

Access Price Benchmarking

A study produced for the
Asia Pacific Carriers' Coalition
(APCC)

by

Teligen

December 2006

Teligen, Harris Interactive UK

Watermans Park
Brentford TW8 0BB
United Kingdom

Contact: Halvor Sannæs, Director Tariff Services

Phone: +44 208 263 5440

Fax: +44 208 263 5222

email: halvors@teligen.com

web: www.teligen.com

Table of contents

1	EXECUTIVE SUMMARY	3
2	INTRODUCTION	4
2.1	Scope of Study	5
2.2	Data Coverage	6
3	LEASED LINE ACCESS	8
3.1	Coverage	8
3.2	Simple and Groomed circuits	9
3.3	Comparison across economies	10
4	ETHERNET ACCESS	28
4.1	Coverage	28
4.2	Comparing across economies	29
5	DSL ACCESS	32
6	LEASED LINES VS. ETHERNET	33
7	CONCLUSION	34

This study has been commissioned to Teligen by the Asia Pacific Carriers' Coalition (APCC) in September / October 2006.
The results have been produced on the basis of information provided by the APCC members.

Copyright APCC 2006

The APCC can be contacted on secretary@asiapacificcarriers.org

1 Executive Summary

The last APCC Access Benchmarking report was released in 2003 on Leased Lines. In this 2006 exercise, we have considerably expanded the scope of study to include additional economies¹ and access types². The number of APCC members participating in this 2006 study has also increased.

We highlight some of the key trends –

- Leased Lines continue to be the dominant means of access for the corporate market.
- Since 2003, there has been an overall reduction (in % terms) in wholesale Leased Line prices although in a few economies, prices have actually increased.
- Analysis also shows that high installation charges can have a material impact on the total cost of provisioning Leased Lines.
- When benchmarked against OECD Leased Line data, 75% of the Asia Pacific economies covered in this study fall within the OECD average.
- India and Taiwan consistently stand out as having the lowest prices for both lower (<2 Mb/s) and higher (>2 Mb/s) speed Leased Line circuits. Lower speed circuits are significantly more expensive in Malaysia and Indonesia. Due to wider price variations for higher speed circuits, no single economy stands out as being the most expensive.
- Demand for Ethernet access technologies is growing and has shown to be consistently less expensive than Leased Lines.
- DSL take up however, has not been particularly significant for any meaningful analysis to be conducted at this stage.
- Considerable variations in wholesale prices may still exist in economies where regulation is more developed. It appears that the level of competition between domestic players has a more influential effect.
- Smallest price variations are experienced in Indonesia, followed by South Korea and Taiwan; Malaysia and India have the widest price ranges.

¹ Economies covered in this 2006 report are Australia, Hong Kong, Singapore, South Korea, Malaysia, Taiwan, Thailand, Indonesia, India, China, New Zealand and Philippines

² Leased Lines, Ethernet and Digital Subscriber Lines (DSL)

2 Introduction

Teligen was commissioned by a group of international carriers in Asia during 2003 to benchmark the prices of domestic leased line access circuits (“Access Circuits”) in selected economies within the region. The Asia Pacific Carriers’ Coalition (“APCC”), representing those same and additional carriers, has now commissioned Teligen to provide an update to the 2003 study and, at the same time, to expand the scope of the study.

Access Circuits are an essential element in the provisioning of international leased circuit services as these domestic circuits are the means by which end users are connected to international networks. Consequently, the cost of acquiring Access Circuits is unavoidable for international operators who provide these international services. Although Access Circuits normally represent only a small proportion of the length of an end-to-end international circuit, the cost of Access Circuits is generally disproportionately high in comparison to the cost of the international network segment of a circuit. As a result, the prices that domestic Access Circuit providers charge international operators have a very significant bearing on those international operators’ costs and, in turn, the prices paid by end users for international leased circuit services. While there are valid reasons for the disproportionate relationship between the cost of domestic and international segment circuit costs, the basis for the level of disparity in the prices charged for these circuits in some economies is not always apparent.

The purpose of this report is to set out comparative Access Circuit prices for a range of circuit types and capacities across selected economies in the Asia Pacific region. The aim in making this comparison is provide an indication of the level and range of Access Circuit prices both within and between regional economies.

This report does not present individual prices offered in markets in each economy, but are composite prices based on price inputs from contributing APCC members. These composite prices have only been presented where three or more price inputs have been provided for the same type of service in any particular economy.

