regulated firm subject to the pricing strictures of a TSLRIC model face incentives to shift its actual network design and operating procedures to some of those suggested by the virtual one, even if these are inefficient? However, the regulated firm is effectively free to set any operating characteristic, subject to the aggregate returns dictated by the access pricing rule. It has no incentive to mimic the virtual network if it considers that it is not profit maximising.

3 That after accounting for rentals, the USO payment and retail costs, leaves the access deficit.

4 And nor did NERA in its study for the ACCC.

conveyancing costs was plus or minus 5 per cent and for line costs plus or minus 30 per cent.

- In its draft and final reports into Telstra's second undertaking, the ACCC published a single estimate. It did not specify the uncertainty over line or call conveyancing costs. It changed the way in which the access deficit was allocated to the declared PSTN services. It noted that it could not determine whether allocating the access deficit on call minutes was superior to call ends and elected to average the two results. While it did not report the uncertainty associated with the access deficit allocation method in its headline estimate, it provided data in the report that made this uncertainty transparent. The allocation method meant that there was an average band of uncertainty around the midpoint access deficit contribution of just over 25 per cent.

Thus, it would be fallacious to conclude that uncertainty was resolved from the fact that recently published estimates no longer include a range (table D.1). The factors that led to these uncertainties remain unresolved. Indeed, taking the three sources of uncertainty together (call conveyancing costs, line costs and the allocation method for the access deficit) it is plausible that the band of uncertainty around the midpoint estimate of PSTN access prices is approximately plus or minus 30 per cent.

Table D.1 **Estimates of PSTN access prices over time**

When estimate produced	*By whom*	*Year to which costs apply*	*Published estimate of the access price (cents per minute)*	*Apparent uncertainty*	*Published call conveyance cost per minute*	*Published access deficit per minute*
			Cents per minute	High estimate/ midpoint	Cents per minute	Cents per minute
Sep-98	NERA	1997-98	3.58 - 3.68	0.03	1.7 - 1.8	1.88
Jan-99	NERA	1997-98	2.85 - 3.18	0.11	1.7 - 1.8	1.15 - 1.38
Jan-99	ACCC	1997-98	2.02	0.00	1.22	0.8
Jun-99	ACCC	1997-98	1.87 - 2.77	0.39	1.42 - 1.67	0.45 - 1.10
Jun-99	ACCC	1998-99	1.73 - 2.53	0.38	..	..
Jun-99	ACCC	1999-00	1.71 - 2.37	0.32	1.32 - 1.42	0.39 - 0.95
Apr-00	ACCC	1999-00	1.8	0.00	0.9	0.7 - 1.2
Jul-00	ACCC	1999-00	1.77	0.00	0.93	0.63 - 1.04
Apr-00	ACCC	2000-01	1.5	0.00	0.8	0.5 - 0.9
Jul-00	ACCC	2000-01	1.53	0.00	0.84	0.5 - 0.87

Sources: ACCC 1999l, 1999g, 2000s, 2000c; NERA 1999 and Telstra sub. DR101, pp. 67ff.

The virtue of publishing a range rather than a midpoint is that:

- it provides an indication of the plausible range of access prices that will provide an appropriate commercial return to access providers. Wide ranges would suggest that greater efforts are required to estimate key parameters with greater precision; and
- the cost of errors may not be symmetric around the mean (as noted below). The regulator could take account of any asymmetric costs of errors when choosing specific access prices in arbitration. Another option might be to let the parties to an access dispute negotiate the prices within the range. However, as the ACCC points out (sub. DR 98, p. 21), 'the very factors which are likely to have given rise to the dispute in the first place — imbalances in bargaining power and information asymmetries — are also likely to prevent commercial negotiation around the options identified as acceptable by the ACCC'.

Information from outside the TSLRIC framework — such as overseas interconnection charges and actual replacement costs — might also be useful in making more sense of the derived access prices. The ACCC adopts this position (2000c, pp. 56ff and 1999l, pp. 79ff) arguing that international comparison provides 'sanity checking'. However, such external information is probably only useful if the basis for different assessments of costs is unravelled and if a sensible set of comparison countries is selected. For example a high interconnection charge overseas is of much greater relevance if it reflects a higher depreciation rate on assets that has been justified by careful research than if it reflects an arbitrary judgment, a different network technology or a regulatory idiosyncrasy. Also, differences arising out of variations across input prices and government obligations have to be factored out before comparisons can sensibly be made.

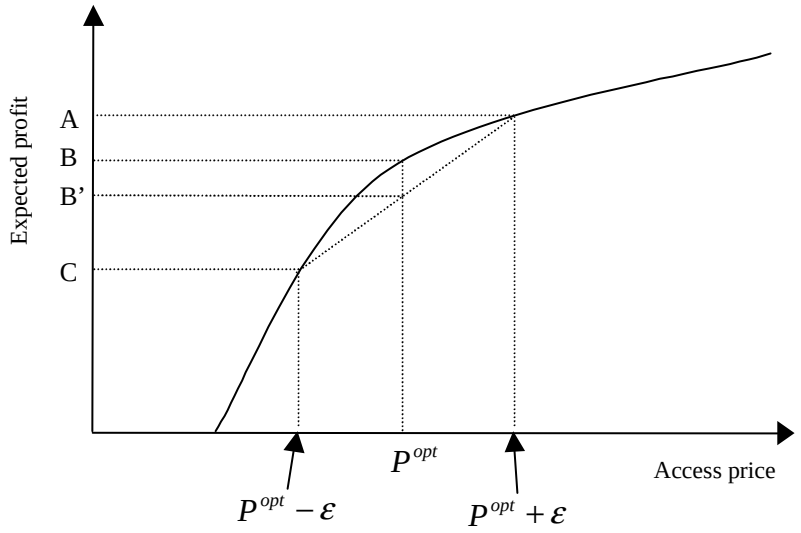
Asymmetric costs of errors around the 'optimal' access price?

Much of the concern by incumbent access providers, such as Telstra, is that the ACCC sets downwardly biased access prices. To the extent that is true, this should be remedied by eliminating that bias. However, paradoxically, there can also be arguments for adjustments to the 'optimal' (unbiased) access price to reflect uncertainty. As shown above, the cost estimates underlying TSLRIC are imprecise, so that regulatory error is inevitable. Even if over successive judgments, the regulator generates unbiased estimates of the TSLRIC price, the regulator will sometimes set prices that are too high and sometimes too low. However, the impacts of downward errors may be different to that of upward errors, requiring that the regulator adjust the price to take account of the adverse effects of errors. This problem has two manifestations.

The concavity of the profit function

As argued by NECG (sub. DR108, pp. 9–10) and Ergas et al. (2001) the concavity of the profit function[5] means that symmetric errors in even unbiased regulator's decision-making must generate asymmetric consequences for the firm's earnings, thus requiring a premium (figure D.1).

Figure D.1 **Concavity of the profit function generates asymmetric effects from regulatory errors**



a The profit associated with P^{opt} is B, that associated with $P^{opt} + \varepsilon$ is A and that associated with $P^{opt} - \varepsilon$ is C. However, the expected profit associated with half a chance of getting $P^{opt} + \varepsilon$ and half a chance of getting $P^{opt} - \varepsilon$ (which by construction has an expected value of P^{opt}) is B' which is clearly smaller than B. Thus if the regulators were convinced that the appropriate return for the firm is that which follows from an access price at P^{opt}, namely B, then in the presence of regulatory estimation errors, a premium is warranted to adjust for this effect and raise the expected profits to the desired level (from B' to B).

Asymmetric effects in the social surplus function?

A further asymmetric effect may arise in another context. As argued by Telstra (sub. DR101, p. 84), a large downwards error in the access price will depress investment, with adverse effects on economic efficiency, whereas the impacts of a large upward error are moderated by the ceiling imposed by monopoly prices.[6]

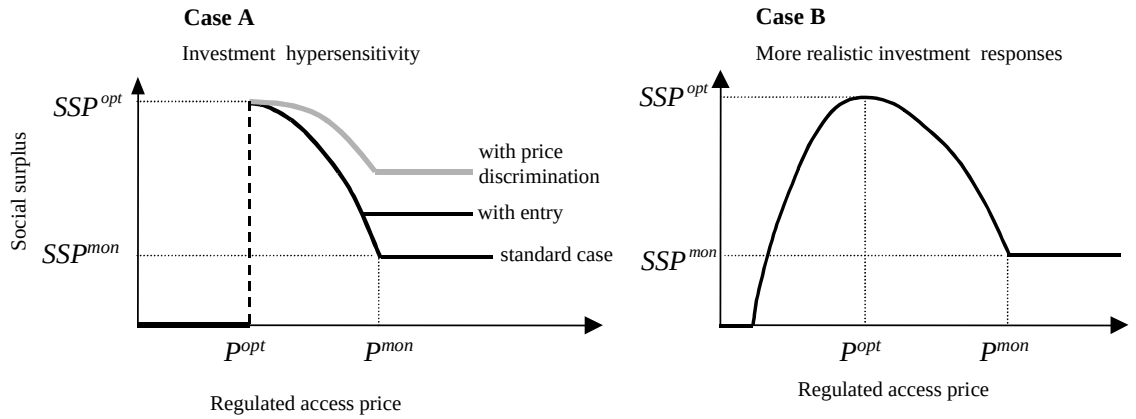
[5] Concavity of the profit function simply requires that profits fall at an increasing rate as prices are reduced. This will be the case under very general assumptions.

[6] In contrast, Cable & Wireless Optus (sub. DR72, p. 39), claimed that the economic welfare loss from errors around the correct access price are symmetric, but it did not elaborate why this was so. The ACCC (sub. DR98, pp. 25ff) argued that there are asymmetric effects of the opposite direction to that suggested by Telstra. But this argument was based on the assumption that the welfare effects were to be gauged by reference to marginal costs. The apparent asymmetry is

However, while the Commission considers that premiums on the conventional TSLRIC price are justified by regulatory truncation errors (chapters 9 and 11) and concavity of the profit function, there is insufficient information to gauge whether any further premium is warranted by the investment asymmetry effects (box D.3). It should also be noted that even were such a premium to be warranted, its likely magnitude is small relative to the uncertainties about specific cost elements (such as the access deficit, depreciation, trenching or the impact of incumbent downstream market power) that affect the level of the optimal price.

Box D.3 **Asymmetric effects in the social surplus function**

Telstra's perspective was that investment was highly responsive to a small negative regulatory error — hence a small downwards deviation of the regulated price from the optimum value has a large effect on social surplus, as no service is supplied in the long run (case A).



The asymmetric effect is even further accentuated if there is potential for entry and scope for price discrimination, since these reduce the costs of an upwards error. These factors mean that the social surplus at the monopoly price are higher than represented in the conventional monopoly model. However, the Commission notes that to the extent that the infrastructure concerned is a genuine bottleneck facility, the potential for widespread entry is not high. Further, the scope for price discrimination is somewhat limited.[7] Even so, in the context of this characterisation of the social surplus function, there would be strong grounds for a premium on the notionally optimum price (P^{opt}).

(continued next page)

therefore a short-run (or ex post) effect that ignores the imperative for funding fixed costs. In discussing the dynamic or ex ante effects of regulatory error, the ACCC cited evidence about whether investment has been adversely affected by its past prices, but this evidence is not relevant to whether the costs of regulatory error are symmetric.

7 Furthermore, if taxes or other regulations attempt to transfer the rents associated with such price discrimination to government, then this may also generate efficiency losses that offset the efficiency gains from discrimination.

Box D.3 **continued**

However, as pointed out by AAPT (sub. DR73, p. 14), the costs of low access prices can be mitigated through regulatory response. The ACCC's decisions are subject to appeal to the ACT, which provides an important avenue for correcting errors. The ACA and the ACCC also have the capacity to monitor whether the core network is being degraded through lack of investment. Thus, while excessively low access pricing for the legacy PSTN network puts future investment at risk, there is scope for error correction that avoids catastrophic consequences. Pricing determinations are adjusted relatively frequently providing scope for such error correction. Moreover, it is not certain that investment is hypersensitive in the way depicted by case A in the figure above — investments may be delayed or downsized, some investments may falter before others, rather than all being completely stopped by access prices below P^{opt}.

These more realistic features of the investment decision-making environment and the scope for regulatory error-correction suggest that the curve to the left of P_{opt} is not a cliff. Rather, it is likely to be a slope, somewhat like that on the right hand side (case B), except that it is not bounded by the welfare that would apply were monopoly to prevail. It is still the case that a downward asymmetry holds for large errors. However, it may not hold for small errors, because the exact characteristics of the social surplus function in the region of P_{opt} are uncertain.

In this context, to calculate any premium that should apply, it is necessary to combine the social surplus function with the probability distribution of the regulatory estimation errors. Any plausible probability distribution has lower probability in its tails. Accordingly, the importance of the clear asymmetry that occurs with large errors may be weighted lightly — depending on the actual variance of regulatory errors.[8] The effect of this asymmetry may then be offset by quite small asymmetric effects (which are weighted highly) that go the other way in the immediate neighbourhood of the regulated price.[9]

[8] Moreover, the life of the investments exceed the regulatory cycle by about a factor of seven (Ergas et al. 2001, p. 4). Thus, any given deviation from P^{opt} only has a weak influence on the overall incentive for investment, unless regulatory errors are serially correlated. Thus, even if there is the possibility of large errors in one cycle, the variance of the average over the economic life of the investment (which is the return relevant to the access provider) is much reduced.

[9] AAPT (sub. DR73, p. 14), for example, argued that there are higher costs from upward errors than downward errors because overly high access prices stimulate inefficient facilities duplication — whose economic costs can never be reversed, while overly low access prices can be reversed, allowing the thwarted investment to go ahead.

Specific TSLRIC assumptions

Accounting for assets earmarked for future demand

Telstra (sub. 42, attachment 3, p. 32) argues that least cost provisioning requires that it build its network ahead of demand — and that the costs associated with early provisioning have to be met some time.

The ACCC agrees that early provisioning can be optimal and that these capital needs should be met, but argues that the timing of payment should be deferred to their time of use:

> Investment undertaken in anticipation of future demand is incorporated within the capital base only when the demand materialises (sub. 40, attachment 3, p. 14).
>
> While it may be efficient for Telstra to install extra pairs [of copper wire] today in anticipation of future demand, these extra costs should be recovered as the future demand eventuates (otherwise current customers will be paying for services used by future generations) (1999l, p. 60).

In its response to the draft report, the ACCC argued that the problem of provisioning in telecommunications may be akin to that of electricity, where it applies a prudence test before accepting assets into the relevant asset base:

> To ensure fairness, any capital expenditure not incorporated into the RAB [Regulatory Asset Base] may be rolled forward with the regulatory rate of return in the same way as expenditure on infrastructure in progress. This accumulated amount may be added to the RAB when the assets are deemed by the [ACCC] to be fully utilised. If the assets are never fully utilised, or the accumulated cost exceeds the cost associated with constructing the necessary infrastructure in multiple stages, that would be strong prima facie evidence that the initial expenditure was not prudent (sub. DR 98, attachment A, pp. 3–4).

However, the inference that assets that are never fully utilised constitutes *prima facie* evidence of imprudent investment ignores the fact that the early provisioning may insure against the risks of later costly capacity expansion. Even if that risk does not eventuate, the provisioning may have been optimal, just as buying fire insurance may be prudent even if ex post no fire occurs (box D.4).

Box D.4 **Assessing the prudence of investment**

Suppose that the cost of building a network with capacity q this period is given by: $TC_1 = F + q$. Assume that demand is sure to double from q_0 to $q_1 = 2q_0$ over the next period, but that there is some uncertainty as to the cost of extending the network by q_0 in the next period, and that the cost could be either $\mathrm{TC}_{1,2} = (\mathrm{F} + \mathrm{q}_0)$ or $\mathrm{TC}_{2,2} = (\mathrm{F} + \mathrm{q}_0)/2$ with equal probability of occurrence. The cost of including the future capacity in today's investment is $\mathrm{C}_{\mathrm{NOW}} = \mathrm{F} + 2\mathrm{q}_0$ while the expected cost of building the network in stages is $\mathrm{C}_{\mathrm{STAGED}} = \mathrm{F} + \mathrm{q}_0 + (\mathrm{F} + \mathrm{q}_0)/2(1 + \mathrm{r}) + (\mathrm{F} + \mathrm{q}_0)/4(1 + \mathrm{r})$ where r is the discount rate. The expected *benefit* of installing capacity now is therefore $\mathrm{C}_{\mathrm{STAGED}} - \mathrm{C}_{\mathrm{NOW}} = 3(\mathrm{F} + \mathrm{q}_0)/4(1 + \mathrm{r}) - \mathrm{q}_0$ which is clearly greater than zero (and hence an expected cost saving) so long as $\mathrm{q}_0 < 3\mathrm{F}/(1 + 4\mathrm{r})$.

Suppose that it was observed that ex-post the costs fell by half. There will be a range of values for which a prudent investment would be mistaken for an imprudent investment if the ACCC's prudence test is employed. The ACCC's prudence test requires that $\mathrm{q}_0 < \mathrm{F}/(1 + 2\mathrm{r})$. This implies that the firm is mistaken for an imprudent investor and not allowed to recoup its costs in the range $\mathrm{F}/(1 + 2\mathrm{r}) < \mathrm{q}_0 < 3\mathrm{F}/(1 + 4\mathrm{r})$. Thus, such a prudence test would discourage a profit maximising investor from provisioning in that range, despite the fact that it would be efficient for it to do so.

While the ACCC's prudence test has some limitations, Telstra's concern about the ACCC's treatment of provisioning lies elsewhere. Telstra claims that the ACCC defers the inclusion of the costs of excess capacity and then fails to include them once demand for such capacity materialises.

The ACCC allows for the saving in operation and maintenance costs associated with excess capacity (1999l, p. 60). It has argued that it is open to suggestions about whether the regulatory rate of return should be given for the interim period for assets that come into the asset base with a delay:

> Whether the ACCC, in its telecommunications cost modelling, should include a component to represent the opportunity cost of holding those assets which are added to the asset base in a particular year is a matter that may deserve further consideration (sub. DR 98, attachment A, p. 4).

Nevertheless, the ACCC's current methodology appears to under-reward Telstra for early provisioning (box D.5). Whether this has a significant bearing on Telstra's capacity to be competitive depends on the magnitude of the impact of the provisioning assumptions. NERA (1999, pp. 43ff) has calculated that the impact of applying the ACCC assumptions rather than Telstra's is a 5 per cent difference in total investment costs in the PSTN — which is significant.

Box D.5 **Accounting for the early provisioning of capacity**

A simplified example may help explain the problems associated with appropriate payments for early provisioning. Suppose that a firm produces a service with growing demand, that there are just two periods and that it may pay the firm to make lumpy investments because of high fixed costs associated with investments. Demand in period 1 is for c_1 copper wires. In period 2 demand is either $2c_1$ copper wires (doubled demand) with probability p, or c_1 copper wires (no change in demand) with probability (1-p). As an additional twist, phone lines sometimes break down and the firm is obliged to fix them quickly under government rules. Excess capacity is assumed to eliminate these costs. Thus, if the firm does not make the early excess capacity investment, the lack of capacity in lines implies that there will be repair costs of c_2 in NPV terms.

Say that the cost of just meeting period 1 demand is $F+c_1$, comprising a fixed cost of digging a trench (F), plus the copper wire (c_1). If the firm just installed this capacity in period one, and demand grew over the interim, then it would need to re-dig the trench (another F) and add additional copper wire (c_1). Accordingly, the total costs of staging the installation of capacity is: $TC_{STAGED} = F+c_1+c_2+ D*(F+c_1)/(1+r)$ where D is an indicator variable with D=1 if demand materialises and D=0 otherwise, and r is the discount rate. Alternatively, the firm can install period 2 capacity in period 1, so that the total cost of taking into account future possible capacity needs in current investment is $TC_{NOW} = F+2c_1$.

The expected social cost saving from investing in extra capacity if demand materialises is given by $(TC_{STAGED} - TC_{NOW}|_{D=1}) = c_2+(F-rc_1)/(1+r)$, while it is c_2-c_1 if demand does not materialise. Thus the expected social benefit of provisioning is $E(B)=p[(F-rc_1)/(1+r)+c_2]+(1-p)(c_2-c_1)$, which will often be positive.

However, the ACCC regulates the returns to the firm and it argues that it will only pay for the cost of the first year capacity in year one ($F+c_1$), plus the value of the early investment in lowering repair costs (c_2), and then subsequently pay the costs of the second copper wire in year two only if demand for that capacity materialises. Thus the regulated firm's revenue (R) is (in NPV terms):

- $R_{STAGED}|_{D=1} = F+c_1+c_2+(F+c_1)/(1+r)$ so that the NPV of profit for the firm is $\pi = 0$ or $R_{STAGED}|_{D=0} = F+c_1+c_2$ and hence again $\pi = 0$ since the firm can simply choose not to build the extra capacity once it observes that the demand has not materialised. Thus, regardless of the probability of demand materialising, not provisioning has an expected return of zero in this scenario.
- $R_{NOW}|_{D=1} = F+c_1+c_2+(1+r)c_1/(1+r)$ so that the NPV of profit for the firm is $\pi=c_2$ while $R_{NOW}|_{D=0} = F+c_1+c_2$ and hence $\pi=c_2-c_1$. Thus expected profits are given by $E(\pi)=pc_2+(1-p)(c_2-c_1)$.

The difference between the expected social benefits from provisioning and the expected profits given by the ACCC's regulated approach is $E(B)-E(\pi)=p(F-rc_1)/(1+r)>=0$ provided $F>=rc_1$. Accordingly, it appears that the ACCC's approach ultimately will lead to less than efficient provisioning.

The above simple model assumes that if a staged investment occurs and higher demand materialises, the network can be expanded instantaneously. Of course this is not the case, and there would be delay costs associated with capacity expansion. In that case, the social losses associated with a failure to condition ahead of demand are even larger.

