

CONTENTS

Abbreviations	vii
Executive summary	ix
1 International telecommunications in Australia	1
1.1 The international network	1
1.2 Providers of international telecommunications services in Australia	5
1.3 Australia's major international traffic flows	7
1.4 Telecommunications reform in Australia	9
1.5 Summary	12
2 Australian international call prices	15
2.1 International telecommunications price comparisons	15
2.2 The costs of providing international calls	21
2.3 Efficiency losses associated with pricing international calls above long-run marginal cost	23
2.4 Summary	28
3 Moving to a more competitive international call market	29
3.1 Existing market structure	29
3.2 Impact of legislative changes	38
3.3 Summary	43
4 The international accounting rate system	45
4.1 Background	45
4.2 The relationship between settlement rates and the resource cost of termination	47
4.3 The international accounting rate system and refile	49
4.4 The international accounting rate system and the current account	50
4.5 The impact of the accounting rate system on international call prices	53

4.6	Factors influencing the impact of the accounting rate system on international call prices	56
4.7	Summary	59
5	Reforming the international accounting rate system	61
5.1	Reform of the international settlement system	61
5.2	Transitional problems for Australia arising from asymmetrical liberalisation	69
5.3	Summary	78
Appendix A Data on international traffic, prices and costs		79
References		87

Tables

1.1	Australia's major international traffic flows, 1990–91 and 1995–96	8
2.1	Carrier and selected service provider off-peak international call prices, March 1997	17
2.2	Bilateral telephone prices, one minute call, peak standard rate, January 1996	19
2.3	OECD basket of international telephone charges, 1995	20
2.4	Estimates used to calculate efficiency losses	25
2.5	Estimated efficiency losses associated with Telstra and Optus pricing international calls above marginal cost	26
A.1	Estimates used to calculate efficiency losses	83
A.2	Sensitivity of efficiency loss estimates to variations in the price elasticity of demand for international minutes	84

Figures

1.1	An example of end-to-end telecommunications services from Australia	2
1.2	International telecommunications market shares, March 1996	7
1.3	Telecommunications access regime, post July 1997	11
2.1	Telstra's peak international standard call prices, 1990 and 1997	16
3.1	Market shares of international telecommunications services, 1991 to 1996	30

3.2	Comparison of Telstra's revenue-weighted price changes for international calls for both standard and special prices	31
4.1	Settlement for termination services	46
4.2	US-Australia settlement rate, 1985 to 1997	48
4.3	Settlement rates and estimated termination cost, 1996	49
4.4	Australian international telecommunications traffic flows, selected years	51
4.5	Australian current account and traffic deficits in international telecommunications, 1989–90 and 1995–96	53
5.1	Example of changes in the retail price in competitive markets facing one-way bypass	72

Boxes

2.1	Long-run marginal cost pricing	24
2.2	The price elasticity of demand for international calls	25
3.1	International calls over the internet	37
5.1	Proposed US unilateral action on international settlement rates	63
5.2	A system of one-way termination rates	68

1 INTERNATIONAL TELECOMMUNICATIONS IN AUSTRALIA

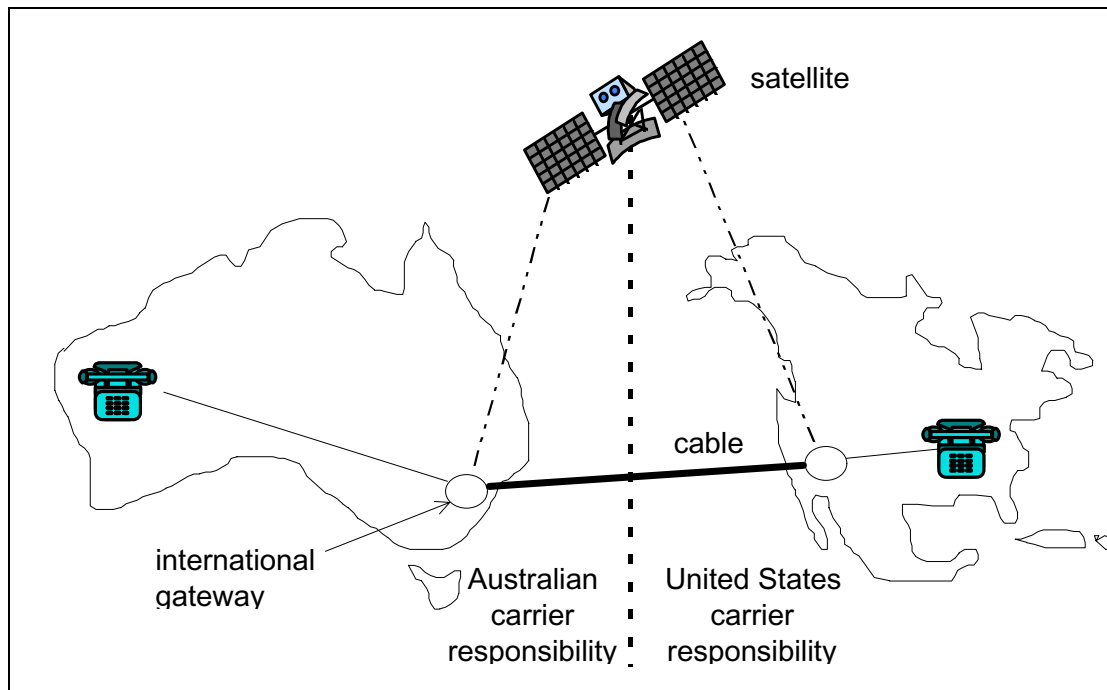
This chapter describes Australia's international telecommunications system. It discusses the main switching and transmission technologies used, and the main providers of international telecommunications services in Australia. Traffic flows to and from Australia are also examined. The chapter briefly reviews recent and prospective deregulatory reforms to the Australian telecommunications industry, including those legislative changes from 1 July 1997.

1.1 The international network

The international network mainly comprises a system of country-to-country telecommunications links which are jointly operated by the international carriers of each country. It starts at the international gateway of the originating country and finishes at the international gateway of the country of destination. The connection between the two international gateways is known as the international circuit. The Australian telecommunications carriers (Telstra and Optus) both provide half circuits from Australia's international gateway switches to the mid-points of the international circuits. Foreign carriers provide the other half of international circuits (see Figure 1.1).

Every international call includes a local domestic component to carry the call from the handset to the local switch, and then to the international gateway. If a call originates in a location without its own international gateway, a domestic long-distance component carries the call to a transit switch in a city with an international gateway. Similarly, an overseas call does not finish at the international gateway of the terminating country — the call must be carried domestically to the called party.

Figure 1.1: **An example of end-to-end telecommunications services from Australia**



Source: BTCE (1993).

Switching

The process of transferring a connection from one telephone circuit to another by interconnecting the two circuits is known as switching. When an international call is made, the telecommunications system must first determine that all the necessary circuits are available and, if so, set up the call routing. This routing requires interconnection between various levels of switches, from the local switch, through transit switches, to the international gateway switch and then through an international circuit. The call then arrives at another international gateway switch and is carried through various levels of switches in the domestic network where the call is terminating. Australia currently has two layers of transit switches in the basic network. Secondary switches collect and distribute traffic for groups of local switches (for example, covering several suburbs in a city), while tertiary switches collect and distribute traffic for groups of secondary switches (for example, covering a city or a major part of a city).

A complicating factor associated with international calls is the geographic routing, which depends on relative traffic levels at different times in various segments of the international network. For example, a morning call from Australia to the United Kingdom could be directed via the Indian Ocean where

‘sleeping nations’ would not be fully utilising communications systems, whereas an evening call could travel via less active circuits in the Pacific region (BTCE 1993).

Transmission media

International telecommunications links between Australia and the rest of the world are provided by satellite or cable.

Satellite links

Although satellite transmission avoids laying costly cable, it requires expensive transmission devices. The satellite receives the telecommunications signal from one international gateway and rebroadcasts at different frequencies to other international gateways.

Australia’s international satellite links are operated by two inter-governmental organisations — INTELSAT (International Satellite Organisation) and Inmarsat (International Maritime Satellite Organisation). These organisations provide satellite capacity for international telecommunications services to over 180 countries. INTELSAT provides Australia with direct access to the world via antenna systems that operate to its satellites over the Pacific and Indian Oceans for switched and private services. INTELSAT carries approximately 60 per cent of Australia’s international switched traffic (BTCE 1993). Inmarsat gives direct access to Inmarsat’s Pacific and Indian Ocean region satellites via antennae that enable provision of land mobile, maritime and aeronautical services.

Owners of INTELSAT and Inmarsat satellites contribute capital in proportion to their relative use of the system, and receive a return on their investment. In addition, usage charges are levied, depending on the type, amount and duration of the service (INTELSAT 1997). INTELSAT comprises 140 member countries, with some members having more than one authorised entity providing INTELSAT services. In Australia, Telstra — a founding member of both Inmarsat and INTELSAT — is the sole signatory to INTELSAT, and its sixth largest shareholder (MDIS 1996). Optus, after its entry as the second carrier in 1992, gained access to both INTELSAT and Inmarsat services through its part ownership by Cable & Wireless which has invested in the satellite bodies.

Cable linkages

Undersea cable systems also link Australia’s telecommunications network to the rest of the world. These cable systems are either coaxial or, more recently, fibre optic.

A coaxial cable consists of an inner conductor wire surrounded by insulation, called the dielectric. The dielectric is surrounded by a conductive shield, usually a layer of foil or metal braiding, which in turn is covered by a layer of nonconductive insulation called the jacket. Coaxial cable, which can be grouped together in one large cable, offers clear and high speed transmission.

Fibre optic cable, which consists of thousands of extremely thin strands of glass or plastic bound together in a sheathing, transmits signals with light beams. High-intensity light beams generated by lasers are conducted along the transparent fibres. These fibres have a thin coating, called cladding, which effectively works like a mirror, preventing the light from leaking out of the fibre. Because it transmits light rather than electricity, fibre optic cable has major advantages. For example, it can support extremely high data transfer rates — upward of 2.5 billion bits per second or 32 000 long-distance phone calls simultaneously. Optical fibre cables are reliable over long distances as they are immune to electrical interference.

International carriers jointly own, operate and maintain international submarine cables through consortia. Typically, ownership interests are allocated as a function of anticipated use (Frieden 1996). In the simplest case, joint ownership is taken to mean that the originating carrier owns the link from its international gateway to a notional halfway point, while the terminating carrier owns the remaining half of the link.

The first trans-Atlantic telephone cable commenced operation in 1956, and the first Pacific telephone cable was laid in 1962. The first Pacific coaxial cable system had only 82 circuits, and was superseded by the initial Australia, New Zealand, Canada Undersea Cable (ANZCAN), which had the equivalent of some 1 400 voice circuits (BTCE 1993).

Australia's direct international fibre optic links are provided by Tasman-2, the PacRim West cable and the new JASURAUS cable (linking Jakarta in Indonesia to Port Headland in Western Australia). The Tasman-2 cable stretches 2 000 km between Sydney and Auckland. It comprises three optical fibre pairs and has the potential to carry 100 000 simultaneous telephone conversations. Australia was connected to Guam by PacRim West in July 1994. The PacRim West cable comprises two optical fibre pairs. The Tasman-2 and PacRim West cables form part of the South Pacific Network (SPN) of cables. The SPN links Australia and New Zealand with Hawaii and Guam and connects with networks in the United States, Europe, Japan and South East Asia.

Telstra also has indirect connections to North America via the PacRim East cable which interconnects with Tasman-2 in New Zealand. In July 1996, Telstra had reportedly joined 20 other international telecommunications organisations to participate in the SEA-ME-WE 3 submarine cable project, extending its

submarine optical fibre cable network through Asia to the Middle East and Europe (MDIS 1996). The system is expected to operate at up to 16 times the transmission rates of existing optical fibre submarine cables, and will support broadband services, such as asynchronous transfer mode data transport and high-definition television. It is expected to enter commercial service at the end of 1998.

Optus is also involved in a number of regional submarine fibre optic cables forming the SPN. The company funded 31 per cent (Telstra the remaining 69 per cent) of the new JASUR AUS submarine cable.

The carriers' choice of cable and satellite mix on routes depends upon bilateral agreements and other factors, such as relative costs.

1.2 Providers of international telecommunications services in Australia

Providers of international telecommunications services currently operate under the *Telecommunications Act 1991*. Such suppliers can be categorised as either carriers or service providers. Carriers are either general (line or satellite) or public mobile carriers. Until July 1997, there are only two licensed general carriers (Telstra and Optus) and three licensed mobile carriers (Telstra, Optus and VodaFone). Only general carriers are responsible for supplying basic carriage services. However, service providers can resell services in competition with carriers.

General carriers

Telstra, a public limited liability company, is currently owned entirely by the Commonwealth Government.¹ It began trading in 1992, following the merger of the former Telecom Australia and the Overseas Telecommunications Commission (OTC). As noted above, Telstra is a major shareholder in the satellite facilities and cable consortia which carry Australia's international calls. In the quarter ending March 1996, Telstra's share of outgoing international call minutes was 63 per cent, compared with 74 per cent in the quarter ending December 1994 (AUSTEL 1997). Telstra also carried 77 per cent of incoming international minutes in the quarter ending March 1996, compared with 81 per cent in the quarter ending December 1994 (see Figure 1.2).

¹ Legislation allowing the one-third sale of Telstra was passed in December 1996.

Optus Communications is the second facilities-based carrier competing with Telstra in what is until July 1997 a duopoly market for fixed network carrier services. It successfully tendered for Australia's domestic satellite operator AUSSAT and began operations in domestic long-distance and international markets in 1992. Under special interconnect arrangements, Optus uses Telstra's local network as a base for customer access. In the March quarter 1996, Optus carried 22 per cent of all outgoing international minutes from Australia, the same share it accounted for in the quarter ending December 1994 (AUSTEL 1997). Optus also carried 22 per cent of all incoming international minutes in the March quarter 1996, compared with 19 per cent in the December quarter 1994 (see Figure 1.2). The remaining minutes were carried by service providers.

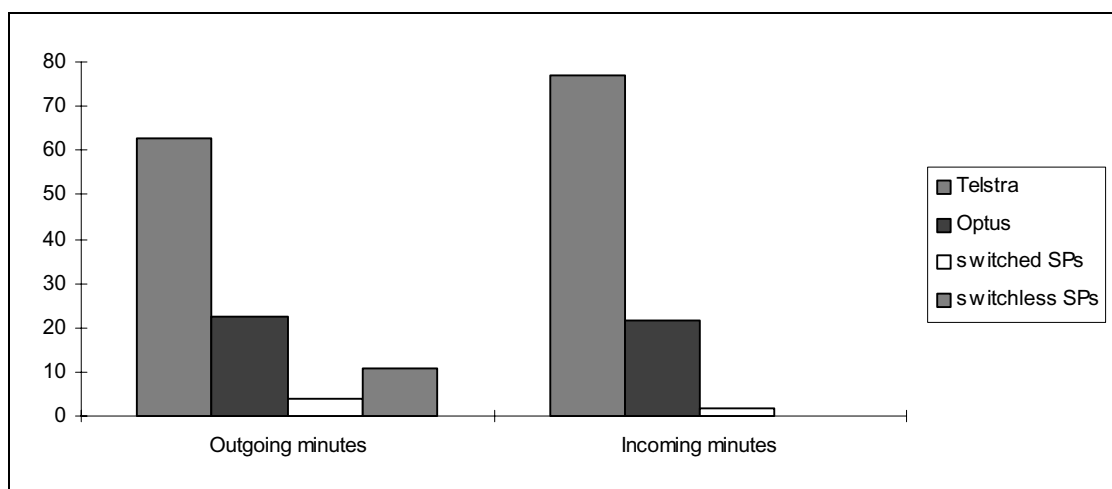
Service providers

Under the *Telecommunications Act 1991*, only licensed carriers can install and maintain telecommunications line links. Service providers can compete with the carriers by supplying telecommunications services using carriers' networks and services. In the March quarter 1996, service providers provided 15 per cent of outgoing international minutes from Australia and 2 per cent of incoming international minutes. Under the current regime, the term 'service provider' encompasses suppliers of value added services (VAS) and private network services (PNS), as well as switchless and switched resellers in both the fixed and mobile network environments.

Service providers offering VAS may lease communication lines from a licensed carrier and then change or enhance standard services. In Australia, services considered as VAS include database or computer bureau services, electronic mail services, voice and electronic directory information services, electronic funds transfer and billing services.

Service providers offering PNS use spare capacity on their extensive private networks for resale purposes. Such businesses may include banks, travel industry members and large corporations, each with differing peak traffic needs, which provide temporal variation in spare capacity.

Figure 1.2: International telecommunications market shares, March 1996



Source: AUSTEL (1997).

Switchless resale is usually characterised by a service provider purchasing, at highly discounted prices, bulk network services from a carrier and then reselling these services to their own clients. The prices at which service providers can distribute the network services reflect discounts that their customers could not acquire individually. Switchless service providers generally do not own or operate telecommunications networks.

Service providers supplying switched resale services install their own independent switching systems and network facilities and combine these with carrier-acquired leased lines and switched access services to provide end-to-end services. Customers of these service providers rely on calls being transmitted over both the service provider's network and the carrier's network.

1.3 Australia's major international traffic flows

The number of international minutes to and from Australia's major traffic destination countries for 1990–91 and 1995–96 are presented in Table 1.1 (see also Appendix A). Australia's largest outgoing traffic flows in 1995–96 were to the United Kingdom, New Zealand and the United States, which together accounted for 41 per cent of total outgoing call minutes, down from 46 per cent in 1990–91. These three countries were also Australia's largest sources of incoming traffic, representing 42 per cent of total incoming minutes in 1995–96, compared with 50 per cent in 1990–91.

The largest increases in outgoing traffic flows between 1990–91 and 1995–96 were to Indonesia (203 per cent), Hong Kong (155 per cent), Singapore (148 per

cent), China (147 per cent) and Malaysia (127 per cent). The largest increases in incoming traffic flows were from the same countries — China (147 per cent), Hong Kong (161 per cent), Indonesia (147 per cent), Singapore (140 per cent) and Malaysia (87 per cent).

Table 1.1: Australia's major international traffic flows, 1990–91 and 1995–96

<i>Country</i>	<i>1990–91</i>		<i>1995–96^a</i>	
	<i>Outgoing</i>	<i>Incoming</i>	<i>Outgoing</i>	<i>Incoming</i>
	'000 minutes	'000 minutes	'000 minutes	'000 minutes
United Kingdom	101 492	79 926	147 800	105 920
New Zealand	78 557	74 303	131 600	116 640
United States	86 699	91 651	126 400	112 000
Hong Kong	25 965	26 991	66 300	70 820
Singapore	16 859	16 981	41 800	40 800
Japan	24 583	23 961	30 700	26 800
Canada	15 098	17 041	29 900	21 040
Malaysia	12 811	9 585	29 100	17 920
Indonesia	9 500	8 173	28 800	20 160
China	10 400	5 040	25 700	13 200
Rest of World	203 097	139 928	341 900	255 200
Total	585 061	493 580	1 000 000	800 000

a Industry Commission estimates, see Appendix A.

Sources: BTCE (1993) and ITU (1996).

Outgoing traffic was greater than incoming traffic in both 1990–91 and 1995–96. Over this period, both outgoing and incoming calls recorded strong growth, with total outgoing calls growing faster at 71 per cent, compared with 60 per cent for incoming calls. Consequently, Australia's deficit of incoming over outgoing minutes rose slightly from 8 to 11 per cent of total traffic (incoming plus outgoing).

1.4 Telecommunications reform in Australia

Until 1989, telecommunications networks and services were provided by government monopolies: Telecom Australia was responsible for domestic

telecommunications, OTC for international communications and AUSSAT was responsible for national satellite operations.

The first telecommunications reform took effect with the implementation of the *Telecommunications Act 1989*. This established the Australian Telecommunications Authority (AUSTEL) to independently regulate the telecommunications industry and permitted the entry of value added service providers. Pressure for increased reform, coupled with problems with the financial viability of AUSSAT, led to further regulatory changes, implemented under the *Telecommunications Act 1991*.

These reforms were intended to introduce 'full network competition' into the telecommunications industry by July 1997. Initially a network duopoly was established in 1991. Telecom Australia and OTC were merged into a new full-service government-owned carrier called the Australian and Overseas Telecommunications Corporation (AOTC), renamed Telstra in 1993. A second carrier, Optus Communications Limited, was formed by the sale of AUSSAT for approximately US\$600 million to a consortium of Bell-South, Cable & Wireless and several Australian investment companies. Telstra and Optus were licensed to operate as 'general carriers' as well as 'mobile carriers'. A third mobile carrier, VodaFone, was licensed in late 1992. Importantly for international telecommunications, the 1991 reforms removed major entry restrictions on service providers supplying basic international telecommunications services.