It had been intended to increase the scope of the current study coverage to include Ethernet access and Digital Subscriber Line (“DSL”) circuits as well as traditional leased line circuits. Due to insufficiency of available DSL price data the study does not comment on DSL pricing, but does provide some observations as to demand for DSL circuits.

2.1 Scope of Study

The objective of the study was to assess Access Circuit prices charged by domestic operators to international carriers in the following 12 economies:

- Australia
- China
- Hong Kong
- India
- Indonesia
- Malaysia
- New Zealand
- Philippines
- Singapore
- South Korea
- Taiwan
- Thailand

Price data was provided by up to eight international carriers for each economy. The number of contributing carriers was dependent upon their individual presence in each economy. In some cases, contributing carriers provided inputs based on prices of several domestic operators.

The price data presented incorporates a broad range of services and bitrates acquired by international carriers for the following Access Circuits:

2.1.1 Leased Lines

Traditional leased line (“Leased Lines”) access across the following speeds –

- 64 kb/s
- 256 kb/s
- 512 kb/s
- 1536 kb/s
- 1984 kb/s
- 2048 kb/s
- 34 Mb/s
- 45 Mb/s
- 155 Mb/s

In most cases price inputs were for circuit lengths of both 2 km and 5 km in order to provide an indication of any distance related price sensitivity. Generally the price inputs were in respect of the capital or major cities of an economy.

Where grooming, i.e. multiplexing of low speed circuits onto a large pipe, is available (or used), then associated price inputs have been reported as well.

2.1.2 Ethernet

Access Circuits provided for direct connection to or between Ethernet networks are reported for a range of speeds, the most important being:

- 2 Mb/s
- 10 Mb/s
- 100 Mb/s
- 1000 Mb/s is also reported for some countries

Intermediate speeds were also reported by some carriers, but the availability and/or use of these intermediate speed circuits lacked uniformity.

Again, price inputs in some economies vary with circuit length, so both 2 km and 5 km circuits were considered.

2.1.3 Digital Subscriber Line (DSL)

Given the increase in end user access using DSL services, the study sought to identify comparative business use price data for DSL services. However, the availability of comparable price inputs between economies was low and it has proven difficult to obtain sufficient data to establish a benchmark with an acceptable degree of confidence. The speeds reported in the study range within:

- 256 / 128 kb/s at the low end
- 2048 / 512 kb/s or similar as the medium
- 6-12,000 kb/s at the high end, although only for some countries

Distance is not an issue with DSL. However speeds do vary considerably - even for the same download speed several different upload speeds may be used by different providers.

2.2 Data Coverage

The price data used in this report has been provided by participating APCC members. This price data reflects the actual prices experienced at wholesale levels of the international carriers in the economies for which these carriers have provided inputs, rather than simply being extracted from published pricelists of domestic operators.

As the availability of data varies by economy and service it has not been possible to provide a full overview of price data for all services in each economy. Initial assessments of the study data provided by contributing carriers gave the following results:

Table 1: Sufficient data available

	Leased Line	Ethernet	DSL
Australia	Yes	Yes	No
China	Yes	No	No
Hong Kong	Yes	Yes	No
India	Yes	Yes	No
Indonesia	Yes	No	No
Malaysia	Yes	No	No
New Zealand	Yes	Yes	No
Phillipines	Yes	No	No
Singapore	Yes	Yes	No
South Korea	Yes	Yes	No
Taiwan	Yes	Yes	No
Thailand	Yes	No	No

“Sufficient data” means three or more data points reported by international carriers for an economy and service. It was considered that fewer than three data points would jeopardise the anonymity and credibility of the data. Even though economies are included on this basis, there may still be gaps in the data for specific circuit speeds.

This analysis and assessment led to the decision by APCC not to pursue DSL price benchmarking at this time, and to only continue the study and report for Leased Lines and Ethernet access in those economies where sufficient data is available.

3 Leased Line Access

The 2003 report focussed entirely on Leased Line access and was somewhat narrower in terms of economies covered³, but in other respects was quite similar to this study. Six additional economies have been included in this study – China, India, Indonesia, New Zealand, Philippines and Thailand. Japan was not included because of price inconsistencies with other economies in the study.