On the other hand, it is not necessarily appropriate to use Telstra's *actual* network provisioning rules, since this might encourage excessive capacity installation (Kahn and Shew 1987, p. 227). In principle, the ACCC would have to calculate the

network provisioning rules that incorporated optimal early provisioning — although this would be difficult. Even so, there may be grounds for altering the assumptions for provisioning in estimating TSLRIC costs for the PSTN.

It should also be noted that early provisioning involves an inherently large risk of stranding, since additional lines are often used for second lines, particularly for internet. Other technologies — such as optical fibre and wireless broadband services — may reduce the value of such early provision. Arguably, the risk of stranding requires a relatively high premium on the rate of return in order to justify irreversible investments in early provisioning.

This suggests that that it may be necessary to determine risk premiums for different assets on a case by case basis. An averaged regulatory rate of return would seem to encourage investment in activities with lower hurdle rates than the regulatory rate and discourage those with higher hurdle rates.

In the case of provisioning, distorted investment incentives may well be present but these are mitigated somewhat by the fact that maintenance costs can be included in the regulatory asset base. More generally, the fact that service obligations exist and are closely monitored implies that the firm has little leeway to actually react to risk differentials in any significant way. That is, Telstra is forced to invest in components of the network that have higher hurdle rates than the regulated rate of return if it is to benefit from investment in components with lower hurdle rates. Thus the effects of a failure to set rates of return individually for each sub-component is certainly mitigated for vital components of the regulated network.

Trench sharing costs

Since trenches may be shared with other parties — such as other telecommunications carriers, other utilities or pay TV operators — the largely fixed costs of trenching have to be shared between the bottleneck telecommunications service and other uses.

In new estates, which account for a relatively small proportion of total trenches, the ACCC allocates trench costs proportionately among an additional 1.5 utility cables — the level that it regards would be achieved by an efficient operator (ACCC 2000c, p. 113). Under a rule that sets trench sharing to an ‘efficient’ benchmark, rather than actual sharing, Telstra has incentives to share its trenches with as many

utilities as possible, although this incentive is weakened if the regulator responds by adapting the trench sharing rule.[10]

In the case of trench sharing between carriers and pay TV operators (in contrast with utilities in new estates), the ACCC has adopted several positions:

- in its draft report on Telstra's 1st PSTN undertaking, the ACCC recommended that trench costs be equally shared between users;
- in its final report on Telstra's 1st PSTN undertaking, the ACCC recommended that trench costs be based on the cost less revenue to Telstra from leasing trenches;
- in its draft report on Telstra's 2nd PSTN undertaking, the ACCC reverted to the view that trench costs be equally shared between users; and
- in its final report on Telstra's 2nd PSTN undertaking, the ACCC recommended that trench costs be shared between users based on cable numbers in the trench.

Allocation of trench costs on the basis of actual cables or users is inherently arbitrary. While, the ACCC claims that this approach is consistent with that adopted for new estates, the fact that *actual* users is employed alters the incentives of Telstra significantly and may result in inefficient under-use of trenches, which is precisely the problem the allocation method was intended to avoid. It ignores the fact that the marginal cost of allowing another firm to use a trench is relatively low until the trench is congested. For example, suppose that Telstra was installing a single cable in a new trench at a trench cost of C and would make the investment regardless of any sharing of the trench with other parties. Another party approaches Telstra with a proposal to share the trench. But it is only willing to undertake the investment at the margin if the trench charge is ¼ C (say reflecting relatively elastic downstream demand for its outputs). In an unregulated context, Telstra is willing to agree to this proposal since its trenching cost has been reduced by ¼ C. However, the latest ACCC approach would mean that were Telstra to share its trench in this way, it could only charge its own customers for ½ C. Telstra would have an incentive to avoid sharing trenches with other users whose willingness to pay a leasing fee for the trench was less than 1/n where there were n users (including Telstra). In this context, Telstra claims that the trench sharing costs assumed by the ACCC do not match the commercial realities of charges that Telstra can actually levy:

> For example, if Telstra attempted to charge Foxtel at the level implied by the ACCC cost allocation method, then Foxtel would in all likelihood have sought an alternative

[10] On the other hand, were the 1.5 to be incorrectly high then it reduces the returns to investment. Given Telstra's obligation to provide a basic telephone service this probably does not affect network construction in new estates.

means of supplying Pay TV (such as satellite or reliance on over-head cabling) (sub. 42, attachment 3, p. 32)

Moreover, there is strong evidence that demand for pay TV is highly price elastic (Chipty 2001), whereas demand for telephony is price inelastic. On Ramsey grounds this would suggest small contributions to common costs from pay TV and high ones from telephony.

In contrast to allocation based on the actual number of cables, a trench cost allocation based on leasing revenue does not reduce incentives for trench sharing. In this sense it is superior to the cable-number-based allocation. On the other hand, the leasing approach does not provide any incentive *for* trench sharing, since the return to Telstra is the same, regardless of sharing arrangements. An ideal mechanism would encourage trench sharing since there are social returns in using the spare capacity in the trench — up to the point of trench congestion. One mechanism that would achieve this would be to allocate trench costs to Telstra, less some proportion of the revenue from leasing of trench space.

One important qualification is necessary because of the scope for Telstra to rent trench space from another utility (ACCC 1999g, p. 58). To the extent that Telstra rents a trench from another utility then the relevant cost would be the rent paid by Telstra.

Another qualification is that if Telstra is associated with the other party that owns the trench it may be necessary to ensure that rentals charged or earned are what would be considered normal in an arms-length commercial arrangement — a point raised by the ACCC with regard to Foxtel's pay TV operations which are partly owned by Telstra (sub. DR98, attachment A, p. 5). The ACCC also notes that a low lease charge for an unrelated party might also be traded off for higher charges on another service supplied by Telstra (for example exchange co-location), though a collusive arrangement like this is probably unlikely among Telstra's rivals.

Thus, all allocation methods for trench sharing have some limitations. However, an approach based on lease payments probably has greater overall merit than one based on cable numbers.

Depreciation

The calculation of economic depreciation to be used in TSLRIC is a highly complex and controversial issue. Economic depreciation is the difference between the market value of an asset over time. Generally, an asset's value is based on the expected NPV of future earnings. Applying the concept of economic depreciation in a regulated return environment is fundamentally problematic because of an

unavoidable circularity — the future earnings potential of a regulated asset is determined by regulation, including the depreciation allowances which in turn are supposed to be determined by the earnings potential. That is, unlike depreciation for unregulated investments, where market prices are exogenous and where depreciation can be determined from earnings potential, the depreciation rate in a TSLRIC framework is in itself a determinant of market prices and hence of earnings potential.

What is relevant is that investors must reasonably expect to recoup the funds committed in an asset, as well as their opportunity cost over the assets life. In the TSLRIC environment, the ability to do this is determined by the regulated rate of return applied to the regulatory asset base. In telecommunications, this asset base is calculated not on the basis of the actual costs of the assets in question but on an 'optimised network' base. That is, it is assumed that a new optimised network is installed each year and it is the cost of this optimised network that is depreciated to make up the asset base. Thus, depreciation in this context has a direct influence on expected returns. It is unimportant whether some component of allowed returns is called 'regulated rate of return' and another 'depreciation', when what matters is the NPV of the overall returns that firms can expect to make from their actual investment.

Hence, the debate about depreciation can be understood in terms of its impact on the NPV of returns that firms can expect. The more front loaded the depreciation profile, the more firms can expect to earn, keeping the regulated rate constant.

The ACCC's method is to represent capital charges as an annuity. The argument for using an annuity is to overcome the 'year 1' problem in TSLRIC accounting for depreciation (ACCC 2000c, p. 96). The 'year 1' problem arises because it is assumed that a new optimised network is installed each year. Some approaches to estimating economic depreciation — such as the declining balance method — result in high depreciation rates in the first year. Since the model never shifts to a second or subsequent year, the depreciation rate would be perpetually set at its high first year level. This would result in over-recovery of asset costs for the facility owner.

One way of dealing with this problem is to calculate the annuity value of the sum of the discounted depreciation effects, and use the annuity rather than the actual depreciation value. In practice, the ACCC amends this annuity approach — adopting a 'tilted' annuity that takes account of future expected inflation and telecommunications-specific equipment prices. The ACCC claims that the tilted annuity recognises the problem of technical obsolescence.

NERA (1999, p. 10) — in its final report on costing the PSTN for the ACCC saw some problems associated with the annuity approach:

> Falling capital equipment prices, increasing productivity of new capital assets, declining output and rising operating costs over the lifetime of an asset will all be associated with a higher level of depreciation (fall in asset value) when an asset is new than at the end of its life. If the depreciation profile that is actually used fails to mirror the economic depreciation profile, this will lead to a failure to recover the cost of investment over an asset's life … Methods of depreciation used for accounting purposes typically fail to mirror economic depreciation profiles when equipment prices and output are falling over time. Whereas depreciation in these circumstances needs to be 'front loaded', straight line depreciation provides an even level of depreciation over time. Annuity depreciation profiles are even less appropriate because a constant annualised capital cost (depreciation plus cost of capital) means that depreciation increases each year, i.e. it is actually 'back loaded'. While it is possible to tilt the annuity to allow for price and output declines, it requires a large tilt to achieve a declining depreciation profile over time.

The key argument put forward by Telstra (sub. 42, p. 33), Ergas and Hardin (1999) and Hardin et al. (1999) against the annuity approach (tilted or otherwise) is that a firm will only be indifferent between an annuity or economic depreciation if there is a contract matching the asset life that ensures the collection of the depreciation charges. Tardiff (1998, p. 8), writing more generally about efficient access pricing, has also argued that:

> … prices based on depreciation rates and cost-of-capital values consistent with the certainty of a long-term contract should only be available to competitors willing to commit to such a contract.

It is claimed that access seekers have no incentive to sign such contracts because the ACCC frequently revises regulatory prices. Ergas (1998c) says that current ACCC practice is out of kilter with methods used in the UK, Germany and US.

The critical issue is not depreciation per se, but the goal of capital maintenance (chapter 11). To achieve this, it is important to take account of the effects of both depreciation allowances and the optimised network approach on the riskiness of investment.

In the case of risk introduced through the optimised network approach, it is, of course, the intention of regulators to increase technological risk borne by firms so as to enhance the incentives of the network owner to pay close attention to technological developments and thus to undertake more efficient investments.

In the case of depreciation, the intention is not to alter the risk profile but rather to stop returns and thus prices from being very high in the first year, and with the year 1 problem, to stop them from being high in general. However, as was noted above, in the absence of long term contracts, this raises the risk of asset stranding.

Given these two forms of risk, which exacerbate each other, it is important either to have an appropriately high risk component in the regulated rate of return or to employ a sufficiently front loaded depreciation profile.

In summary, what matters from a financial point of view is that investors must reasonably expect to recoup the funds committed in prudent investments, as well as the opportunity cost over the life of such investments. Whether this rate of return on their assets is due to the optimised network cost, to the regulated rate of return or due to a depreciation profile is irrelevant in this context. However, the weights of the various elements making up the expected return for firms is relevant for incentives to pay attention to technological development, to go ahead with riskier/less risky investments, to employ more or less fixed cost intensive production technologies and for incentives to write long term contracts. How to trade off these different elements is controversial and there seems to be no ready solution, especially due to the effects on expected risk adjusted returns that incentive regulation entail.

The Weighted Average Cost of Capital (WACC)

Telstra maintains that the ACCC's method for calculating the WACC produces a downwardly biased measure (by about 20 per cent). Telstra argued that this reflects the fact that the ACCC has selected a gearing ratio out of line with that actually used by Telstra, applied an effective tax rate that has been rendered obsolete by the Ralph reforms and used a 2 year bond rate as the appropriate riskless rate, when the appropriate rate should match the expected (longer) life of the relevant assets. In a more fundamental critique, Ergas (1998b, pp. 13ff) has questioned the use of a capital asset pricing model (CAPM) framework for calculating the cost of capital altogether. In particular, he argues that CAPM does not appropriately incorporate the risks associated with the irreversible investments that characterise telecommunications. The CCNCO (1998) has also more generally questioned the accuracy of estimates derived from the application of CAPM and the WACC — suggesting that the scope for large errors are substantial.

The ACCC (sub. 40, attachment 3, p. 18) has countered some of these arguments, arguing that optimal industry gearing ratios for a regulated infrastructure asset of the form of Telstra's PSTN should be applied, rather than the observed gearing ratio.

The theory of incentive regulations suggests some merit in aspects of the ACCC's approach. Assuming for the moment that all parameters in the WACC are independent of each other, then if the ACCC were to use Telstra's actual leveraging, then Telstra would have weaker incentives to choose an optimal capital structure.

Moreover, Carlin (1999) has shown that the actual reliance on debt versus equity does not need to change in order to effect the appearance of a more costly capital structure. For example, by forming different sorts of lease obligations — consistent with Australian Accounting Standards — a firm can tilt its apparent gearing. In this case, there would be no costs associated with sub-optimal gearing, but there would be the allocative inefficiencies associated with inflated access prices in downstream markets.

On the other hand, the assumption of parameter independence in the WACC may also be questioned. The CCNCO (1998, p. 9) has argued that:

> the WACC is not as sensitive to changes in the capital structure as simple manipulations of the WACC formula … would appear to indicate.

It is likely that, regardless of the assumptions made about gearing, the WACC can scarcely be measured with much precision. This uncertainty should be reflected in the access prices.

ISDN minutes

Telstra (sub. 42, p. 33) argues that the PSTN costs are also allocated to ISDN minutes, though ISDN is an old technology that would not be offered on a forward-looking basis. The addition of ISDN minutes means that the unit PSTN costs are lowered.

The rationale put by the ACCC (2000c, p. 48) for the inclusion of ISDN is that it shares common costs with PSTN:

> Leased line and ISDN traffic is included in the model to calculate and allocate common costs where network components such as switching and transmission capacity are shared between these services and PSTN services. To not do so would result in the Commission over-estimating the costs of supplying the declared PSTN services. This is because the inter-exchange network is used to carry not only PSTN calls, but also ISDN and leased line traffic. Given that network costs increase by only a small proportion in response to an increase in traffic volumes (i.e. there are economies of scale and scope …), only including PSTN traffic would result in average costs that are higher than those likely to be incurred by an efficient operator.

Telstra then argues that even if it accepted that ISDN should be included, it is also appropriate to include the incremental costs associated with ISDN. The ACCC dismisses this argument because the purpose of including ISDN (and leased line) call minutes is only to allocate shared costs between these services and the PSTN services, not to collect revenue for ISDN services.

Allocation problems of this kind are inevitable when a costing methodology has to allocate common costs to specific services. If access prices are to be calculated on a service by service basis, then some sorts of assumptions about cost allocation have to be made. If some services are highly regulated and others are not, leaving the cost allocation rules to the incumbent may provide it with cost shifting incentives (to reduce the contribution to fixed costs from non-regulated services).

Various price capping approaches *might* allow for the most efficient recovery of common costs, without the regulator deciding how to allocate costs. Such recovery would usually be based on demand characteristics. Other regulatory mechanisms for allocating joint costs — such as cable sharing, call minutes or line ratios — are arbitrary and lack an economic basis.

If, in fact, practical considerations dictate that the regulator set service by service access prices, an allocation of common costs must be made. One reasonable requirement is that the sum of service by service costs should not exceed the total cost of providing the services. Thus common costs should not be recovered more than once (as emphasised by Cable & Wireless Optus sub. 8, p. 110).

This does not solve the problem of allocating common costs. Some choices for recovering common costs are:

- by using conventional, but arbitrary measures, such as allocating common costs on the basis of lines, calls or call minutes; or
- allocating a greater share of common costs to services where the demand is inelastic, though this places a considerable informational burden on the regulator.

It is not clear that, given practical constraints, the ACCC's approach for dealing with common costs between the ISDN and PSTN has been worse than alternatives.

The access deficit

The access deficit arises because social regulations place a limit on Telstra's ability to recover line-related costs from line-related rental charges for fixed phones, and must therefore seek to recover these from call charges. PSTN originating and terminating access charges are one source of recovery mechanism. The access deficit contribution by such access services is not trivial in its effect on long distance call prices — amounting to 0.69 cents per call end minute (about 45 per cent of the total access charge according to the ACCC 2000c, p. 27). Changes in the way the access deficit contribution is calculated have the potential to increase this figure substantially — hence the importance of this element of access pricing.

The first-best solution to the dilemmas posed by the access deficit is to question the regulations that give rise to it. The ACCC (2000b, 2001q) has recommended their removal, as has the Commission in this inquiry (chapter 11). However, in the absence of a first best solution, another approach has to be adopted.

The central problem is how to allocate the access deficit to the various call types in a way that has the smallest inefficiency consequences.

There are four call types over which the access deficit can be recovered:

- PSTN terminating and originating access for rivals to Telstra (rival interconnect services) used to make domestic long distance, international long distance and fixed to mobile calls;
- ISDN;
- PSTN terminating and originating access for Telstra to its own long distance and mobile services (internal interconnect services); and
- local calls.

Current practice is to allocate the access deficit between the rival interconnect and other call segments using a hybrid call/minutes share allocation method:

$$AD_1 = \left\{ \frac{0.5 \times m_1}{m} + \frac{0.5 \times c_1}{c} \right\} \times AD = \alpha_1 \times AD \qquad \{1\}$$

where the m_1 and c_1 denote rival interconnect call minutes and call numbers respectively and m and c denote total call minutes and call numbers respectively. As with allocation of common costs of the PSTN network with ISDN, the approach is readily workable, but arbitrary from an economic perspective. It is likely to have some adverse efficiency effects because it does not recover more costs from those services that are more price inelastic.

However, Telstra claims that it has a further hidden disadvantage. The implication of the calculation is that AD-AD_I has to be recovered from other Telstra call charges. If it is argued that the hybrid weights are the appropriate means for calculating the access deficit contribution of rival interconnect services, then consistency suggests it should be feasible for Telstra to recover the necessary deficit contributions from the remaining three services in the same way. Accordingly, the deficit contributions for these services, consistent with the ACCC methodology, would be:

$$AD_j = \left\{ \frac{0.5 \times m_j}{m} + \frac{0.5 \times c_j}{c} \right\} \times AD = \alpha_j \times AD \qquad \{2\}$$

for j=2,3,4 for the ISDN, internal interconnect and local call segments respectively.

However, local call charges are limited by regulation. Telstra has claimed that these retail price regulations means that it cannot recover the amount, AD_4, suggested by the ACCC's approach. To the extent that this is true, it would imply that Telstra would have to recover the unfunded part of the deficit from additional markups on other services. *To the extent that these are supplied in competitive markets*, this would place it at a competitive disadvantage relative to rivals.

The part of the deficit that is unfunded due to the price cap can be calculated as follows:

$$U = \{COSTS + AD_4 - P_{cap} \times c_4\} \; if \; \{COSTS + AD_4\}/c_4 - P_{cap} > 0$$
$$else \; U = 0 \qquad \{3\}$$

where COSTS are the production costs associated with local calls (including conveyance and retailing costs, but *not* including any line-related costs that give rise to the access deficit in the first place), c_4 is the number of local calls made and P_{cap} is the price cap.

An adapted formula consistent with the ACCC's approach that took into account the impact of the price cap would be:

$$\hat{AD}_1 = AD_1 + \left\{ \frac{0.5 \times m_1}{\sum_{j=1}^{3} m_j} + \frac{0.5 \times c_1}{\sum_{j=1}^{3} c_j} \right\} \times U \qquad \{4\}$$

So long as U>0 then the contribution from non-local call services consistent with the weighting scheme adopted will be greater than that implied by the ACCC approach. Subject to the (strong) assumption that Telstra's long distance and fixed to mobile services have symmetric marginal costs and demand conditions to those of rivals, this formulation would permit competitive neutrality, since the access deficit markup for Telstra's sales to its own divisions would be the same as rivals.

In responding to the draft report, the ACCC (sub. DR98, pp. 34–5) argued that there were four apparent shortcomings in {4}. The ACCC claimed that implementation of {4} would:

- lead to a large increase in the access charge (for 2000–01, from 0.69 cents per minute to 2.52 cents per minute). However, concern over such a price increase presumes that the 0.69 cents level is somehow correct, which is the issue being contested.

- enable Telstra to place a two-way price squeeze on its rivals offering substitute services. Rivals' costs would rise, but there would also be retail price pressure because of the operation of retail price controls. Telstra points out a limitation in this argument:

  > Surely it is appropriate to set the access charges to allow the full recovery of efficient costs, even if it results in a charge higher than expected by the ACCC. If the retail price controls prevent these costs from being recovered, then perhaps it is necessary to revise the retail price control arrangements (sub. DR115, p. 11).

- distort investment because bypass incentives would rise in areas where the line costs were less than the rental charge (such as CBD areas). However, the Productivity Commission notes that it is not clear that the distortions so arising would be greater than those from distorted prices. Moreover, Telstra has an incentive to discourage bypass since it displaces retail income without any compensating access income. Since the ACCC sets a ceiling, but no floor, on access prices, Telstra has some capacity to negotiate an access price in particular areas that reduces bypass potential; and

- would not meet competitive neutrality when viewed in a second best context. It is true that once one price is distorted, it is not clear that removing distortions from other markets is *necessarily* welfare enhancing. However, to the extent that the downstream market is competitive, it is hard to see why competitive non-neutrality between Telstra and rivals could be welfare enhancing on second best grounds. The onus of proof would be for the ACCC to justify such non-neutral treatment.

It should be emphasised that the Commission does *not* favour the use of {4} as the appropriate allocation method (as pointed out in the draft report). However, the reasons are quite different from those advanced by the ACCC, as are the implications.