In May 1996, the Minister for Communications and the Arts released a discussion paper containing broad proposals for key aspects of the post-July 1997 regulatory environment for telecommunications. Following public consultations, the Government released exposure draft legislation in three packages during August, September and October 1996. The legislation passed through the Senate in March 1997.

The package of legislation repeals the *Telecommunications Act 1991*. It is replaced with a new regulatory framework principally contained in the *Telecommunications Act 1996* and new parts of the *Trade Practices Act 1974*.²

The *Telecommunications Act 1996* removes all restrictions on the number of carrier licences from 1 July 1997. Carriers no longer have a 'reserved right' to install certain infrastructure or be the primary supplier of certain services. The Act defines the market to include the overlapping categories of carrier, carriage service provider and content service provider, and sets out the rights and obligations accruing to each of these entities.

² Several smaller bills deal with the relevant taxing arrangements, the creation of the new Australian Communications Authority, transitional arrangements for carrier licence fees and amendments to the radio communications tax legislation.

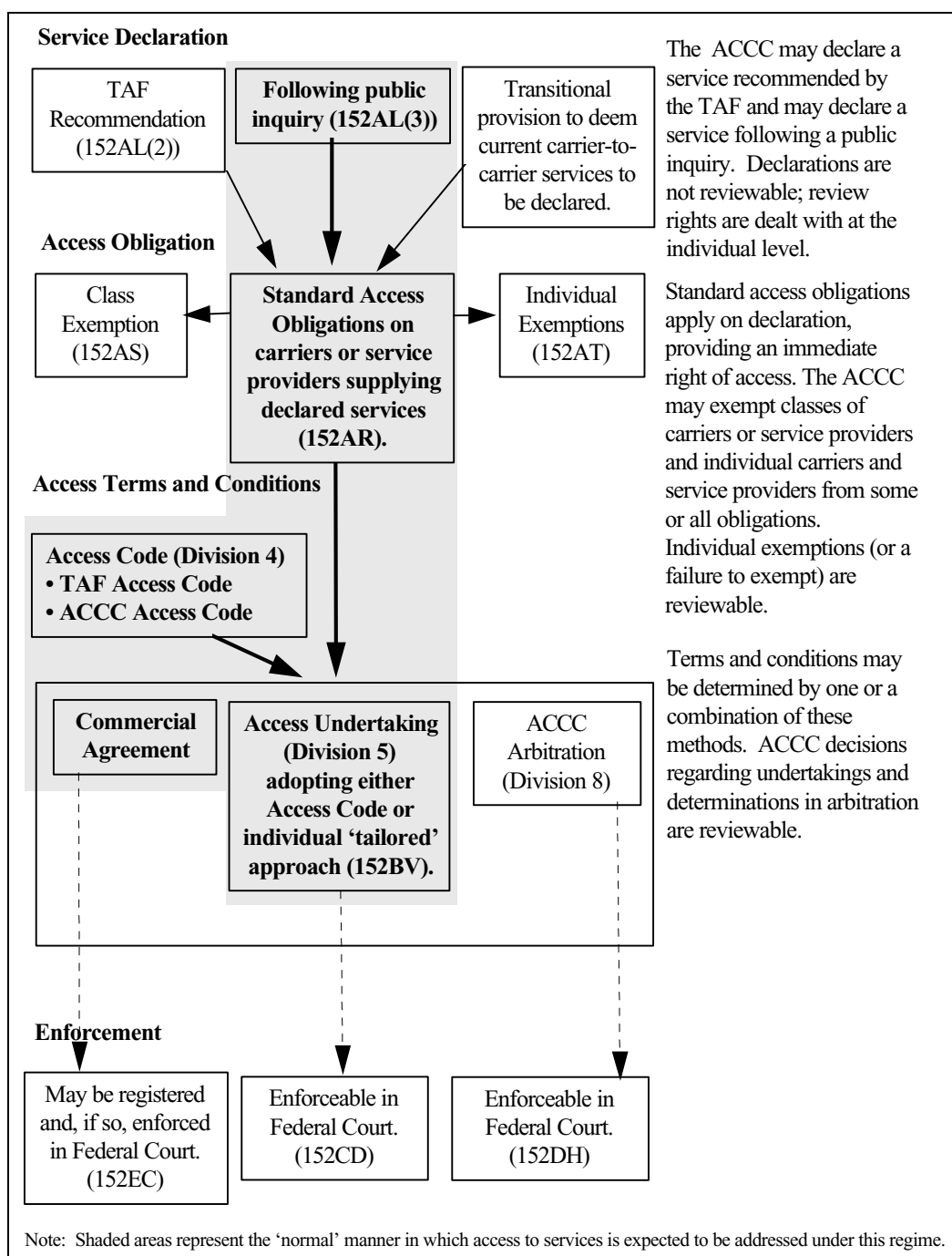
The *Telecommunications Act 1996* also removes the legislation restricting access to international line links (cable and satellite) for service providers. Currently, service providers must obtain international links for providing international calls from existing carriers. Leasing such capacity from Optus or Telstra has been relatively expensive (see Chapter 3). From 1 July 1997, service providers are permitted to access international transmission capacity from alternative more cost-effective sources.

Amendments to the *Trade Practices Act 1974* (new Part XIC) will establish an industry-specific regime for regulating access to carriage services or of services provided by means of carriage services (see Figure 1.3). This provides for the 'declaration' of a service by the Australian Competition and Consumer Commission (ACCC). Once declared, a set of standard access obligations apply to carriers or carriage service providers supplying those services (access providers), unless specifically exempted. These are aimed at giving third parties the right to gain access to telecommunications infrastructure or services on agreed, or arbitrated, terms and conditions, including the access price.

The new access regime applies only to 'declared services'. The Act details what is likely to be a declared service and how it can be declared by the ACCC on the basis of a public hearing, or by it accepting such a recommendation from the new Telecommunications Access Forum (TAF). Once made, declarations are not reviewable, but individual entities may be exempted from the standard access obligations. Importantly, provisions in the Act relating to current carrier-to-carrier services mean that Telstra's interconnect facilities available to Optus and VodaFone will be a declared service. Thus, from July 1997, the provision of Telstra's basic carriage services to service providers are subject to the access obligations.

Importantly, the terms and conditions of service provider access to declared services may be different from arrangements prior to July 1997. Such terms and conditions of access are to be determined under the Act either by commercial agreement between the parties or by an undertaking from the carrier or carriage service provider that is acceptable to the ACCC. Failing this, terms and conditions of access will be determined by ACCC arbitration.

Figure 1.3: Telecommunications access regime, post July 1997



Source: House of Representatives (1996a).

In February 1997, the ACCC released *Access Pricing Principles — Telecommunications a Draft Guide* to detail its approach to considering access pricing issues (ACCC 1997). The ACCC will endeavour to ensure that access prices charged for declared services equate with the costs of providing those

services, and are not used to hinder competition. The draft guidelines include a number of rules designed to ensure that access prices for particular declared services are not greater than prices levied within a vertically integrated service provider, and are consistent with access prices charged on related services.

The draft telecommunications guidelines also state that the ACCC has adopted total service long-run incremental cost (TSLRIC) as the benchmark for implementing cost-based access pricing.³ The ACCC identifies two approaches to estimating TSLRIC. The first is a cost study involving the identification, measurement and verification of all the relevant costs (full-cost approach). The second is to use existing access prices that are consistent with TSLRIC as a base and alter the price in accordance with subsequent changes in costs (delta approach). Importantly, the ACCC identifies the pre-July 1997 Optus interconnect price as one of the access prices that it considers as an appropriate benchmark for the delta approach. This presupposes that the pre July 1997 interconnect price is itself properly cost-based, a supposition that may not hold (IC 1997).

The Minister responsible for telecommunications may also provide guidelines to assist the arbitration process. These would be binding on all parties, and all access undertakings or agreements would need to be compatible. The Minister, therefore, may have substantial discretion over the principles guiding arbitration and perhaps, could determine prices directly.

1.5 Summary

The international network connects the international gateways of countries through satellite or cable transmission media. An international call is carried to the international gateway in the originating country via the local and often the domestic long-distance networks. When a call reaches the international gateway of the destination country, its domestic network carries the call to the final destination.

Australia's international telecommunications traffic has increased dramatically over the past five years, particularly with Asian countries. Although traffic is still carried mainly by the two Australian carriers, service providers recently appear to be gaining an increasing share of the international calls market.

³ TSLRIC consists of the operating and maintenance costs the firm incurs in providing the service, as well as a normal commercial return on capital. TSLRIC also includes common costs that are causally related to the access service (see Chapter 3).

Telecommunications in Australia has undergone significant reform since 1989. The *Telecommunications Act 1991* was intended to foster competition in the provision of telecommunications services, largely by removing the main entry restrictions on service providers wishing to supply international calls. The legislative changes of 1 July 1997 remove most of the remaining restrictions on telecommunications in Australia. Chapter 2 examines the impact on international call prices of previous telecommunications reforms, and identifies the remaining disparities between the prices charged for international services and their cost of provision.

2 AUSTRALIAN INTERNATIONAL CALL PRICES

Telecommunications reforms have contributed to lower Australian international call prices. However, while prices compare favourably with many other OECD countries, Australia's relative ranking has deteriorated since 1990. More importantly, despite the entry of some additional service providers, consumers are generally charged international call prices that substantially exceed their long-run marginal cost — the level consistent with efficient pricing.

2.1 International telecommunications price comparisons

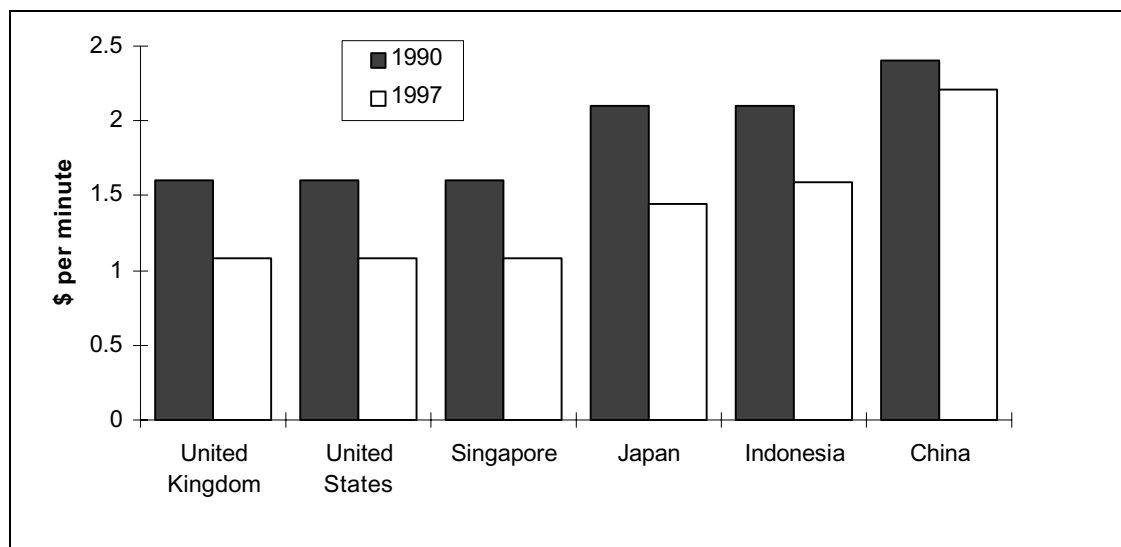
Australia's international call prices have fallen substantially over recent years. These reductions have resulted from the introduction of new, lower cost telecommunications technology, as well as increased competition in the provision of international calls following reforms to Australian telecommunications since 1989 (see Chapter 1). This section examines changes to Australia's international call prices over time, and compares these prices with those of other OECD countries.

Australia's international call prices over time

According to AUSTEL, Telstra's international call prices have fallen significantly since telecommunications reform commenced. Over the period from 1 July 1989 to 30 June 1992, Telstra's revenue-weighted average of international prices fell in real terms by over 19 per cent (AUSTEL 1992). International revenue-weighted average prices fell by almost 11 per cent in 1992–93 and by 10.2 per cent in 1993–94 (AUSTEL 1993 and BTCE 1995). In 1994–95, revenue-weighted average prices for international calls fell by 7.6 per cent (AUSTEL 1995c). Of this latter fall, 1.7 per cent was due to reduced standard call prices, while the remaining 5.9 per cent was due to specials (such as weekend discounts), flexi-plans and other reductions. AUSTEL (1996) also reported that, over the period July to December 1995, revenue-weighted average prices for international calls fell by a further 0.6 per cent. An increase in standard prices of 0.6 per cent during this period was more than offset by a 1.2 per cent decrease in the average price due to specials, flexi-plans and other discounts.

The falls in Telstra's international call prices since 1993–94 reported by AUSTEL appear to be largely concentrated in specials, flexi-plans and other discounts. However, a comparison of Telstra's peak international call prices on individual routes in 1990 and 1997 indicates that standard international call prices have also fallen considerably (see Figure 2.1).

Figure 2.1: Telstra's peak international standard call prices, 1990 and 1997^a



a 1997 international call prices are deflated by the CPI to 1990 prices.

Source: Telstra pricing schedules.

On standard rates, Optus has tended to price at rates marginally below those of Telstra (see Table 2.1). In addition to the two carriers, several service providers offering domestic long-distance and international call services have recently commenced operations in Australia, offering what appear to be substantially reduced prices (see Table 2.1). At the beginning of 1997, at least four switched service providers were offering domestic long-distance and international services to both business and residential customers using Telstra's National Connect product to reticulate these calls locally.¹ In addition, numerous switchless service providers were offering domestic long-distance and international services by purchasing capacity from the carriers or from switched service providers.

¹ Telstra's National Connect product was introduced in November 1992. This ISDN-based product allows switched service providers to provide national end-to-end services using their own switching facilities. Service providers have been critical of both the pricing and quality of this product, and Telstra is currently replacing it with National Access to improve access capabilities and qualities offered to service providers.

Table 2.1 compares off-peak prices offered by switched service providers with Optus's and Telstra's standard off-peak prices on selected international routes. Although these comparisons overstate the average prices that carriers charge by not including the effects of their special discounted rates, they do indicate the substantially higher prices paid by callers charged at the carriers' standard prices, and the high degree of discounting needed for carriers to be competitive. For example, it appears that some service providers are offering prices for some routes up to 50 per cent lower than standard Telstra and Optus off-peak prices. Comparisons of peak prices yield similar results.

Table 2.1: Carrier and selected service provider off-peak (\$ per minute) international call prices, March 1997

<i>Country</i>	<i>Telstra</i>	<i>Optus</i>	<i>AAPT</i>	<i>Global One</i>	<i>WorldxChange</i>	<i>Telegroup</i>
	standard off-peak	standard off-peak	off-peak	off-peak	single rate	single rate
China	2.28	2.11	1.59	1.60	1.83	1.78
Canada	0.91	0.84	0.68	0.64	0.70	0.54
Hong Kong	0.85	0.78	0.63	0.60	0.85	0.71
Indonesia	1.78	1.64	1.24	1.25	1.60	1.35
Japan	1.39	1.28	0.96	0.97	0.86	0.71
New Zealand	0.72	0.66	0.49	0.50	0.55	0.71
Singapore	0.85	0.78	0.66	0.64	0.80	0.71
United Kingdom	0.91	0.85	0.68	0.64	0.58	0.58
United States	0.91	0.84	0.68	0.64	0.60	0.45

Notes: Indicative comparisons only, since standard off-peak rates used for Telstra and Optus overstate their prices by excluding temporary discounts and other special offers. Carriers and service providers charge a 12 cent connection charge for all successful calls. No minimum purchases or other charges apply. Off-peak times differ marginally between operators.

Sources: Telstra, Optus, AAPT, Global One, WorldxChange and Telegroup.

To the extent that service providers do have a price advantage over incumbents, it is surprising that they have not captured a larger share of the international call market (see Chapter 1). Although service providers have in principle been able to offer their services since 1991 when the main legislative restrictions on their operations were removed, their growth has mainly occurred since 1995 (Chapter 3). Service providers appear to have concentrated their initial marketing efforts in large capital cities on particular consumer groups, targeting large corporate customers and certain ethnic groups. However, all have plans to extend their

coverage post-July 1997, and new entrants appear imminent.² Telstra's new National Access service to replace the technically-inferior National Connect product will facilitate this trend.

Several legislative provisions restricting the operations of service providers are removed from 1 July 1997. The removal of these cost impediments should make service providers more competitive by further reducing their costs of accessing international line links and domestic transmission capacity (Chapter 3). This in turn should place increasing competitive pressure on Telstra and Optus to further reduce their international call prices.

OECD price comparisons

The OECD regularly publishes studies showing international price comparisons for overseas calls. These comparisons are usually made by the OECD using both simple bilateral rates and a basket of international rates.

Table 2.2 presents simple bilateral peak telephone rates between Australia and other OECD countries for 1996. In competitive markets offering a host of tariff discounts and price reduction plans to consumers, peak prices represent the maximum charge. These price comparisons suggest that, at peak prices, it is cheaper to call from Australia to Austria, Belgium, France, Germany, Ireland, Italy, Japan, Mexico, Netherlands and the United States than in the other direction.

OECD price comparisons using a basket of international call charges are based on country pairs. They represent the relative price of making a call from one country to another, expressed as a percentage of the price of the same call in the opposite direction. The call pairs are weighted by the population size of the terminating countries as a proxy for the likelihood of calling, to estimate each country's overall average international call price. Each country's average price is then expressed as a percentage of the OECD average, and presented as an index (Table 2.3). Thus, countries with an index of below 100 are cheaper than the OECD average, while those above 100 are more expensive than the OECD average.

² USA Global Link, reportedly the world's biggest seller of discounted services, recently announced plans to enter the Australian international calls market. According to reports, callers will be charged between \$0.28 and \$0.62 a minute, depending on the destination (Australian Financial Review, 10 April, 1997, p. 10). Moreover, WorldxChange claims that its recent reductions in international call charges to most destinations now offer Australian callers prices equal to, or below, callback charges (Australian Financial Review, 16 April, 1997, p. 38).

Table 2.2: Bilateral telephone prices, one minute call, peak standard rate (\$US), January 1996^a

<i>Country</i>	<i>From Australia</i>	<i>To Australia</i>
Austria	1.33	1.79
Belgium	1.33	1.69
Canada	1.03	0.86
Denmark	1.18	1.14
Finland	1.18	0.94
France	1.18	1.95
Germany	1.25	1.27
Greece	1.47	1.27
Iceland	2.07	1.86
Ireland	1.00	1.46
Italy	1.07	1.67
Japan	1.33	1.78
Luxembourg	1.47	1.42
Mexico	1.47	2.01
Netherlands	1.18	1.74
New Zealand	0.81	0.78
Norway	1.18	0.64
Portugal	1.47	1.43
Spain	1.55	2.61
Sweden	1.18	1.12
Switzerland	1.33	1.19
Turkey	1.47	1.14
United Kingdom	1.00	0.91
United States	1.00	1.77

a Calculated as the average per minute price of a four minute international call ie. the total cost of the call (including flag-fall charges) divided by four.

Source: OECD (1997).

Table 2.3: **OECD basket of international telephone charges, 1995**

<i>Country</i>	<i>Business^b</i>		<i>Residential^c</i>	
	<i>% of OECD average</i>	<i>Rank</i>	<i>% of OECD average</i>	<i>Rank</i>
Australia (Telstra)	89	10	83	5
Austria	91	12	83	6
Belgium	88	8	96	16
Canada (Teleglobe/Bell Canada)	95	14	91	10
Denmark	76	2	87	7
Finland (Telecom)	80	4	89	8
France	89	11	94	13
Germany	96	16	94	14
Greece	102	20	105	20
Iceland	100	18	103	19
Ireland	101	19	107	21
Italy	98	17	101	18
Japan (KDD)	88	7	76	1
Luxembourg	87	6	92	11
Mexico	208	25	199	25
Netherlands	96	15	93	12
New Zealand (TCNZ)	95	13	79	4
Norway	71	1	78	2
Portugal	126	23	126	23
Spain	112	22	113	22
Sweden	83	5	89	9
Switzerland	80	3	80	3
Turkey	151	24	148	24
United Kingdom (BT)	89	9	95	15
United States (AT&T)	109	21	99	17
OECD average	100		100	

a The basket is expressed as an index, with the OECD average set at 100, so that the figures represent a percentage of the OECD average.

b The international call basket charges for businesses exclude tax.

c The international call basket charges for residential users include tax.