3.1 Coverage

All 12 economies were covered for Leased Line price benchmarking. The availability of price data for each economy varies, as does the availability of circuits in terms of speeds. The following speeds were used as the base services:

- 64 kb/s
- 256 kb/s
- 512 kb/s
- 1,536 kb/s
- 1,984 kb/s
- 2,048 kb/s
- 34 Mb/s
- 45 Mb/s
- 155 Mb/s

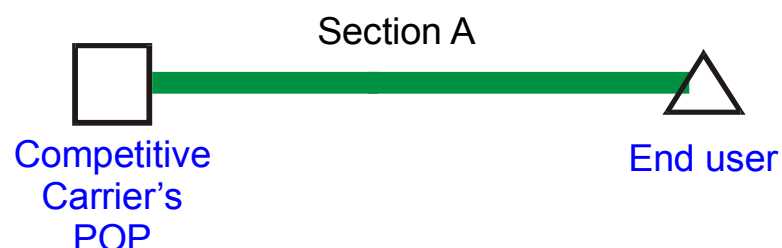
Prices are reported for 2 km and 5 km circuit lengths. Many domestic operators charge a single price irrespective of distance across this range of local circuit distances. In some instances, contributing carriers have reported prices for 2 km circuits but not 5 km circuits, or vice versa. Where the price inputs from other contributors clearly suggest that prices are uniform for the two distances, if a contributing carrier did not provide prices for both distances then the same price is used for both.

Where domestic operators apply different prices for different areas of the country, e.g. there is a price difference between major cities and other areas; the price for major cities has been used.

³ The six economies covered in the 2003 study were Australia, Hong Kong, Singapore, South Korea, Malaysia and Taiwan

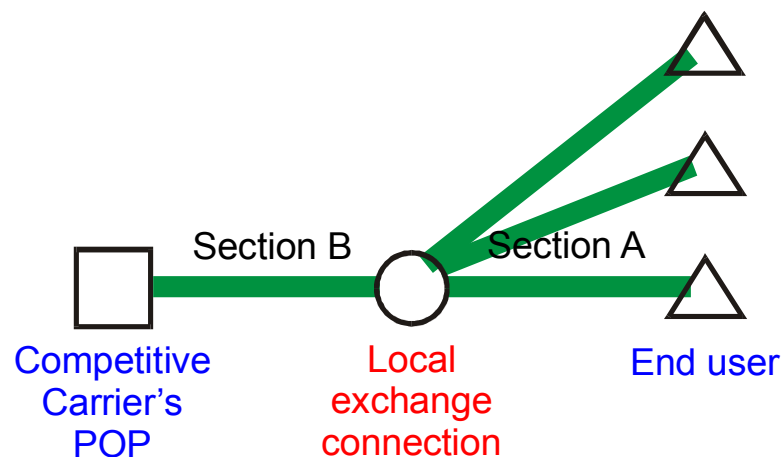
3.2 Simple and Groomed circuits

A simple Leased Line will connect a customer premises to an international carrier's Point-Of-Presence (POP) as a single, direct circuit.



Circuits of any bitrate can be realised this way.

However, some domestic operators also offer an alternative to basic point to point access circuits by employing "Grooming" techniques. This means that several lower speed circuits (Section A) that go through the same local exchange connection of a domestic network can be multiplexed into a higher speed circuit (Section B) connecting to an international operator's POP.



The sum of bitrates of Section A circuits must be lower than the bitrate of Section B. Normally utilisation of up to 80% of Section B's bitrate can be realised. Where multiplexing is offered by the domestic operator, this will generally incur a separate grooming charge.

The benefit of grooming is that it should enable cost reductions compared to the separate routing of all the low speed circuits through a domestic network.

From the submissions of contributing carriers, grooming circuits are available in all the study economies except India, but is most widely used in Australia, Hong Kong, New Zealand, Singapore and Taiwan.

3.3 Comparison across economies

This section summarises the key findings from benchmarking the monthly rental prices (excluding and including installation charges) of Leased Line access across the 12 economies being studied. Comparisons against 2003 prices and OECD prices have also been made.

Detailed information and further analysis on individual economies is provided in Appendix A (not published).

3.3.1 Monthly Rental

To facilitate price comparison with the data from the 2003 report, the economies covered in this current study have been segregated into two categories - those covered in the 2003 report and the additional economies.