First, it may be possible for Telstra to earn excess returns from its overall PSTN services due to residual market power — a point emphasised more generally in chapter 11 when discussing the effect of access pricing on Telstra's investment incentives. The ACCC's approach to funding the access deficit is akin to levying a lump sum tax of U on Telstra. So long as any monopoly rents (R) derived from the PSTN are greater than U, then the implicit rent tax levied by the ACCC is economically efficient. It means that prices in downstream markets tend towards their efficient (lower) levels because of competition from access seekers. However, if the access deficit calculations are based on this premise, then the ACCC should make this clear. Moreover, U itself has nothing to do with the actual size of any monopoly rent that Telstra may derive from the PSTN. When in some periods U<R, this begs the question of why R-U was left unscathed. And when, as competition

intensifies, U>R, then the ACCC's approach to the access deficit provides an implicit subsidy to entrants, with adverse consequences for economic efficiency (and therefore the LTIE). Thus, while downstream market power may well provide a justification for a bigger access deficit contribution from Telstra than would be correct if downstream markets were competitive, the justification is temporary and the current approach not directly calibrated to any residual market power.

Second, while the adapted pricing approach {4} is *consistent* with the stated logic of the allocation method used by the ACCC, this does not mean it is the most efficient way of recovering the access deficit. In particular, allocating the contribution by a hybrid call/minute share lacks an economic rationale. In principle, the access deficit is just like an additional item in common costs and should be recovered in a like manner. This usually will involve different markups on different services depending on the relevant superelasticities. These superelasticities will be a function of the own demand elasticities (in a conventional Ramsey sense) and the degree to which rivals' downstream services cannibalise the incumbent's downstream services. However, as noted in the main report, for practical and theoretical reasons the variable markup approach may not be deemed feasible. In this case, the question arises of whether there is some other imperfect measure that is reasonable.

Third, a more efficient method may be to allocate the access deficit in a manner similar to the USO and allocate the access deficit to parties according to their revenue (net of access revenues). The revenue share approach is relatively simple to implement and based on clearly observable data. It does not take account of superelasticities, but nor do uniform ad valorem tax rates in many other contexts. Where a service is sold in competitive markets and the incumbent has few incumbency advantages, then it is approximately competitively neutral. It is also consistent with the approach that is applied for USOs and common costs. Some modelling by the Commission suggests that the revenue share approach may, in certain circumstances, approximate the access deficit contributions that would occur under optimal access pricing with a binding sub-cap on local call usage prices (table D.2). In contrast, the quantity share, which is the method used by the ACCC, is a relatively poor guide for the efficient access deficit contribution by the rival when the price cap is binding — though this may be model dependent.

Finally, as with common costs, another possible approach is to allow the facility owner to recover the access deficit costs via non-linear prices and price discrimination in markets where social regulation permit, subject to the rule that it cannot price in a way that is anti-competitive.

Table D.2 **Illustration of the impacts of sub-caps on recovery of the access deficit** [a]

	Case 1 Symmetric demand[b]		*Case 2 Incumbent has captive customers*[c]		*Case 3 High rates of cannibalism* [d]		*Case 4 Rival has lower costs*[e]	
	Binding	Non-binding	Binding	Non-binding	Binding	Non-binding	Binding	Non-binding
Optimal access deficit share of rival (%)	22.9	10	11	3.2	15.5	12.1	23.3	10.4
Quantity share of rival (%)	8.6	8.7	4.4	4.6	5.8	5.8	8.8	8.9
Revenue share basis of rival (%)	19.4	18.8	10.6	10.2	13.3	13.1	18.8	18.1

a A simple three service model of the type described by Laffont and Tirole (1994, pp. 1676–9) and Armstrong, Doyle and Vickers (1995) is a useful vehicle for exploring the appropriate access deficit contributions. The market and costs are the same as those described in box D.2. Linear demand equations of the following form (Laffont and Tirole 1994, p. 1695) were assumed: $q_0=a_0-b_0p_0$; $q_1=a_1-bp_1+dp_2$; $q_2=a_2-bp_2+dp_1$. These are flexible enough to allow symmetric or asymmetric demand conditions between rivals and the incumbent. Clearly, if $a_1=a_2$, then demand is symmetric. Conversely, if $d<b$ and $a_2<a_1$ then this matches a situation in which the incumbent has 'captive' customers (say due to significant consumer switching costs). A binding sub-cap can be modelled as a requirement that $p_0=v$ (where v, the sub-cap, is smaller than the optimal price for p_0). The model solutions were calculated to maximise total economic welfare for four scenarios. In each scenario the outcomes when all prices were free to vary (the non-binding case) are contrasted with the outcomes when the local call price was capped below the optimum price (the binding case). The cap has the implication that there is an amount of the common costs that is no longer recovered from local calls. This burden has to be recovered from the long-distance segment of the incumbent and from access charges. The basic parameters are $a_0=10\,000\,000$ and $b_0=9\,000\,000$, $a_1=1\,200\,000$, $b=1\,000\,000$, $k_0=100\,000$, $c_0=0.05$, $c_1=0.2$, with others varying as the scenarios change. **b** Based on $a_2=1\,200\,000$, $d=200\,000$, $c_2=0.2$ and $p_0=0.106$ when the cap is deemed to be binding. The implied elasticities for local calls, incumbent long distance and rival long distance calls are 0.11, 0.33 and 0.58. **c** As in a except that $a_2=720\,000$. **d** As in b except $d=700\,000$. **e** As in a except that $c_2=0.18$.

Source: Commission calculations.

The implications of incumbent's downstream market power

As discussed in chapter 11, there is some evidence that the incumbent has some downstream market power. While this is present, it is appropriate to allocate a greater amount of the common costs of the bottleneck network to the incumbent's downstream services because these are less price elastic. This factor offsets the influence on efficiency of apparent underestimation by the ACCC of various cost elements above, such as the access deficit contribution by access seekers (box D.6). However, as noted in chapter 11, this offsetting effect will disappear as downstream market power wanes.

Box D.6 **The effect of incumbent downstream market power on the optimal access price markup**

This simple model shows the conditions that are necessary for investment to be unaffected, based on an adaptation of the framework in box D.2. The adaptations are that:

- the entrants do not make a 'full' contribution to fixed costs but only λ per cent of the amount that would be consistent with the pure additive method, and
- the access provider can charge a markup (m) in the long distance retail market.

The net revenue of the incumbent associated with this facility is:

$$R = (2c_0 + \frac{k}{Q})q_0 + (2c_0 + c_1 + \frac{k}{Q} + m)q_1 + (2c_0 + \lambda\frac{k}{Q})q_2 - (2c_0Q + k)$$

$$= \frac{k}{Q}(q_0 + q_1) + mq_1 + \lambda\frac{k}{Q}q_2 - k = mq_1 - (1-\lambda)\frac{k}{Q}q_2$$

This is greater than zero if the overall margin (above full cost) on long distance calls (mq_1) is enough to offset the loss that is made because of 'under payment' by access seekers. If λ is not far from 1, and q_1 is much greater than q_2, only a very small margin is required to achieve this condition.

D.4 The retail-minus approach for local call resale

Under a retail-minus approach, access prices are calculated by deducting from retail prices the costs associated with retailing. The ACCC (2000jt) applies this approach to local call resale access prices. On the basis of its own pricing principles (ACCC 2000j p. 10), the ACCC would have applied TSLRIC++ (as it did with PSTN services), rather than retail-minus pricing to local call resale. However, it justifies the use of retail-minus on the basis that local call retail charges are subject to price regulation, with the potential that Telstra is providing retail local calls below cost.

> The existence of retail price controls on Telstra may create a situation where the TSLRIC of providing the LCS is greater than the price obtained using the retail-minus approach (ACCC 2000t, p. 10).

Were a TSLRIC-based access price to be applied then it would mean that rivals to Telstra offering resale services to the same type of customers would have to make losses on resale services. This would obviously limit the attractiveness of resale services as part of the bundle of telecommunications services offered by rivals.

Accordingly, the ACCC calculated the costs avoided by Telstra in the long run if it ceased retailing calls (such as marketing, customer care, billing etc). These avoided costs were then subtracted from the normal undiscounted call price to derive a wholesale access price for local call resale. In effect, the approach adopted is an

application of the ECPR because it would encourage the entry of resellers where they could more efficiently supply local call retailing. As argued by the ACCC (2000t, p. 9):

> The retail-minus approach should provide that Telstra is largely indifferent between supplying local calls in the retail market or supplying the LCS.

The implicit argument is that while Telstra will make a loss in selling retail services if it provides them through a rival, it does not avoid that loss if it provides them through its own downstream provider. In this sense, the existence of a loss associated with the sale of resale services to rivals does not genuinely represent a 'significant subsidy … to Telstra's competitors' (Telstra sub. 42, p. 35) as this loss is not avoidable.

Another way of examining the problem is to imagine that Telstra was vertically separated and that its wholesale division sold access to a range of parties, one of which was subject to a statutory requirement to supply under a retail price cap. Say that the full cost wholesale price was W and that the efficient retail margin was R. In a competitive industry, local call charges among equally efficient retailers are L= W+R. However, if one retailer was capped to p<L, but had to continue to supply the market, then other retailers would exit, since voluntary supply at L would not be profit maximising. Moreover, if the capped retailer were somewhat more inefficient than other retailers, the process of exit would still occur, and keep in business the 'wrong' downstream supplier. In this vertically separated context, the way in which signals to allocate retail functions to the most efficient downstream operators would be to impose the loss created by the cap on the wholesaler. This would be done by forcing the wholesale price to W-(L-p) = p-R, which is the approach undertaken by the ACCC. This provides competitively neutral incentives for the entry of downstream retailers.

That said, there remain two problems.

First, retail-minus access prices for local call resale may send the wrong signals about an investment and local loop facilities competition. The access prices appear to be below TSLRIC++.[11] Across all facilities, TSLRIC++ must be met in order to achieve financial capital maintenance. Failure to do so for one cost element implies above TSLRIC++ cost recovery is required for others, which may not be feasible if they are subject to access and retail price regulation. To the extent that the shortfall cannot be recovered from other services, below TSLRIC++ pricing on local call resale poses broader risks for investment incentives by the incumbent. It may also

[11] The ACCC agrees that the NERA model results in a TSLRIC++ price for local call resale that is above the capped retail price (sub. DR98, p. 24). However, the ACCC argues that the appropriate price is TSLRIC — with no contribution to the access deficit or indirect costs. However, such a pricing policy is not sustainable across all services or consistent with the treatment of PSTN access services.

deter efficient facilities competition by a lower cost rival. On the other hand, prices for domestic PSTN originating and terminating access services — the same infrastructure that serves as the basis for wholesaling local call resale — includes an access deficit contribution that *encourages* bypass. Moreover, with the exception of some CBD customers, the scope for genuine facilities-based competition in the local loop appear to be currently low, given its declining cost characteristics.

Second, telecommunications firms often offer loss leaders in certain parts of their bundle of services, and this is apparent in local call charges of rivals to Telstra (Telstra sub. 42, p. 35). Suppose that Telstra's actual retail price was used in the retail-minus access pricing approach. If a rival to Telstra were to set a price equal to Telstra's, less some loss leading margin, then Telstra could never match it. Any attempt to match a rival's price would create a base for a new lower access price, allowing the competitor to lower the price again. Thus setting retail-minus access prices using Telstra's actual retail price would initiate a vicious cycle that would either amplify Telstra's losses on local calls or reduce its retail market share — with damage to its ability to bundle services. The ACCC's solution to this problem is to use the price of a standard unbundled local call supplied by the access provider (2000j, p. 22).

As with the problems posed by the access deficit for PSTN interconnection charges, the efficient response is the removal of service-specific price regulations. In the absence of this policy response, the ACCC's retail-minus approach appears to be the least costly and most easily implementable access pricing approach.

The other implication of the access pricing approach for local call resale is that in some cases ECPR is an appropriate pricing rule — and that optimal pricing rules are contextual.

D.5 The benchmarking approach for GSM terminating access

Under this approach, the ACCC (2000g, 2001n) has proposed a benchmarking approach to terminating access fees. In the initial period, all mobile operators will have to set a mobile termination charge (for a mobile to mobile or fixed to mobile call) equal to the lowest Australian access price (L) for mobile termination services across all services at the commencement of the pricing regime. In subsequent periods, each mobile operator can change the termination prices it charges other operators, but only by the average retail price for their own mobile package of services. Thus, the mobile terminating charges (MT) for the *i*th mobile provider at time t will be set as:

$$MTC_{it} = L \times p_{it} / p_{i1}$$

where p_{it} is the average retail price for the mobile service package of the *i*th mobile provider at time t and p_{i1} is the average retail price for the mobile service package of the *i*th mobile provider in the starting period.

The approach only anchors terminating prices to a common value for the starting period. After that point the size of terminating charges is determined by the individual retail price performance of each mobile operator. The implication of the pricing arrangement is that as the retail prices for mobile services fall, so too will terminating prices.

The theoretical justification for setting the change in terminating access prices equal to the change in retail mobile services is that the costs used to terminate calls is the same as used to originate calls. Consequently as productivity-based cost reductions in mobile services occurred, these would drive down prices equally for termination and origination services.

The willingness of the ACCC to use the change in originating prices as the 'glidepath' for terminating prices is that originating prices are set competitively. Otherwise, each mobile operator would face incentives to increase margins on retail prices, so as to increase margins on terminating charges (ACCC 2000g, p. 49). However, even in a workably competitive — but not perfectly competitive market — the ACCC's approach may have some unintended adverse consequences. Changes in the retail prices of each operator set a ceiling for changes in terminating prices. Thus, if the market is not perfectly competitive, the incentive to lower originating prices to attract more customers is reduced, since any revenue gained from attracting customers this way is partly lost via lower terminating charges.

However, if originating prices are set (roughly) competitively it raises the question of why intervention is required at all. The competitive assumption implies that mobile operators make (approximately) normal profits. In this case, they could not make significant excess profits from termination charges since these would be bid away as lower origination returns (as also noted by the ACCC 2000g, p. 5 and by Laffont, Tirole and Rey 2000, p. 205). In fact, for mobile to mobile calls, the use of (cooperative) reciprocal termination charges directly removes any incentive for high termination charges for this sub-market. Any increase in mobile to mobile terminating charges by one operator is reciprocated, creating exactly offsetting revenue and cost streams. Accordingly, the ACCC focuses on mobile termination charges for fixed to mobile calls, which is where access disputes have arisen (chapter 7).

Here, the ACCC (2000g, p. 4) suggested that each firm may have still some market power in terminating access services because:

- Once an end-user is connected to the mobile network, the mobile carrier has control over access to mobile termination for that end-user to other callers. As noted by Laffont, Tirole and Rey (2000, p. 186) it is:

  > … a common fallacy that small players do not have market power and should therefore face no constraint on their termination charges … Indeed, under the assumption that retail prices do not discriminate according to where the calls terminate, the network has more market power, the smaller its market share.

- Lack of awareness by consumers allows a mobile carrier to increase access prices for termination without feeling the full effect of the increase.

However, given that any rents from fixed to mobile termination charges would be bid away, the question is whether the gains from cheaper origination charges to consumers are outweighed by the consumer surplus losses associated with more costly termination charges. If calls to mobile phones were more price inelastic than calls from mobile phones then this might justify a larger margin on termination charges (in the Ramsey tradition). For this reason, the Commission has recommended that the mobile market should not be subject to declaration (chapter 11).

That said, the proposed pricing approach by the ACCC ensures that the terminating and originating prices decline (or rise) at the same rate, but does not bring terminating and originating charges into line. It may therefore preserve a, potentially optimal, margin between the two.

Given a desire to discipline termination charges, the ACCC's broad approach — if not its exact implementation — has some advantages over heavier-handed alternatives:

- it requires no detailed cost evaluation as would be required for a bottoms-up TSLRIC approach or to a lesser extent a retail-minus approach;
- the retail-minus approach would be complicated by complex pricing menus in the retail market; and
- if implemented as a glidepath decoupled from observed retail prices, it provides for some likely downward pressure on termination charges, leaving overall pricing as a function of market conditions and firm decision-making.

However, as noted above, if instead the approach is implemented with the glidepaths coupled to individual operator's retail prices:

- if the market is sufficiently competitive, the ACCC's method would have the above desired outcomes; or
- if the market is not sufficiently competitive, it risks higher overall retail prices than otherwise would hold, including higher terminating charges. The ACCC has proposed to monitor and publish prices, which would probably reduce this risk.

If mobile continues to be regulated, a better approach would be to use a glidepath for terminating charges that is decoupled from the operators' originating charges. One possibility would be to use *average* industry retail prices.

Another approach that might also be considered is price monitoring, rather than direct intervention. Price monitoring has the advantage that it collects evidence on whether there really is a problem and provides pressure for competitive pricing, but allows carriers to otherwise make their business decisions unencumbered by specific regulation. Price monitoring may serve as a useful transition *out* of an access regime. Moreover, another advantage of the price monitoring approach is that it could encompass other mobile services that are not declared — such as CDMA.

D.6 Interactions between different access pricing approaches

Telstra has claimed that some network services — the local and domestic PSTN access services, local carriage service and the ULL are substitutes (sub. 38, p. 15). Yet access prices for these services are based on different access pricing methodologies, so that the relative prices of the services may be distorted.

The extent to which this is likely to be a problem depends on markets in which these services are supplied and the extent of substitution between them. Local call resale (or local carriage services — LCS) is a way of bundling local calls purchased wholesale from Telstra into a pre-selected package of telephony services. It does not require equipment in Telstra's exchanges.

However, at least two other Telstra services may be used to allow Telstra's competitors to offer local calls. This is achieved by placing equipment into Telstra's exchanges. For example:

- Local PSTN originating and terminating services (LPOTS) — where the access point is located in the local exchange closest to the end user — may be used for the carriage of local calls.[12] However, the ACCC (2000h) notes that a pre-

[12] As may be domestic PSTN originating and terminating access services to a lesser degree.

selection determination by the ACA to allow selection of service provider for the carriage of local calls was seen as being necessary to enable CSPs to fully exploit the use of LPOTS for local calls. Telstra (2000c, p. 8) indicated that some CSPs are using override codes to offer local calls using LPOTS.

- The ULL or unconditioned local loop allows access seekers to gain access to the separate copper lines from customers' premises to the point where the copper terminates. Through xDSL, the ULL allows high-speed voice and data-based services, and could include local voice services. ULL services are in a separate market to standard local calls, because the ULL is mainly oriented to higher bandwidth services and to the business rather than the residential market.

However, there are three areas where there may be interactions between the ULL and resale markets.

- While many customers cannot access a ULL service or would not consider a ULL service as an affordable substitute for a local call service, those customers that do buy a ULL service are unlikely to also purchase a local call service. Were TSLRIC to be used for local call resale, this would raise its price, and might increase the demand for the ULL.
- Local call charges include an implicit contribution to the access deficit, whereas the ACCC's suggested pricing for the ULL does not (ACCC 2000i). This would tend to increase artificially the attractiveness of the ULL.
- The ULL is to be made available on a geographically de-averaged basis[13], whereas local call resale is geographically averaged because of social regulations. This encourages large businesses to use bypass technologies, including the ULL.

Even so, it is important not to exaggerate the interactions between local call resale (a very wide market) and the ULL (so far a relatively narrow market). The pricing distortions arising from different access pricing methodologies are not likely to have been substantial so far. However, they may be appreciable as unbundling proceeds.

13 That is, prices can vary across areas as costs change.

E Number portability

This appendix expands upon the discussion of number portability contained in chapter 14.

The appendix outlines the attempts to achieve number portability under the 1991 regime (section E.1) and the current regulatory requirements relating to number portability (section E.2). Section E.3 details the take up rate of portability for local, local rate and freephone services. Finally, section E.4 provides a brief description of selected technical solutions for providing number portability.

E.1 Regulatory framework under the 1991 regime

The introduction of competition in 1991 and, more specifically, the roll-out of competing telecommunications networks in 1995, highlighted the question of effective portability arrangements. While customers were able to choose between service providers, the incentive for them to change from one service provider to another was in part affected by their ability to retain their existing telephone numbers.

AUSTEL sought to introduce number portability in four key areas: local numbers; 1800 global numbers; 13/1300 global numbers; and GSM mobile numbers and in June 1995 set target dates for a range of services (table 14.3).

However, under the *Telecommunications Act 1991*, AUSTEL had limited powers to enforce the implementation of number portability. This, together with difficulties achieving industry stakeholder agreements on technical solutions and commercial terms, led to delays in the implementation of number portability.

In late 1996, following unsuccessful negotiations between Telstra and Cable & Wireless Optus on the implementation of local number portability (LNP) within the Telstra network, AUSTEL was formally requested to arbitrate commercial arrangements for LNP between the parties. AUSTEL reached the view that it did not have the power to make a determination on the LNP arbitration.

In September 1997, the Government imposed an interim licence condition on Telstra requiring it to provide LNP to Cable & Wireless Optus from 1 May 1998.[1] Under the Government's decision, Cable & Wireless Optus was required to pay one cents per call made to a ported number[2] plus an administrative cost for customers switching over, reported as approximately eight dollars per customer (Lynch 1997).

E.2 Regulatory framework under the 1997 regime

Industry provision of number portability is currently managed under the Telecommunications Act (box E.1) and the Telecommunications Numbering Plan 1997 (box E.2).

Box E.1 Summary of key elements of the *Telecommunications Act 1997* relating to portability

- The ACA must make a plan for:
  - the numbering of carriage services in Australia; and
  - the use of numbers in connection with the supply of such services (s. 455(1)).
- The numbering plan may set out rules about the portability of allocated numbers (including rules about the maintenance of, and access to, databases that facilitate portability) (s. 455(5)).
- The ACA must not make a numbering plan that sets out rules about portability of allocated numbers unless directed to do so by the ACCC (s. 458(1)).
- The ACCC may direct the ACA in relation to portability of allocated numbers (s. 458(2)).
- In exercising its power, the ACCC must ensure that, at all times when the numbering plan is in force, the plan sets out rules about portability of allocated numbers (s. 458(3)).
- The ACA must exercise its powers in a manner consistent with the ACCC's directions (s. 458(4)).
- In exercising its powers, the ACCC must have regard to whether portability of particular numbers is required in order to promote the long-term interests of end-users (s. 458(5)).

Source: Telecommunications Act 1997.