Source: Xavier (1996).

International comparisons using call basket charges indicate that, in 1995, Australia ranked 10th among industrialised countries for business users, with

charges equivalent to 89 per cent of the OECD average.³ Norway, Denmark and Switzerland ranked first, second and third respectively, while Mexico ranked last among the OECD. Australia was ranked 5th on international call basket charges for residential users, behind Japan, Norway, Switzerland and New Zealand.

Examining OECD comparisons over time suggests that Australia's ranking has deteriorated since telecommunications deregulation commenced. Its ranking for international charges for business calls slipped from second in 1990, to sixth in 1994 and down to 10th in 1995. The residential basket slipped from first in 1990, to fifth in 1994 and 1995. This would seem to suggest that, while Australian standard charges are not high by international levels, they have become relatively more expensive than those in other OECD countries since 1990. This outcome reflects the fact that, while Australia has substantially deregulated its market since 1989 and reduced international call prices, some other OECD countries appear to have achieved greater price reductions, notably the Scandinavian countries and Japan for business users, and Japan and New Zealand for residential users.

However, such conclusions need to be qualified. Country rankings based on international call baskets can vary substantially over time and are sensitive to several factors. First, fixed charges are not included in the international call basket, so that countries with low fixed charges and high usage charges, such as Australia, may be disadvantaged. Second, the call pair methodology can substantially change a country's relative ranking if some of the more heavily populated countries reverse the tariff balance (ie the cost of an outgoing call to a certain country compared with the cost of an incoming call from that destination) between themselves and a particular destination (OECD 1995). Thus, country rankings are volatile and may fluctuate considerably between years for any particular country.

It is not altogether surprising to find that such international comparisons produce variable results given they use different methodologies and assumptions.

2.2 The costs of providing international calls

While international call prices in Australia have fallen considerably and seem to compare relatively favourably with many other OECD countries, they appear excessively high when compared with their long-run marginal cost of provision, including operating costs, depreciation and a normal return on the capital used to carry the calls. Long-run marginal cost is generally accepted as the most

³ Data from 1995, rather than 1996 (reported in OECD 1997), are quoted so as to allow for comparison with earlier years. The 1996 data are calculated using a new methodology.

appropriate benchmark for efficient pricing of services supplied by public utilities (see Box 2.1).

An international call uses the domestic local network, and often the domestic long-distance network, in both the originating and terminating countries, as well as the international network itself. Thus, the long-run marginal cost of an international call is the sum of long-run marginal costs of using each of these networks. The long-run marginal cost to Telstra and Optus of carrying an international call minute can be divided into four components.

- The cost of carrying the call from the caller's handset to one of Australia's international gateways. This is estimated to be 5.4 cents per minute (see Appendix A).
- The cost associated with using the international gateway — estimated to be, at most, 3 cents per minute.
- The cost of carrying the call from the international gateway to the midpoint of the international circuit. The long-run marginal cost of this component is estimated to be 2.5 cents per minute (see Appendix A).
- The cost of having the foreign carrier take the call from the midpoint of the international circuit to the handset of the called party (call termination). Since most countries have similar telecommunications technology, the long-run marginal cost (as distinct from the price actually charged) of this component is likely to be close to the Australian cost of 10.9 cents per minute (5.4 cents + 3 cents + 2.5 cents).

Therefore, the total long-run marginal cost of carrying an international call minute is estimated to be 22 cents per minute (10.9 cents x 2).

However, the price Australian consumers pay Telstra and Optus for an overseas call is substantially higher. The average Telstra/Optus price of an international call from Australia in 1995–96 is estimated to be \$1.11 per minute (see Appendix A). This average price is calculated using estimates of Telstra's and Optus's revenue for 1995–96 and their traffic for the same period. Therefore, the average price takes account of all permanent and temporary discounts received by consumers during 1995–96.

2.3 Efficiency losses associated with pricing international calls above long-run marginal cost

The gap between the average price that Telstra and Optus charge consumers to carry an international call and its long-run marginal cost represents a loss in economic efficiency (see Box 2.1). In a more competitive market, charging consumers a price significantly above marginal cost would be less sustainable —

the supply of services would normally expand to the point where international call prices approximated long-run marginal cost.

This section estimates the efficiency losses in 1995–96 resulting from Optus/Telstra charging international call prices above long-run marginal cost. These estimates are best interpreted as broad orders of magnitude only. They are estimated for total outgoing international traffic, as well as for:

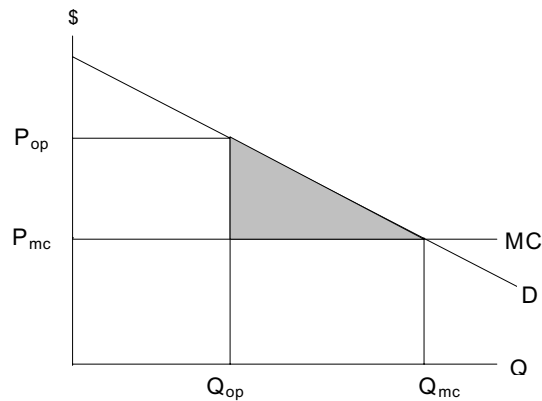
- the United Kingdom and the United States, which represent Australia’s traditional call destinations and continue to account for a large proportion of total outgoing traffic;
- Singapore and Japan, which represent industrialised Asia and are now important destination countries in terms of number of outgoing international minutes; and
- Indonesia and China, representing developing Asia and for which outgoing traffic has increased substantially over the last five years.

Estimating economic efficiency losses requires price, long-run marginal cost and traffic data. The data estimates used in this analysis are summarised in Table 2.4. In addition, an estimate is needed of the price elasticity of demand, a measure of the extent to which subscribers would vary their use of international calls in response to a price change. This provides an estimate of the number of additional international call minutes likely to be made if the price per minute were lowered to long-run marginal cost. For this report, an estimated aggregate price elasticity of demand across all routes and for all callers was used of -1.2 (see Box 2.2). It has also been assumed that the marginal cost of terminating the international call overseas is the same as the marginal cost of the Australian component of the call.

The efficiency losses on individual routes presented in this report are only indicative estimates. Identical long-run marginal costs have been assumed on all routes, since long-run marginal costs cannot be derived for separate routes. Moreover, the same price elasticity of demand has been used on each route. In practice, it is unlikely that these assumptions would hold.

Box 2.1: Long-run marginal cost pricing

Suppose an international call minute could be supplied at a constant long-run marginal cost, MC , and has a demand curve D . Socially optimal output is Q_{mc} — the level of output where the price paid by consumers equals long-run marginal cost. Suppose that the service is instead overpriced at P_{op} , reducing quantity demanded to Q_{op} . The efficiency losses — the excess of the value to users of the international minutes forgone over the cost of providing them — is represented by the shaded triangle. Any price below P_{op} closer to long-run marginal cost will not only benefit consumers but, more importantly, reduce the ‘deadweight’ efficiency losses imposed on the economy.



Although the principle is widely accepted, views differ somewhat on which costs to include in estimating long-run marginal cost. The definition of long-run marginal cost used in this report is the cost (on a per unit basis) of keeping a particular facility 'alive and well' in the long run. In the case of telecommunications, this can be proxied by the average total cost of that facility, measured to include operating costs, depreciation and a normal return on capital, expressed per minute of its use.

While pricing at long-run marginal cost improves economic efficiency and recovers all costs directly attributable to that particular telecommunications service, it will not generate revenues necessary to meet unallocable (common) costs, such as billing and administrative costs. Covering these costs will require prices to be above long-run marginal cost for at least one telecommunications service. The most efficient way to recover unallocable costs is to increase price above long-run marginal cost for services with the most inelastic demand. Alternative, more economically efficient ways of recovering unallocable costs, such as raising subscriber access charges, are examined in Industry Commission (1997). Since the demand for international calls is the most elastic of any service, an efficient pricing regime would not seek to recover a significant proportion of unallocable costs from the price of international calls.

Table 2.4: **Estimates used to calculate efficiency losses**

<i>Country</i>	<i>Traffic-weighted average price</i>	<i>Long-run marginal cost^a</i>	<i>Telstra and Optus outgoing traffic</i>
	\$ per minute	\$ per minute	million minutes
United Kingdom	1.091	0.218	128
United States	1.072	0.218	110
Singapore	1.030	0.218	36
Japan	1.493	0.218	27
Indonesia	1.812	0.218	25
China	2.376	0.218	22
All countries	1.114	0.218	867

a This is the estimated long-run marginal cost averaged across all routes.

Source: Appendix A.

Box 2.2: The price elasticity of demand for international calls

The price elasticity of demand for international calls is required to calculate the change in Telstra/Optus traffic resulting from a reduction in the price of an international call. Most international studies that estimate the price elasticity of demand for international calls are from the United States (see IC 1997). Although useful, they may not be appropriate to the Australian market. Unlike the United States, a large proportion of international calls from Australia — estimated by AUSTEL (1995a) to be 70 per cent — are made by residential users. As residential demand for international calls is more sensitive to price changes than business demand, US studies are likely to underestimate the overall price elasticity of demand for international calls from Australia. Further, studies which estimate elasticities for US-Canada traffic may not be appropriate for Australian international traffic because of the unique geographic and cultural relationship between the United States and Canada (BTCE 1994).

Therefore, this report uses an elasticity estimate drawn from an Australian study of international telephone demand. Bewley and Fiebig (1988), using data from 1978 to 1983, estimate that the elasticity of demand for an international call minute with respect to the price per minute is -1.2 in the short run and -1.5 in the long run (excluding international calls to New Zealand and Papua New Guinea). Given that international call prices from Australia have fallen substantially since 1983, these elasticity estimates are likely to be too high. Therefore, the lower estimate of -1.2 is used in this analysis.

Based on the assumptions outlined above, the estimated economic efficiency losses associated with Telstra and Optus pricing international calls above their long-run marginal cost of provision is estimated to be \$375 million for 1995–96

(see Table 2.5).⁴ For individual markets, the highest efficiency losses are estimated for the United Kingdom and the United States, which both receive a large number of international minutes from Australia. Indonesia and China receive less traffic from Australia than do Singapore or Japan. However, they are associated with larger efficiency losses than either of those countries because of their extremely high per minute prices of international calls.

The efficiency loss calculations are sensitive to the price elasticity of demand estimates used for international call minutes. However, even if the demand for international call minutes were more inelastic, substantial efficiency losses would still arise from pricing above long-run marginal cost (see Appendix A). Conversely, efficiency losses would be even larger than those reported in Table 2.5 if a more price elastic estimate was used in the analysis.

Table 2.5: Estimated efficiency losses associated with Telstra and Optus pricing international calls above marginal cost

<i>Country</i>	<i>Efficiency losses, \$ million</i>
United Kingdom	54
United States	45
Singapore	14
Japan	17
Indonesia	21
China	26
All countries	375

However, to the extent that international call prices currently contribute to recovering general overhead costs, reducing these charges from Australia towards long-run marginal cost may affect Telstra's ability to cover total costs and make profits. Whether Telstra's profits to shareholders (ie revenue less costs) would be reduced in the short term as part of the transitional adjustment to a more

⁴ These gains to economic efficiency from reducing international call prices would need to be set against the economic costs of raising prices above long-run marginal cost on other services, so as to recoup general overhead costs previously recovered from international call charges. The likely magnitude of these economic costs will depend upon the extent of the price rise, and the price elasticity of demand for those other services. Estimates show the demand for international calls tends to be more price elastic than for other services, so any tariff rebalancing could be expected to produce positive net gains in economic efficiency, especially if price rises were limited to services with relatively inelastic demand, such as business subscriber access, and to a lesser extent, residential subscriber access charges.

competitive telecommunications market, is unclear, and would reflect several factors:

- Competitors would also need to recover overhead costs.
- Telstra could increase the prices of services that currently fail to cover their cost of provision, thereby ending their subsidisation from international call revenue. According to the Industry Commission (1997), the residential subscriber access deficit was \$614 million in 1995–96. Raising residential subscriber access prices to remove this deficit would allow a substantial reduction in international call prices. However, Telstra’s ability to do this is constrained by the existing price-cap arrangements. These effectively prevent price rises for individual residential services, while also requiring the average price across all main services to fall.⁵ The implications of increasing subscriber access prices on consumers and the economy generally are examined in IC (1997).
- Telstra’s revenue from various services would respond to changes in prices. This would depend upon the price elasticity of demand for these services. Thus, for international calls, the demand for which is estimated to be price elastic, reductions in prices can be expected to increase revenue, while for other services that are price inelastic, price rises are likely to raise revenue.
- Telstra could reduce its operating costs. In 1995–96, Telstra’s total costs (revenue minus operating profit) were reported to be \$11 792 million. A relatively small reduction in Telstra’s overhead costs would therefore help overcome the need for Telstra to raise other prices to recover such costs previously recouped through higher international call prices. Telstra has already taken and announced further cost saving initiatives, and more have been foreshadowed.

Similar arguments also apply to Optus.

2.4 Summary

Australian telecommunications reform has contributed, along with the introduction of new lower cost technology, to reduced international call prices for Australian consumers. However, despite some evidence of improved efficiencies in the provision of international calls by incumbents, partly induced by the entry of limited competition from service providers, a substantial gap remains between

⁵ The current price control arrangements for telecommunications include an overall price cap of CPI minus 7.5 per cent applied to a nominated basket containing most services, plus individual price sub-caps of CPI minus 1 per cent on residential services (connections, line rentals, trunk and international calls).

the prices that Australian consumers pay Telstra and Optus to carry international calls, and the long-run marginal cost of providing those calls. This disparity represents a potential loss in economic efficiency, estimated to be \$375 million in 1995–96. The remainder of this report examines why this disparity exists, and discusses potential avenues for domestic and international reforms which would have the potential to push prices closer to long-run marginal cost, and thus raise economic efficiency.

3 MOVING TO A MORE COMPETITIVE INTERNATIONAL CALL MARKET

Despite the removal of restrictions on the sale of basic international telecommunications services in 1991, competition in the Australian international calls market remains limited. Switched service providers have made some inroads into the high volume market, contributing to substantially reduced prices in these markets. However, their entry and expansion has been hindered by a number of domestic impediments. This chapter discusses the success of switched service providers in developing a competitive fringe in the international calls market. It examines the factors that have limited their coverage, and how these will be affected by the July 1997 legislative changes.

3.1 Existing market structure

Basic international telecommunications services in Australia are provided by the licensed carriers, switched service providers and switchless service providers.

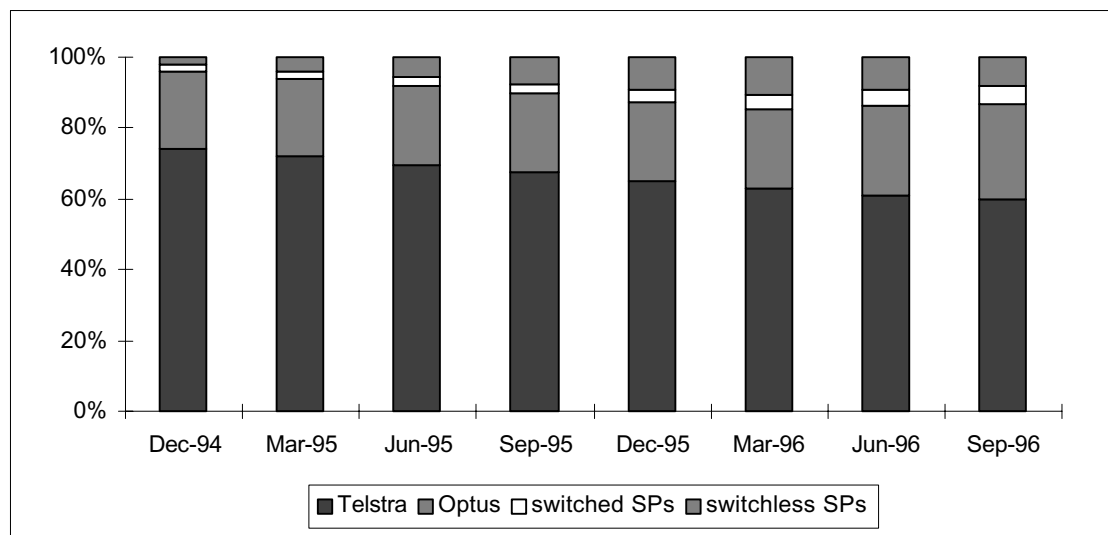
As discussed in Chapter 1, switchless service providers resell services offered by carriers or switched service providers. They purchase capacity in bulk, earning large discounts that are passed on to final users. Therefore, although switchless service providers compete directly for market share in providing final services in the retail markets, the carriers or switched service providers still provide the service.

On the other hand, switched service providers compete directly with carriers for supplying international call services in Australia. Such providers install their own switching systems and network facilities and combine these with carrier-acquired leased lines and switched access services to provide end-to-end services to consumers. Achieving a more competitive international call market is therefore closely linked to the growth of switched service providers.

The growth in market share of switched service providers has accelerated in recent years, but from a very low base. At the end of 1996, their share of the outgoing international calls market was just over 5 per cent, up from below 2 per cent two years earlier (see Figure 3.1). While care is needed when comparing international call prices between carriers and service providers, the magnitude of the price differentials found in this report in favour of service providers (Chapter

2) raises questions as to why service providers have not captured a larger market share.

Figure 3.1: Market shares of international telecommunications services, 1991 to 1996



Note: Market shares for March to September 1995 were interpolated.

Source: AUSTEL (1997).

A number of factors can help to explain the relatively low market share to date of switched service providers, and hence the limited competitive pressure exerted so far on Telstra and Optus to reduce their standard international call prices available to general callers. However, there are signs that the international call market is in a transitory stage of 'gearing up' to the post-July competitive environment, when some of these limits are removed.

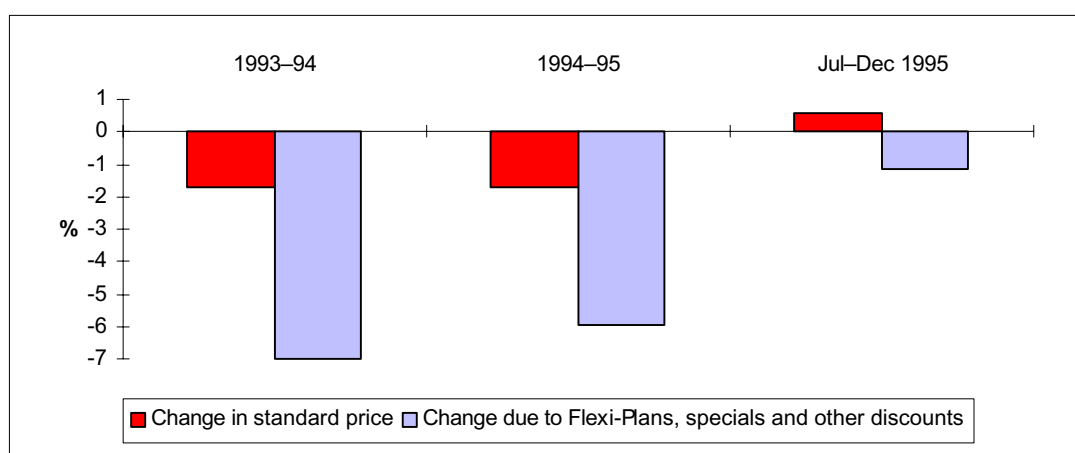
Targeted markets

Switched service providers have entered the Australian international calls market mainly by targeting large volume users (businesses and ethnic markets) in major capital cities (Sydney, Melbourne, Brisbane and Perth). Therefore, they offer international services in only a segment of the total market serviced by Telstra and Optus. The market share of switched service providers is, of course, higher in the markets they have targeted than their share of the national market.

Moreover, the indicative comparisons with Telstra and Optus standard peak and off-peak prices given in Chapter 2 may overstate the price differences that currently exist. In the market segments targeted by service providers, Telstra has lowered prices to maintain market share. For example, Telstra's most highly discounted retail flexi-plan, the *Long Distance Saver 4*, provides a maximum

discount on international calls of 23 per cent for customers spending above \$450 000 per month in telecommunications charges. On certain international routes, this discounted rate matches the lowest prices offered by service providers. AUSTEL's monitoring of Telstra price movements clearly shows that most price reductions on international calls are due to discounts (Figure 3.2). These discounts are often subject to eligibility criteria, such as minimum monthly expenditure thresholds. In addition, discounts generally increase with the level of customer expenditure (AUSTEL 1996). Optus also discounts heavily to high volume users, although these tariffs, unlike for Telstra, need not be registered with AUSTEL.