Table 3.3.1 2 km circuit prices 2006, simple circuits

	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	161	117	135	348	178	86
256 kb/s	406	198	260	900	441	110
512 kb/s	487	248	367	986	728	110
1536 kb/s	760	264	595	1,391	1,019	304
1984 kb/s	606		773		1,097	307
2048 kb/s	411	469	786	1,804	832	305
34 Mb/s	2,609		4,461		3,372	
45 Mb/s	2,652	3,206	4,609	6,096	4,736	1,376
155 Mb/s	6,059	5,787	8,632		9,959	2,499
	China	India	Indonesia	New Zealand	Phillipines	Thailand
64 kb/s	188	44	805		223	116
256 kb/s	462	70	1,222		364	267
512 kb/s	593	93	1,617		473	439
1536 kb/s			2,349		635	879
1984 kb/s	756	51			632	
2048 kb/s	950	87	2,507	772	898	1,028
34 Mb/s	2,354					4,427
45 Mb/s	4,267	1,320			4,380	6,434
155 Mb/s	8,692	3,220				10,616

Prices are simple averages of monthly rental across the available data, in US\$.

Table 3.3.1c 2 km circuit prices 2006, groomed circuits

	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	176	151			165	92
256 kb/s	314	305			377	117
512 kb/s	366	385			566	117
1536 kb/s	542	477			1,105	
1984 kb/s	598				1,221	
2048 kb/s					548	
34 Mb/s					2,839	
45 Mb/s					3,132	
155 Mb/s						
	China	India	Indonesia	New Zealand	Phillipines	Thailand
64 kb/s				281		
256 kb/s				479		
512 kb/s				559		
1536 kb/s				921		
1984 kb/s				974		
2048 kb/s						
34 Mb/s						
45 Mb/s						
155 Mb/s						

Prices are simple averages of monthly rental across the available data, in US\$.

The graphs below show the monthly rental for a 64 kb/s, 2 Mb/s, 45 Mb/s and 155 Mb/s simple circuits across all the economies covered. These graphs highlight that monthly rental -

- for lower circuit speeds (64kb/s, 2mb/s) are significantly higher in Indonesia and Malaysia compared to the other economies;
- for Leased Line access in India and Taiwan are consistently less expensive than the other economies for all speeds.