[1] This condition formalised a commitment that Telstra had made to the Government in 1997.

[2] Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997.

Box E.2 **Summary of the key elements of the Numbering Plan relating to portability**

Part 1 — Preliminary

- Number portability means the right of a customer to change either carriage service provider (CSP) and/or carrier network, within particular number ranges, and retain the same telephone number.

Part 2 — Providing number portability

- A CSP holding a portable number must transfer the number to the customer's new CSP if asked by the customer or the customer's new CSP to do so.
- A CSP asked to transfer a portable number must transfer it to the new CSP as soon as practicable. The ACA may determine the time that is practicable in a particular case or class of cases.

Part 3 – Providing equivalent service to ported numbers

- A customer using or calling a ported number should receive 'equivalent service'. That is, any differences in quality, reliability, services or features relative to a non-ported number should not be apparent to the customer or, if apparent, should not influence their choice of CSP.

Part 4 — Rules for routing calls to ported numbers

- Routing responsibility for calls lies primarily with the Originating Access Service Deliverer (OASD). After the implementation date for number portability, the OASD must enable call completion to the ported number.

Part 6 — Exemptions from obligations

- The ACA is empowered to grant exemptions to CSPs from requirements to provide portability.

Part 7 — Management of portable numbers and reporting

- A CSP that holds a portable number must keep a register that identifies portable numbers and the CSP to which the number has been transferred. This register must be made available to other CSPs and the ACA.

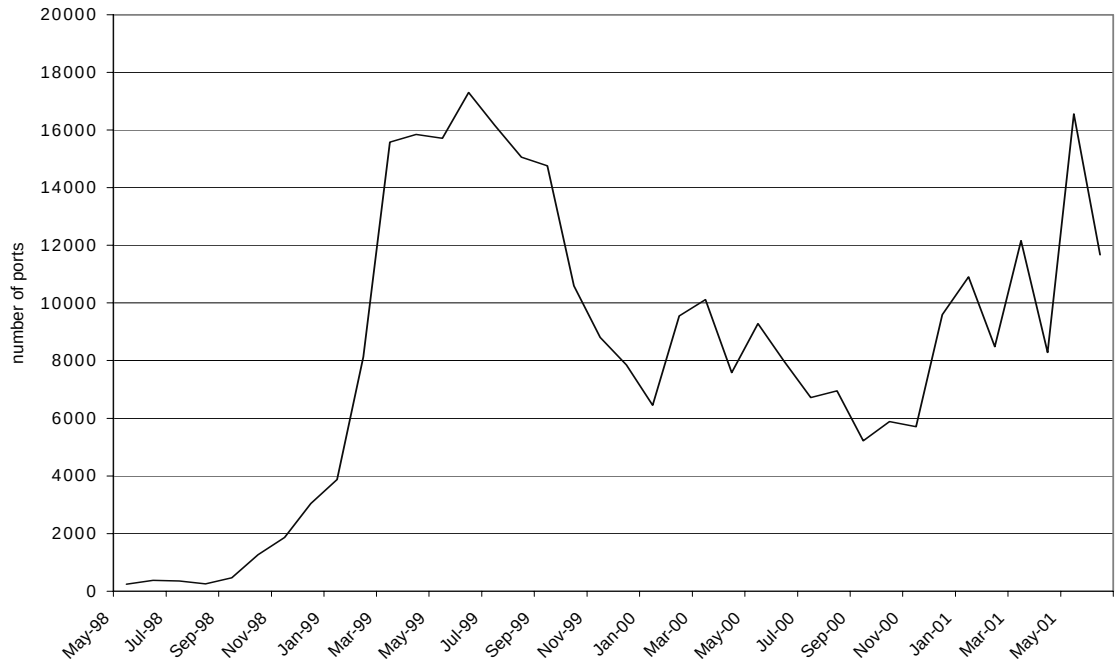
Source: Telecommunications Numbering Plan 1997 (includes amendments 2001 (no.2)).

E.3 Take up rate of portability

Since the introduction of limited LNP on 1 May 1998 around 317 000 local service ports have occurred. Approximately 157 000 of these were following the implementation of full LNP in January 2000 (figure E.1). As at June 2001, there were approximately 6 000 local rate and freephone ports (figure E.2). This represents approximately 3.5 per cent of total local rate and freephone numbers allocated.

Figure E.1 **Take up rate of local number portability**

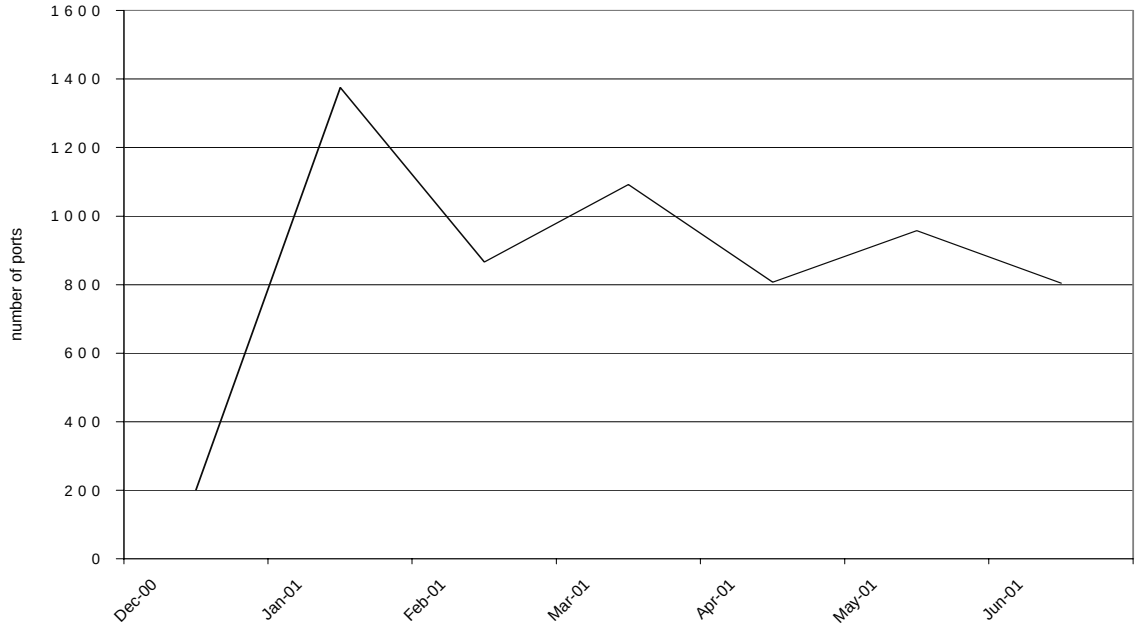
May 1998 – June 2000



Data source: Data supplied by ACA.

Figure E.2 **Take up rate of local rate and freephone portability**

December 2000 – June 2001



Source: Data supplied by ACA from INMS.

E.4 Understanding how portability works

A telephone number, in addition to being a customer identifier, forms part of a highly structured numbering scheme used by telecommunications operators as information for the routing of calls through their networks. Numbers typically identify the country, the network, the area and eventually each local exchange.

As noted by Europe Economics and Arcome (1999, p. 10):

> Number portability fundamentally modifies this approach: if a number has been ported … then the dialled digits no longer contain all the necessary information to enable call routing. It is therefore necessary to collect additional information at some point in the call set-up mechanism (such as information that the call has been ported and an indication of the new network housing this number) in order to be able to complete the call.

Potentially, there are a number of different technical methods for providing number portability. These solutions can be classified into two broad categories — on-switch and off-switch solutions (box E.3).

Box E.3 Technical solutions for providing number portability — on-switch and off-switch solutions

Off-switch solutions transfer the portability information into one or several external databases that can be accessed by all network switches for query (for example, by using intelligence network (IN) techniques). IN solutions can be further distinguished by where in the donor CSP's network the database is located. The earlier in the routing of the call the database is interrogated the more efficient will be the routing of the call. However, the earlier in the network the database is interrogated, the more calls to non-ported numbers must interrogate the database.

On-switch solutions rely on information in the donor local exchange (ie the exchange where the subscriber was initially located). On-switch solutions involve call forwarding or 'tromboning', at least in the signalling phase, if not for the duration of the call.

Source: Europe Economics and Arcome 1999.

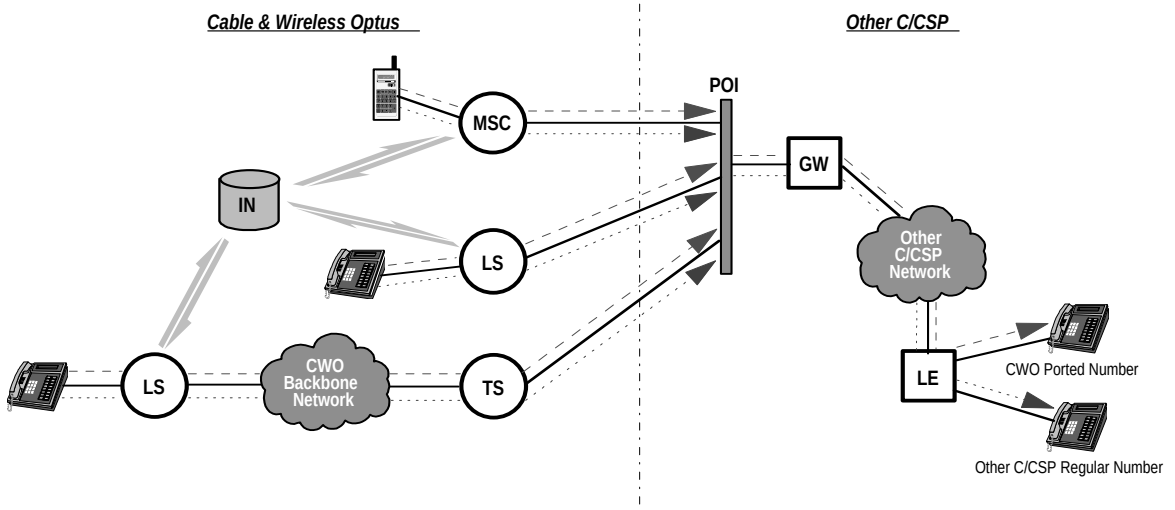
Portability solutions employed by carriers to provide LNP

Cable & Wireless Optus

Cable & Wireless Optus have employed an intelligent network (IN) solution to provide LNP. All calls originating on the Optus network (from both fixed and mobile phones) to number ranges where LNP is implemented will trigger an inquiry

to the IN layer to determine the correct destination network for the call. Calls to Cable & Wireless Optus' numbers ported to a 'recipient' network and calls to non-ported numbers on the recipient's network in its portable number range are handled in the same fashion (figure E.3).

Figure E.3 **Cable & Wireless Optus network architecture for LNP**



a Local switch (LS), transit switch (TS), local exchange (LE), gateway exchange (GW), mobile switching centre (MSC).

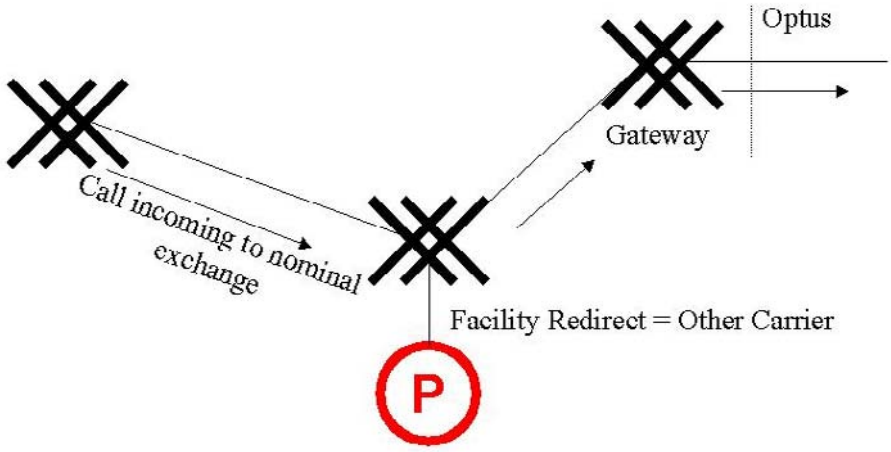
Data source: Cable & Wireless Optus (sub. 95, figure 6.1, p. 59).

Telstra

In order to meet the requirement to provide limited LNP by 1 May 1998, Telstra implemented a 'LNP redirection at the terminating exchange' (facility redirect) solution. Under this solution calls to ported numbers travel through the donor CSP's network until they reach the local exchange to which the party receiving the call was connected before porting their number. The destination local exchange recognises that the number has been ported and re-routes the call to the recipient network via a point of interconnection (figure E.4).

This type of solution necessitates that the call path from the call origin through the terminating exchange and through the point of interconnection is held up for the duration of the call.

Figure E.4 **Redirection from terminating exchange**



Data source: Figure supplied by Telstra.

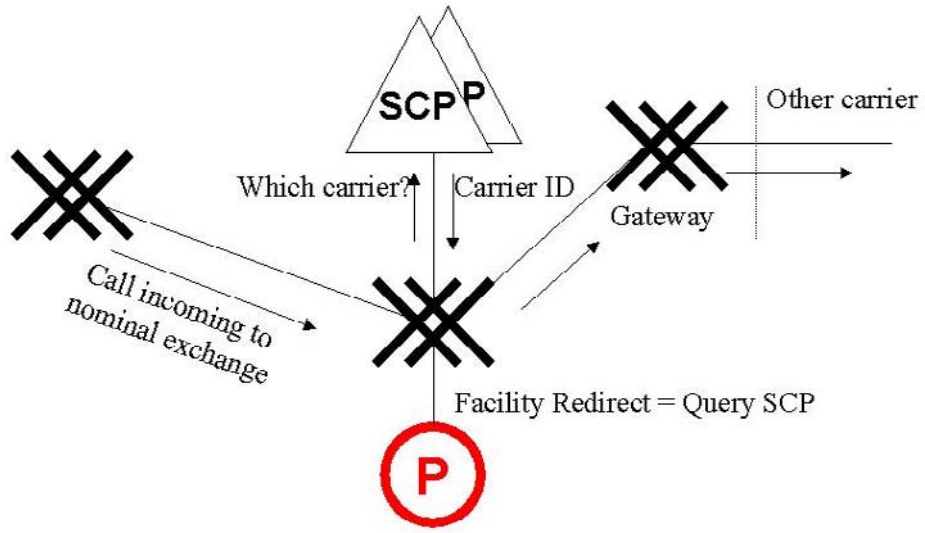
Telstra advises that this solution was designed for porting between Telstra and Cable & Wireless Optus and was expanded to accommodate six additional carriers in November 1999. However, it could only accommodate a further nine carriers and was therefore not compliant with the ACA's long-term requirements.

In March 2000, Telstra introduced a terminating IN lookup (figure E.5) in order to extend the number of carriers able to be supported by LNP.

While an improvement on the previous iteration (the solution can support 100 carriers), the modification to the network did not obviate the need for the call path to travel via the destination local exchange. Consequently, when customers with relatively large volumes of traffic port their number Telstra must first identify whether sufficient capacity exists between the destination local exchange and the gateway exchange.

Telstra recently announced its intention to further modify its LNP solution to provide for 'query on release' (figures E.6 and E.7). Query on release involves releasing the call from the destination local exchange when the call is to a ported number. This triggers an IN query to the signalling control point (SCP) from the incoming exchange whereby the call is rerouted more directly to the gateway exchange. The donor CSP's destination local exchange takes no further part in the call. This disperses the traffic more widely for large customers that port.

Figure E.5 **Redirection from terminating exchange with IN lookup**

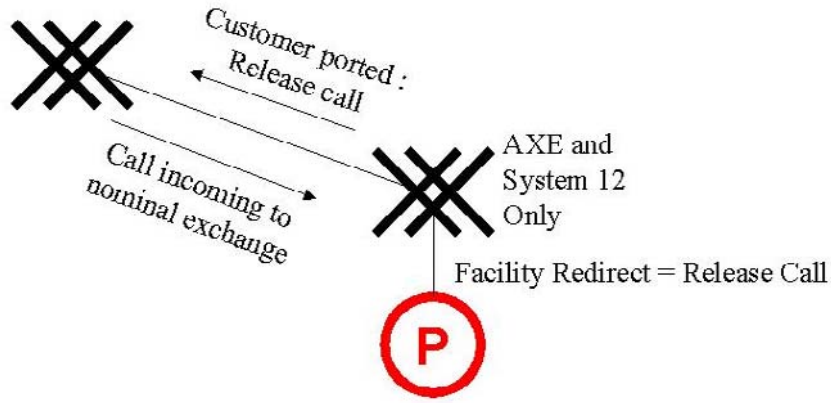


a SCP: signalling control point.

Data source: Figure supplied by Telstra.

Query on release allows for more efficient routing and network use (figure E.6). Further, Telstra considers that query on release will reduce the need to undertake pre-porting studies and subsequent network modifications for complex ports by raising the traffic threshold at which the studies are required.

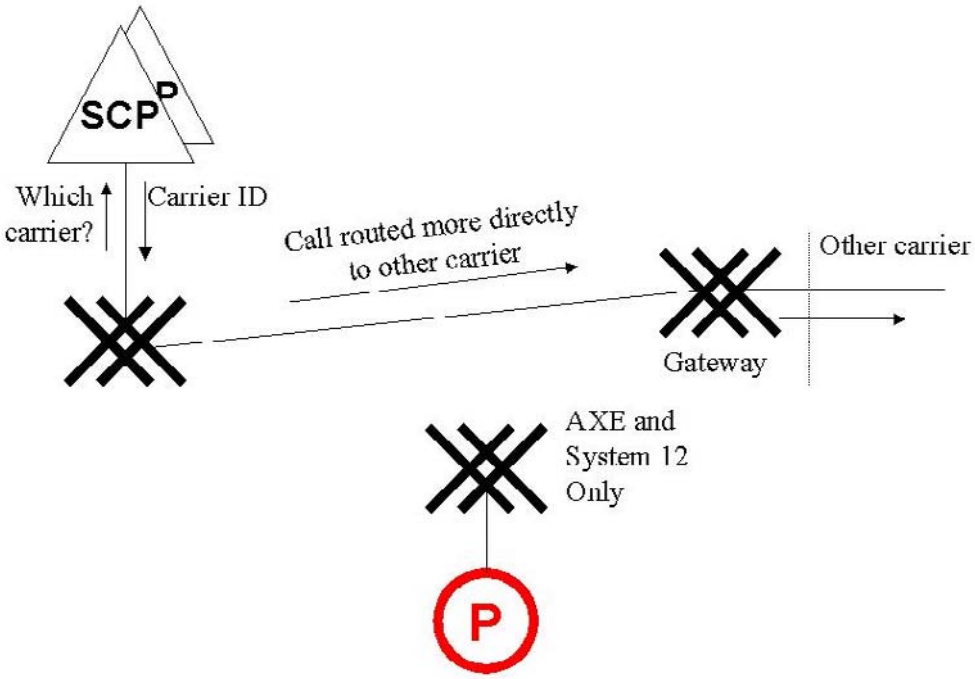
Figure E.6 **Query on release**
Step one – the call attempt



Data source: Figure supplied by Telstra.

Figure E.7 **Query on release**

Step two – the query and redirected call



Data source: figure supplied by Telstra.

F Industry development plans

This appendix describes some features of IDPs, the monitoring of these plans, enforceability provisions and carriers' reported achievements. It also summarises available information about their administrative and compliance costs.

F.1 What is an IDP?

An IDP is a plan formulated by a carrier for the development in Australia, in connection with the carrier's business as a carrier, of:

(a) industries involved in the manufacture, development or supply of facilities; and

(b) research and development activities relating to an industry referred to in paragraph (a). (*Telecommunications Act 1997*, Part 2 of Schedule 1)

To illustrate, several industry plans are summarised in the following boxes (box F.1 to F.4). These outline commitments made by two large carriers (Telstra and AAPT) and two small carriers (Global Dial and Uecomm).

F.2 Purpose of an IDP

The requirement for each carrier to have an IDP was initially formalised in the *Telecommunications Act 1991*. The reasons given by the government of the day for the adoption of IDPs, (as set out in the second reading speech of the Telecommunications Bill 1991) were as follows:

> … it is essential that the carriers be able to turn to a dynamic local industry, with a research and development ethos that looks beyond Australia's boundaries, for necessary support.
>
> Secondly, we recognise that Telecom's [now Telstra's] policies to date have contributed in no small measure to the development of a significant electronics industry in Australia and a research and development base. It is important that we build on this. (pp. 3094–5)

Box F.1 **AAPT industry plan, 1997 to 2001**

AAPT plans capital expenditure over the 5 year period of around $305 million with the bulk for major network elements needed to implement a nationwide voice and data network.

Local involvement in planned IT requirements ($45m), with the most favourable prospects in software and services, are assessed as high for design, manufacturing and support. For telecommunications equipment ($231m), local involvement is high for local support (apart from submarine cable); for design best for regional cable and CBD fibre; and for manufacturing best for submarine cable, mobile services and CBD fibre.

In relation to *research and development*, AAPT expects its budget to grow in line with growth in overall revenues. Opportunities for local industry in software applications development are most likely in network management; new billing/invoice facilities; and operational support systems. Opportunities for collaborative development projects with specialised research bodies, local and overseas companies will be explored.

Export development is being pursued through significant investment in several submarine consortia, ongoing strategic relationships with Singapore Telecom International and correspondent agreements in 10 overseas countries.

Employment of 500 to increase to around 1200 during implementation of the plan. An ongoing training/skills development of around $900 000 per year.

Source: http://www.aapt.com.au/industry.htm.

Box F.2 **Global Dial, 1 December 1999 to 1 December 2001**

Global Dial, based in Perth, plans to expand its Internet business, with a focus on Internet telephony, throughout Australia and the Asia-Pacific region.

Strategic relationships have been established with system integrators, design and content providers, and service providers, in addition to procurement partnerships.

Research and development will aim to increase the effectiveness of internet telephony and develop a software product to add functionality to call centre systems.