Figure 3.2: Comparison of Telstra's revenue-weighted price changes for international calls for both standard and special prices



Source: AUSTEL (1995c, 1996).

As a result of these pricing strategies, the large volume market is already quite competitive and prices offered by carriers and service providers in this market are lower and more comparable (especially when allowance is made of essential add-on costs such as billing that must be recovered from international callers by service providers). Consequently, the benefits of service provider competition in the international calls market have so far accrued primarily to high volume users.

Overseas data on market shares of service providers indicates that the Australian experience is similar to that in the United States and the United Kingdom. Switched service providers have operated in the US international market since December 1992. They accounted for 2.4 per cent of the international call market in 1995, compared with 0.2 per cent in 1994 (TeleGeography 1996). Switched service providers in the United Kingdom increased their share of the international call market from 2.2 per cent in 1993, to 3.3 per cent in 1994, and to 6.5 per cent in 1995 (TeleGeography 1996).

Switched service providers would also be expected to increase market share as their service coverage increases. The Minister of Communications and the Arts, Senator Richard Alston, recently claimed that 'tens of thousands of Australians are deserting Telstra and Optus for newer, cheaper phone companies such as WorldxChange for long distance and international calls' (Address to National Press Club, 12 March 1997).

In summary, switched service providers have a significant market share in the high volume markets in which they operate. The competitive pressure brought to bear by such entry is reflected in the price reductions Telstra and Optus have been forced to offer to retain customers. Other factors which help explain why switched service providers have not gained a larger share of the total international calls market are discussed below.

Impediments to service providers supplying international calls

In part, the failure of switched service providers to gain a larger presence in the total market for international calls is a transitional effect. Although it has been technically and legally feasible for switched service providers to offer international call services in Australia since 1991, it appears that it has only become economically feasible to do so in the last two to three years.

Strategic Partnership Agreements

Until 1994, Telstra offered Strategic Partnership Agreements (SPAs) to large volume business users. These agreements involved large organisations entering into contracts with Telstra to supply their telecommunications needs. In order to enter into a SPA, organisations were required to purchase at least \$1 million worth of basic carriage services per year. The discounts available varied between 11 per cent and almost 13 per cent, depending on business volume (AUSTEL 1993). These discounts appear to have locked Optus and switched service providers out of the highly lucrative large volume international business market for a time.

It was not until May 1994, following amendments to the *Telecommunications Act 1991*, that Telstra withdrew the SPAs. The *Telecommunications Act 1991* prohibited the dominant carrier from engaging in discriminatory pricing, unless it was cost justified. During 1993–94, Optus questioned whether Telstra's SPAs were cost justified, and successfully challenged these in court.

Withdrawal of the SPAs allowed Optus and switched service providers to enter the large volume market. However, by 1995, Optus had not achieved substantial in-roads into the largest corporate accounts. Telstra was found to be in a dominant position in the international services market, and it clearly retained an

overwhelmingly strong position at the very 'top end' of the market (AUSTEL 1995a). Since then, however, the international calls market as a whole has changed significantly enough for AUSTEL to conclude that it is not clear whether or not Telstra is in a position to dominate the international market (AUSTEL 1997).¹

Cost of international transmission capacity

Another impediment to entry faced by switched service providers into the Australian market for international services has been access to, and the costs of, international half-links between Australia and foreign markets. As detailed in Chapter 1, international carriers jointly own, operate and maintain international submarine cables through consortia and international satellites through cooperatives such as Intelsat.

There are generally two mechanisms by which a service provider may access international cable transmission facilities. First, a service provider can own cable capacity either by investing in a consortium that is developing new facilities, or by leasing capacity on a long-term basis, referred to as an indefeasible right of use (IRU). Second, a service provider may purchase international transmission services off a consortium member by leasing an international private line (IPL).

When comparing costs it is important to note that these two methods of access are not identical. Ownership of capacity either through investment or IRUs offers no guarantee of availability and no in-built redundancy. With an IPL, however, there are guarantees of availability based upon the provision of back-up capacity (on satellite or other cables). In addition, owned cable terminates at the cable termination point, whereas the price paid for an IPL extends the international capacity seamlessly through to the location of the service provider's switch.

Detailed data on the effective cost of capacity acquired by consortium members are not publicly available. However, a BTCE (1993) estimate of an average international half link cost on an investment per minute basis of \$0.025 is considered accurate.² The average per minute cost of an international half-circuit

¹ Prior to 1 July 1997, a range of preconditions, safeguards and undertakings were put in place to constrain Telstra's capacity to exercise its discretionary power in the international market to prevent it from being in a position of dominance in that market. After 1 July the international calls market will no longer be subject to the dominance test. It will, however, be covered by the new telecommunications legislation.

² This estimate was based on data obtained on the construction costs and operating profiles of the undersea cables that were planned across the Atlantic Ocean to link the United States and Canada with European countries. Straight line depreciation was applied based on the 20 to 25 year service lifetimes of cable systems and their nominal

IPL from Australia (to the United States, the United Kingdom and New Zealand) is estimated to be \$0.08, over three times the cost of cable capacity acquired through ownership.³ Even given the additional benefits associated with an IPL, these differences seem excessive.

Under the current legislative framework, both Telstra and Optus have acquired extensive transmission capacity through investment. As such, both carriers have access to international transmission capacity at ownership rates. This is not the case for switched service providers.

Service providers can invest in international cables as well as independently acquiring IRUs. However, under the pre-July 1997 licensing arrangements, service providers with these types of access are prohibited from undertaking double-ended interconnection (direct interconnection into the networks at both the source and termination ends of the call), unless the IRU is purchased from either Optus or Telstra. This limitation on the use of international capacity means that service providers can only link independently-acquired international cable into the public network in the Australian market, but not the foreign market. This effectively prevents service providers from using independently-acquired international cable links to provide international services in Australia.

The legislative limitations on access to cable also apply to the acquisition of international satellite capacity. Service providers are allowed to use private earth stations to acquire international links. However, the International Service Provider Class License does not allow service providers with this access to undertake double-ended interconnection, unless they lease the satellite capacity from either Optus or Telstra.

The pre-July 1997 licensing arrangements mean that service providers must obtain international links to provide international calls from one of the carriers. Moreover, while service providers and the carriers have held negotiations on the provision of IRUs, none have yet been provided by either Telstra or Optus. Service providers, therefore, have had to rely upon IPLs and other relatively expensive transmission services to obtain international transmission capacity.

circuit capacities. An indicative cost of capital of 20 per cent was used, matched with various degrees of circuit utilisation. The analysis does not address switching, termination or maintenance charges and back-up capacity.

³ This estimate is based on a service provider entering into a three year contract with an establishment charge of \$230, a monthly charge per unit of \$2 750, the use of digital circuit multiplication equipment (DCME) and 100 000 minutes of international traffic per derived circuit per year.

The higher costs imposed upon service providers by these restrictions in accessing international line links may have impeded their entry into the Australian international call market.

Cost of National Connect

Every international call includes a domestic component which requires access to the basic network. Pre-July 1997 legislative arrangements mean that service providers pay more for this transmission capacity than do Telstra and Optus.

In order to facilitate the entry of Optus and VodaFone into the Australian market and to protect new entrants from anti-competitive behaviour by the incumbent carrier, certain competitive safeguards were adopted in the 1991 legislation, along with associated regulatory and ministerial interventions. Of particular importance are the legislative interconnection provisions designed to ensure cost-based access to Telstra's network.

It is estimated that Optus pays Telstra around 3.5 cents per minute for local interconnection (IC 1997). While considered to be above long-run marginal cost, the interconnect arrangements appear to ensure Optus access to local domestic transmission capacity at closer to cost than they do for switched service providers.⁴

Until recently, switched service providers have only been able to provide national end-to-end service using Telstra's *National Connect* product — Telstra's ISDN based service that allows service providers, using their own switching facilities and leased lines, to provide national coverage to customer nominated sites. For this product, service providers pay Telstra a usage charge of up to 6.6 cents per minute⁵, nearly double the estimated interconnect rate for Optus. More importantly, National Connect includes a series of fees and charges which significantly increase the cost of the product. For example, a switched service provider using National Connect would have to pay an establishment charge of \$50 000, conditioning charges per local area of up to \$70 000, connection charges and a series of annual charges (Telstra 1996).

The premium for network access paid by service providers above the rate currently faced by Optus and VodaFone places service providers at a competitive disadvantage. National Connect has probably acted as a significant impediment to entry in the international services market, and discouraged the expansion of switched service provider services both geographically and to lower volume

⁴ It has been estimated that Telstra's long-run marginal cost of providing a local call is about 2.5 cents per minute (IC 1997).

⁵ This is based on a flag fall cost of 6 cents per call, an average call duration of 2 minutes and a usage rate of 0.06 cents per second.

users. Interestingly, 1997 has seen the emergence of service providers offering lower-priced international calls using leased internet lines to bypass National Connect (see Box 3.1).

Quality of National Connect

The entry and coverage of switched service providers has been also limited by the quality of interconnection provided by National Connect. AUSTEL concluded that the conditions imposed by the carriers on access to the network restricted the use that could be made of the network by switched service providers, and hence the types of services they could offer (AUSTEL 1995b). By providing switched service providers with interconnection to the network on the line-side of an exchange, National Connect significantly reduces the uses of the network available to service providers, as compared with trunk-side interconnection.

Specifically, line-side interconnection does not permit signalling to be undertaken based on a full or reduced set of Common Channel Signalling System Number 7 (CCS7), which involves network access at the trunk-side of an exchange. CCS7 is designed to increase network efficiency, stimulate the development of new services, promote the introduction of intelligent network capabilities and minimise post-dialling delay. Switched service providers claim that the absence of CCS7 diminishes the quality of service, results in longer call set-up times and creates a less intelligent interface for overflow and re-routing purposes between the carriers and service providers. Without trunk-side interconnection, service providers are prevented from further developing value added services which are increasingly important to business customers and are currently only provided by the carriers, such as '1800', '13' and other network database services (AUSTEL 1995b).

At the beginning of 1995, only one switched service provider was using Telstra's National Connect product. Other switched service providers relied on leased lines directly to their customers' premises. This added substantially to the cost of providing services to customers other than large volume users. At the beginning of 1997, at least four switched service providers used Telstra's National Connect product to reticulate local calls. Telstra is currently replacing its National Connect with National Access to offer greater functionality (CCS7) to switched service providers. From 1 July 1997, switched service providers are no longer to be treated like any other customer for network capacity, but will be covered by a new set of legislative arrangements for access to the carriers' networks. This should improve their capacity to offer additional services.

Box 3.1: International calls over the internet

The use of the internet as a medium for the exchange of information has grown exponentially over the past few years. Increasingly, the possibilities of using the internet as a medium for voice telephony, particularly for international voice telephony, have become a reality. Several companies operating in Australia offer international calls over the internet at rates substantially below standard carrier prices.

Providers of internet telephony services have a substantial cost advantage over their standard telephony counterparts for three reasons. First, internet telephony services obtain domestic transmission capacity via access to AARNET at rates significantly below rates levied on service providers for domestic transmission capacity under National Connect. Second, internet telephony service providers can use international line links acquired from sources other than Telstra or Optus. Finally, on many of the routes on which they operate, providers of internet telephony are able to circumvent the international accounting rate system via two-way bypass (see Chapter 4).

The major problem with internet telephony services is the quality of the voice signals that are digitised and compressed over the internet. In particular, the internet uses switching technology that lowers the quality of voice transmission. Furthermore, Telstra and Optus face binding quality standards which place limits on the number of calls which they can multiplex over one line. Internet providers do not face such constraints and, hence, can place a greater number of calls on the one line. This decreases costs, but further reduces service quality.

These quality issues are likely to slow the development of the internet for voice communications. However, as technology progresses, quality problems will almost certainly be overcome. Carriers in both Finland and New Zealand, for example, provide internet telephony to their customers as part of their overall telecommunications service.

3.2 Impact of legislative changes

Telecommunications reform has made significant progress in encouraging competition in the international calls market. Although the benefits are spreading, the success to date of these reforms is reflected primarily in lower international call prices for large volume users. To further increase competitive pressures, remaining impediments to open competition in the international calls market — in particular those that increase service providers' domestic and international transmission costs — need to be eliminated.

The new package of legislation that passed through the Senate in March 1997, and will be introduced from 1 July 1997, should go a long way to achieving these

goals. The legislation repeals the *Telecommunications Act 1991*, replacing it with a new regulatory framework principally contained in the *Telecommunications Act 1996* and the new parts of the *Trade Practices Act 1974*.

Access to international transmission capacity

The *Telecommunications Act 1996* removes the regulatory restrictions on access to less expensive international capacity. In particular, entrants are allowed to:

- obtain IPLs from carriers other than Telstra and Optus;
- obtain IRUs and international satellite capacity directly from the relevant international bodies; and
- provide double-ended interconnect using independently-acquired international capacity.

Industry expectations are that these changes will decrease the prices of both IPLs and IRUs. For service providers with the necessary capacity, this should mean costs of less than \$0.05 per minute for an international half-link, compared with the current average IPL rate of \$0.08 per minute. This should allow for more competitive entry into the international calls market.

Almost immediately after July 1997, therefore, service providers with ownership or alliance relationships with foreign carriers are likely to have access to international capacity at close to efficient rates. As noted above, the least expensive rate for an international half-link (\$0.025 per minute) comes from investing in international satellite or cable ventures. Service providers may decide to invest directly in international capacity. However, direct ownership involves some maintenance and administrative costs that are avoided when leasing an IRU. Also, the lead time before ownership capacity comes on stream may be quite long. While the expected fall in international transmission costs is only likely to have a minor influence on international call prices initially, it may become more important as competition intensifies and profit margins are reduced.

Access to domestic transmission capacity

The amendments to the *Trade Practices Act 1974* establish an industry-specific regime for regulating access to carriage services (see Chapter 1). The implications of this access regime for competition in the international calls market depend critically upon the terms and conditions used to set the access price, as well as the functionality of the access.

The rapid pace of technological change and the ever increasing importance of telecommunications to the Australian economy and society, means that continued

investment in telecommunications infrastructure is vital. However, if the access prices are set 'too low', there will be little incentive for Telstra, Optus and/or other potential carriers to invest in maintaining or modernising their networks. Unduly low access prices could also induce inefficient entry of service providers. Service providers would, in effect, be subsidised by providers of network capacity.

If network access prices are 'too high', the existing barriers to entry arising from high access rates, identified above, will continue to operate, at least in the short run. Service providers will incur costs of transmission that exceed those costs incurred by competitors that own their own network. This will place them at a cost disadvantage and continue to limit the opportunities for competition in the market for international calls. High access prices could also encourage inefficient entry of providers of network capacity (ie inefficient network duplication).

As noted in Chapter 1, the ACCC has developed a draft set of pricing guidelines (ACCC 1997) which details the cost-based pricing principles it plans to adopt when considering access pricing issues under the new regime. According to the draft guidelines, access prices brought before the ACCC will not be permitted unless they reflect the cost of providing the service. Cost is to be determined on the basis of an assessment of the total service long-run incremental cost (TSLRIC). The ACCC separates costs to be included in TSLRIC into three categories.

- *Operating costs* are the on-going operational costs of providing the service, including the labour and materials that would not be required if the firm ceased to provide the service.
- *Common costs* are the costs incurred in the provision of a group of services. The ACCC distinguishes between common costs that are not causally related to the provision of access services (eg retail and marketing costs)⁶ and hence should not be recovered in access prices, and common costs that are causally related to the provision of the service (eg maintenance of the customer access network or operation of a switch that is used to direct a variety of telecommunications traffic) and should be recovered in access prices. How, exactly, common costs are to be allocated among various services remains unclear.
- *Capital costs* are the costs incurred in developing the infrastructure that makes the declared service feasible. Essentially this equates with a normal commercial return on capital, which the ACCC proposes to value at

⁶ The BTCE (1997) calls these non-causally-related common costs 'overheads'.

replacement cost. It is unclear what capital will be included in the calculations.

The ACCC view that a contribution towards common costs should be included in any access charge is supported by the BTCE (1997). Both acknowledge the difficulties of allocating common costs across various services but argue that:

...failure to attribute a reasonable share of overhead costs to the price for access services would disadvantage the customers of the access provider who would be forced to bear the full cost of these overheads (BTCE 1997, p. 23).

The Industry Commission (1997), on the other hand, has cautioned against the incorporation of nonallocable overhead costs or customer access network (CAN) costs. In particular, in response to the ACCC's suggestion that (non-usage based) CAN costs are one type of common cost that might be included in an access charge, the IC has argued that CAN costs can be more efficiently recovered from subscriber access charges. That Telstra is not doing so currently should not enter the debate on network access pricing. Indeed, if CAN costs were again built into the access pricing formula, this would provide a reason (in addition to the price sub-caps) for perpetuating Telstra's currently inefficient pricing of the CAN.

Similarly, the IC's view is that recovery of nonallocable overheads should not enter the debate in access pricing (IC 1997). These are most efficiently recouped by Ramsey-Boiteux variations in the prices on final services (ie raising final prices above long-run marginal cost in the market with the most inelastic demand), depending on the demand characteristics of those services (see Ramsey 1927 and Boiteux 1956). Carriers operating under competitive market conditions will adopt such efficient methods of recovering common costs via their retail prices.

The ACCC argues that, in practical terms, estimating TSLRIC, or any other measure of costs, for an individual service is likely to prove a difficult and time consuming task. As noted earlier, the ACCC has identified two main approaches to estimating TSLRIC. The first is a cost study involving the identification, measurement and verification of all the relevant costs (full-cost approach). The second is to use existing access prices that are consistent with TSLRIC as a base, and to alter the price in accordance with subsequent cost changes (delta approach). Importantly, the ACCC identifies the pre-July 1997 interconnect price as one of the prices that it will consider as an appropriate benchmark for the delta approach.

However, the interconnect price that was initially determined by the Government on advice from AUSTEL included a contribution to the cost of the CAN. As discussed above, recovering CAN costs through access prices only serves to perpetuate Telstra's current inefficient pricing of the CAN. The current interconnect price that was negotiated between Telstra and Optus is higher than

that originally recommended by AUSTEL. There is a possibility that Telstra and Optus renegotiated the interconnect price to position themselves for the post-July 1997 competitive regime by establishing a high base on which the consideration of the rate for new carriers will commence (IC 1997). If the access price was set too high for Optus, this may have influenced the decision to lay its own cable network. Therefore, using the current interconnect price as a benchmark for TSLRIC could result in an interconnect price that overestimates cost. Since some cost estimates are already available, and given the importance of setting the correct interconnect price, it would be more appropriate to apply the full-cost approach (IC 1997).

Even if a figure close to the current interconnect price is adopted as the TSLRIC for the declared service, the costs of domestic network capacity for potential entrants into the Australian market would be substantially reduced, from a maximum of 6.6 cents to 3.5 cents per minute. Furthermore, the cost advantages enjoyed by the existing carriers, in terms of network capacity, would be removed as access prices based upon the estimate of TSLRIC are available to all users of the dedicated service. This, in turn, would remove a significant impediment to entry in the Australian market and contribute to cheaper international calls.

Tariffing arrangements

From 1 July 1997, the dominant carrier is no longer required to publish the terms and conditions of its services in advance. However, it will have to supply pricing information to the ACCC which will decide whether or not to publish tariffs. There is some evidence from the United States that posted tariffs act as a mechanism for the support of tacit collusion. For instance, MacAvoy (1995) finds that a number of conditions established in the United States since 1990 have been conducive to the development of market sharing rather than significant price competition. He claims that the most important of these has been the tariffing process of the Federal Communications Commission under which MCI and Sprint replicate AT&T's price announcements. As market shares stabilised, and as regulation formalised the price-setting process, the price-cost margins of the three largest carriers increased and converged. MacAvoy concludes that these results are not consistent with price competition, but suggest emerging tacit collusion among AT&T, MCI and Sprint.

It is not possible to prove that the US carriers' pricing patterns are the result of tacit collusion. Even if they are, it is not clear that the same scenario would apply in Australia, particularly given the difference in the level of telecommunications regulation in the United States and Australia. Although there is some evidence that could be interpreted to imply a degree of tacit collusion between Telstra and Optus in setting standard international call prices,

this is not clear, and the entry of switched service providers in the high volume market has resulted in substantially lower prices for these customers. It is likely that this price competition will be extended to other parts of the international calls market following the removal of remaining cost impediments. However, given the increasing incentive for tacit collusion as switched service providers' market share increases, it may not be desirable for the ACCC to publish tariffs supplied to it upon request.⁷ Standard competition policy safeguards alone may be a more effective means of preventing anti-competitive pricing.⁸

3.3 Summary

Domestic telecommunications reform has made significant progress in fostering competition in the market for international telecommunications services. Switched service providers have captured a significant share of the markets they have targeted. Consequently, prices in these markets more closely reflect their marginal cost of provision, and are well below standard carrier prices. The transition of the international call market to an openly competitive environment is greatly enhanced by the elimination of remaining legislative impediments discouraging entry and expansion of switched service providers from 1 July 1997. The next chapter examines international barriers which have contributed to high international call prices.