Figure 3.3.1a Monthly Rental, simple circuit, 64 kb/s

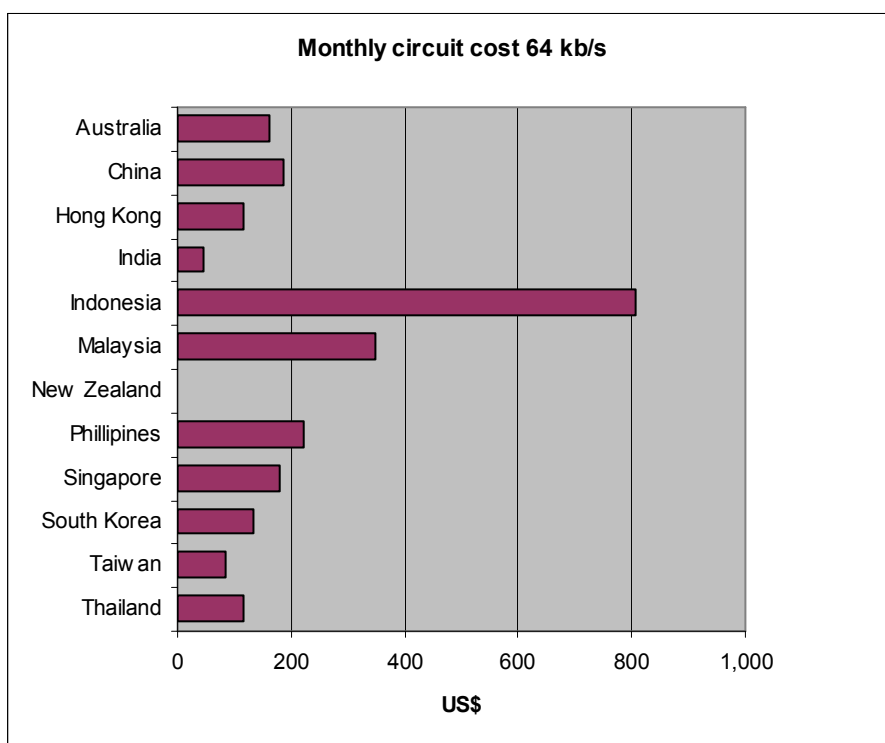


Figure 3.3.1b Monthly Rental, simple circuit, 2 Mb/s

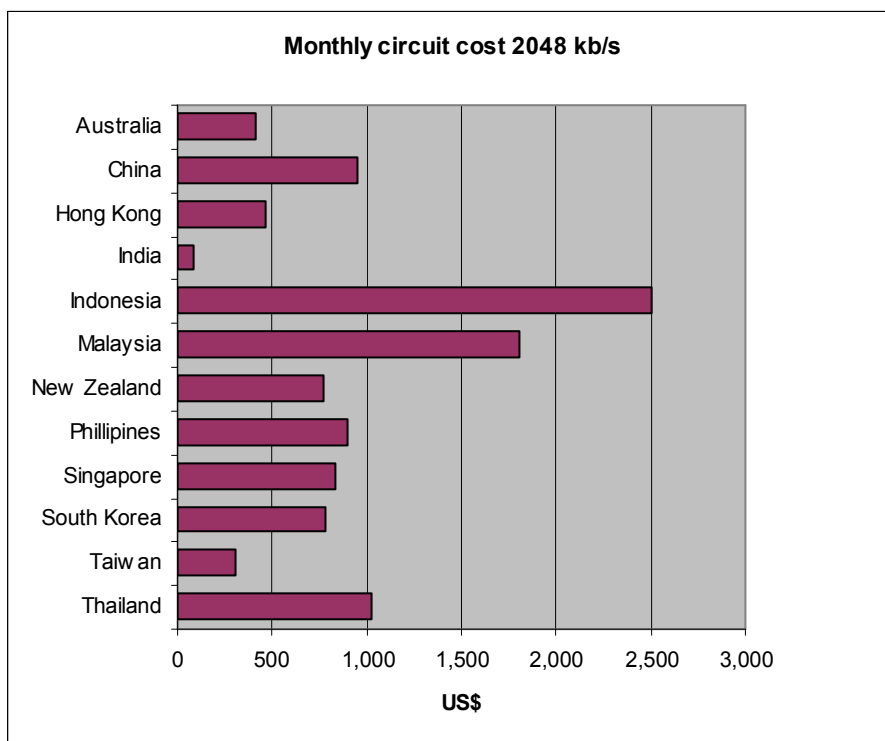


Figure 3.3.1c Monthly Rental, simple circuit, 45 Mb/s

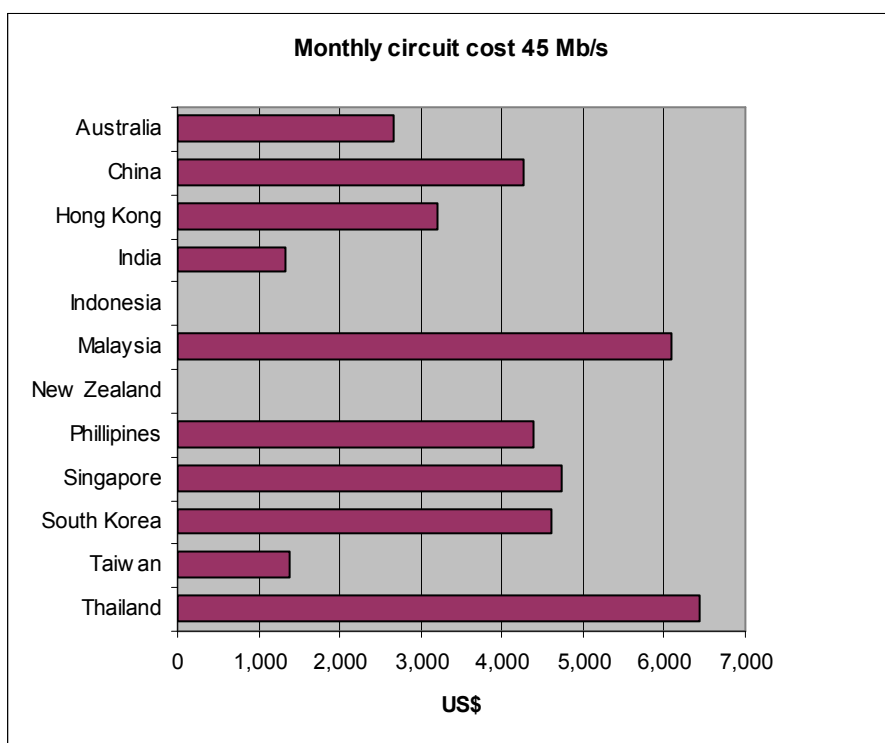
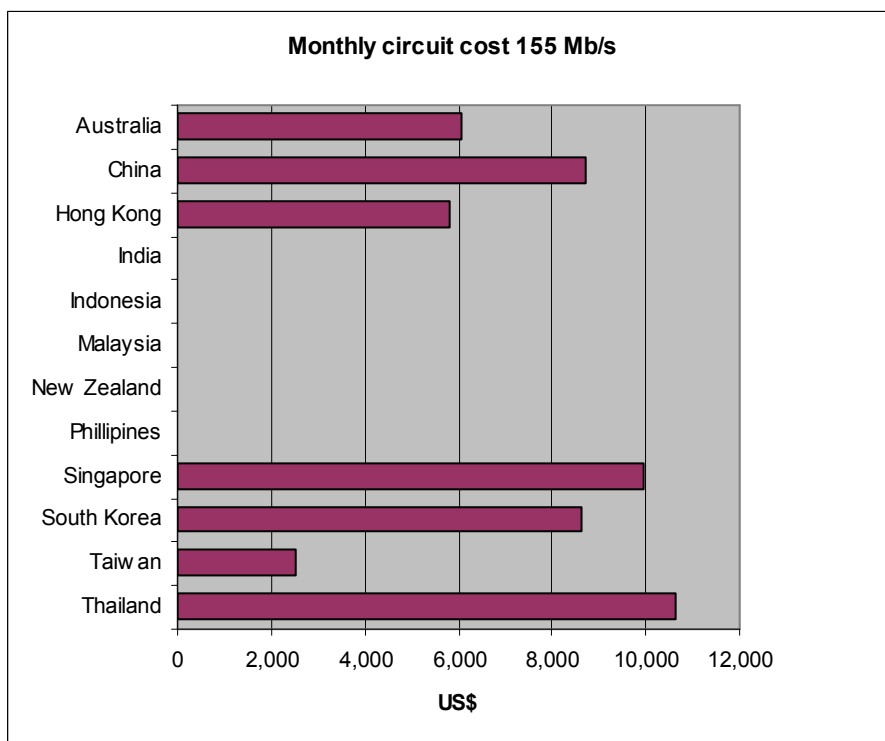