Export development efforts will initially aim to provide services to Asia.

Employment to increase significantly with a doubling of employees in the first year.

Continuing relevant in-house and external training to be provided.

Source: ftp:/ftp.dcita.gov.au/pub/industry/idp/global.doc.

Box F.3 **Telstra, 2000 to 2001**

Strategic relationships continued through term contracts with suppliers through Product Sourcing Agreements establishing formal ordering and forecasting processes. Other measures include the creation of retail partnerships through a licensed stores program allowing independent retailers to use the Telstra brand name; and major purchases of new technologies and developments within the area of content and application offerings, such as Wireless Application Protocol.

Major application areas where Telstra will invest in *research and development* include broadband services, next-generation networks, customer access, network management and electronic commerce and business support. Telstra's research laboratories will conduct around one-quarter of the research, concentrating on strategic innovations and problem solving. The Launceston Broadband Project, jointly funded by Telstra and the Commonwealth Government to total $30 million over 5 years, is aimed at introducing new on-line applications to the local community.

Telstra's *international strategy* is to grow its base of international wholesale carrier and service provider customers and its international revenues from Multi-national Corporation retail customer world-wide (Global Connectivity), and to participate in telecommunications growth in Asia Pacific.

There will be a continued increase in the adoption of on-line and multi media approaches to the delivery of training, accounting for over 60 per cent of in-house training.

Source: http://www.telstra.com.au/corpsupply/docs/plan2000-01.pdf.

Box F.4 **Uecomm (formerly United Energy Telecommunications), 1 January 1999 to 30 December 2000**

United Energy Telecommunications (UET) has an optical fibre network in Sydney and Melbourne supporting a range of different technologies and services.

Strategic relationships with a range of organisations including suppliers, equipment and systems vendors of UETs clients, local government, end user customers, other carriers and organisations providing value added services.

Involvement in *research and development* covers software development for its operational systems and the use of powerlines for carriage of telecommunications.

Doubling of *employment* in 1999 with further growth planned for 2000. Training provided in many areas, including new switching and transmission technologies.

Source: http://www.uet.com.au/index_ie4.htm.

The principal goal of the IDP arrangements is 'to assist the development of the Australian telecommunications industry by encouraging carriers to undertake

activities which contribute to the growth of the industry, while recognising that the carriers' actions must remain fundamentally strategic and commercial in nature' (DCITA 1999a).

The industry development obligations of carriers relate to strategic commercial relationships; research and development activities; export development plans; and employment opportunities and training. Box F.5 provides greater detail of these obligations.

Box F.5 **Legislative requirements of industry development obligations**

Strategic commercial relationships, including (but not limited to) the carrier's:

(a) relationships in connection with the production and supply of facilities;
(b) relationships in connection with investment in, and development of Australian manufacturing and supply capabilities;
(c) strategic alliances with Australian companies;
(d) strategic alliances with multinational companies; and
(e) relationships in connection with the production and supply of equipment for use by people with disabilities.

A carrier's R&D activities, including (but not limited to) matters in connection with:

(a) investment in research and development capabilities;
(b) research into, and development of, new technologies;
(c) arrangements for maintaining Australian ownership of intellectual property;
(d) arrangements relating to technology transfers to Australian industry; and
(e) research and development to address the needs of people with disabilities.

Relevant particulars of the carrier's export development plans, including (but not limited to) export development plans relating to equipment for use by people with disabilities.

A carrier's arrangements aimed at encouraging employment in industries involved in the manufacture, development or supply of facilities, including (but not limited to) arrangements aimed at encouraging:

(a) employment opportunities relevant to those industries; and
(b) training relevant to those industries.

Source: Telecommunications Act 1997, Schedule 1, Part 2.

F.3 Enforceability

As specified in the legislation, a carrier must comply with the research and development activities of its IDP. Other commitments made under the IDPs are in a

formal sense, voluntary. There are no explicit penalties (specified in the Act) for non-achievement of these commitments.

As Cable & Wireless Optus pointed out:

> The idea of the industry plans is that we've had very, very firm advice from the department that you can't put in binding targets in to your industry development plans, and so while you're under an obligation to provide an industry development plan, you aren't under any obligation to provide binding targets of where you will source - or the extent of content that you've got to source from Australian industry. The reason for that is that it's argued that that is in breach of some provisions of the World Trade Organization protocols that we're signatories to (trans., p. 91).

IDPs are not to contravene Australia's obligations through its membership of the World Trade Organization (WTO) or indeed, any other international commitments (such as with New Zealand under CER).

For goods, Australia's commitments under the WTO are essentially those involving national treatment, under GATT 1994 and the Agreement on Trade-Related Investment Measures. It would be in breach of national treatment if a company entered into undertakings with the Government giving preference in one way or another to domestic goods over imported goods or permission to invest that is conditional on exporting.

For services, there are similar commitments made by Australia on national treatment of telecommunications service suppliers and on market access under the General Agreement on Trade in Services (sub. 46, p. 6).

F.4 Monitoring of IDPs

Provisions in the Telecommunications Act allow for a carrier to vary its plan and to have a new plan approved prior to the expiry of an existing plan. This is designed to ensure that the IDPs continue to provide a current reflection of a carrier's activities.

If a carrier becomes aware that a particular matter may affect the achievement of its current industry development plan, the carrier must notify the Communications Minister. DCITA indicated that this has occurred in several instances where a company has changed its corporate structure, decided to adopt a different business strategy and engaged different partners, or at the department's initiative following a site visit (departmental communication).

The Act contains the following reporting requirements for IDPs.

- A carrier with a current IDP must provide annual reports to the Industry Minister, setting out the progress made in implementing the plan during that year; and make a summary of that report available to the public.
- The Industry Minister must prepare and table reports on progress by the carriers in implementing their IDPs.

F.5 Carriers' achievements in IDPs

An advisory body, the Telecommunications Industry Development Authority (TIDA), was established in July 1992 to monitor and advise the Industry Minister on the extent to which carriers met their industry development commitments. It was abolished in June 1997. Since then the responsible Minister has reported annually.

Reported achievements over the period from 1992 to 1999 are summarised in table F.1. It should be noted, however, that these reports did not attempt to quantify the extent to which IDPs contributed to this increased activity as compared to what carriers would have undertaken in their absence.

F.6 Costs of IDPs

Administrative costs

There are administrative costs for government associated with assessing, negotiating, approving and monitoring the IDPs.

Staffing arrangements in DCITA are five full time equivalents and one contractor on an intermittent basis when workloads are heavy (departmental communication). The cost of administering the IDP program for 1999-00 was just under $380 000.

As a result of the opening up of the telecommunications market since 1 July 1997, more than 60 carrier licences had been granted by the end of December 2000. More plans have had to be approved and monitored in line with this increase in the number of carriers. Many of these are small carriers who are resellers, serving regional or specialised communications markets. These carriers typically have IDPs of a shorter duration.

Table F.1 **Reports on carrier performance, 1992 to 1997, 1997-98 and 1998-99**

TIDA 1992 to 1997	*Minister's report 1997-98*	*Minister's report 1998-99*
Actual expenditure on equipment & services around $24 billion by end July 1997 (planned exp. of $12 billion).	*Turnover* $20 billion (net of intercarrier payments).	*Turnover* $24 billion (including intercarrier payments).
	Capital investment $5.1 billion	*Capital investment* $6 billion
Strategic relationships formed with suppliers eg Telstra's Future Mode of Operation strategic supplier initiatives, Optus' selection of strategic partners for its network rollout.	Established strategic relationships with companies in network equipment, cable and software industries, terminal equipment industry, communications engineering services sector, civil construction industry and research organisations.	Continued to build strategic relationships.
Research & development Over $1billion, including in-house and that contracted out to universities, CSIRO and CRCs.	*R&D* $420m (including Telstra's spending of $244m with a significant proportion by companies on behalf of Telstra).	*R&D* $430m (including Telstra's spending of $337m).
	Exports $631m mainly undertaken by carriers' strategic partners resulting from relationships with carriers.	*Exports* $200m
	Employment 64 400 full time equivalent positions at June 1998.	*Employment* 64 100 at June 1999. Another 5000 positions in supplier companies to meet carrier requirements.
	Training $225m Range of activities to improve access and services for people with disabilities.	*Training* $210m Range of activities to improve access and services for people with disabilities.

Sources: DCITA 1999b, DCITA 2000a, Industry Commission 1998.

Compliance costs

The costs to carriers from complying with the IDP requirements involve preparing the plan, going through the approval process and reporting annually on progress in implementing the plan.

A survey conducted by the Industry Commission in 1998 on IDPs found that the relative magnitude of compliance costs differed across carriers mainly due to their size. The costs of preparing an IDP in 1998 averaged around $60 000 for incumbents and around $17 000 for new carriers; costs associated with making IDPs publicly available averaged around $30 000 and $2400 respectively; while the monitoring and reporting costs averaged around $70 000 and $9000 respectively per year.

However, it could be also be argued that the IDP process poses little burden for any carrier, irrespective of size, since most of the information required is already available from its business plan. This view is advanced by the ACA. It stated that:

> An industry development plan is fundamentally the extension of a person's business plan, amended as required to address the specific requirements of Part 2 of Schedule 1 to the Telecommunications Act. It is expected that a person intending to apply for a carrier licence would have such a business plan before deciding to establish a telecommunications network or own a network unit (sub. 10, p. 14).

Two of the larger carriers expressed differing views about the significance of the costs of IDPs. AAPT indicated that the 'direct financial costs [of an IDP] are limited' (sub. 7, p. 39). However, Cable & Wireless Optus stated that 'preparing the plans is complex and expensive which ultimately increases the level of telecommunications prices' (sub. 8, p. 162).

The costs involved in the IDP process for carriers do not appear to be particularly onerous — amounting to around $160 000 for an incumbent and $28 400 for a new carrier in 1998 (Industry Commission 1998). However, it could be expected to be comparatively more of a burden for smaller carriers.

Costs imposed through IDP approval delays?

In an industry where speed to market can be critical to success, any delays in the approval process could clearly disadvantage new entrants (typically small carriers). The Industry Commission's earlier survey found that the approval times for new carriers were generally fairly short, averaging one to two months. The number of carriers has, however, increased substantially over the past few years with a resultant increase in the number of plans requiring approval.

DCITA advised that the approval time for IDPs (as at December 2000) is usually between 2 to 4 months, depending on the quality of drafts from carriers. The department has a mandate to respond to each successive draft within five working days (departmental communication).

G Delays in the access regime

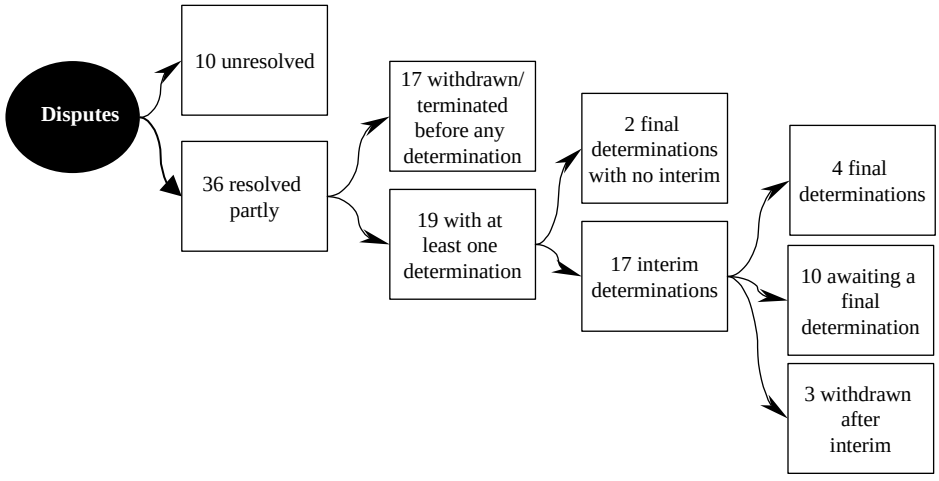
G.1 Introduction

Many participants have argued that the access regime works too slowly, with long delays before access arbitrations are completed (chapter 10) and a myriad of still unresolved disputes. The Government has also signalled that delay in resolving access disputes is a major concern that requires policy action (Alston 2001h). This appendix examines empirical evidence about the resolution of access issues in telecommunications, with an emphasis on measuring and interpreting the extent of delay associated with different disputes.

G.2 The pattern of disputes

Examining the ACCC's database of arbitration disputes, 46 disputes were notified between 12 November 1997 and 22 August 2001 (figure G.1). Of these, 36 had been resolved by either an initial determination, through withdrawals of notifications (private settlement) or by termination by the ACCC by 22 August.

Figure G.1 **Resolution of telecommunications arbitrations by the ACCC[a]**



a This includes a number of matters relating to disputes over number portability as well as declared services. The data relate to the period from 12 November 1997 to 22 August 2001.

Resolution of a dispute by withdrawals of the notification are almost as common as determinations made by the ACCC. None of the nine GSM disputes had been resolved through any determination by the ACCC by the end of August 2001, although six had been resolved through private settlement (table G.1). The small number of disputes involving each of domestic transmission services, ISDN and access to Cable & Wireless Optus PSTN services were resolved by private settlement rather than through determinations. Very few disputes have reached final determinations (only six of the disputes) and no matter subject to appeal has yet been resolved.

Table G.1 **Notified disputes by type of service**[a]

November 1997 to 11 August 2001

Service type	*Notified disputes*	*Withdrawn or terminated before determination*	*Determination made by ACCC*	*Unresolved*	*Resolution rate*	*Resolution rate through ACCC determinations*
	No.	No.	No.	No.	%	%
Telstra's local loop	21	5	11	5	76	52
PSTN	8	3	4	1	88	50
LCS	9	2	4	3	67	44
ULL	4	0	3	1	75	75
Other	25	12	8	5	80	32
GSM	9	6	0	3	67	0
PSTN-ISP	5	2	3	0	100	60
DDS	2	0	2	0	100	100
ISDN	1	1	0	0	100	0
Transmission	2	2	0	0	100	0
PSTN-Optus	1	1	0	0	100	0
Portability	3	0	1	2	33	33
Pay TV	2	0	2	0	100	100
All	46	17	19	10	78	41

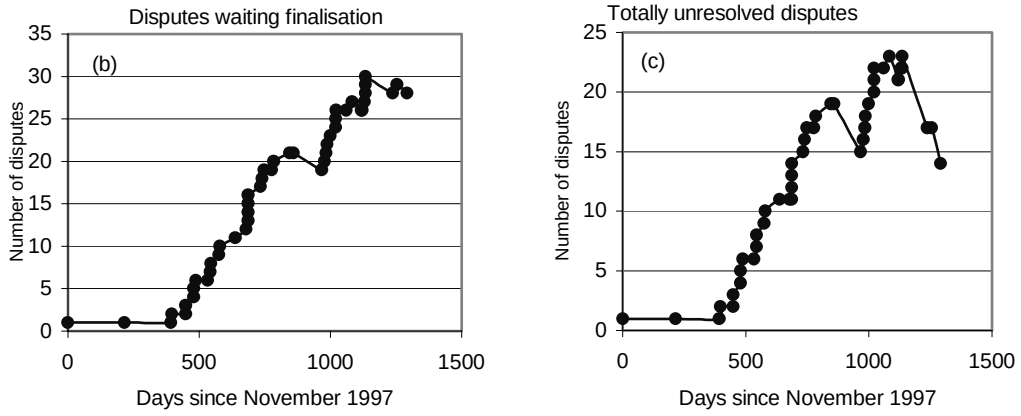
a PSTN refers to originating and terminating access to Telstra's PSTN services, while PSTN-Optus refers to an access dispute involving Cable & Wireless Optus. PSTN-ISP are disputes about termination on non-dominant PSTN networks.

Source: Information from the ACCC.

The number of matters before the ACCC steadily climbed from the inception of the telecommunications access regime, although the rate of increase has slowed in 2001 (figure G.2). This pattern has mainly reflected the widening range of disputes (which was partly stimulated by the declaration of new services) and the delay in fully resolving disputes. The number of (and delays in) disputes places pressures on resources of the ACCC.

Figure G.2 **Individual disputes before the ACCC over time**[a]

Awaiting finalisation and totally unresolved



a Each dot corresponds to the date at which a dispute was notified and then records a measure of the number of disputes at that time. **b** This records the number of disputes that require the ACCC to either make a future determination of any kind or to defend an appeal to the Australian Competition Tribunal. At least some resources would have to be devoted to their future determination and so it provides one measure of resource demands on the ACCC. **c** This records the number of disputes that require the ACCC to make a *first* determination. Since (under the current system) the first determination made by the ACCC requires data collection and the development of a pricing methodology, it probably represents the most demanding part of the arbitration phase. Accordingly, this provides another perspective on the resource demands posed by arbitration over time.

Data source: Information provided by the ACCC.

The resource demands on the ACCC are also a function of the number of fresh issues they are required to address, not just the overall number of disputes (figure G.3). Broadly categorised there have been eleven generic access areas that the ACCC has had to consider.[1] The number of generic matters awaiting finalisation through arbitration rose steeply until the end of 1999, but has since fallen. Had the ACCC the capacity to resolve disputes multilaterally (or through mandatory undertakings), the number of current disputes would be relatively small.

G.3 The sources of delay

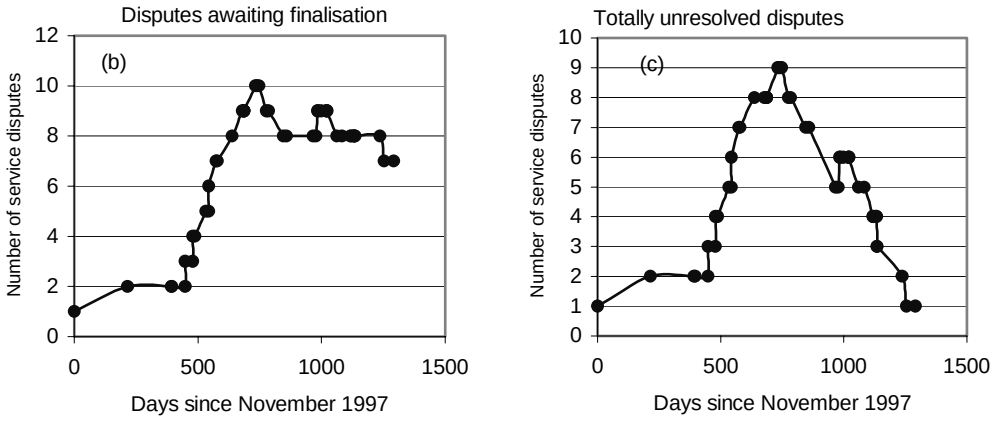
There are three phases in the regulated access regime where delayed access may emerge:

- the time taken to declare a service;

[1] Mobile, Telstra's PSTN, local call resale, portability, unconditioned local loop, data services, Telstra's termination on non-dominant networks, access to Cable & Wireless Optus' network, ISDN, analogue pay TV and transmission services.

- the time taken for commercial negotiations to fail, leading to a notification of an access dispute; and
- the time taken for the ACCC to arbitrate and to provide an interim determination. It is at this point that the access seeker has access to the access provider's facilities at regulated prices. While there are further delays in reaching a final determination and for the Australian Competition Tribunal (ACT) in resolving any appeal of a final determination, these affect the commercial risks associated with regulated terms and conditions for access seekers and providers, not effective access.

Figure G.3 **Number of generic disputes before the ACCC over time[a]**
Awaiting finalisation and totally unresolved



a Each dot corresponds to the date at which a dispute was notified and then records a measure of the number of disputes at that time. **b** There are 11 different categories of services over which disputes have arisen. Once a dispute has been resolved for a particular service type (such as PSTN termination), then the costs associated with the resolution of a dispute with other parties over the same service are usually less. Accordingly, this graph measures the number of services that await finalisation. A service may be finalised when the first service of a particular kind reaches a final determination without appeal or when all services of a particular kind are withdrawn by the contesting parties. **c** This measure measures services that require a first determination.

Data source: Information provided by the ACCC.

The delays associated with the first two phases are not amenable to obvious remedies:

- the ACCC must gather information, develop expertise and follow a careful process in declaring a service — and is already subject to an indicative timeframe; and
- the time taken for commercial negotiations is generally short and within the control of the access seeker. At any time after commencing negotiations in 'good faith', the access seeker can notify a dispute.

However, the delay in the arbitration phase may be remedied by procedural changes, such as alternative dispute resolution, multilateral arbitration, compulsory undertakings and changes to the merit appeals process. But prior to considering such remedies (chapter 10) it is important to consider the nature of such delays.

Delay in reaching determinations

Of those few disputes that have reached a final determination, the average time elapsed from the notification of these disputes to their final determination is 446 days. Some final determinations have been appealed. Such appeals may take several more years to finalise. For example, the substantive hearing into the PSTN final determination by the ACT is scheduled for April 2002, 18 months after the final determination, with the final Tribunal determination probably not being made until late 2002 (ATUG sub. DR94, p. 2). Accordingly, the time from the initial notification of a dispute in the key local loop service to its finalisation may be as long as five years.

However, the best measure of the effective speed of the access regime may not be the time taken from the notification of a dispute to its final determination (or to the conclusion of an appeal on a determination). Rather the time elapsed to the first determination, usually an interim one, or a withdrawn dispute (a private settlement) is generally more relevant (although as noted in chapter 10, delays to the final determination and appeal stages remain important). This is because a disputing party can operate in the market at workably competitive access terms and conditions from that time.

Defining a resolved dispute as one that has been either withdrawn, terminated by the ACCC or where a first determination has been made, the average delay until resolution was 283 days (with a median[2] of 260 days) — which is much less than the time elapsed to final determinations.

On the other hand, 10 disputes have not yet been resolved. By 22 August 2001 the average time elapsed on these unresolved disputes was 329 days (with a median of 252 days) — and obviously these delays will grow further over time. The measured average delay of disputes to 22 August 2001 underestimates the average delay once all disputes have been resolved (should there be such a point).