⁷ Whether this is desirable is likely to depend upon the nature of the particular market. The publication of tariff data in a market such as telecommunications, where new entrants are likely and the gains from collusion therefore large, may facilitate tacit collusion between incumbents and new providers.

⁸ For a similar argument in relation to petrol pricing, see IC (1994).

4 THE INTERNATIONAL ACCOUNTING RATE SYSTEM

The international accounting rate system is often identified as the major obstacle to reducing international call prices. Since accounting rates are set substantially above the underlying resource costs of providing an international call, they appear to place a high floor under such prices. However, the degree to which the international accounting rate system maintains high international call prices depends on a carrier's balance of international traffic, settlement rates and the resource costs of carrying an international call. For Australia, the international accounting rate system is not the main factor preventing reductions in international call prices.

4.1 Background

Over the past one hundred years, telephone companies and other telecommunications service providers have developed a system of 'correspondent agreements' to facilitate international telecommunications. These contractual arrangements arose in response to the emergence of national telecommunications monopolies and the consequent inability of a single carrier to provide end-to-end service on international routes (Ergas and Paterson 1991).

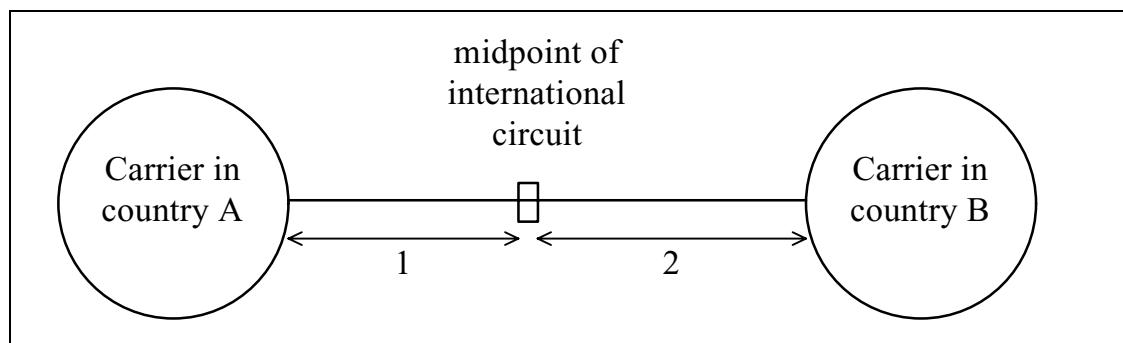
A carrier in a country in which a call originates generally has to purchase from other carriers *call termination* services to provide international services. The contractual basis for setting international termination services between carriers is encompassed in so called 'correspondent agreements'. These agreements are based upon a framework set down in the International Telecommunications Convention, its associated regulations and the recommendations of a committee of the International Telecommunications Union.

Included in each correspondent agreement is an *accounting rate*, originally designed to reflect the joint cost of international services borne by the originating and terminating carriers. Accounting rates are negotiated bilaterally between carriers and/or telecommunications administrations, and are usually expressed in special drawing rights (SDR). In Australia, both carriers negotiate their own accounting rates with overseas parties. Thus, Telstra and Optus can have different accounting rates on the same route. For example, in 1996 Optus had an accounting rate with all US carriers of US\$0.43. The equivalent rate for Telstra was US\$0.45 (FCC 1997). Because accounting rates are negotiated bilaterally,

significant differences exist between routes. The US-France route, for example, has an accounting rate of US\$0.35 per minute, while the US-Germany route has an accounting rate of US\$0.23 per minute (FCC 1997).

The amount paid by the originating carrier to the terminating carrier — referred to as the *settlement rate* — is a set proportion of the accounting rate. The proportion is typically 50 per cent (OECD 1994). For example, when a call is made from country A to country B, the carrier in country A carries the call to the midpoint of the international circuit (distance 1 in Figure 4.1). It then pays the carrier in country B the settlement rate to carry the call from the midpoint of the international circuit to its final destination (distance 2 in Figure 4.1). Similarly, when the carrier in country A terminates a call from country B, it receives a payment from country B equal to the settlement rate. Therefore, carriers both pay and receive the settlement rate for call termination services.

Figure 4.1: **Settlement for termination services**



However, rather than making continuous payments to each other, carriers settle their net balances at the end of each settlement period. Therefore, on any bilateral route, the actual amount paid or received by a carrier for call termination services is determined by the carrier's *balance* of incoming and outgoing traffic at the end of the settlement period, and the settlement rate itself. For example, assume at the end of a settlement period a carrier in country A has terminated 100 minutes of traffic sent to it by a carrier in country B, and the country B carrier has terminated 80 minutes of traffic sent from the carrier in country A. Therefore, country A has a surplus of incoming over outgoing traffic of 20 minutes with the carrier in country B. Similarly, the carrier in country B has a deficit of the same magnitude with the carrier in country A. The only payment made is by the carrier in country B, the deficit carrier. The value of the payment would be 20 minutes — the balance of incoming and outgoing traffic between the carriers — multiplied by the settlement rate per minute.

The settlement rate is, therefore, the fee an originating carrier pays a terminating carrier for call carriage and completion services. It is separate from, but part of,

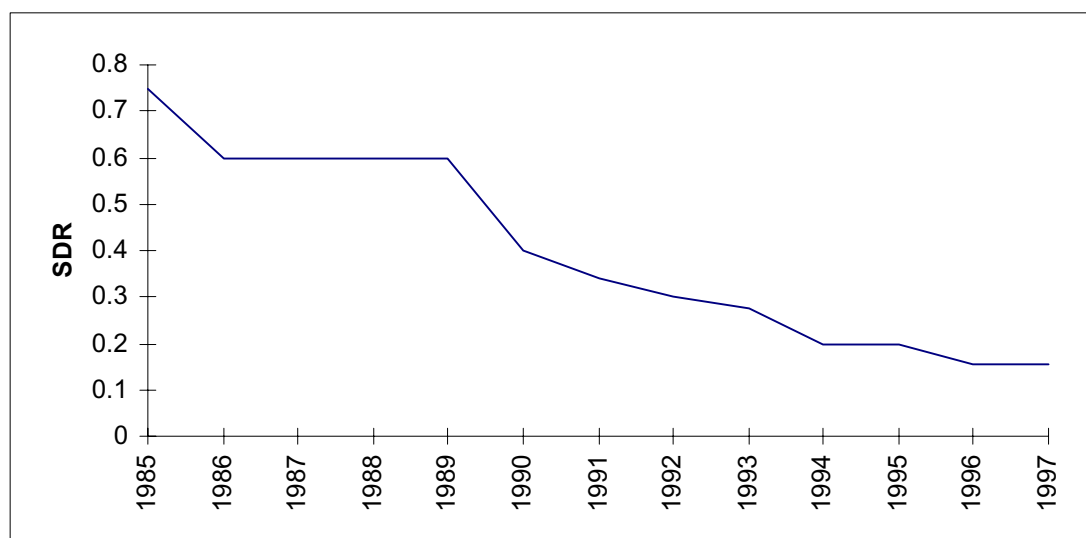
the price consumers pay for international telecommunications services. The difference between the settlement rate and the price paid by consumers is important. In general, the bilateral settlement rate is identical for carriers at both ends of any particular route, whereas the price charged to consumers for an international call can differ substantially between two countries.

4.2 The relationship between settlement rates and the resource costs of termination

As discussed in Chapter 2, the long-run marginal cost of an international call represents the annualised cost of preserving the networks which carry an international call. This is the 'resource cost' of an overseas call. However, in principle, the cost to Telstra and Optus of an outgoing call is substantially higher than the resource cost. While they face resource cost for the originating component of an outgoing international call, the cost they face for termination is the settlement rate which, as discussed below, is well in excess of the resource cost. This section examines the relationship between the carriers' cost of termination — the settlement rate — and the resource cost of termination.

Over the past two decades, the underlying costs of telecommunications services have fallen dramatically, largely reflecting the introduction of lower-cost technologies and the trend towards more competitive markets. To some extent, this trend has been mirrored in declining settlement rates. Figure 4.2 plots the settlement rate for Telstra (assumed to be half the accounting rate) levied on the US route from 1985 until 1997.¹ This rate was the same for Optus until 1995. In 1996 and at the beginning of 1997, Optus's rate was slightly lower than Telstra. The settlement rate has declined over the period, particularly during the last 8 years. This trend appears to be replicated on most bilateral routes. The OECD (1997) estimates that the average settlement rate for nine OECD countries declined by 29 per cent from 1991 to 1994.

¹ US data are used in Figure 4.1 because it is the only country, apart from the United Kingdom, for which historical data on accounting rates are publicly available. In Australia, settlement rates negotiated by Telstra and Optus are not public.

Figure 4.2: **US-Australia settlement rate, 1985 to 1997**

Note: At the end of 1996, one SDR was equal to US\$1.45.

Source: FCC (1997).

Despite these reductions, settlement rates on most bilateral routes have not kept pace with falls in underlying resource costs (Frieden 1996). It is estimated that, in 1995–96, the traffic-weighted average settlement rate was 6 times the underlying average resource cost of terminating an international call minute (see Appendix A).²

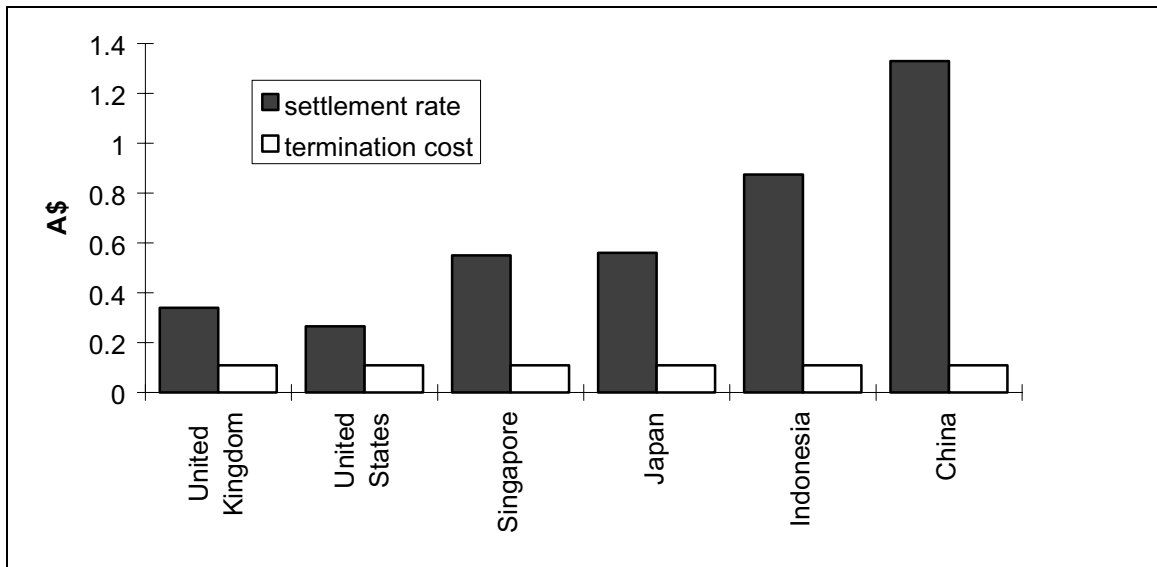
On individual routes, the difference between the settlement rate and the resource cost of termination varies considerably. Figure 4.3 plots 1996 US settlement rates, which appear to closely approximate Australian settlement rates³, for individual markets against the estimated average resource cost of terminating an international call in those markets.

Although declining over time, it is apparent from Figure 4.3 that settlement rates on Australia's most important international routes remain significantly above the underlying resource cost of providing termination services. High settlement rates artificially increase carrier costs and hence may be an important factor preventing retail prices from falling.

² This estimate is consistent with Ergas (1996) who found, using confidential 1994–95 data, that the median settlement rate on routes to and from Australia was some five times unit network costs.

³ Information provided to the Industry Commission suggests that Australian accounting rates closely reflect those of the US.

Figure 4.3: Settlement rates and estimated termination cost, 1996



a The termination cost is the average cost of termination on all routes. For the reasons discussed in Chapter 2, this is assumed to be the same for each route (11 cents per minute). US settlement rates are used to approximate Australian settlement rates on all routes except the United Kingdom where the UK-Australia settlement rate is used.

Source: Appendix A, FCC (1997) and Ofel (1996).

4.3 The international accounting rate system and refile

Differentials between settlement rates that do not reflect costs open up the possibility of carriers providing international refile services. *Refile* is a form of transit routing where the intermediate country is incorrectly recorded as the point of origination by the terminating carrier. For example, assume that an originating carrier in country A (carrier A) can route traffic directly to country B at a high accounting rate, whereas a carrier in country C (carrier C) can route traffic directly to country B at a low accounting rate. Rather than pay the higher direct rate, carrier A may route its traffic to carrier C, which then changes the country code attached to that traffic (from A to C, hence refile) and forwards the traffic on to B as if the traffic originated in country C. For this service, carrier A pays carrier C a negotiated refile fee, which has to be less than the cost to carrier A of sending the traffic directly to carrier B.

The incentive to engage in refile services is enhanced by the widespread use of the rule of proportionate return. *Proportionate return* is where a carrier in one market will send traffic to each of the carriers in another market in the same

proportions as incoming traffic it receives from them.⁴ The differentials between settlement rates and termination costs make incoming traffic a lucrative revenue earner. Therefore, carriers subject to proportionate return will have an incentive to provide refile services to increase their outgoing traffic in order to maximise their share of incoming traffic.

Whether refile services comply with ITU recommendations is a moot point. Where the originating and terminating carriers have a direct relationship, ITU recommendations appear to prohibit refile. Even where no direct relationship exists, refile does not involve the degree of mutual consent among the parties required by the ITU for correspondent agreements. In a refile configuration, the terminating carrier is always misled about the true point of origination of the traffic (Aamoith 1994).

The benefit of refile, however, is that it helps eliminate discrimination (Ergas 1996). It places pressure on carriers in the terminating market (carrier B in the above example) to remove anomalies between its settlement rates. If carrier B charges a higher rate to carrier A than to carrier C, B may eventually find that all traffic is refiled through C unless the same settlement rate applies on both routes. Depending upon B's bargaining strength, it may equalise the rate charged to A and C by raising the rate charged C. Therefore, while refile will invariably create incentives to reduce the *variation* in excess returns earned on different routes, it will not necessarily lead to lower *levels* of settlement rates.

4.4 The international accounting rate system and the current account

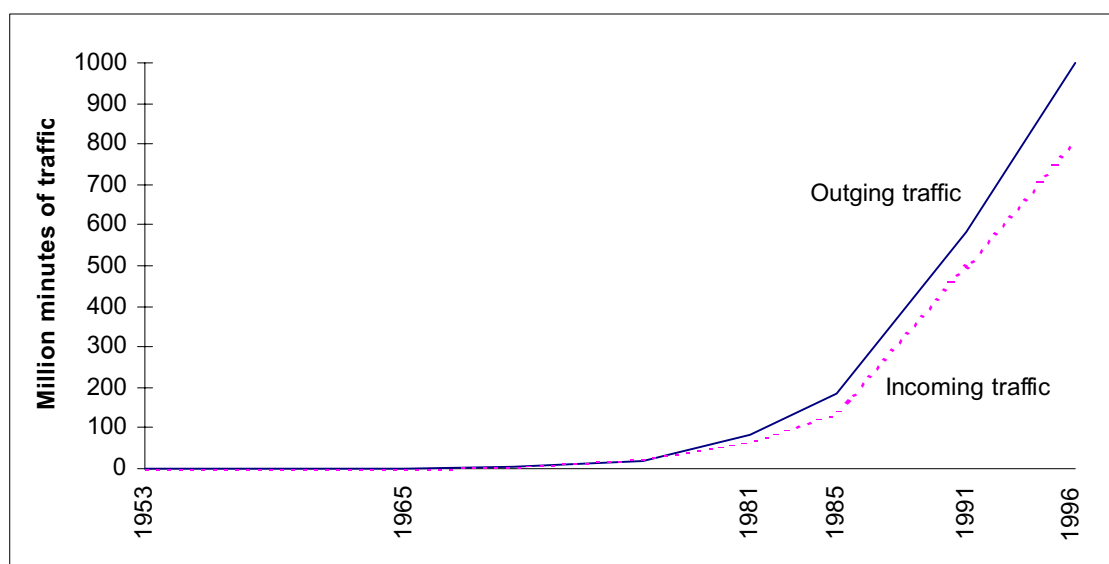
The single most common complaint about the international accounting rate system is its perceived adverse impact on a country's current account balance (see Cheong and Mullins 1991, FCC 1988, Frieden 1993, Johnson 1991 and Stanley 1991). Since the early 1980s, an increasing number of countries have recorded persistent imbalances in international telecommunications traffic. The impact of these imbalances on a nation's current account is directly related to the accounting rate system. Outgoing calls are, in effect, imports of termination services. Conversely, incoming calls are exports of termination services. If outgoing calls exceed incoming calls, a current account deficit is registered, with the actual dollar amount of the deficit dependent upon the balance of traffic and the settlement rate paid by carriers.

⁴ In most countries with a competitive telecommunications market, proportionate return is an informal commercial practice. However, in the United States and the United Kingdom, it is enforced by regulation.

Consequently, some countries with large traffic deficits have sought reform of the international accounting rate system, aimed at reducing settlement rates and lowering their deficit on international telecommunications services. Conversely, countries with traffic surpluses have tended to resist changes to the current system to protect what is a lucrative source of international earnings.

When the current international accounting rate system was first developed, a rough equality in international telecommunications traffic flows was the norm. However, in more recent times, traffic imbalances have become much more common. As Figure 4.4 indicates, Australia recorded a small positive balance on international telecommunications traffic until the late 1970s. By 1981, traffic had started to increase exponentially and outbound traffic began to exceed inbound traffic. It is estimated that in 1995–1996, outbound traffic was some 25 per cent greater than inbound traffic.

Figure 4.4: **Australian international telecommunication traffic flows, selected years**



Source: BTCE (1993), Appendix A.

Australia is not alone in registering increasing deficits in international telecommunications traffic. Several developed economies — most notably the United States — have seen increases in outbound traffic far outstrip those for inbound traffic. Many developing economies, on the other hand, record a surplus on international telecommunications services (OECD 1994).

Large deficits or surpluses need not be of major concern — Australia should not necessarily expect balanced trade in telecommunications services, in the same way that it does not expect balanced trade in products, such as steel and processed food — for which both exports and imports are considerable. Traffic

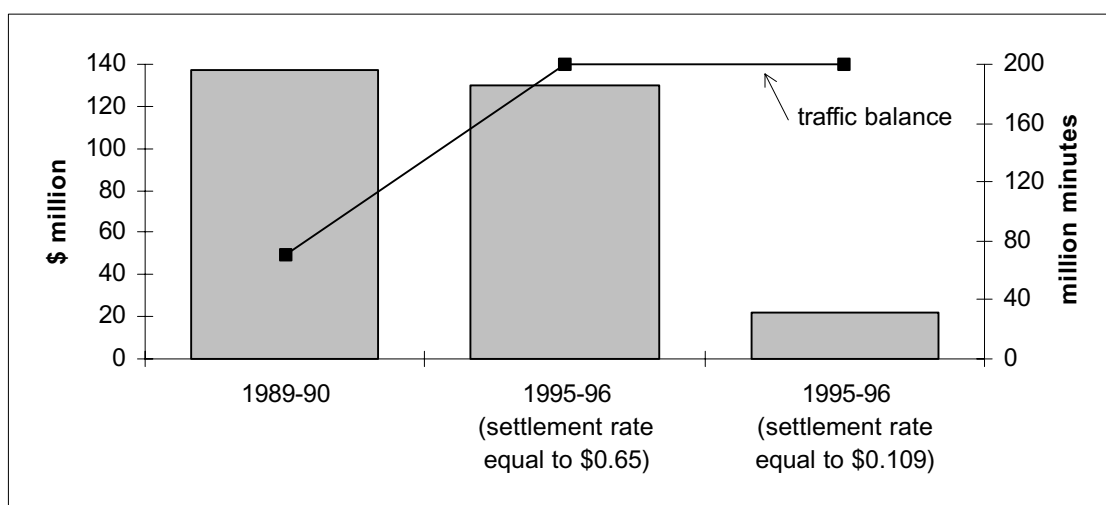
imbalances reflect asymmetrical growth in the demand for international telecommunications services in different countries. The reasons for this are varied and complex. However, one important explanation is differences between countries' international call prices. Several countries, particularly those with a relatively competitive market for telecommunications, have experienced significant decreases in international call prices (OECD 1995; Ergas 1996) and, as a consequence, increased demand. On the other hand, demand continues to be constrained by high retail prices in countries maintaining a telecommunications monopoly. Other explanations for asymmetrical growth in demand include differences in the level of development, in immigration patterns and the extent to which industries in a country are integrated into the world economy (Cheong and Mullins 1991). Depending upon the mix of incoming and outgoing settlement rates, refile may also exacerbate the current account imbalance.