Figure 3.3.1d Monthly Rental, simple circuit, 155 Mb/s



3.3.2 Comparison with 2003 prices

The table below compares 2006 price data for simple circuits with similar data from 2003. The 2003 data has been taken directly from the results tables in the 2003 report.

Table 3.3.2a Price change 2003 – 2006 for simple 2 km circuits

	Australia		Hong Kong		South Korea	
	2003	2006	2003	2006	2003	2006
64 kb/s	225	161	308	117	108	135
256 kb/s	469	406	641	198	227	260
512 kb/s	527	487	756	248	291	367
1536 kb/s	611	760	962	264	535	595
1984 kb/s	866	606	1,641	-		773
2048 kb/s	349	411	1,421	469	648	786
34 Mb/s		2,609				4,461
45 Mb/s	3,490	2,652	7,520	3,206	4,862	4,609
155 Mb/s	8,724	6,059	13,335	5,787	9,235	8,632
	Malaysia		Singapore		Taiwan	
	2003	2006	2003	2006	2003	2006
64 kb/s	236	348	171	178	112	86
256 kb/s	588	900	637	441	134	110
512 kb/s	629	986	949	728	134	110
1536 kb/s	421	1,391	1,832	1,019	369	304
1984 kb/s	423		2,230	1,097	369	307
2048 kb/s	1,129	1,804	836	832	369	305
34 Mb/s				3,372		
45 Mb/s	4,754	6,096	5,013	4,736	1,656	1,376
155 Mb/s	6,585		11,419	9,959	3,095	2,499

Prices are simple averages of monthly rental across the available data, in US\$.

For comparison, the percentage price changes between 2003 and 2006 are:

Table 3.3.2b Price change for 2 km circuits

Simple channel	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	-28%	-62%	24%	48%	5%	-23%
256 kb/s	-13%	-69%	15%	53%	-31%	-18%
512 kb/s	-8%	-67%	26%	57%	-23%	-18%
1536 kb/s	24%	-73%	11%	230%	-44%	-18%
1984 kb/s	-30%				-51%	-17%
2048 kb/s	18%	-67%	21%	60%	-1%	-17%
34 Mb/s						
45 Mb/s	-24%	-57%	-5%	28%	-6%	-17%
155 Mb/s	-31%	-57%	-7%		-13%	-19%
Average	-11%	-65%	12%	79%	-20%	-18%

It is worth noting that the 2003 study was focussing on the incumbent operator in each economy, while this study covers several providers in each economy. Part of the price changes seen in some economies may come from the inclusion of more operators' prices rather than a price change by the incumbent operator.