[2] The median is the middle value. This means that fifty per cent of resolved cases had been going on for 260 days or more.

In order to correct for this underestimation of delay, a 'survival' function was estimated.[3] With this correction, the average delay before a resolution of an arbitration dispute in telecommunications was estimated to be just over a year (379 days), while the median delay was 297 days. Many parties can expect much longer delays — with around a quarter facing expected delays of around 1.3 years (table G.2). An estimated 8 per cent of disputes will take two years or more before full or partial resolution.

Table G.2 **Estimated probability of a resolution to a dispute in the telecommunications access regime**

Days delay	*Likelihood of a dispute lasting this time or longer*
791	5 per cent
472	25 per cent
297	50 per cent
164	75 per cent
52	95 per cent

a Based on estimating the survival function : $S(t) = \exp(-t \times \exp(-\beta))^{1/\sigma}$ where t is the delay. It was found that β=5.938 and σ=0.671 (each estimate also being highly statistically significant).

Data source: Commission estimates based on data provided by the ACCC.

While table G.2 provides an overall picture of delay, it does not take into account the fact that different sorts of disputes have different likelihoods of earlier resolution.

There are marked differences in the length of delay associated with different disputes (table G.3). Disputes that have involved Telstra as the access provider (or seeker) have shorter expected delays than those not involving Telstra — with the median delay for non-Telstra cases being more than twice as long. However, this probably reflects the central importance of Telstra's services and the associated emphasis in case management by the regulator.

The same pattern is repeated when different services are examined. Services that are based on the local loop (PSTN, LCS and ULL) have tended to face shorter delays than other services. In contrast, access disputes involving the mobile network or other services have taken markedly longer.

[3] The estimation of such functions is routinely used in the examination of duration data and can take account of the fact that at the time of estimation, the measured duration for some observations is less than the duration of the dispute that will ultimately occur (data censoring). Estimation requires an assumption about the underlying distribution. Among the possible options, a Weibull distribution best fitted the data, and was employed in the estimation. The model was estimated taking into account the censoring of the time elapsed for disputes that were still continuing at 22 August 2001. LIMDEP (v.7.0) was used for all estimation (Greene 1995, pp. 731ff).

There is some evidence that the delays in resolving disputes were initially low at the inception of the access regime, climbed steeply and have fallen in recent times. As an example of recent more rapid resolutions, three of the four ULL disputes were resolved in an average of 138 days.

There is also evidence that where the ACCC has reached a determination on a like service, subsequent resolutions have been quicker than when no such determination has been reached. This reflects the scope for the regulator to apply the lessons learned from one arbitration to speed up other bilateral disputes for like services.

Table G.3 **Delay in arbitrations associated with different types of dispute**

	Average delay to date[a]	*Estimated median delay to first resolution*[b]	*Estimated mean delay to first resolution*[b]	*Cases*
	Days	Days	Days	Number
Telstra the access provider	264	276	356	34
Telstra the access seeker	215	212	243	6
Not Telstra	534	554	617	6
No case in this service before	363	335	445	23
Case decided before	223	248	292	23
PSTN	143	127	168	8
LCS	262	301	329	9
GSM	496	558	676	9
ULL	188	..	..	4
Other	329	305	364	16
0-450 days after 12/11/97	124	86	124	6
451-900 days after 12/11/97	428	421	499	21
901+ days after 12/11/97	196	235	274	19

a The data relate to the period up to 22 August 2001. The first column is based on the actual data and does not take account of the fact that the ultimate duration for some disputes may be greater than currently recorded. **b** These are estimates based on an estimated survival function for each sub-sample of dispute cases. Results for the ULL service are not shown, as there were too few observations to estimate the function with any reliability.

Data source: Commission estimates based on data provided by the ACCC.

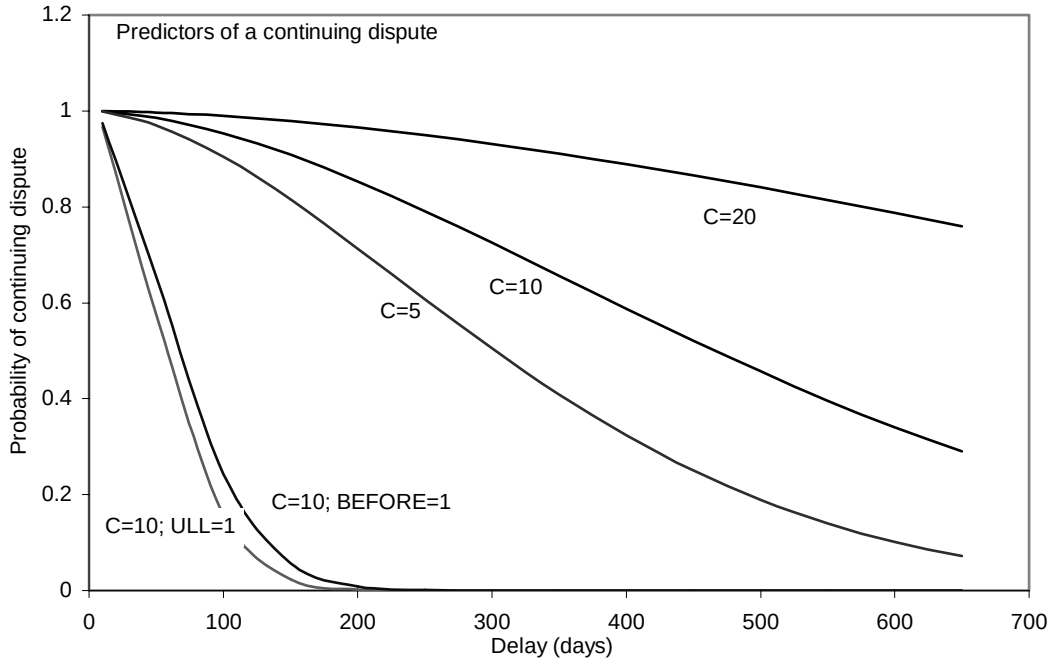
While the results in table G.3 suggest that the problem of delay varies markedly depending on the nature of the dispute, they do not take account of the fact that various dispute characteristics overlap. In order to control for this, a multiple regression survival function was estimated. This measures the effects of each of a number of dispute characteristics, holding other characteristics fixed. Not all the

variables in table G.3 were statistically significant in the model — and a simpler model was derived.[4] The best fitting model suggested that:

- the ACCC's workload delays arbitrations. The higher the aggregate number of disputes at the time of notification of a dispute, the longer it takes for that dispute to be resolved;
- a dispute will be resolved more quickly if a determination by the ACCC has been made in another like arbitration; and
- ULL matters take shorter than average time to resolve.

Figure G.4 reveals how different experiences with delay are a function of the nature of the dispute.

Figure G.4 **The impact of dispute characteristics on dispute length[a]**



a C denotes the number of disputes current at the time of the notification of a dispute. BEFORE=1 denotes a dispute where a like bilateral dispute has been resolved earlier. ULL=1 denotes a dispute over the unconditioned local loop.

Data source: Commission estimates based on ACCC data.

4 This does not necessarily mean that the omitted variables are unimportant by themselves, just that they do not add to the explanatory power of the model, once the other variables are included.

G.4 Conclusions and implications

The key area of policy concern is the delay between a notification of an access dispute and an interim determination, since access seekers can obtain access at reasonable terms and conditions from the time of an interim determination. This implies that policy measures that might seek to hasten final determinations or block rights of appeal on such determinations would probably have a reduced impact on the real problem of delay.

The ACCC has developed methodologies for the calculation of access prices that have been applied in at least an interim determination for the key local loop services. Such services — access to Telstra's PSTN services, ULL and LCS — have a relatively high resolution rate (80 per cent) and a higher probability that matters are resolved through determinations by the ACCC rather than through withdrawals of disputes. Delays are shorter for such core services compared to non-core services — reflecting the ACCC's case management.

In other areas — such as GSM — disputes have been resolved more slowly. However, as these are areas where competition concerns are small, the costs of delay are also small. In this case, adding up delays by dispute, without taking account of the different costs of delay, exaggerates the inefficiencies in the access regime.

Once a particular type of arbitration dispute has been determined (such as the first PSTN case), other outstanding disputes tend to be resolved faster than if they were independent disputes. Were all similar bilateral disputes to be resolved quickly once an interim determination has been reached for the first like dispute, then arguments for procedural reforms, such as multilateral arbitration and compulsory undertakings (chapter 10), would be somewhat weakened. However, there have been protracted delays in settling an arbitration even when a prior arbitration has been resolved for a like service. For example, the Primus-Telstra ULL dispute was unresolved by the end of August 2001, despite interim determinations being brought down for the other ULL disputes in December 2000. Without referring to this particular matter, the reasons that such like matters may not be resolved quickly are that:

(i) an individual access seeker might try to hold out for a better deal or perceive their bilateral dispute as different from apparently similar bilateral disputes;

(ii) where the dispute was notified after or just before an interim determination was issued for a like service in another dispute, there are still procedural requirements that can delay the resolution of the dispute (for example, a requirement for appropriate consultation), and

(iii) where the dispute is notified well after an initial determination for a like service:

   (a) the costs of the access provider may have changed and there may be delay in incorporating this new information into the costing methodology; and

   (b) it may save regulatory resources to issue a final determination at a somewhat earlier date than would otherwise occur, but without issuing an interim determination in the mean time.

It is not clear that reason (i) necessarily justifies consolidation as it may lead to consolidation of disputes that appear to be similar, but really are not. Nor does reason (iiia) provide a basis for consolidation of disputes, since clearly the dispute is effectively a new one if additional cost data must be adduced to resolve it. However, reasons (ii) and (iiib) provide possible rationales for procedural changes that allow consolidation of disputes. Evidence that the ACCC suffers from dispute 'overload' that can aggravate delay also suggests possible gains from reducing the number of disputes through consolidation into multilateral negotiations.

Finally, the number of disputes has plateaued, while the number of completely fresh access issues to be resolved has fallen. This suggests that most future disputes may involve updating determinations. Given that the cost methodologies are in place, updates should be relatively quick, and indeed could be done prior to the expiry of old determinations. For example, Telstra has made an offer on short term access pricing for PSTN originating and terminating services that has been accepted by the ACCC (2001p) — thus avoiding delays in re-determinations on this matter.

H The Australian Pay TV industry

This appendix contains some additional information on:

- program supply arrangements;
- ownership links;
- recent changes to sports rights; and
- the anti-siphoning list.

H.1 Current program supply arrangements

Pay TV operators generally buy continuous, 24 hour, program channels which have been prepared for them (or for general distribution) by programming houses. These suppliers purchase pre-existing programs and other content from a range of domestic and foreign sources and combine these into channels for sale to the pay TV operators. (A list of selected program suppliers is contained in table H.1.) Pay TV operators may also buy or create content and prepare their own channels in-house, and they may also retransmit local free to air television services.

While operators may carry a wide range of channels, premium sports and Hollywood movies are 'recognised as the drivers of pay TV subscriptions' (ACCC 2000o, pt. 2, paper 2, p. 1).

There are four major suppliers of this content in Australia.

The two main suppliers of Hollywood movies are owned by groupings of (mainly Hollywood) film and television studios.[1]

- **Premium Movie Partnership (PMP)** is a consortium of Columbia Tristar, Paramount, Universal, Twentieth Century Fox and Liberty Media. It produces *Showtime* (a channel of current release movies) and *Encore* (re-run movies).[2]

[1] Distribution arrangements are dictated by who owns (or has first rights over) the international rights to the output of particular studios (although the terms of the agreement for some co-productions may mean the international rights are relinquished by one party to the other).

[2] A third channel, *Showtime 2*, is a time-shifted, repackaged *Showtime*.

- **The Movie Network** is a consortium of Disney, Warner Brothers, MGM and the Australian distributor Village Roadshow. It also has exclusive supply arrangements with Steven Spielberg's Dreamworks SKG, New Vision, New Line, Turner Pictures and The Globe Film Co. The Movie Network produces three channels: *Movie One* (new release movies), *Movie Extra* (TV mini-series and movies and independent films) and *Movie Greats* (movies from the 1930s to the 1980s).

There are two main suppliers of channels showing premium sports.

- **Fox Sports** is a partnership between News Ltd and PBL. Fox Sports obtains sports programs and compiles them into three channels, *Fox Sports*, *Fox Sports Two* and *NRL on Optus*.[3]
- **Seven Cable Television** is a subsidiary of the Seven Network, which supplies the *C7 Sport* channels.

The rights to broadcast these channels are heavily influenced by the ownership links and/or exclusive supply arrangements that exist between the programming houses and the pay TV operators.

- PMP's channels are exclusively licensed to Foxtel, which also holds the distribution rights. Foxtel sub-licenses these channels to Austar and Neighborhood Cable.
- The Movie Network's channels were once exclusive to Optus Television, but they are now supplied non-exclusively. However, Cable & Wireless Optus advised that:

  > In relation to Foxtel, supply of the Movie Network channels is conditional on Foxtel making available the [PMP] channels to [Optus] (sub. 54, p. 13).

  The Movie Network's channels are broadcast by Optus Television and Austar.
- The Fox Sports channels *Fox Sports* and *Fox Sports 2* are broadcast by Foxtel and Austar, while a third channel, *NRL on Optus*, is licensed to Optus Television.
- The Seven Cable Television channels are non-exclusive, and are broadcast by Optus Television, Austar, Neighborhood Cable and Access 1.

Exclusive contracts to supply programming are an important feature of the Australian pay TV industry, extending beyond these channels.

For example, XYZ Entertainment exclusively owns and/or distributes six key programming channels, which it provides to its joint owners, Austar and Foxtel.

[3] Fox Sports also provides its channels directly to various commercial premises.

XYZ has long-term exclusive distribution rights in Australia for the *Discovery Channel* and *Nickelodeon*. Its distribution contracts with Austar and Foxtel range from eight to 25 years (Austar 2001c, p. 17).

Similarly Foxtel, as exclusive distributor of a number of premium channels, has the right to determine whether or not to supply them to other pay TV providers. (In addition, Foxtel is, from 2002, holder of the rights to pay TV coverage of the AFL. Under its agreement with the AFL, it is required to provide AFL to Optus Television and Austar.) Foxtel's comments on the origins of exclusive programming in Australia are contained in box H.1.

Box H.1 **Pay TV and exclusive programming in Australia: Foxtel's view**

Foxtel said that:

> In 1995, when pay TV was finally introduced in Australia, exclusive programming was recognised as the only way in which the start-up pay TV providers could build brand and attract subscribers in the emerging pay TV industry. Many of these arrangements were entered into before pay TV providers commenced operations.
>
> The first pay TV providers, Optus Vision and Australis, both secured exclusive rights to movies from the major US movie networks Optus Vision with Disney, Time Warner and MGM (the Movie Networks) and Australis with Columbia, Paramount, Universal and, later, Twentieth Century Fox (the Premium Movie Partnership or PMP). When FOXTEL commenced its service in October 1995, it was forced to sub-license the PMP movies from Australis at an unsustainably high price. When Australis collapsed in 1998, FOXTEL was then able to take over the arrangement directly with PMP.
>
> The minimum subscriber numbers required by the movie networks on launch of pay TV meant that it was necessary to appeal to and attract large numbers of subscribers which could only be done on the basis of exclusive programming. In addition, it was necessary to attract these subscribers to recover the large initial investment in the infrastructure necessary to provide pay TV.
>
> Competition was initially also driven by the fact that the cable roll-out of FOXTEL and Optus Vision was largely overbuilt, that is to say, approximately 80% of homes passed by one cable in metropolitan areas are also passed by the other cable …
>
> It was also necessary to enter into exclusive arrangements for sporting events not on the anti-siphoning list. Because so much popular sport is on the anti-siphoning list and available live and exclusive on free-to-air television, the different pay TV providers entered into exclusive arrangements to differentiate their sport offerings. As with movies, Optus was amongst the first pay TV operators to enter into exclusive arrangements in relation to sport with SportsVision which held the pay television rights to both the AFL and ARL.

Source: Sub. DR92, p.13.

As some indication of the value of exclusive arrangements:

- XYZ 'is conservatively valued at $350 million', according to the Australian Financial Review (Collins 2001, p. 20); and

- referring to its half ownership of Foxtel, Telstra reported expenditure commitments as follows:

  > Joint venture entity commitments of approximately A$1,964 million [arising from] minimum subscriber guarantees for pay television programming agreements (Telstra 2001e, p. 76).

Some channel suppliers are wholly non-exclusive (such as the international sports channel, ESPN and Channel Seven's *C7 Sport*), while others may provide at least some of their content on a non-exclusive basis. For example, Turner International distributes channels such as *Turner Classic Movies* (which contains pre-1986 MGM movies) and *Cartoon Network* on a non-exclusive basis (and, indeed, most networks carry them), but its new movie output is distributed on an exclusive basis as *Turner Pictures*. In this case, the Australian rights are held by The Movie Network and incorporated into its channels.

In summary, for the main pay TV operators, arrangements are broadly as follows.

- Foxtel controls many of the channels it broadcasts through ownership links and/or exclusive contracts, and has the rights to decide whether these channels may be shown on other networks, and by whom.
- Optus Television relies more on non-exclusive supply, although previously it had exclusive rights over the output of The Movie Network. Like Foxtel, it produces some channels of its own.
- Austar, partly because of its history and its regional focus, has access to a wider range of programming than either Foxtel or Optus Television, which at the moment are excluded from, or choose not to take, certain programming shown on each other's networks. Foxtel has on-licensed a range of channels to Austar, and the two operators have broadly complementary networks which cover the whole of Australia. Telstra, as half owner of Foxtel, noted that:

  > Foxtel has licensed movie programming to Austar for satellite delivery in areas serviced by Austar on an exclusive basis, with the effect that it [Foxtel] may not provide a satellite service containing this programming in those areas (2000a, pp. 20-1).

  Nevertheless, Austar observed that:

  > Of [its] 34 channels Austar has exclusive rights only to 9, and any exclusivity rights that Austar has acquired are technology-specific, and relate only to MMDS and satellite transmission (sub. 60, p. 4).

Current arrangements for the smaller players are as follows.

- Neighborhood Cable obtains some channels from Foxtel, *C7 Sport* from Seven Cable Television, and the remainder from sources other than the main programming houses;

- TARBS provides mainly foreign language channels by satellite (and is seeking to distribute via Telstra's cable);
- Access 1 currently offers *Bloomberg Television* (news and business), *C7 Sport* and *Music Videos*, and has plans for further training and educational channels; and
- TransACT is broadcasting a small range of current affairs, foreign and parliamentary channels.

An indication of the range of channels currently carried by all pay TV operators is given in the following table. (The table does not purport to cover all channels provided. It excludes, for example, retransmission of free to air channels, which may be of significant benefit to those locations where the free to air signal is weak.)

H.2 Ownership links

There are three major pay TV companies in Australia — Foxtel, Austar and Optus Television. Foxtel is the most vertically integrated of the three although all have a range of ownership and exclusive contractual arrangements with program suppliers, other pay TV operators, delivery platform owners and telecommunications companies. The key relationships include the following.

- Foxtel is half owned by Telstra, the other half owner being Sky Cable, owned jointly by PBL and News.
- Fox Sports is owned by PBL and News, and supplies *Fox Sports 1* and *Fox Sports 2* to Foxtel and Austar.[4]
- The cable over which Foxtel's pay TV service is provided is owned by Telstra.
- Optus Television is owned by Cable & Wireless Optus.
- The cable over which Optus Television's pay TV service is provided is owned by Cable & Wireless Optus.
- Austar and Optus have formed a joint venture to provide satellite carriage services for pay TV, which Austar uses to provide direct to the home broadcasting across Australia. The joint venture also provides satellite carriage services to Foxtel.
- Austar and Foxtel jointly own XYZ Entertainment, the largest Australian producer of pay TV channels, which supplies *Arena*, *Discovery*, *Lifestyle*, *Nickleodeon*, *Channel V* and *musicMAX*.

[4] An additional channel, covering NRL only, is provided to Optus Television.

Table H.1 **Selected suppliers of programming for pay TV**

Channel supplier and/or distributor	*Selected channel*	*Programs carried by …*						
		Foxtel	*Optus Television*	*Austar*	*Neighborhood Cable*	*TARBS*	*Access 1*	*TransACT*
Major programming houses								
PMP (distributor, Foxtel)	*Showtime*	✔		✔	✔			
	Encore	✔		✔	✔			
Movie Network	*Movie One*		✔	✔				
	Movie Extra		✔	✔				
	Movie Greats		✔	✔				
Seven cable TV	*C7 Sport 1 and/or C7 Sport 2*		✔	✔	✔		✔	
Fox Sports	*Fox Sports and/or Fox Sports 2*	✔		✔				
	NRL on Optus		✔					
Other suppliers of multiple channels								
XYZ Entertainment	*Arena*	✔		✔				
	Discovery	✔		✔				
	Lifestyle	✔		✔				
	Nickleodeon	✔		✔				
	[V] Channel	✔		✔				
	musicMax	✔		✔				
Foxtel	*Fox 8*	✔		✔				
	Fox Kids/ Fox Classics	✔		✔				
	fX	✔		✔				
	Foxtel Weather	✔						
Main Event Television	*Main Event*[a]	✔	✔	✔				
	Adults Only	✔	✔	✔				
Overlook	*RAI International*	✔	✔		✔			
	Antenna Pacific	✔	✔		✔			
	ART		✔					
	LBC		✔					

[a] Pay per view service.