Figure 4.5 plots Australia's net international telecommunications traffic flow and current account balance for international telecommunications services in 1989–90, the latest year for which figures are available. Commission estimates for 1995–96, based on estimates of traffic flows and average settlement rates (see Appendix A), are also shown, along with the estimated current account deficit in telecommunications if settlement rates in all countries were to equal the underlying resource cost (this assumes that a fall in settlement rates would not be reflected in lower Australian retail prices and, hence, there would be no change in the number of minutes demanded by Australian consumers).

In 1989–90, Australia registered an overall deficit of \$132 million in telecommunications services (ABS 1993) on a net traffic imbalance of about 70 million minutes (BTCE 1993). The estimated 1995–96 deficit is \$130 million (200 million x \$0.65). The figure is lower in 1995–96, despite a greater traffic imbalance, because of declining average settlement rates (see Figure 4.2). If, however, settlement rates were equal to their estimated underlying resource cost of termination then, in 1995–96, Australia's current account deficit for international telecommunications would have been only \$22 million.

In the United States, the telecommunications deficit is of even greater magnitude. From a position of surplus in 1980, the United States registered a deficit in international telecommunications of US\$4.3 billion in 1994 (FCC 1997). Consequently, the United States is particularly concerned about settlement rates which are well in excess of the underlying cost.

Figure 4.5: **Australian current account and traffic deficits in international telecommunications, 1989–90 and 1995–96**



Notes: The 1995–96 estimates are based upon a traffic deficit of 200 million minutes. The first 1995–96 current account deficit is estimated using a traffic-weighted average settlement rate on all routes of \$0.65 per minute. The second estimate uses a cost-based settlement rate which is estimated to be \$0.11 per minute.

Source: ABS (1993), BTCE (1993), Appendix A.

The amount of the deficit is of major concern for individual carriers. However, as noted above, from Australia's point of view the current account deficit in telecommunications (as with any particular commodity or service) is not in itself a problem. Indeed, from the perspective of the economy as a whole, a deficit in traffic flows may indicate that consumers in the deficit country are better off, in that there is cheaper/better access to international telecommunications services than in surplus countries.

Thus, the deficit should not be used as a reason for government policies to restrict outgoing traffic flows. A much greater problem from the point of view of the country's overall economic efficiency is that the current international accounting rate system appears to increase costs artificially, and thus contribute to higher international call charges.

4.5 The impact of the accounting rate system on international call prices

On the surface, high settlement rates appear to be responsible for a large proportion of the disparity between the price Telstra or Optus charge customers for an international call, and the resource cost of that call. For instance, the OECD (1997, p. 119) argues that:

one of the main reasons for [the modest reductions in retail rates, given the reductions in costs] is that accounting rates are still far above costs, even though accounting rates have been falling.

The average 1995–96 Telstra/Optus price of an international call is estimated to be \$1.11 per minute. The average resource cost of an international call — origination plus termination — is estimated to be 22 cents per minute. While it costs Telstra and Optus a resource cost of 11 cents per minute for origination, it costs them, on average, 65 cents per minute to have a foreign carrier terminate their outgoing international calls (the settlement rate). Therefore, it appears that the accounting rate system increases the carriers' cost of an outgoing international call from 22 cents per minute to 76 cents per minute, and so is responsible for over 60 per cent of the disparity between the average retail price and the average resource cost of an international call. Furthermore, it might seem that Australia can do little to lower international call prices unilaterally unless the international accounting rate system is reformed.

However, carriers not only pay the settlement rate on every outgoing minute that is terminated by a foreign carrier, they also receive the settlement rate for every incoming minute they terminate for a foreign carrier. Therefore, the impact of the settlement rate system on a carriers' total international carriage costs will depend on their balance of international traffic.

At the end of a settlement period, the total cost (TC) of providing international carriage services (both incoming and outgoing calls) is the underlying resource cost (RC) of carrying all outgoing international calls (O) to the midpoint of the international circuit (see Figure 4.1), plus the resource cost of terminating all incoming international calls (I), plus the settlement rate (S) on the balance of outgoing minutes over incoming minutes:

$$TC = RC(O + I) + S(O - I).$$

The larger a carrier's deficit of minutes (ie more outgoing than incoming minutes) the greater the impact of the settlement rate system on their total international carriage costs.

At the end of 1995–96, Telstra and Optus had a deficit of traffic estimated at 79 million minutes (867 million outgoing minutes minus 788 million incoming minutes). The average resource cost of origination and termination is estimated to be 11 cents per minute and the traffic-weighted average settlement rate is estimated to be 65 cents per minute (see Appendix A). Therefore, in 1995–96 the carriers' combined total costs associated with international carriage services were \$231 million:

$$TC = \$0.11(867 \text{ m} + 788 \text{ m}) + \$0.65(867 \text{ m} - 788 \text{ m}) = \$231 \text{ million}.$$

A carriers' total international call revenue is the average price of an international call multiplied by the number of outgoing minutes carried:

$$TR = p \times O.$$

The average price of an international call carried by Telstra and Optus in 1995–96 is estimated to be \$1.11 per minute. Therefore, their total revenue in 1995–96 is estimated to be \$966 million:

$$TR = \$1.11 \times 867 \text{ m} = \$966 \text{ million.}$$

If Telstra and Optus were under competitive pressure to lower prices of outgoing international calls, then prices could fall to where total costs were just covered by total revenue. The lowest price that they could offer — called in this report the *offset price* — with the international accounting rate system in place, is that which maximises the number of outgoing international minutes demanded while covering total costs. This can be calculated recognising that reducing retail prices for international calls would increase demand for outgoing international calls, thereby altering the balance of international traffic.⁵ This would in turn change the carriers' total cost.

Using 1995–96 data, the offset price is estimated to be 47 cents per minute (see Appendix A). At this price, demand for outgoing international calls would increase to 1 470 minutes and total cost would equal total revenue:

$$TC = \$0.11(1470 \text{ m} + 788 \text{ m}) + \$0.65(1470 - 788) = \$689 \text{ million}$$

$$TR = \$0.47 \times 1470 \text{ m} = \$689 \text{ million}$$

This analysis indicates that, even with the international accounting rate system in place, Telstra and Optus could, if under competitive pressure to do so, lower international call prices substantially.

Such a reduction in the price of an international call — from \$1.11 to 47 cents per minute — would substantially improve economic efficiency. In Chapter 2, the efficiency losses associated with the carriers' pricing of international calls in 1995–96 were estimated to be \$375 million. Reducing the average international call price from \$1.11 to 47 cents would eliminate 92 per cent, or \$346 million, of these efficiency losses.

This analysis implies that the international accounting rate system contributes only the gap between the offset price and the underlying resource cost of an international call. In Australia, this accounts for only an estimated 28 per cent of

⁵ There is limited evidence of significant cross-price effects in international telecommunications (see Appendix A). Hence, a reduction in Australian retail prices of outgoing calls is assumed to have no impact on incoming traffic volumes.

the difference between the average Telstra/Optus international call price and the resource cost of provision, and less than 10 per cent of the associated efficiency losses. The remaining 72 per cent of the price gap, corresponding to 92 per cent of estimated efficiency losses, appear to be caused by the lack of domestic competitive pressure on Telstra and Optus to lower their international call prices.

The offset price is sensitive to a number of factors, including international traffic, the underlying resource cost of an international call and the traffic-weighted average settlement rate. If the offset price has been overestimated, then so has the importance of the international accounting rate system as a factor preventing reductions in international call prices. Similarly, if the offset price has been underestimated, then the international accounting rate system is likely to be a more important factor preventing prices from falling. The next section discusses the main factors likely to affect these estimates, and hence the importance of the international accounting rate system as a factor preventing falls in international call prices.

4.6 Factors influencing the impact of the accounting rate system on international call prices

A carrier's offset price is the lowest international call price that can be offered to consumers given the international accounting rate system. The closer the offset price is to the underlying resource cost of an international call, the less important the international accounting rate system is in preventing international call prices from falling. A carrier's offset price is determined by its underlying resource costs, balance of international traffic and settlement rates.

Resource costs

The resource cost of an international call used in the above analysis was estimated to include the long-run costs associated with preserving the networks that carry an international call (operating costs, depreciation and a normal return on capital). This approach was taken because other costs of operating a telecommunications network were not directly allocable to the international calls market. For example, one of the most important costs excluded from the estimated resource cost of an international call is the cost of billing such services. Telstra customers receive one bill which covers charges for subscriber access, local calls, domestic long-distance calls and international calls. Optus also provides customers with only one bill covering all services. It is inappropriate from an economic perspective (though often a common accounting practice) to attribute a portion of this billing cost to the international calls market.

However, unallocable costs still need to be recovered, implying that the price of at least one telecommunications service offered by Telstra and Optus will be above long-run marginal cost. Unallocable costs can be most efficiently recovered by increasing price above long-run marginal cost for the service with the most inelastic demand. The Industry Commission (1997) found that unallocable costs could be most efficiently recovered by increasing business subscriber access charges — where demand is most inelastic.

For carriers or service providers offering only international calls, their price must cover all costs (including billing) of providing the service. Service providers need not, however, charge higher prices than Telstra and Optus. In a competitive international calls market their pricing structures would depend on their relative efficiency.

Traffic balances

As shown above, the cost to the carrier or service provider of carrying an international call is largely determined by their balance of international traffic. AUSTEL (1997) market shares indicate that, in the March quarter of 1996, Telstra and Optus terminated over 98 per cent of Australia's incoming call minutes, with switched service providers terminating the remainder. The level of the service providers' offset price, and hence their ability to apply downward pressure on international call prices, will be determined by their access to the market for international call termination to minimise their traffic deficit, or alternatively their ability to bypass the accounting rate system (refile).

However, even if service providers are unable to terminate any international minutes, they should still be able to place some downward pressure on international call prices. As shown in Chapter 2, switched service providers already appear to be offering lower international call prices in certain market segments where they are competing with Telstra and Optus. The removal from July 1997 of the legislative impediments identified in Chapter 3, and greater coverage in the provision of their services, should allow service providers to place further competitive pressure on the current carriers to lower international call prices.

Finally, the development of a separate market in Australia for international termination services would undermine the ability of any carrier or service provider to lower total costs by offsetting the settlement rate on outgoing calls with the settlement rate received on incoming calls. With the current accounting rate system in place, the emergence of companies offering only termination services (one-way bypass) could potentially be a major hurdle to reducing international call prices (see Chapter 5).

Settlement rates

The above analysis assumed that the settlement rates on total outgoing and incoming international minutes were equal. This may not be the case. If Australia received a greater proportion of its incoming minutes than its outgoing minutes from countries with low settlement rates, then the traffic-weighted average settlement rate on incoming minutes would be lower than the traffic-weighted average settlement rate on outgoing minutes. If this were the case (and it probably is), then the value of the deficit would be larger than if the settlement rates were equal. This implies that the cost, and hence the offset price, would be underestimated and, as a consequence, the importance of the international accounting rate system as a factor preventing reductions in international call prices also would be underestimated.

The disparity between incoming and outgoing settlement rates is likely to be further increased as a consequence of lowering international call prices. Low outgoing international call prices would encourage foreign carriers to refile traffic from low settlement rate countries to high settlement rate countries through Australian carriers. This would increase the value of the traffic deficit by lowering the average settlement rate on incoming traffic, and increasing the average settlement rate on outgoing traffic. Again, this would raise costs along with the offset price and increase the importance of the international accounting rate system as a factor preventing Australian international call prices from falling.

4.7 Summary

Settlement rates, although having declined over the last two decades, remain substantially above the resource costs of terminating an international call. However, the common view that the international accounting rate system is the major barrier to reducing international call prices from Australia needs to be qualified. The floor placed under international call prices by the international accounting rate system is lower than might be initially thought.

This is because carriers not only pay the settlement rate on outgoing international calls, but also receive this rate on incoming international calls terminated for a foreign carrier. Therefore, the extent to which the international accounting rate system increases carriers' costs, and hence prevents reductions in international call prices, depends on the value of a carrier's balance of traffic. With a sufficiently competitive market, incumbents would be pressured to lower outgoing call prices using revenue from terminating incoming calls until total revenue from international carriage services equals total cost. Without such domestic competition, there is no pressure to do so.

The analysis presented in this chapter indicates that, for Australian carriers, the international accounting rate system is only part of the explanation for the large discrepancy between the carriers' international call prices and their resource costs. On one idealised calculation it accounts for only about one-quarter of the difference. In terms of economic efficiency, it accounts for less than 10 per cent of the estimated losses associated with the carriers' 1995–96 pricing of international calls. The competitive pressures for incumbent carriers to reduce prices should intensify from July 1997. Not only are newly emerging service providers expanding their facilities and offering considerably cheaper international calls, but also some of the remaining legislative barriers that restrict their operations are removed.

5 REFORMING THE INTERNATIONAL ACCOUNTING RATE SYSTEM

Since the international accounting rate system is likely to be having a smaller impact on international call prices in Australia than internal factors, domestic reforms are likely to produce most gains. Nevertheless, additional significant benefits may result from international initiatives. This chapter discusses ways of reforming the international settlement system. It examines multilateral developments within the World Trade Organisation, along with the implications for Australia that arise from asymmetrical liberalisation.

5.1 Reform of the international settlement system

This report has found that the large premium between retail international call prices and their long-run marginal cost of provision in Australia primarily reflects lack of domestic competitive pressures (see Chapter 3). Nevertheless, as shown in Chapter 4, the international settlement system is also contributing to higher priced international calls. Moreover, the relative importance of international factors will increase following transition to the more competitive domestic market expected from the post-July arrangements.

Unilateral reforms

Unlike the domestic factors inhibiting competition discussed in this report, the Australian Government can do very little unilaterally to reduce settlement rates to cost. The very nature of the international settlement system means that both parties on a bilateral route must agree before settlement rates can be reduced. While Australia could reduce the prices levied for terminating incoming calls by reforming unilaterally to allow a more competitive market for termination services, it would continue having to accept high settlement rates for its outgoing calls.

Somewhat perversely, the implication of such unilateral action could be to reduce significantly the scope for future price reductions for Australian consumers. As detailed in Chapter 4, carriers facing competitive pressure in the market for outgoing calls could use the rents gained from terminating incoming calls to lower prices of outgoing calls, though this has not yet happened in Australia (see Chapter 3). Removing these rents on incoming calls could therefore limit the

extent of future price reductions in outgoing call prices brought about by domestic reforms. By maintaining the settlement rate system, outgoing call prices would be expected to fall within a competitive domestic market to a level equal to the offset price detailed in Chapter 4. If Australia unilaterally withdrew from the settlement rate system (and hence received only resource cost for terminating incoming minutes), the scope for price reductions would be less. Under competitive pressure, prices could only fall to a level given by resource costs plus the settlement rate paid on all outgoing minutes.¹ Unilateral withdrawal from the settlement system could therefore significantly reduce the scope for price reductions in the newly competitive Australian international calls market.

The implications for foreign consumers of such unilateral action by Australia would depend upon whether foreign carriers passed on their potentially significant costs reductions resulting from reduced termination expenses in Australia. This would depend largely upon the degree of competition within those markets. Australia therefore is likely to receive an increased number of incoming calls from competitive foreign markets, with consequent benefits to Australia. Benefits will include, for example, the advantages associated with making it cheaper for foreign firms to transact with Australia. However, these benefits are likely to be outweighed by the additional costs imposed on Australian consumers if such unilateral action reduced the scope for cutting outgoing call prices.

An alternative unilateral approach for reforming the international settlement system being considered by the United States is to require all of its carriers to pay no more than prescribed maximum settlement rates to foreign carriers for terminating their outgoing calls (see Box 5.1). However, such an approach may encounter other difficulties and, in any event, is unlikely to be feasible for a comparatively small market such as Australia.

Box 5.1: Proposed US unilateral action on international settlement rates

In December 1996, the Federal Communications Commission (FCC) issued a Notice of Proposed Rulemaking (IB Docket No. 96-261) on the possibility of prescribing maximum

¹ In the terms set out in Chapter 4, unilateral reductions in settlement rates would mean that prices in a competitive market would be set at a rate higher than the offset price:

$$P(O) = C = RC(O) + S(O) > RC(O+I) + S(O-I).$$

Using 1995–96 estimates for Telstra/Optus (see Appendix A), the average price would only be able to fall to \$0.76 per minute.

settlement rates. If introduced, the FCC would require US carriers to pay no more than certain benchmark rates to foreign carriers terminating their calls.

These benchmark rates have been developed by the FCC on the basis of a conservative estimate of foreign carrier costs. Countries have been divided into three economic development categories, with the upper benchmark settlement rate being set at the average cost in each category. As such, US carriers will be prohibited from paying settlement rates of greater than US\$0.154 to carriers from upper income countries; US\$0.191 to carriers from middle income countries; and US\$0.234 to carriers from low income countries. For some countries, existing rates would need to be reduced by as much as 80 per cent.

The FCC proposes that those carriers classified from high-income countries would have one year to bring settlement rates down to the new benchmarks, while carriers from middle-income countries would have two years. Carriers from low-income countries would have four years. The US proposal would require China, for example, to drop its settlement rate from US\$1.07 a minute to US\$0.234 within four years.

Whether this strategy will lower accounting rates is a moot point. Preliminary analysis by Salomon Brothers suggests that most countries will have little choice but to drop their rates in line with FCC demands (Business Times, 15 February 1997). However, the International Telecommunications Union has suggested that the US policy of splitting countries into three categories may breach MFN and be actionable under the WTO (Business Times, 15 February 1997).

Multilateral reforms

The special nature of international telecommunications makes the international settlement system largely a multilateral problem. Thus, for small countries like Australia, it requires a multilateral solution. In this context, negotiations under the World Trade Organisation (WTO) have recently resulted in the extension of world trade disciplines to telecommunications. As discussed below, participants in the agreement have made commitments aimed at liberalising trade in basic telecommunications services, covering both cross-border supply and commercial presence by foreign firms. Importantly, this should increase the number of markets where carriers can gain access to foreign markets to supply basic telecommunications services, albeit to varying degrees.

Multilateral market access would have major implications on the international settlement rate system. By allowing international telecommunications operators to terminate their own traffic by investing in, or leasing, network capacity in the destination market — known as *two-way bypass* — foreign carriers could avoid the settlement system. Thus, on routes enabling two-way bypass — where both the originating and destination markets are open to foreign entry — settlement

rates significantly above costs become unsustainable. Telecommunications operators could simply bypass any carrier that levied rates above cost. As more countries increasingly allow international access to their telecommunications market, bilateral settlement rates should fall towards actual resource costs on major routes.

The General Agreement on Trade in Services (GATS)

A major achievement of the Uruguay Round was the creation of the General Agreement on Trade in Services (GATS). As a result, services were incorporated into the World Trade Organisation (WTO), and for the first time are subject to multilateral rules aimed at liberalising international trade.

The coverage by GATS of the four modes of supplying services, including commercial presence, also means that foreign direct investment is to be incorporated in negotiations on services 'trade'. The broad definition of market access adopted by the GATS also means that competition policy, defined broadly to cover entry restrictions in general, is increasingly on the trade policy agenda (Snape and Bosworth 1996). In concrete terms, the main contribution of the GATS so far has been to put a cap on the extent of protection provided many service industries. Thus, it will help constrain any backsliding in reforms.

Although the GATS represents a significant step forward, it has a number of structural weaknesses which potentially undermine its effectiveness as a means of liberalising international trade in services.² In particular, the GATS suffers from a preoccupation with sector-specific commitments, whereby its core commitments on market access and national treatment apply to a positive list of sectors scheduled by participants.³ In scheduling specific service industries, most countries preferred either to make unbound (equivalent to no) commitments, or to bind the current situation, including any existing impediments. Most countries also chose not to schedule many important sectors.