Figure 3.3.2 Average price changes for 2 km access circuits, monthly rental only

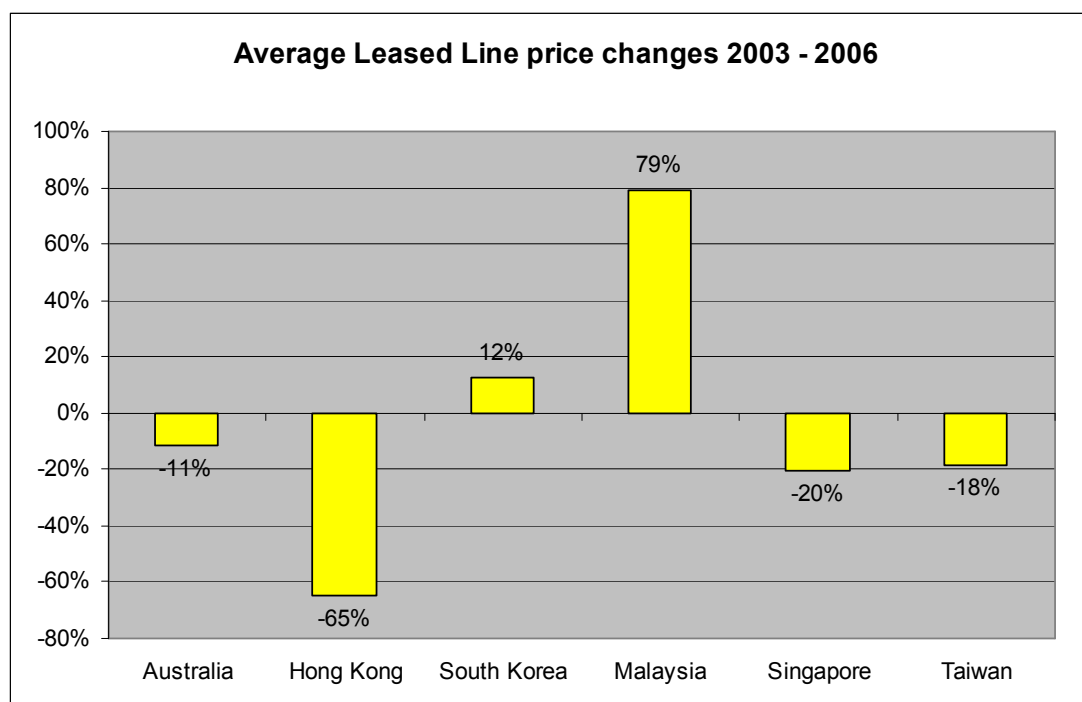


Figure 3.3.2 above shows that there have been price increases in South Korea and Malaysia. Reasons for these price increases may be:

- South Korea was generally one of the least expensive economies in the 2003 survey. A movement in exchange rate against the US Dollar of about 25% over the three year period also impacts in this comparison. Without this exchange rate movement a slight decrease in price would be seen
- For Malaysia there is a significant increase in the prices reported.. The least expensive prices reported are at a similar level to the 2003 average.

With the exception of 2 Mb/s circuits in Singapore, price reductions for the other economies appear to be of similar orders of magnitude

For further comments on the 2006 data see the individual economy summaries in Appendix A.

3.3.3 Monthly Cost including Installation Charge

The results in sections 3.3.1 and 3.3.2 only include the monthly rental charges for a 2km circuit. As associated circuit installation charges are both essential and significant, it is also necessary to compare price data that incorporates both the monthly rental and installation costs. Such analysis is set out below. Prices are per month, using 12 month contracts as the basis to determine the price, i.e. the installation charge is divided by 12.

Table 3.3.3a 2 km circuit prices with installation, 2006, simple circuits

	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	276	124	140	387	204	121
256 kb/s	524	206	273	1,055	496	153
512 kb/s	605	256	380	1,140	787	153
1536 kb/s	878	272	603	1,546	1,079	348
1984 kb/s	719		779		1,158	347
2048 kb/s	553	485	799	1,895	931	346
34 Mb/s	3,236		4,518		3,896	
45 Mb/s	3,227	3,302	4,695	6,553	5,497	1,462
155 Mb/s	7,217	5,878	8,689		11,376	2,604
	China	India	Indonesia	New Zealand	Phillipines	Thailand
64 kb/s	458	198	891		251	138
256 kb/s	730	224	1,307		392	293
512 kb/s	861	246	1,703		501	473
1536 kb/s			2,434		663	920
1984 kb/s	1,221	180			657	
2048 kb/s	1,285	235	2,593	837	931	1,069
34 Mb/s	2,998					4,455
45 Mb/s	4,880	1,665			4,594	6,479
155 Mb/s	9,409	3,666				10,660

Prices are simple averages of monthly rental plus 1/12th of the installation, in US\$.