(Continued next page)

Table H.1 **(Continued)**

Channel supplier and/or distributor	*Selected channel*	*Programs carried by …*						
		Foxtel	*Optus Television*	*Austar*	*Neighborhood Cable*	*TARBS*	*Access 1*	*TransACT*
Turner Broadcasting	*Turner Classic Movies*	✔	✔	✔	✔	✔		
	CNN	✔	✔	✔	✔	✔		
	CNN fN		✔					
	Cartoon Network	✔	✔	✔	✔	✔		
A selection of other channel suppliers and channels								
AETN	*The History Channel*	✔						
Artist Service Cable Management	*The Comedy Channel*	✔		✔				
Austar	*The Weather Channel* (interactive)			✔				
Australian News Channel	*Sky News Australia*	✔	✔	✔	✔			
BBC Worldwide	*BBC World*	✔	✔		✔			✔
Bloomberg	*Bloomberg Television*	✔		✔	✔		✔	
Buena Vista	*The Disney Channel*		✔	✔	✔			
CNBC Asia	*CNBC Asia*	✔	✔	✔	✔			✔
Country Music Television	*Music Country*	✔	✔	✔	✔			
Crown Media	*Hallmark*	✔		✔	✔			
Discovery/BBC	*Animal Planet*		✔		✔			
ESPN Inc	*ESPN*		✔	✔	✔	✔		
Fashion TV	*Fashion TV*	✔			✔			
Fox News Network	*Fox News*	✔						
MTV	*MTV*		✔					
National Geographic Australia	*National Geographic*	✔	✔	✔	✔			
Pan TV	*World Movies*	✔	✔	✔				
Sky Channel	*Sky Racing*	✔	✔	✔	✔	✔		
TARBS	*Nightmoves*					✔		
TV Shopping Network	*TVSN* (shopping)	✔	✔	✔	✔			✔
TV1 Partnership (distributor, Foxtel)	*TV1*	✔		✔				
UK TV	*UK TV*	✔		✔				

(Continued next page)

Table H.1 **(Continued)**

Channel supplier and/or distributor	*Selected channel*	*Programs carried by …*						
		Foxtel	*Optus Television*	*Austar*	*Neighborhood Cable*	*TARBS*	*Access 1*	*TransACT*
	Adventure 1		✔					
	Alpha GATV		✔					
	Aust Christian Channel		✔					
	CCTCV							
	Chinese							
	Deutsche Wella German				✔			✔
	EWTN Catholic Network				✔			
	Imparja				✔			
	Italian					✔		
	Korean					✔		
	Lashkara Indian TV				✔			
	Macedonian					✔		
	MCM (music videos)				✔	✔		
	Mega Cosmos		✔					
	Music Videos						✔	
	NHK		✔					
	Odyssey		✔					
	Oh		✔					
	Optus Weather		✔					
	Ovation		✔					
	Parliamentary Channel							✔
	Philippino					✔		
	Phoenix		✔			✔		
	Polish					✔		
	Portuguese					✔		
	Russian					✔		
	Spanish					✔		
	TRT Turkish TV				✔			
	Turkish					✔		
	Various Arabic					✔		

Source: ACCC 2000o, Foxtel, other submissions and websites.

- Foxtel, Austar and Optus Television jointly own Main Event Television, producer of Australia's only pay per view channel (*The Main Event*) and *Adults Only*.

Ownership links can extend to offshore ventures. For example:

- Austar and Telstra are joint partners in Telstra Saturn New Zealand, a provider of broadband internet, telephony and pay TV (Austar 2001c, p. 19).
- Foxtel and Artist Services jointly own *The Comedy Channel*.

Each of the main pay TV producers owns certain channels outright. For example, *The Weather Channel* is a wholly owned subsidiary of Austar.

There are also cross-ownership interests between pay TV and free to air broadcasters (for example, PBL owns Channel Nine, 25 per cent of Foxtel and 50 per cent of Fox Sports). These links are also important in respect of the free to air and pay TV rights for sports broadcasting.[5]

H.3 Some recent changes to pay TV rights for sport

As noted earlier, premium sports are seen as one of the main drivers of pay TV demand. There have been recent changes to the allocation of free to air and pay TV broadcasting rights for the AFL and the NRL.

C7 Sport holds the pay TV rights for AFL until the end of the 2001 season. From 2002 to 2006, the free to air and pay TV rights have been awarded to a consortium led by News Ltd. Foxtel has acquired the pay TV rights from News Ltd and holds the rights to broadcast certain matches over pay TV for that period (with free to air coverage being via channels Nine and Ten). The AFL said that these pay TV rights:

> … include the right to sub-licence, and the AFL and Foxtel are in the process of finalising an arrangement for the broadcasting of AFL matches on pay television throughout Australia for 2002 to 2006.

But it added that:

> It will be a term of the agreement between the AFL and Foxtel that Foxtel can sub-licence pay television rights, and that it must sub-licence the pay television rights to Austar and Optus on reasonable commercial terms (sub. DR83, p. 5).

Foxtel said that it:

[5] Chapters 2 and 3 of the Commission's broadcasting report (Productivity Commission 2000) contain charts of media ownership structures.

… will make its AFL coverage available to all pay TV homes across Australia by offering it non-exclusively to other pay TV platforms (sub. DR92, p. 15).

Exclusive contracting of sports programming

The AFL argued that exclusive licensing was necessary to maximise its revenue from the sale of the broadcasting rights to its games (box H.2).

Box H.2 **Access to programming content: the views of a content provider — the AFL**

The AFL is a content provider in so much as it contracts to grant the rights to broadcast AFL matches (content) on pay television. The AFL's current and future pay television broadcasting agreements are exclusive agreements …

The AFL's motive for contracting on an exclusive basis is to maximise revenue by obtaining a premium for exclusivity. The existence of an 'exclusivity premium' has been noted in Fox Sport's submission to the Commission.

The AFL's exclusive contract arrangements include the right to sub-license. The right to sub-license creates an incentive for the licensed pay television operator to sub-license to other pay television operators and get back some of the exclusivity premium. It is through the sub-licensing of AFL content that regional pay television operators have obtained access to AFL related content.

It is the experience of the AFL that sub-licensing results in pay television broadcasts of AFL matches throughout New South Wales, Queensland and Victoria. The broadcasting on pay television of AFL matches in these areas accords with the AFL's mass market objectives. The experience of the AFL in the broadcasting of AFL related content by regional pay television operators is not consistent with the suggestion in the draft report of foreclosure of such content in regional areas.

Source: Sub. DR83, p. 6.

The AFL said:

> Broadcasting rights revenue is the single largest source of funding for the AFL, making up more than one third of total revenue (sub. DR83, p. 2).

At the same time, the AFL has strong incentives to have as many consumers as possible watching its games. It said:

> Media coverage of AFL matches is a key component of the AFL's effort to attract young Australians to play Australian football in preference to many other sporting and recreational options. FTA television coverage and pay television coverage throughout Australia is a very important part of these efforts, particularly in the under developed New South Wales and Queensland markets ... It is the mass market objective of the AFL and the imperatives which drive it that AFL football be viewed by as many Australians as possible, both on FTA television and pay television (sub. DR83, p. 3).

Consequently, pay TV rights include a requirement that the (Foxtel related) rights holder must also provide the content to the other two large pay TV companies — Optus Television and Austar (sub. DR83, p. 7). This is a reflection of the fact that having pay TV exclusively on one network would mean that a significant number of customers would be excluded from watching the AFL — as the cost of being able to switch between pay TV companies is much higher than between free to air channels. In such circumstances, exclusivity would represent a loss to consumers, and a loss (in terms of customers missed) to the AFL. Moreover, the return to the AFL would be arguably lower under an exclusive arrangement for pay TV distribution, than it would be under a non-exclusive arrangement. It is unlikely that any individual pay TV operator can generate enough per-customer exclusivity premium to offset the loss in revenue that the AFL would suffer by excluding itself from a large share of the market.

This is essentially confirmed by the way current arrangements are set up. While the pay TV rights are provided to Foxtel, they are not exclusive in the same way that free to air rights can be.

The free to air market is simpler but quite different. Because of the ease with which customers can switch to the channel displaying the product, exclusive marketing does not preclude any customers from accessing that product. The per-consumer exclusivity premium thus represents a clear net gain that the content provider can obtain by offering exclusive distribution rights. Were exclusivity to be prohibited, the premium would be lost, and no significant increase in customers would be obtained to offset this loss. Unlike the pay TV rights, the free to air rights are usually exclusive.

Thus, while it is correct to say that there is a premium for exclusive distribution of pay TV content, this is unlikely to translate into a higher overall return to the AFL, because it appears to be more than offset by the loss of customers that exclusivity entails — a situation reflected in the final non-exclusive contractual arrangements.

The ACCC's proposal to prohibit exclusive content contracts in the pay TV industry is unlikely to materially change the existing situation, other than to make it more certain that pay TV companies could access key sports content (they would no longer be reliant on the AFL or the NRL requiring this) and access would be possible for the smaller pay TV companies not covered by current arrangements.

Any such changes would not prevent a sports provider from specifying a premium price for its product, to reflect the premium that it considers its sport can command (in the same way that a book publisher can set the price of a book to include the value that it thinks the author will command, but will still distribute that book through any bookstore that is prepared to stock it.)

H.4 The anti-siphoning list

The following is the current anti-siphoning list, as discussed in chapter 17.

Box H.3 **The anti-siphoning list**[a]

Horse racing — the Melbourne Cup

Australian Football League — all AFL Premiership competition matches, including the finals, and each State of Origin match

Rugby League — all NRL Premiership competition matches, including the finals, each State of Origin match and each international Rugby League match involving Australia

Rugby Union — all Rugby World Cup matches, each international Rugby Union test match involving Australia and each match in the Hong Kong Sevens tournament

Cricket — all Australian test matches, each one-day cricket match involving Australia (including World Series Cricket) and each World Cup one-day cricket match

Soccer — each finals match of the National Soccer League's competition, the final of the English FA Cup and each match in the FIFA World Cup tournament

Tennis — each match in the Australian Open, Wimbledon, French Open, US Open, the Hardcourt Championships, the Adidas International Tennis Tournament and the Davis Cup when an Australian team is involved

Netball — each international match involving Australia

Basketball — each match in the Australian National Basketball League playoffs

Golf — each round in the Australian Masters, the Australian Open, the US Masters, the US Open, the US Professional Golf Association Championship and the British Open

Motor Sports — each race in the Formula 1 World Championship (Grand Prix), the Motorcycling World 500cc Motorcycle Championship, the Australian Touring Car Championship, the Bathurst 1000 and the Australian IndyCar Grand Prix

a Certain individual events have been delisted by the Minister, following reports from the ABA (www.aba.gov.au/about/public_relations/newrel_01/7nr01.htm accessed March 2001).

Source: Productivity Commission 2000, p. 430.

In December 2000, the Government directed the ABA to investigate which events should be removed from or added to the anti-siphoning list and the date or dates that protection should expire for listed events.

In conducting its investigation the ABA was directed to have regard to the policy that an event should be included on the list only if the event has been consistently broadcast on free to air television in the past five years.

The ABA provided the report of its investigation to the Minister on 29 June 2001. It said:

> While confirming the underlying philosophy of the anti-siphoning regime the ABA's investigation concluded that there were problems with the list that should be addressed.

Its recommendations are summarised in box H.4.

Box H.4 **The ABA's recommended changes to the anti-siphoning list**

Events recommended to be removed from the list

The ABA recommended that the following events, which were not consistently broadcast, should be removed from the list:

- Australian Football League State of Origin matches
- international rugby league matches involving the senior Australian representative team and a non-representative team
- Hong Kong Sevens Rugby tournament
- test cricket matches involving the senior Australian representative team played outside Australia and the United Kingdom
- one day cricket matches involving the senior Australian representative team played outside Australia or the United Kingdom
- doubles matches and singles preliminary rounds and quarter finals of the French Open tennis tournament
- Australian Men's Hardcourt tennis Championship
- Australian Women's Hardcourt tennis Championship
- semi finals of the Australian National Basketball League playoffs.

Events recommended to be added to the list

The ABA recommended adding three new events in the categories of swimming and soccer — reflecting changing viewer interest since the introduction of the list, and future expectations arising from consistent coverage by free to air TV of these events:

- each international soccer match involving the senior Australian representative team and the senior representative team of another country.
- Federation Internationale de Natation (FINA) World Swimming Championships (Long Course).
- Pan Pacific Swimming Championships.

Source: ABA 2001.

The ABA also argued for a future review of the anti-siphoning rules. It said:

> The current decade promises to be the most structurally significant for Australian broadcasting with potentially major changes to the television landscape. The ABA recommends the new list should run for no more than five years through to the end of 2006.
>
> Before this time there should be a thorough re-examination of the anti-siphoning rules, with changes to the scope of the list and its operation decided in the context of the outcomes of the scheduled digital television reviews. This should include any changes to the restrictions on multi-channelling after 2005 and the 2006 moratorium on new players. The application to the Australian market of a possible non-exclusive rights arrangement perhaps along the lines of the UK system, covering a more limited list of events, should be evaluated. This would require a more rigorous examination of market factors concerning the acquisition and use of sports rights with access to relevant commercial information (ABA 2001).

The UK system referred to in the quotation is similar to that recommended by the Productivity Commission in its broadcasting report (Productivity Commission 2000).

The Government is considering the ABA's report.

I Administrative and compliance costs

I.1 Background

As noted in chapter 2, the Australian telecommunications regime involves complex layers of regulation and procedure resulting in significant administrative and compliance costs for regulators and firms. Costs are both direct (such as staffing costs) and indirect (such as the cost of waiting for decisions).

This appendix aims to estimate the direct administrative and compliance costs of the telecommunications *competition* regime. It does this by summing:

- the telecommunications competition specific costs associated with the activities and operations of the following administrative bodies:
  - Department of Communications, Information Technology and the Arts (DCITA);
  - Australian Competition and Consumer Commission (ACCC);
  - Australian Communications Authority (ACA);
  - Australian Communications Industry Forum (ACIF);
- the costs of non-government personnel dedicated to regulatory issues;
- the cost of access arbitrations; and
- the costs of trade practices litigation.

This approach follows closely the method employed by NECG in its more general review of the Australian telecommunications regime (NECG 2000).

I.2 Costs associated with the activities and operations of government and self-regulatory bodies

Responsibility for administering the telecommunications regime spans a number of government institutions including the ACA, which is primarily responsible for technical regulation, the ACCC, which is primarily responsible for competition

regulation, and DCITA, which provides advice on regulatory policy aspects of the telecommunications sector.

In 1999-00, the total telecommunications specific administrative cost for the ACA was approximately $16 million.[1] While many of the ACA's functions have implications for competition, the ACA has been given responsibility for a number of areas, such as number portability, pre-selection and facilities access, which are specifically designed to facilitate competition — the Commission has focused on enumerating the costs of these 'competition specific' functions.

The cost associated with the ACA's Telecommunications Licensing Group for the 1999-00 period was just over $1 million.[2] The Group is responsible (among other things) for number portability, pre-selection and access to telecommunications infrastructure. Given the focused nature of the costs the Commission is seeking to estimate, the Commission considers that this figure is a better approximation than that of the total of $ 16 million.

In 1999-00 the cost attributable to the ACCC's telecommunications functions was approximately $3 990 000.[3] Given that the ACCC's function with respect to telecommunications is to administer 'competition and economic regulation', the Commission has also used this as an estimate of the cost of the ACCC's telecommunications competition role.

Within DCITA, the Telecommunications Competition and Consumer Branch is responsible for providing policy advice on telecommunications competition issues. In particular, the branch manages the administration of, and provides policy oversight of, relevant parts of the *Telecommunications Act 1997*, Parts XIB and XIC of the *Trade Practices Act 1974* (TPA), and subordinate legislation. In 1999-00 the cost of the branch was approximately $1 300 000.[4] This is an upper bound estimate of the cost to DCITA of its telecommunications competition role since the branch is also involved in other activities. Further, it is likely that DCITA would retain a policy advising role even were the nature of the regulatory regime to change.

As noted in chapter 12, DCITA is also responsible for administering Industry Development Plans (IDPs). In 1999-00 the cost to DCITA of administering IDPs was approximately $380 000.

1 Telecommunications (Annual Carrier Licence Charge) Determination 2001.

2 Information provided by the ACA.

3 ACCC (2000w, p.3)

4 Information provided by DCITA.

A large component of the costs outlined above are recovered from carriers in the form of carrier licence fees. Under the *Telecommunications Act 1997* and the *Telecommunications (Carrier Licence Charges) Act 1997* carriers are required to pay an annual charge determined by the ACA. Fees consist of a $10 000 application fee, a $10 000 annual fee and a variable percentage of annual revenue calculated in relation to the cost of maintaining the regulatory regime.[5]

Additionally, the ACCC charges fees for the provision of certain telecommunications regulation services under the TPA. These fees are based on the lowest expected cost of performing the function.[6] In 1999-00 telecommunications fees amounted to about $143 250.[7]

A number of self-regulatory bodies have also been established to facilitate the operation of the telecommunications regime including ACIF, an industry funded body that develops and administers technical and operating arrangements. In 1999-00 the cost of ACIF was around $2 300 000[8] of which, approximately 30 per cent related to telecommunications competition issues.[9]

In sum, the total (upper bound) telecommunications competition administrative costs for regulatory and self-regulatory bodies for the year ended 30 June 2000 was approximately $7.5 million (table I.1).

I.3 Costs of non-government personnel dedicated to regulatory issues

It has become increasingly common for carriers and carriage service providers (CSPs) to have personnel dedicated to 'managing' their relationship with the various regulatory bodies (box I.1).

Further, carriers and CSPs employ the services of legal firms and economic consultants to assist them generally in complying with the telecommunications regulatory regime.

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5 Cost is broadly defined as the proportion of ACA and ACCC costs attributable to telecommunications functions and powers, the Commonwealth's contribution to the International Telecommunications Union, grants made under s. 593 of the Telecommunications Act 1997 and DoCITA's administrative costs in relation to IDPs.

6 ACCC (2000w, p. 4).

7 Information supplied by the ACCC.

8 Total expenditure for ACIF as reported in ACIF 2000b (p. 52).

9 Discussions with ACIF.

It is extremely difficult to measure the resources devoted by individual carriers to regulatory functions. Even where these costs can be identified, often the function of regulatory personnel extends to other regulatory activities, such as consumer or technical matters, which do not have a 'strict' competition focus.

Box I.1 **Regulatory sections within telecommunications firms**

Cable & Wireless Optus provides the following description of its regulatory team:

> The Regulatory team at CWO manages the company's relationships with the Federal Government, State Government, and a range of regulators who impact on our day to day operations – including the Australian Competition and Consumer Commission; the Australian Communications Authority; the Department of Communications, Information Technology and the Arts; and the Telecommunications Industry Ombudsman. Our aim is to manage those relationships in a way which enhances shareholder value and enables CWO to get on with business. We do that work by advocating CWO's position in a range of ways including through preparing written submissions; attending meetings and giving presentations; and through making public and media statements. In this work, economic and legal skills, and knowledge of Government and regulatory processes, is important.

Source: http://www.careers.cwo.com.au/vacancy/legregul.htm (accessed 20 July 2001).

Telstra estimated the cost, to all carriers, of non-government regulatory personnel for the year 1999-00 as $20 million — by assuming that approximately 200 non-government personnel are employed by the carriers and other interested parties in order to comply with the regime at an average salary of $100 000. The Commission considers that this is an upper bound estimate.

As noted, such personnel often undertake other 'non-competition' regulatory activities. Further, based on information received from a small sample of carriers, it appears that the number of regulatory personnel may be less than 200. For example, in 1999-00 there were less than 20 firms whose telecommunications revenue for USO purposes (as determined by the ACA) exceeded $1 million. Some of these firms employed less than one full time person (internal and external) to deal with regulatory issues. On the other hand, due to reliance on external resources and the senior nature of many roles, the cost per position may have exceeded $100 000.

The Commission estimates that in 1999-00 the cost to carriers of employing dedicated regulatory staff, consultants and legal firms to assist them in complying with the regime was more likely to be in the order of $12 million (table I.1).

I.4 Costs of access arbitration and trade practices litigation

In addition to the 'dedicated' regulatory staff and legal and economic consultants outlined above, carriers and CSPs engage law firms and economic consultants to advise them with respect to particular access arbitrations and/or trade practices litigation (including whether to pursue action).

In 1999-00, there were 23[10] 'current' access arbitrations. As was the case with non-government regulatory personnel, it is difficult to estimate the cost of access arbitrations — access arbitrations are conducted in private and the degree of effort put into access arbitrations variers across carriers, particularly where the one service is under arbitration by a number of providers.

The Commission estimates that the cost of access arbitrations was approximately $5 to $5.75 million for the 1999-00 year (table I.1). However, it is important to remember that in an unregulated environment commercial negotiations on access matters would not be costless.

In 1999-00 the ACCC conducted five major investigations into potential anti-competitive conduct by telecommunications carriers and CSPs (ACCC 2001d). A number of other actions (under s.46 of the TPA) were also progressed over the period.

The Commission estimates that the cost to carriers of trade practices litigation (including whether to pursue action) for the 1999-00 period was approximately $9.5 million.

I.5 Total administrative and compliance costs

Based on available information, the Commission estimates that total administrative and compliance costs associated with the telecommunications regime amounted to approximately $34 million for period 1999-00 (table I.1).

This estimate is significantly less than the $87 million estimate for the year ended 30 June 1999 produced by NECG (2000, p. 83). This is mostly explained by the more focused nature of the costs that the Commission was seeking to estimate. While the NECG estimate pertains to the administrative and compliance costs of the

[10] This includes a dispute pertaining to number portability under the Telecommunications Act and treats the Primus-Cable & Wireless Optus GSM originating and terminating dispute as two separate disputes.

telecommunications regime, where possible the Commission's estimates only reflect one component of the regime — that of telecommunications *competition* regulation.