² See IC Annual Report, 1994–95 and 1995–96.

³ These core commitments on market access and national treatment apply only to specific sectors scheduled by members. Market access requires each member to grant foreign service suppliers treatment no less favourable than the restrictions specified in the country's schedule, and prohibits the use of six types of quantitative restrictions. National treatment requires foreign service providers to be granted treatment no less favourable than accorded domestic suppliers. The use of these two terms together in the GATS is somewhat confusing, and the market access commitment would appear to cover all government-imposed barriers, and not only those directed against foreign suppliers (Snape and Bosworth 1996).

Basic telecommunications is a case in point.⁴ It was generally recognised that since most telecommunications services were often monopolised and controlled by governments, commitments in telecommunications and other related sectors could be easily undermined without substantial commitments on network access.⁵ However, inadequate progress at the time led to negotiations being extended beyond 1995, aimed at achieving a basic telecommunications accord by 1998 (see Petrazzini 1996). Negotiations were further extended from end-April 1996, and the basic telecommunications agreement was not concluded until 15 February 1997.

Much of the negotiation on basic telecommunications has centred on achieving commitments from members on key aspects of domestic competition policy affecting telecommunications, including mainly matters of interconnection, competition safeguards and transparency (Low 1996).

The WTO Agreement on Basic Telecommunications

Participants in the new agreement, to operate from 1 January 1998, have scheduled varying commitments on basic telecommunications services covering market access (including foreign direct investment controls) and national treatment. These commitments were made on an MFN or non-discriminatory basis.

The agreement's 69 participants (including the 15 EU member states) accounted for over 91 per cent of the world's total telecommunications revenues in 1995. Of these, five participants (the European Union, Japan, United States, Canada and Australia) represented 77 per cent of this market. They also included important developing countries with strong growth potential, such as Korea, Brazil, Mexico, Argentina, India, Turkey, Hong Kong and Singapore. For many countries, such as Australia, the United Kingdom and the United States, these commitments only locked in unilateral progress, but for others, implementation of the agreement should generate substantial additional liberalisation.⁶

⁴ Basic telecommunications services are defined in terms of the central product classification and include such services as voice telephony, telex and telegraph transmission. In the original GATS agreement, so-called value-added telecommunications services were extensively listed by most parties to the agreement.

⁵ The Annex on Telecommunications to the GATS contained commitments by members to ensure each other with access to and use of public telecommunications networks 'on reasonable and non-discriminatory terms and conditions', for those services scheduled (Paragraph 5 (a) of the Annex).

⁶ Australia had decided independently from the GATS' telecommunications negotiations to deregulate its basic telecommunications market from 1 July 1997. The bound

Central to the telecommunications agreement are the market access commitments to international services and facilities made by 53 countries. All developed country participants, including Australia, are committed to providing market access in international services from 1 January 1998. Most developing countries adopted extended periods for meeting their commitments.⁷ By agreeing in principle to open up their international call markets to overseas competition, foreign suppliers increasingly should be able to use their own facilities to provide seamless end-to-end services.

Underpinning these market access arrangements are commitments regarding pro-competitive principles and foreign investment. Participants have accepted a set of agreed pro-competitive regulatory principles aimed at providing foreign providers with effective interconnection rights into existing networks at reasonable rates, terms and conditions. Participants must establish independent regulatory bodies and ensure that foreign suppliers can interconnect with domestic networks at competitive prices. Countries also agreed to limit foreign ownership restrictions on telecommunications services and facilities. However, while a few participants, including the United Kingdom and the United States, committed to having no foreign investment controls, many countries, including Australia, agreed to do so for new entrants only, thereby reserving the right to maintain such controls for certain incumbents.⁸

The telecommunications agreement appears to offer substantial promise as a means of achieving more competitive global markets. However, whether it will generate sufficient competitive markets multilaterally to lower international settlement rates to reflect actual termination costs of member countries remains uncertain at this stage. This will ultimately depend upon the scope of participants' commitments, and on how well these market-opening reforms are implemented. Although any such assessment of members' commitments is beyond the scope of this paper, it would be reasonable to expect uncertainties and problems of implementation to unfold. For example, the agreed pro-competitive

commitments made by Australia in the telecommunications agreement therefore reflect these changes.

⁷ These range from, for example, 1999 for Peru, 2000 for Singapore, 2005 for Indonesia, 2006 for Thailand, through to 2013 for Venezuela and Jamaica. Two EU members also negotiated substantial extensions, these being 2003 for Greece and 2000 for Ireland.

⁸ While Australia has agreed not to place any foreign ownership limits on new carriers entering Australia, it has reserved the right to maintain foreign ownership restrictions on existing carriers. Existing legislation requires both Optus and VodaFone to maintain majority Australian ownership, and foreign ownership in Telstra is limited to approximately 11 per cent. Investment commitments by some countries, such as Canada, apply only to selected services, and were extended beyond 1998 by many, mainly developing, countries.

regulatory principles are very general. If these are to work, they will need to be translated by participants into effective domestic competitive regulations that can successfully prevent anti-competitive behaviour by incumbents. Guaranteeing such access is imperative, since foreign suppliers will generally need to use the existing domestic network in supplying international calls.

For Australia, the scope for open market access in some of its leading call destination markets would appear limited, at least for some time.⁹ This reduces the likelihood that competitive pressures exerted by two-way bypass will lower settlement rates towards the long-run marginal costs of termination on several key routes. Thus, although this problem is unlikely on routes to competitive markets, Australian carriers are likely to continue facing settlement rates that are above costs on some of its fastest growing bilateral routes because of the maintenance of limitations on market access.

Another multilateral approach proposed by Australia during the telecommunications negotiations is for a system of one-way termination charges, but this failed to win widespread acceptance (see Box 5.2).

⁹ For example, some of Australia's developing neighbours that are important destinations for international calls have extended time periods beyond 1998 for meeting their commitments. Moreover, China — Australia's fastest growing market — is not yet a WTO member, and therefore is not party to the agreement.

Box 5.2: A system of one-way termination rates

A system of one-way termination charges would have three major features (Ergas 1995).

- Each country would post a uniform ‘termination rate’ for all countries;
- Route-specific transportation charges would be separate to the termination rate, and reflect the costs of carrying traffic along the requisite international lines; and
- While the transport charge could be the same in both directions, the termination rates may differ at the two ends of a bilateral route.

Such a system would not vary termination rates across source countries, and would be MFN consistent. It would also reduce incentives for refile, whereby carriers receive more through-traffic simply because they have negotiated lower settlement rates, or have enforced proportionate return. Termination rates would be public, thereby enhancing transparency. Countries wishing to tax incoming telecommunications traffic could list high termination rates. Like tariffs, these could be negotiated downwards through multilateral trade rounds. Transparency could also encourage domestic reforms.

However, a system of one-way termination charges may enable termination costs in a monopoly market to increase. The current requirement that settlement rates be symmetrical (the 50/50 formula) may help constrain monopoly carriers from raising accounting rates. Higher settlement rates increase both a monopolist’s incoming revenue and termination costs. Without this constraint, monopolist carriers could raise their termination rates to the monopoly price — assuming they are not already there — thereby increasing outgoing international call prices in competitive markets.

Moreover, as uniform termination rates by competitive carriers spread, a margin will develop between incoming and outgoing termination rates on individual routes. This may further increase the total costs of competitive carriers (see Chapter 4), and hence raise international call prices on that route in the competitive market.

Australia made two proposals in the multilateral negotiations to limit rate increases:

- setting external constraints on the rates, such as limiting them to an agreed multiple of the highest domestic long-distance charge, or ITU cost benchmarks; or
- agreeing on a general set of principles on terms of settlement arrangements, and allowing for a staggered introduction of the proposed system.

Many participants found these approaches unacceptable. Thus, such a system was not included in the basic telecommunications agreement. Despite its many advantages, the major liberalised markets are unlikely to support such a multilateral approach without having some mechanism to prevent monopoly carriers from hiking termination rates.

5.2 Transitional problems for Australia arising from asymmetrical liberalisation

This report concludes that significant gains should accrue to Australian consumers from increased domestic competition in the international telecommunications market following the July 1997 reforms. An important source of this increased competition will be from foreign telecommunications operators, in line with Australia's commitment to non-discriminatory market access under the WTO Agreement on Basic Telecommunications.

There are, however, certain potential problems that will need to be properly addressed if Australia is to ensure that it captures the benefits from liberalising its own telecommunications markets while market access remains restricted in other key destination markets, and settlement rates continue to be set substantially above costs. In particular, such asymmetries between Australia and other countries in liberalisation may open up opportunities for foreign monopolists to engage in anti-competitive behaviour to the detriment of consumers in markets undergoing liberalisation, such as Australia. These problems need to be addressed by well-targeted domestic competition policy safeguards.

It must be stressed that these anti-competitive problems associated with asymmetrical liberalisation are unique to international telecommunications, and a handful of other sectors, where completing the transaction is directly dependent on suppliers jointly utilising facilities in two or more countries.¹⁰ In order to provide an international call, an Australian carrier has to be able to access the destination markets network, either by using a foreign carrier and paying a termination fee, or directly by establishing its own subsidiary in the foreign market and accessing the network (two-way bypass). Clearly, these concerns will greatly diminish as market access becomes increasingly possible in a greater number of Australia's major call destinations, thereby offering Australian carriers the possibility of engaging in two-way bypass.

Asymmetrical liberalisation and anti-competitive behaviour

The major problem that arises for Australia from the combination of asymmetrical liberalisation and high settlement rates is the possibility of foreign monopolists engaging in anti-competitive behaviour to the detriment of Australian consumers.

Anti-competitive behaviour in international telecommunications is made possible by the continuing restrictions on market access in many countries and the fact

¹⁰ Another example of this situation is postal services, where a similar international settlement system operates (IC 1992).

that most settlement rates remain significantly above costs. The margin between settlement rates and the actual cost of terminating a call creates a stream of rents that, in general, accrue to the carrier receiving more minutes than it originates. In other words, if carrier A receives from carrier B more minutes of international traffic than it sends, it will acquire the excess returns from the margin between the settlement rate and the costs of termination on each of those surplus minutes.

If there is an asymmetry between carriers A and B in terms of the degree of competition they face in their home market, the rents from above-cost settlement rates can be distributed differently by anti-competitive behaviour. If carrier A is a monopolist in its home market and carrier B faces competition, then carrier A will generally have the incentive to engage in 'whipsawing' and/or 'one-way bypass' in order to increase its share of the rents from international settlement. The problem this causes for Australian consumers is that it reduces the scope for price reductions by raising the offset price (see Chapter 4).

Whipsawing

Whipsawing refers to the situation where a monopoly carrier uses its bargaining leverage to acquire a greater share of the stream of rents flowing from the settlement system. Generally, this involves the monopoly carrier seeking a reduction in the rate it pays for termination services and/or an increase in the rate paid to it for termination services (Frieden 1996). For example, a competitive carrier (possibly a new entrant) may agree with a foreign monopolist to pay a premium over the applicable settlement rate or agree to terminate calls at a discount until a threshold volume of traffic is generated.

On the particular route where it occurs, whipsawing has the potential to increase substantially the costs of international telecommunications for consumers in a liberalised market. Carriers in the competitive market will either face a higher effective settlement rate for outgoing calls or receive less for terminating incoming calls. Revenue from incoming calls, used to offset the costs of an outgoing call, declines. In consequence, the effective cost of an outgoing call is raised and the scope for price reductions in the competitive market is reduced.

Evidence of whipsawing in the Australian market is unavailable due to the lack of published data on the correspondence agreements entered into by Australian telecommunications operators. However, it would seem unlikely, with Telstra and Optus terminating 98 per cent of incoming traffic (AUSTEL 1997), that a foreign monopolist would be able to engender a bidding war in the Australian market. Both carriers would quickly realise that such behaviour is not in their long-term interests. Removal of the impediments to entry identified in Chapter 3 may alter this situation. Post-July 1997, new entrants may succumb to the

overtures of foreign monopolists as a means of entering the lucrative market for call termination.

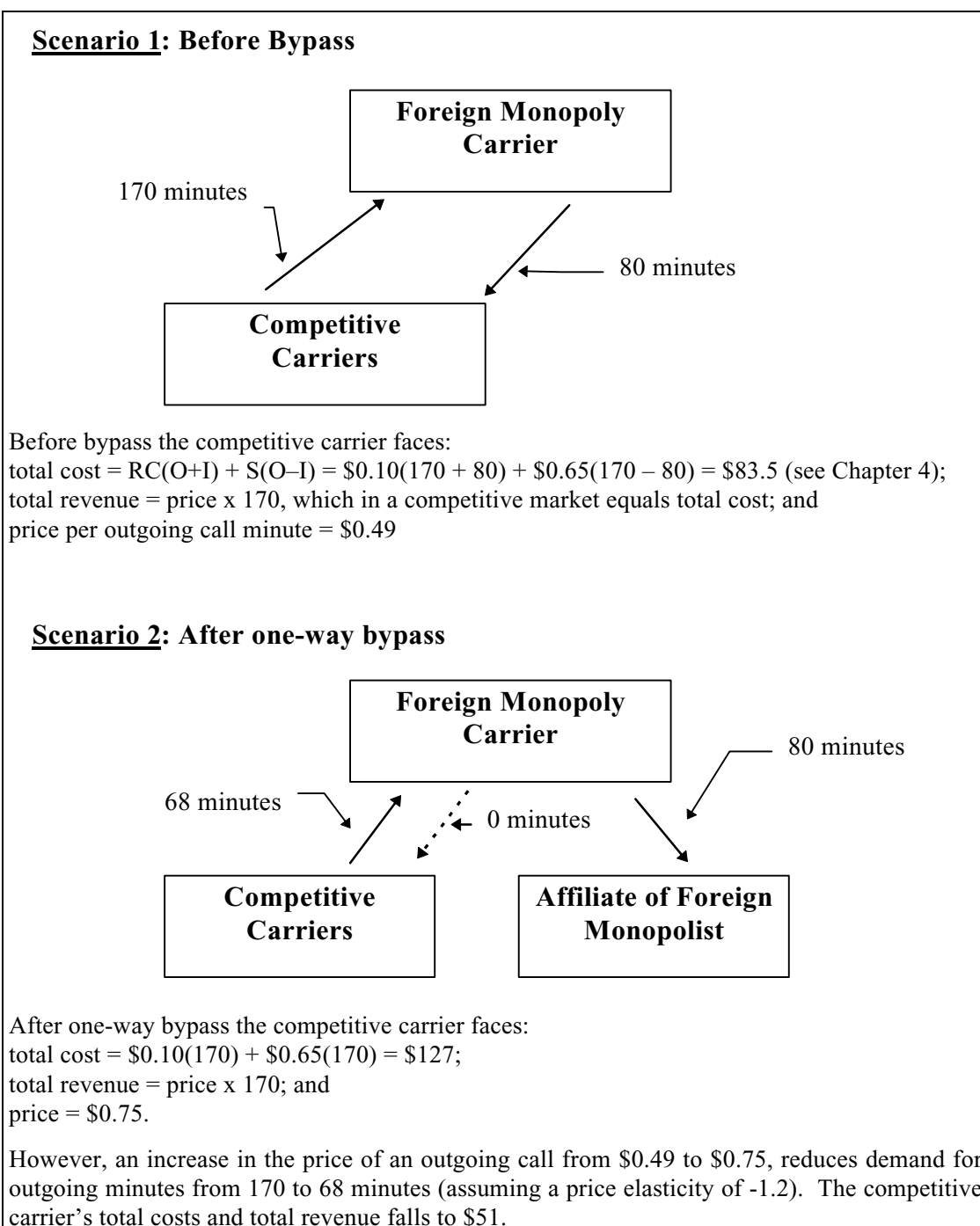
One-way bypass

A potentially more serious example of anti-competitive behaviour by a foreign monopolist is *one-way bypass*. One-way bypass occurs when a foreign carrier from a closed market either sets up a subsidiary or leases a private line in a competitive market and terminates all or a proportion of its own incoming traffic. The bypass is 'one-way' because carriers in the competitive market are unable to obtain equivalent entry in the foreign carrier's home market. Once again, this problem reflects the unique characteristics of supplying international telecommunications. It is only likely to be a major problem for Australia on call routes to closed markets who have not signed the WTO telecommunications agreement.

As a result of one-way bypass, competitive carriers may receive a significantly reduced number or even a cessation of incoming calls on that particular bilateral route. This, in turn, would alter the balance of incoming and outgoing traffic for the competitive carrier, resulting in a significant traffic imbalance in the foreign monopolist's favour. Importantly there would also be an increase in the number of outgoing minutes with termination costs that are no longer offset by the revenue from terminating incoming calls. In consequence, the effective cost of an outgoing call is raised and the scope for price reductions in the competitive market is reduced.

Figure 5.1 provides an illustrative example of the impact of one-way bypass on the effective cost of terminating an outgoing call for all competitive carriers. The extreme case is shown where the competitive carriers lose all incoming minutes. The foreign monopolist's affiliate (or partner) essentially obtains a monopoly on incoming calls on that route, which it presumably terminates at cost (10 cents per minute). The elimination of incoming minutes directed to the competitive carriers after the foreign carrier engages in one-way bypass can be seen to have a major impact on the effective cost of outgoing calls for the competitive carriers, with total costs rising from 49 cents per minute to 75 cents per minute in the example provided.

Figure 5.1: **Example of changes in the retail price in competitive markets facing one-way bypass**



The actual impact of one-way bypass on consumers in the competitive market would depend on the behaviour of the foreign monopolist's affiliate (or partner). To begin with, the affiliate may only terminate, and hence pass none of the cost

advantages it enjoys on to consumers. Thus, consumers in the competitive market would face a retail price fully equal to the competitive carrier's total effective cost of 75 cents per minute.

Alternatively, the affiliate may exploit its cost advantage and price outgoing calls in such a manner that it undercuts the competitive carriers. Presumably this would be at a price that was far enough below 75 cents per minute to obtain the desired market share.¹¹ This would be a better outcome for consumers in the competitive market than when the affiliate simply terminated calls. However, it would likely be a long way above the price that was possible before bypass occurred, when retail prices could be 49 cents per minute, therefore reducing the scope for price reductions that should flow from increased domestic competition.

At present, one-way bypass does not appear to be an issue in the Australian market. Affiliates of foreign carriers likely to engage in such behaviour presumably face the same barriers to entry identified in Chapter 3 as other potential entrants. However, this situation may change after July 1997 when many of these barriers will be removed. There are some suggestions that at least one foreign monopolist has already acquired capacity in the Australian market, technically opening the way for it to engage in one-way bypass.

These concerns over possible anti-competitive behaviour by foreign monopolists raises questions as to how Australia can best ensure that the expected benefits from unilaterally liberalising its international calls market, from 1 July 1997, will accrue to the economy and Australian consumers through lower outgoing overseas calls, rather than to foreign monopolists engaging in whipsawing or one-way bypass. The most appropriate solution would seem to be that of current policy, of pushing ahead with unilateral deregulation of the Australian market, while ensuring that these concerns are adequately addressed by domestic competition policy safeguards.

The increased importance of competition policy

The above concerns over anti-competitive conduct by foreign monopolists exploiting Australian consumers will not arise on routes involving competitive international call markets, or those about to become more open through meeting their WTO commitments. In such major markets, such as the United States, the United Kingdom, New Zealand and Japan, two-way bypass is an increasingly

¹¹ The foreign monopolist presumably would not allow its affiliate to sell outgoing calls at a price where the margins between revenue and cost that the affiliate made on outgoing calls no longer offset the losses incurred by the foreign monopolist terminating its affiliates' outgoing traffic at cost (10 cents per minute) instead of the competitive carrier's traffic at the settlement rate (65 cents per minute).

feasible option. Furthermore, many significant markets within the Asia Pacific and European regions are rapidly deregulating their telecommunications industries. Thus, Australia would be far better off fulfilling its liberalisation objectives and reaping the benefits on these routes, while at the same time implementing important competition policy safeguards to ensure that gains to Australian consumers on routes involving uncompetitive markets are not undermined by anti-competitive behaviour.

Two possible types of competition policy are available to a government seeking to prevent a foreign monopoly carrier from engaging in whipsawing and/or one-way bypass. The first option, an *ex ante* competition policy, is undesirable as it restricts beneficial market entry and breaches the MFN principle. The second option, an *ex post* competition policy, has its limitations, but in general is likely to successfully constrain the opportunities for anti-competitive behaviour. It appears to be the preferred policy response of the Australian Government.