Table I.1 **Administrative and compliance costs of the Australian telecommunications regime, 1999-00**

Cost Category	*$*
DCITA	1 667 000 [a]
ACCC	4 134 000 [b]
ACA	1 014 000 [c]
ACIF	682 000 [d]
Costs of regulatory and self regulatory bodies	**7 497 000**
Costs of non-government regulatory personnel	$12 000 000 [e]
Costs of access arbitration	$5 000 000 – 5 750 000 [f]
Costs of trade practices litigation	9 500 000 [g]
Total administrative and compliance costs	**$33 997 000 – 34 747 000**

[a] Cost of DCITA's Telecommunications Competition and Consumer Branch plus the cost of administering IDPs. [b] The ACCC portion of the telecommunications levy ($3 990 833) plus revenue for fees of $143 250. [c] Cost of ACA's Licensing and Infrastructure Branch. [d] 30 per cent of ACIF's 1999-00 total expenditure $2 273 082. [e] Based on estimates from a number of carriers whose eligible revenue represented 94 per cent of total eligible revenue for the year 1999-00. The estimate was based on a number of different methodologies, all of which gave estimates of approximately $12 million. [f] The lower bound estimate was based on estimates supplied by carriers. Estimates of the cost to both parties of a dispute were obtained for over 80 per cent of disputes. In the remaining 20 per cent of disputes, an estimate was obtained for at least one party. The upper bound estimate (which is closely based on the NECG methodology) is based on $250 000 per dispute for 23 disputes. [g] Based on information supplied by carriers with extrapolation to carriers that did not supply information.

Further, the Commission notes that both the NECG and Commission estimates outlined above do not include the cost of social regulation of telecommunications — such as the universal service obligation and price control arrangements for Telstra. The compliance costs associated with these regulations are significantly greater than those of telecommunications competition regulation (chapter 18).

Examining the counterfactual

While the repeal of legislative provisions often results in lower compliance and administrative costs, in the case of the telecommunications competition regime, it is not clear that this would be the result — since carriers and CSPs would still be covered by the general provisions of the TPA.

One of the major distinctions between the processes provided for under telecommunications specific legislation and those provided for under general provisions of the TPA is that the former (at least in the first stages) is an administrative process while the latter (particularly Part IV) relies more heavily on

legal processes. Accordingly, the costs per action under the general provisions would probably be significantly higher.

Whether *total* costs would increase in the absence of a telecommunications specific regime is unclear. While the cost per action is likely to be higher, carriers may be less willing to take action — due to the additional cost and the reduced likelihood of success (the criteria established under Parts IIIA and IV are relatively more stringent that those established under Parts XIC and XIB of the TPA).

J Services declared under Part XIC

This appendix, which outlines the declaration decisions made since deeming, expands upon the discussion of the access regime contained in chapter 7.

Local telecommunications services

In October 1997, the Telecommunications Access Forum (TAF) referred the 'local call service' and the 'unconditioned local loop' to the Australian Competition and Consumer Commission (ACCC) for possible declaration.

The ACCC commenced a public inquiry in March 1998 and released its final report in July 1999 (ACCC 1999c), in which it decided to declare three types of local services: the unconditioned local loop service, local PSTN services, and a local carriage service.

For the *unconditioned local loop service* (the use of the copper wire between the end user's network boundary and a local or remote switch):

- the ACCC considered that without declaration, this service would not be provided to access seekers (in a manner that would meet their demand);
- the ACCC did not come to a definitive view on whether the local loop was a natural monopoly, merely saying that 'the telecommunications industry was at one time thought to demonstrate strong natural monopoly characteristics' (ACCC 1999c, p. 50). The ACCC noted that barriers to entry into the local loop included economies of scale and the sunk nature of trenching and cable costs;
- the ACCC found that declaration would promote competition to a significant extent for high bandwidth services (xDSL technologies) and local calls. However, it was expected that competition in the local call market would be slow to develop; and
- where multiple local loops have been constructed (in some CBD areas for example), the ACCC considered that declaration would have little effect. Although declaration was applied to all geographical areas, this would be reviewed in five years.

For the *local PSTN originating and terminating services* (the carriage of calls between the customer premises equipment and a point on the trunk side of the local switch):

- the ACCC found that declaration of local PSTN would lower long distance prices. It would enable providers to avoid interexchange switching and transmission costs that are bundled into the deemed PSTN declared service. Declaration would also improve the contestability of interexchange infrastructure and reduce inefficient switching that may have occurred due to the previous bundling of interexchange switching;
- although declaration of local PSTN services could be used to provide local calls, this would be unlikely to occur where pre-selection does not cover local calls; and
- access prices could be structured in accordance with retail price regulation. Thus, the access price would depend on the purpose for which the services were used. If the services were used for local calls, a per-call price could be appropriate because of local call parity requirements. If the services were used for long distance calls, a price consistent with PSTN services (a per minute price and flagfall) would be appropriate.

For *local carriage services* (the access provider provides the wholesale or network elements of local calls, and the access seeker provides the retail elements such as billing):

- the ACCC argued that even with the declaration of the unconditioned local loop and local PSTN, local call competition will take time to emerge. In the meantime, local carriage resale will provide the main form of local call competition;
- the ACCC considered that access seekers could use the local carriage service to increase their knowledge of retail services. Bundling services to end users on the one bill would assist their market penetration;
- by facilitating market entry and enabling providers to obtain useful market information about demand characteristics and the likely responses of competitors, declaration of the local carriage service would reduce the risks associated with infrastructure deployment. This should increase efficient investment;
- as a result of retail price controls, regulated access pricing could use an avoidable cost methodology (to avoid cream skimming). The ACCC did not evaluate these avoidable costs (this would be done at arbitration) but noted that the United States regulator (the FCC) regarded 17–25 per cent as a reasonable starting point; and

- once the unconditioned local loop and local PSTN services can be used to provide local calls, the declaration of local carriage services should be reviewed.

In 2000, Telstra applied (in two separate applications) to be exempted from the standard access obligation to supply this service in CBD areas, metropolitan areas of capital cities and some regional centres. In September 2001, the ACCC made a draft decision to remove current access regulation on Telstra and other carriers supplying wholesale local calls in the CBD districts of Sydney, Melbourne, Brisbane, Adelaide and Perth (ACCC 2000h, 2001k and 2001m).

Data services

Over the last two months of 1997, the TAF referred a set of data services to the ACCC for investigation — possible declaration of an ISDN service and the variation of two deemed services (transmission capacity and a digital data access service).

The ACCC commenced a public inquiry in late December 1997 and released its final report in November 1998 (ACCC 1998a), in which it decided to declare originating and terminating ISDN services and to vary the service descriptions for transmission capacity and the digital data access service.

For *ISDN services* (a faster — though now somewhat dated — digital service than that available through the standard PSTN telephone service but using the same copper wire lines, its capacity being less than 2Mbps):

- declaration would promote competition in the markets for leased line (private network) and switched services (a 'dial-up' switched digital service used on a call-by-call basis);
- the ACCC argued that although some limited network duplication has occurred in CBDs, it would not be viable to build an alternative ubiquitous ISDN network. Thus the cost structure of service provision indicates a natural monopoly; and
- the primary benefit of declaration would be lower prices (rather than a wider range of services). Telstra already offers wholesale ISDN services (where technically feasible). However, these wholesale ISDN services are priced at retail levels. By opening the door to subsequent arbitration, declaration should result in lower prices and increased competition. In addition, declaration should facilitate the timely resolution of negotiations through the application of standard access obligations (which encourage a standard approach).

For *transmission services* (bandwidth transmission capacity over 2Mbps):

- the original deemed service was transmission capacity of 2Mbps or multiples thereof, except for routes between Brisbane, Sydney, Canberra, Melbourne, Adelaide and Perth. As the traffic routes between capitals involved higher volumes and more than one provider, these routes were considered to be contestable and were not deemed to be declared;
- in its 1998 review of the deemed service, the ACCC decided to selectively declare intercapital transmission routes where new entry was not occurring (and not likely to occur). Effectively, this meant that all routes apart from Melbourne–Canberra–Sydney were declared. The ACCC decided to monitor market structure and conduct and to review its decision after two years;
- in addition, the 1998 declaration decision altered the description of the service so that access seekers could interconnect at places other than a nominated PSTN Gateway Exchange. In doing so, they could avoid some network elements and reduce costs; and
- in 2000, the ACCC commenced a review of the intercapital aspects of the varied service. In May 2001, it announced its intention to remove all the remaining intercapital routes from the declaration (ACCC 2001*l*).

For *digital data services* (high speed data services used to provide ATM, frame relay and Internet Protocol level services) that were originally deemed:

- the original deemed service was the domestic carriage of high speed data between an access seeker's facility and a customer's premises, where the customer is directly linked to the access provider's digital data network. The deemed service included a mandatory requirement for time division non-connect equipment to be used by access seekers;
- in 1998, the ACCC removed the mandatory requirements for all data links to pass through time division cross-connect equipment. This removes unnecessary elements and costs and does not let Telstra's architecture limit market growth; and
- the description was varied to remove quality and reliability elements that the ACCC argued were best determined through commercial negotiation.

Pay TV services

Transitional legislation introduced in 1997 required the ACCC to deem services necessary for the supply of broadcasting services by means of line (as distinct from air) links, where these services were in use at 13 September 1996. The legislation did not require the ACCC to determine whether deeming was in the long-term

interests of end-users (as for other services). As a result, the primary task of the ACCC was to specify the broadcasting service to be deemed.

As a result, the ACCC deemed an analogue service necessary for the delivery of broadcasting services by means of line links. The deemed service included optional elements that could be requested by the access seeker.

In December 1998, the ACCC commenced two separate but related inquiries into whether to declare an 'analogue-specific subscription television broadband service limited to line links' and a 'technology-neutral subscription television broadband service limited to line links'.

In August/September 1999, the ACCC declared the analogue-specific service but did not declare the technology-neutral service. The decision to declare the analogue-specific service was appealed by Telstra.

In deciding to declare the analogue-specific service (limited to line links) the ACCC (1999h and 1999i) claimed that:

- the vertical integration between the retail pay television service providers and the providers of the cable carriage service provided an incentive for the latter to restrict access to their cables;
- a key issue was whether there was sufficient choice of programming. Although competition already existed between the major providers of pay TV services, declaration would promote competition in cabled metropolitan areas through customers gaining access to a wider range of services. In particular, suppliers of niche services such as ethnic programming would be able to offer a wider range of services more cheaply than current suppliers; and
- declaration would have little negative effect on investment (taking into account that an existing declaration was in place whilst all existing cable networks were constructed).

In deciding not to declare a technology-neutral service (limited to line links), the ACCC argued that:

- no cable networks were configured to deliver digital pay TV services (although satellite pay TV services were digital to the set top unit); and
- given uncertainties in consumer demand, regulation and business models, there was not enough evidence that declaration would promote competition in the provision of digital services. Similarly, due to the lack of widespread demand, there was not enough evidence with respect to the effect on investment.

The Commission further discusses pay TV services in chapter 17.

Mobile roaming

The Government announced in July 1997 its intention to auction certain spectrum bands. To provide bidders with as much certainty as possible, the Minister for Communications and the Arts (as the portfolio then was) requested in September 1997 that the ACCC consider whether roaming between digital networks should be declared.

The ACCC commenced its inquiry in November 1997 and decided in March 1998 not to declare the service. In deciding not to declare the service the ACCC (1998b) found the following factors influential:

- the ACCC found the mobile market was competitive, and that future competition would increase even without roaming. But as customers value national coverage, the ACCC also found that roaming would probably increase the level of competition that would otherwise occur;
- it was likely that roaming would be offered commercially, given carrier's preferences for commercial outcomes;
- the declaration of roaming would be irrelevant to any-to-any connectivity (as GSM access services are already declared); and
- the ACCC found that declaration would have possible adverse effects on investment incentives.

Although it decided to not declare the service, the ACCC made an explicit threat to intervene in the market (either through Part XIB or to review its declaration decision) if roaming was not offered commercially:

> Since roaming is nonetheless important for new entry, the [ACCC] considers that indications of anti-competitive conduct by the incumbents such as refusal to provide roaming in a timely manner will result in action by the [ACCC] which could include early action under Part XIB and/or a review of the declaration decision at that stage (ACCC 1998b, p. 33).

This was intended to encourage commercial roaming — carriers would compete to offer roaming at a commercial price rather than a regulated price (King in ACCC 1998b, attachment B). The ACCC also indicated that if it *were* to declare the service, any arbitrated prices would not be based on TSLRIC, but on more commercial pricing methods. This was intended to further encourage the commercial provision of roaming — access seekers would not be able to obtain lower access prices by resorting to Part XIC.

Long distance mobile originating service

In June 1998, the TAF referred the 'mobile to fixed' services to the ACCC for possible declaration.

In October 1998 the ACCC commenced an inquiry into whether it should declare this service. Over the course of the inquiry, this service was clarified to be a long distance mobile originating service, defined as the carriage of certain long distance calls from a mobile phone to a point of interconnection located at a mobile switching centre. The mobile calls to which this service would apply are calls to international numbers and national long distance calls to fixed telephone networks.

In January 2000, the ACCC released its final report (ACCC 2000e) and decided not to declare the service. Factors which influenced this decision included:

- the ACCC found the mobile market to be competitive, and that future competition would increase even without the declaration of long distance mobile originating services;
- supply of long distance mobile originating service seemed unlikely in the absence of declaration. But its declaration would not lead to more vigorous competition;
- the expected intensification of competition would place direct incentives on carriers to invest and use infrastructure efficiently. It was doubtful whether declaration would have any real impact compared to this increase in competitive pressure; and
- The impact on any-to-any connectivity was minimal.

Billing and collection and smartcard technology services

In two cases, the ACCC has decided to not hold a public inquiry into declaration. These decisions — relating to a billing and collection service and a smartcard technology service — are summarised briefly below.

Billing and collection service

In May 1999, the TAF referred a billing and collection service to the ACCC for possible declaration.

Currently, special number services are associated with 13, 1300, 1800, 0500 and 1900 numbers. For example, 13 numbers allow a caller (A-party) to call a national network (such as Qantas) for the cost of a local call. At the moment, these calls are paid for as follows: at the retail level, the A-party provider charges the A-party; and

at the wholesale level, the B-party provider pays an originating access charge to the A-party provider in order to reach the A-party. In addition, the B-party pays the B-party provider for the special number service.

B-party providers sought declaration of a billing and collection service in relation to special number services. This would allow B-party providers to set the A-party charge. The A-party provider would collect the charge and pass it on to the B-party provider.

Those opposing declaration (A-party providers) stated that the service was not an eligible service, and that there was no contract existing between the A-party and the B-party (or its provider).

In June 1999, the ACCC decided that the most timely and effective way to facilitate the matter was to encourage the parties to negotiate commercially, and if this failed, to seek arbitration under the originating PSTN service.

To date, parties have not sought arbitration on this matter.

Smartcard technology

In December 1999, the TAF referred Telstra's smartcard payphone technology to the ACCC for possible declaration.

Currently, callers can pay for calls made in payphones by several methods, such as phonecards and cash as well as services which bill calls to another number (eg. Homelink). Phonecards are sold by Telstra and at least two other companies (for use in their own payphones). More widely, consumers use several payment methods, including credit cards, EFTPOS, and cash.

Declaration of Telstra's smartcard technology would allow other providers to access the intellectual property in Telstra's swipecards and to produce cards that can be used in Telstra's payphones.

In June 2000, the ACCC decided that these services were not within the definition of an 'eligible service'. This was because the smartcard services were not essential to the delivery of a carriage service, as other payment methods were easily substitutable.

Glossary

Access provider	**Carrier** or **CSP** that supplies declared services to itself or other persons — see s. 152AR of the TPA.
Access seeker	Service provider that makes, or proposes to make, a request for access to a **declared service** under s. 152AR of the TPA.
ADSL	*Asymmetric Digital Subscriber Line*. A compression technology that supports high speed **digital** services over conventional copper telephone lines. It has significantly greater capacity in one direction than the other.
AMPS	*Advanced Mobile Phone System*. The **analogue** mobile phone system which operated in Australia until 2000.
Analogue	The term used to describe the continuously variable wave form nature of voices and other signals. A signal for which the amplitude (strength) and frequency (tone) varies continuously.
Any-to-any connectivity	A network has this feature when subscribers to one network are able to call and receive calls from subscribers to an alternative network.
ATM	*Asynchronous Transfer Mode.* A high bandwidth, low delay technology in which multiple traffic types (such as voice, video, or data) are conveyed in fixed-length cells. This enables high speeds, making ATM popular for network backbones.
Bandwidth	(1) The range of frequencies that an **analogue** transmission medium is capable of carrying. Measured in Hertz (cycles of electromagnetic radiation per second). (2) The data-carrying capacity of a (**digital**) network connection, used as an indication of speed. Measured in **bps**.
bps	*Bits per second*. Basic unit of measurement for serial data transmission capacity.

Broadband	Imprecise, but often used to refer to telecommunications capable of providing multiple channels of data over a single communications medium, typically using some form of frequency or wave division **multiplexing**.
Carrier	The holder of a telecommunications carrier licence under the *Telecommunications Act 1997*.
Carrier pre-selection	The system that allows subscribers of a carrier (usually the incumbent) to choose in advance another carrier for making particular types of calls (usually long distance or international calls).
CDMA	*Code Division Multiple Access*. A digital mobile phone technology developed to be compatible with the analogue **AMPS**. Signals are spread across the entire available spectrum and are not confined to that part which would be allocated to an individual channel, allowing multiple calls to be placed on one channel.
Churn	The transfer of a telecommunications customer from one provider to another.
Circuit switching	Temporary direct connection of two or more channels between two or more points in order to provide exclusive use of an open channel. A discrete circuit path is set up between the incoming and outgoing lines, in contrast to message switching and packet switching, in which no such physical path is established.
Copper wire	The main transmission medium used in **telephony** networks to connect a telephone or other apparatus to the local exchange. Copper wires have relatively low **bandwidth** and so have limited ability to carry broadband services unless combined with an enabling technology such **ADSL**.
CSP	*Carriage service provider*. A party which uses its own or someone else's network facilities to provide basic or value-added telecommunications services.

Customer access network	The portion of the **PSTN** which comprises the transmission system connecting customers to the local switch. In Australia, it essentially comprises a fixed network of **copper wire** pairs.
Declared service	An eligible service declared by the ACCC under s. 152AL of the TPA. Once an eligible service is declared, **access providers** are required to supply the service to **access seekers** upon request — see s. 152AR of the Act.
Digital	The representation of a signal in the form of a stream of binary numbers rather than as an **analogue** electrical signal.
DDS	*Digital data service*. High speed data services used to provide ATM, frame relay and Internet Protocol level services.
Exchange	Performs the switching function necessary to establish a connection between two telephones or communication devices. Exchanges operate at local, trunk and international levels.
Fibre optic cable	Cable incorporating a number of very thin strands of glass on which information is conveyed in the form of pulses of light.
Frame relay	A high speed packet switched technology for voice, data and video signals which uses packets of varying lengths, or frames.
GHz (gigahertz)	One billion Hertz.
GSM	*Global System for Mobiles.* A digital mobile phone technology based on time division multiple access.
HFC network	*Hybrid Fibre Coaxial cable network*. Consists of **fibre optic cable** supplemented by coaxial cable for the connection to the customers' premises.
ISDN	*Integrated Services Digital Network.* A form of telecommunications network capable of carrying both voice (telephone) and data traffic, including over **copper wires**.
kbps	Kilobits (thousands of bits) per second.

LCS	*Local carriage service.* This is where the access provider provides the wholesale or network elements of local calls, and the access seeker provides the retail elements such as billing.
LCR	*Local call resale.*
LMDS	*Local Multipoint Distribution Service.* A broadband service capable of providing local loop services, interactive video, high speed internet and a range of advanced multimedia applications.
Local access switch	Provides ring current, dial tone and battery feed to end-users, as well as switching calls locally to other local access switches. It also provides number analysis for call routing and charging, call waiting and call diversion etc.
Local exchange	The exchange to which a customer is directly connected, usually the closest exchange to the customer.
MHz (megahertz)	One million Hertz.
Microwave	A high frequency form of radio transmission (generally over 1 GHz).
MMDS	*Multichannel Multipoint Distribution Service.* A one-way microwave service that usually transmits in an omnidirectional radiational pattern to multiple receiving facilities at fixed points.
Multiplexing	A range of techniques to enable transmission of multiple signals or voice channels simultaneously along a single transmission medium.
Number portability	An arrangement that allows subscribers of a telecommunications service to change **carriers** without having to change their number.

Packet switching	A method of transmitting messages by subdividing them into short packets containing the data and a destination address. Each is passed from source to destination through intermediate nodes which direct each packet onwards, not necessarily by the same route. The packets are reassembled into the original message at the receiving end.
Point of interconnection	The point at which one network interconnects with another.
POP	*Point of Presence.* A geographic location where a **CSP** can be accessed by a customer. Normally used in relation to services requiring dial-up access to a **CSP**'s network.
Port	*noun*. A point of access into a communications switch, a computer, a network, or other electronic device. *verb*. To transfer a telephone number from one carrier to another (through **number portability**)
PSTN	*Public switched telephone network*. The switched telephone telecommunications network to which public customers can be connected. The infrastructure for basic telecommunications services (including telephones, switches, local and trunk lines, and exchanges). It enables any customer to call and communicate with any other customer.
SMS	*Short message service*.
Spectrum	The **bandwidth** of a communications system, expressed in terms of the frequencies it can carry.
Telephony	A generic term describing voice telecommunications.
ULL	*Unconditioned local loop.* The copper wire between the end user's network boundary and a local or remote switch.
USO	*Universal Service Obligation*. The obligation under the Telecommunications Act 1997 to ensure that standard telephone services, payphones and prescribed carriage services are reasonably accessible to all Australians on an equitable basis, wherever they reside or carry on business.

Value added services	Services provided over a public or private network which, in some way, add value to the basic carriage services (such as storing and forwarding messages).
Virtual private network	A software defined network offered by telephone carriers for voice and data communications among multiple sites. The network provides the appearance of a private network, except that it makes use of the public switched network rather than physically dedicated leased lines.
VoIP	*Voice over Internet Protocols.* Enables voice communication to be transmitted and received via the internet.
WAP	*Wireless application protocol*.
Wireless local loop	A system where fixed radio systems are used instead of copper pairs to provide a connection between a handset (fixed or mobile) and a telecommunications base station or network.
xDSL	A generic term for digital subscriber line technologies (see **ADSL**), which enable broadband services over copper wires.

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