Ex ante competition policy

An *ex ante* competition policy establishes a set of observable preconditions that, if met, are taken as evidence that anti-competitive activity is being undertaken. As such, any potential entrant into an industry that meets these preconditions is either prevented from entering the market or is only allowed to enter the market subject to evidence of compliance with a number of safeguards.

In telecommunications, the most prominent example of an *ex ante* competition policy is the effective competitive opportunities (ECO) test developed by the US Government.¹² Incorporated as part of the Federal Communications Commission's power to vet foreign investment in the American telecommunications industry, the ECO test proscribes (or allows with strict conditions) investment in the United States by carriers whose home market does not offer effective opportunities for US carriers to compete in the provision of basic and international services and facilities.

Ex ante competition policies, such as the ECO test, have the advantage of simplicity and some degree of certainty. There are, however, several major problems with this approach. To begin with, investment designed to provide higher quality, lower cost international telecommunications may be prevented, simply because the investor comes from a restricted market (or has some other

¹² The ECO test was introduced in 1995 to widespread condemnation on the part of America's trading partners. Even countries sympathetic to the FCC's objectives were concerned about the breaches of MFN inherent in the policy. While still in force, the ECO test is expected to be reviewed before the agreement on basic telecommunications comes into operation (Reuters, 19 February 1997).

characteristic that invokes the competition policy). This would be a detrimental outcome for both the economy and consumers.

More importantly, an *ex ante* competition policy that is based upon the characteristics of the home market of a potential entrant undermines the MFN principle that is the basis of the multilateral trading system. Service suppliers from one (uncompetitive) market are treated differently from service suppliers from another (competitive) market. As a relatively small economy with a limited ability to secure unilateral market access, Australia has a vested interest in maintaining the MFN principle.

Ex post competition policies

An alternative policy response for a government seeking to prevent a foreign monopoly carrier from engaging in whipsawing and/or one-way bypass is an *ex post* competition policy. This is where the entry of a foreign monopolist is allowed and competition policy only applies in the event of anti-competitive behaviour occurring. In general, this is the policy approach adopted by the Australian Government under its new telecommunications regime.

In introducing the new legislative package for telecommunications, the Australian Government explicitly recognised the potential for foreign monopoly carriers to engage in anti-competitive conduct. Proposed new provisions in both the *Trade Practices Act, 1974* and the new *Telecommunications Act, 1996* are designed to limit this activity through the use of an *ex post* competition policy.

The proposed changes to the *Trade Practices Act, 1974* introduces a new misuse of market power provision based on an 'effects test' to define anti-competitive conduct in telecommunications markets. It enables the ACCC to prosecute a telecommunications operator that:

... engages in anti-competitive conduct, if it has a substantial degree of power in a telecommunications market and takes advantage of that power with the effect, or likely effect, of substantially lessening competition in that or any other telecommunications market (s.151AJ(2) *Trade Practices Act, 1974*).

Both whipsawing and one-way bypass are *prima facie* examples of such conduct. Foreign monopolists are using their dominant position in their home market as a means of reducing competition in the Australian market. This is particularly true of one-way bypass, where a foreign monopolist may use a local affiliate to capture all traffic on a bilateral route. It may be more difficult to prove that whipsawing reduces competition.

The jurisdictional coverage of Australia's competition policy may also need to be addressed. The technical applicability of the new legislation to foreign monopolists engaging in whipsawing or one-way bypass will depend in part upon whether the behaviour is deemed to occur within an Australian

telecommunications market. This is as yet untested and will depend critically on the facts of the case. This is primarily a concern in regard to whipsawing, as the proposed new provisions of the *Trade Practices Act* would *prima facie* apply to the Australian affiliates or partners of foreign monopolists engaged in one-way bypass with fewer jurisdictional concerns.

To ensure that anti-competitive conduct by a foreign monopolist is still captured by Australian law, the proposed *Telecommunications Act, 1996* empowers the Minister to make Rules of Conduct governing dealings between Australian and foreign telecommunications operators, with the aim of preventing 'unacceptable conduct' by an international telecommunications operator. The Act is expressed to have extraterritorial effect, therefore not constraining the ability of the Rules to address matters of concern arising because of activities undertaken in foreign markets.

However, in practice, the Rules will apply to carriers and service providers operating in Australia, rather than their foreign correspondents, because of the legal and practical difficulties of imposing Australian law externally. This may mean, for example, that Australian law will not be able to prosecute a foreign carrier engaging in whipsawing or one-way bypass, but will be able to litigate to prevent Australian-based operators from collaborating in such anti-competitive behaviour.

The exact nature of these rules is yet to be determined, with the Minister for Communications required to give due regard to Australia's international obligations, particularly the outcome of the multilateral negotiations on basic telecommunications. However, in the explanatory memoranda accompanying the relevant amendments it is suggested that:

... the Rules may, for example, require carriers or carriage service providers to use all reasonable endeavours to prevent unacceptable conduct by an international telecommunications operator. The disclosure of information relating to dealings is seen as a potential disincentive, and remedy, for unacceptable conduct (House of Representatives 1996b).

As this quote correctly identifies, a major problem with an *ex post* competition policy is the difficulties associated with accurate identification of anti-competitive conduct. In international telecommunications, this is particularly difficult. Full disclosure of information is therefore an essential requirement for the efficacious operation of the proposed regulatory framework. In particular, it would seem to be a useful requirement of all carriers and carriage service providers that they provide the ACCC with regular information on all correspondent agreements entered into with foreign carriers and with complete data on bilateral traffic flows.

With full information on correspondent agreements, in particular on settlement rates, the ACCC would be able to monitor whether or not a foreign carrier was engaging in whipsawing. Relatively minor deviations in settlement rates between carriers is a matter of little concern. Carriers should be allowed to negotiate settlement rate reductions for high volumes or as a mechanism to stimulate traffic flows. However, in markets where the foreign correspondent is a monopolist and where significant settlement rate deviations are seen to arise, further investigation may be warranted. The significance or otherwise of a rate differential can be determined by reference to differentials on other routes.

With full information on bilateral traffic flows, the ACCC also would be able to monitor individual routes for evidence of one-way bypass. In particular, the ACCC would be able to gauge whether a telecommunications operator in the Australian market was obtaining an unduly large share of inward traffic volumes on a particular bilateral route. To determine whether or not the operator's share was 'unduly' large, the ACCC could use the practice of *proportionate return* as a point of reference.

As discussed in Chapter 4, proportionate return is where a carrier in one market (eg a foreign monopolist) sends traffic to each of the carriers in another market in proportions equivalent to the proportions of incoming traffic it receives from them. In Australia, proportionate return is simply a convention. However, on routes where an Australian telecommunications operator appears to be terminating significantly more traffic than it is originating, further investigation may be warranted. Again, the significance or otherwise of a rate differential can be determined by reference to differentials on other routes.

On routes where the foreign market is not open to Australian international telecommunications operators, the Government could consider enforcement of proportionate return. This would have the consequence of preventing the development of a specialist call termination market, at least on those routes where it was enforced. While this is obviously very much an 'nth best' solution compared with reducing settlement rates and/or allowing two-way bypass, the special nature of the international calls market may leave little practical alternative but to enforce proportionate return as a means of minimising the possibility of whipsawing or one-way bypass.

However, any decision to introduce proportionate return should only be made in the light of a full assessment of its costs and benefits, as well as any viable alternatives. Further work is needed in this area, since proportionate return itself contains anti-competitive elements. At best, it is only desirable in the face of a large number of other constraints in the market for international telecommunications services. Moreover, the possible implications for Australia's

WTO commitment to MFN of implementing proportionate return on selected routes would need to be examined.

As the process of multilateral and unilateral reform gathers pace, fewer of Australia's bilateral routes are likely to have a monopolist at one end. Consequently, the need for regulatory intervention and other measures, such as proportionate return, to counter anti-competitive behaviour would diminish.

5.3 Summary

The importance of the international accounting rate system as a factor maintaining high international call prices is likely to increase as domestic competition intensifies. There has been significant progress made under the WTO to liberalise international telecommunications. In particular, the Basic Telecommunications Agreement commits all developed country participants to providing market access in international services from 1 January 1998. Despite this important breakthrough, many of Australia's fastest growing telecommunications markets will remain closed for the foreseeable future. Further, the reform of the international accounting rate system failed to be included in the Agreement. Therefore, continued unilateral reform appears to be the best option for Australia to pursue. However, unilateral reform opens up opportunities for foreign monopolists to engage in anti-competitive behaviour such as whipsawing and one-way bypass. These problems are best addressed by well-targeted *ex post* competition policies. Consideration could be given to using the practice of proportionate return as a transitory means of checking anti-competitive conduct by foreign monopolists in liberalising markets.

APPENDIX A: DATA ON INTERNATIONAL TRAFFIC, PRICES AND COSTS

Very little data are published on Australian telecommunications traffic flows, prices and costs. The available information has been substantially reduced in recent years. Thus, many numbers in this report had to be estimated. This appendix discusses the sources and generation of the traffic, price, cost and elasticity estimates used in the economic efficiency analysis presented in Chapter 2, and in the offset price analysis presented in Chapter 4. It also examines the sensitivity of the efficiency estimates to variations in the price elasticity of demand and the methodology used to calculate the offset price.

A.1 Traffic

Iain Falshaw of Optus (personal communication) estimated that in 1995–96, Australia’s international call traffic comprised approximately 1 000 million outgoing minutes and 800 million incoming minutes. Using these estimates of international minutes and AUSTEL (1997) market shares for 1995–96, the number of minutes Telstra and Optus carried into and out of Australia in 1995–96 can be calculated. Using AUSTEL (1997) market shares for outgoing international calls for the last three quarters of 1995–96 (market shares for the first quarter are not available) and interpolating the market share for the first quarter to calculate market shares for the whole year, indicates that Telstra carried 63.8 per cent or 638.4 million outgoing international minutes and Optus carried 22.9 per cent or 228.9 million outgoing minutes in 1995–96. AUSTEL (1997) only published market shares for incoming minutes for two quarters in 1995–96. Using these market shares (from October 1995 to March 1996) and interpolating the remaining two quarters to calculate total 1995–96 market shares, indicates that Telstra carried 77.2 per cent or 617.6 million incoming minutes and Optus carried 21.4 per cent or 170.8 million incoming minutes in 1995–96. The remainder of outgoing and incoming international minutes were carried by service providers and callback operators.

Outgoing minutes to individual markets were calculated by multiplying total outgoing minutes by the estimated share of each destinations’ outgoing traffic (obtained from industry sources). However, as indicated above, not all of this traffic was carried by Telstra and Optus. Therefore, it was assumed that 86.7 per

cent of traffic in 1995–96 to each of the top ten destination countries was carried by Telstra and Optus (Table A.1).¹

A.2 Prices

Calculating the average price of an international call across all destination countries or by individual route is difficult. Although Telstra and Optus publish their international peak and off-peak pricing schedules (as well as country specific flexi-plan prices offered by Telstra), they mainly reflect maximum charges by not taking into account temporary and permanent volume discounts commonly available.

Discount schemes are volatile and vary considerably. Volume discounts apply at various levels, including the value of the total account, the value of specific bills and may or may not be specific to international call services (eg Optus provides a discount on the total of the customer's account). Some discount options have a range of rates, while others involve subscription fees (eg Telstra Flexi-plan discounts).

Even if a standard discount could be determined, information to ascertain call profiles and the use of discounts is difficult to obtain. This section describes how these difficulties were dealt with in calculating an average Telstra/Optus price for all outgoing international calls, as well as for individual markets.

Average Telstra/Optus price for all international calls

In an attempt to include the effects of discounts, total revenue from international calls and total outgoing call traffic were used to estimate an average Telstra/Optus price per minute for all international calls.

Telstra's revenue from outgoing and incoming international call markets in 1995–96 has been estimated to be \$1 122 million (BZW Australia 1996). Telstra's revenue from incoming international calls is the settlement rate (the amount Telstra receives from the foreign carrier) for terminating an international call multiplied by the number of incoming calls carried. Personal communication with Iain Falshaw of Optus indicated that the traffic-weighted average settlement rate on outgoing international traffic is approximately 65 cents per minute. While the traffic-weighted average settlement rate on incoming international traffic may not be the same as that on outgoing international traffic, the same settlement rate was assumed to apply on incoming international traffic.

¹ This assumes that service providers have the same distribution of call destinations as Telstra and Optus combined.

The traffic-weighted average settlement rate for Telstra is assumed to be the same as for Optus. This appears reasonable given that published accounting rates (United States and United Kingdom) show only a slight difference between Telstra and Optus. Using 65 cents as the settlement rate, Telstra's total revenue from incoming call minutes in 1995–96 was \$401.44 million ($\0.65×617.6 million). Taking incoming revenue from total revenue leaves revenue from outgoing calls of \$720.56 million. This gives an average price per minute of \$1.129 ($\$720.56 \text{ million} / 638.4 \text{ million}$).

Optus's average price per minute of an international call is assumed to be 5 per cent below Telstra's. This gives an Optus average price per minute of \$1.072 and a total Optus revenue from outgoing calls of \$245.4 million ($\1.072×228.9 million).

The average Telstra/Optus price of an international call was calculated by dividing total Telstra/Optus revenue from outgoing international calls by the number of outgoing international minutes carried by Telstra and Optus. This gives an average price (including all discounts) of \$1.11 per minute for an international call from Australia.

Average Telstra/Optus price for individual markets

Market shares and net revenue estimates for individual markets are not publicly available. Therefore, estimates of average prices for individual markets are based on published Telstra and Optus international pricing schedules. The carriers offer two sets of prices — peak and off-peak (Telstra also offers country specific flexi-plan prices which are not considered in this analysis). However, data on the share of international minutes at each rate, as well as the amount of traffic carried by Telstra and Optus are not available.

To overcome these data deficiencies, one weighted average price for each destination country is estimated (Table A.1). First, Telstra and Optus peak and off-peak prices are weighted (by total Telstra/Optus traffic) to calculate one peak price and one off-peak price for each destination country. Second, one average price for each destination country is calculated by assuming that all residential calls are made at off-peak prices and all business calls are made at peak prices. According to AUSTEL (1995a), the split between residential and business international minutes is about 70/30. Per minute prices are calculated on a four minute average to include the standard 12 cents connection fee which applies to all international calls ($(\text{price per minute} \times 4) + 12 \text{ cents}) / 4$.

A.3 Costs

The long-run marginal cost of carrying an international call in 1995–96 is estimated to be 21.8 cents per minute.

The cost of originating an international call (carrying a call from the caller's handset to the midpoint of the international gateway) is estimated to be 10.9 cents per minute. This estimate assumes that 60 per cent of all outgoing international minutes originate in Sydney or Melbourne. Both Sydney and Melbourne have international gateways, so calls originating in these cities only need to be carried locally to the international gateway. For outgoing minutes carried locally the resource cost of carriage to the international gateway is estimated to be 2.5 cents per minute (IC 1997). The remaining 40 per cent of international minutes are assumed to be carried long-distance to Sydney or Melbourne and then locally to the international gateway. The average long-distance carriage cost is estimated at 7.36 cents per minute (IC 1997). Therefore, the average long-run marginal cost of carrying a call to the international gateway is 5.4 cents per minute (0.6×2.5 cents) + ($0.4 \times (2.5$ cents + 7.36 cents)). The cost of using the international switch is estimated to be, at most, 3 cents per minute. The long-run marginal cost of carrying the call from Australia's international gateway to the midpoint of the international circuit is estimated to be 2.5 cents per minute (BTCE 1993). Therefore, the cost of originating an international call is estimated to be 10.9 cents per minute (5.4 cents + 3 cents + 2.5 cents).

Assuming identical costs in the destination country, the long-run marginal cost of termination is also taken to be 10.9 cents per minute. Therefore, the long-run marginal cost of an international call (origination plus termination) is estimated to be 21.8 cents per minute.

A.4 Price elasticity of demand

The price elasticity of demand for international call minutes with respect to price per minute was drawn from Bewley and Fiebig (1988). They estimate, using Australian data from 1978 to 1983, that the elasticity of demand for an international call minute with respect to the price per minute is -1.2 in the short run and -1.5 in the long run (excluding international calls to New Zealand and Papua New Guinea). Given that international call prices from Australia have fallen substantially since 1983, these elasticity estimates are likely to be too high. Therefore, the lower estimate of -1.2 is used in this paper. The sensitivity of efficiency losses to this estimate are examined below.

Also needed for estimating the offset price in Chapter 4 are cross-price effects of reducing international call prices — the impact of reducing the price of outgoing

international calls on the demand for incoming international calls. If incoming and outgoing international calls are substitutes then a reduction in the price of outgoing international calls would reduce the demand for incoming international calls as consumers could use call-back arrangements. However, if international calls are complements, then a reduction in the price of outgoing international calls would increase the demand for incoming international calls since more outgoing calls could encourage more return calls. The extent to which either of these factors may dominate is not clear. A study of telephone demand between the United States and 17 West European countries found cross-price effects to be statistically insignificant (Acton and Vogelsang 1992). Therefore, there are assumed to be no cross-price effects in this study.

Table A.1: Estimates used to calculate efficiency losses

<i>Country</i>	<i>Weighted average price</i>	<i>Long-run marginal cost</i>	<i>Telstra and Optus outgoing traffic</i>
	\$ per minute	\$ per minute	million minutes
United Kingdom	1.091	0.218	128
United States	1.072	0.218	110
Singapore	1.030	0.218	36
Japan	1.493	0.218	27
Indonesia	1.812	0.218	25
China	2.376	0.218	22
All countries	1.114	0.218	867

Notes: Weighted average prices for individual countries are calculated on the basis of published tariff schedules and therefore do not include discounts. The average price for all countries is calculated using total revenue and therefore includes all discounts.

Source: Optus and Telstra pricing schedules and IC estimates.

A.5 Sensitivity of efficiency loss estimates to alternative elasticity assumptions

The possibility of different reactions of quantity to price changes is considered by examining how sensitive the estimated efficiency losses presented in Chapter 2 are to the estimated price elasticity of demand. The efficiency losses associated with Telstra and Optus pricing international calls above their long-run marginal cost of provision are estimated for alternative values of the price elasticity of demand for international calls. Table A.2 reports the efficiency losses when the

base case price elasticity of demand for international calls (-1.2) is varied by plus and minus 25 per cent and plus and minus 50 per cent.

Table A.2: Sensitivity of efficiency loss estimates to variations in the price elasticity of demand for international minutes

<i>Country</i>	<i>Efficiency losses, \$ million</i>				
	<i>minus 50%</i>	<i>minus 25%</i>	<i>base case</i>	<i>plus 25%</i>	<i>plus 50%</i>
	<i>-0.6</i>	<i>-0.9</i>	<i>-1.2</i>	<i>-1.5</i>	<i>-1.8</i>
United Kingdom	27	40	54	67	81
United States	22	34	45	56	67
Singapore	7	10	14	17	21
Japan	9	13	17	22	26
Indonesia	11	16	21	26	32
China	13	20	26	33	39
All countries	188	281	375	469	563

The sensitivity analysis indicates that the estimated efficiency losses associated with Telstra and Optus pricing international calls above their long-run marginal cost of provision are sensitive to the price elasticity of demand for international call minutes. The variation in the efficiency losses are linear with respect to the variation in the elasticity estimate. For example, when the elasticity estimate is increased by 25 per cent the efficiency losses also increase by 25 per cent.

The sensitivity analysis indicates that even if the demand for international call minutes was relatively inelastic (-0.6), the efficiency losses associated with Telstra and Optus pricing international calls above their long-run marginal cost of provision would still be substantial. Similarly, the more elastic the demand for international call minutes with respect to the price per minute, the larger the efficiency losses associated with pricing above marginal cost.

A.6 Calculation of offset price

The offset price in Chapter 4 is calculated by finding the price, p^* , which maximises the number of minutes demanded, O^* , subject to the constraint that total revenue equals total cost. This problem was solved algebraically by finding p^* to maximise:

$$O^* = O + \left\{ \left[\frac{(p^* - p)}{p} \right] \times \eta \right\} \times O$$

subject to the constraint:

$$(O^* \times p^*) - \{RC(O^* + I) + S(O^* - I)\} = 0$$

where:

- p^* is the optimal price solution;
- O^* is the quantity of outgoing minutes demanded at price p^* ;
- p is the average Telstra/Optus 1995–96 price of an outgoing call;
- O is the 1995–96 quantity of outgoing minutes demanded;
- η is the estimated price elasticity of demand;
- RC is the estimated long-run marginal cost, or the resource cost, of an outgoing call; and
- I is the estimated 1995–96 quantity of incoming minutes demanded.

The problem was solved using Microsoft Excel 5.0 Solver.

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