Table 3.3.3b 2 km circuit prices with installation, 2006, groomed circuits

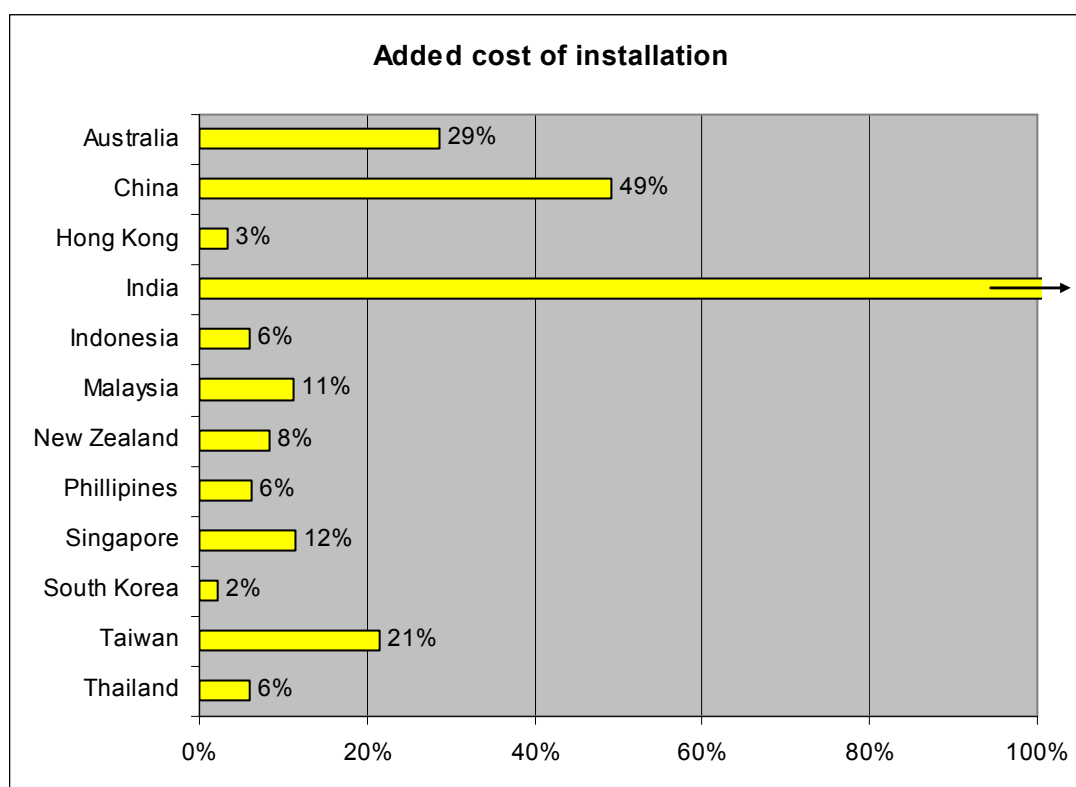
	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	260	161			192	141
256 kb/s	398	315			434	167
512 kb/s	449	396			624	167
1536 kb/s	626	494			1,162	
1984 kb/s	682				1,279	
2048 kb/s					588	
34 Mb/s					3,188	
45 Mb/s					3,545	
155 Mb/s						
	China	India	Indonesia	New Zealand	Phillipines	Thailand
64 kb/s				306		
256 kb/s				552		
512 kb/s				634		
1536 kb/s				1,005		
1984 kb/s				1,063		
2048 kb/s						
34 Mb/s						
45 Mb/s						
155 Mb/s						

Prices are simple averages of monthly rental plus 1/12th of the installation, in US\$.

The cost of installation as a proportion of the annual rental charge is shown in figure 3.3.3a below - as an average across all bitrates. Three economies clearly have high installation costs relative to recurring charges, at over 25% of the annual rental: Australia, China and India. The lowest relative installation costs are found in Hong Kong and South Korea.

The following graphs below show the monthly cost including a 1/12th portion of the installation charge for 64 kb/s, 2 Mb/s, 45 Mb/s and 155 Mb/s circuits across all economies covered. Compared with the standalone monthly rental charge graphs in section 3.3.1, the inclusion of the comparatively high installation charges in India and China changes their positions significantly.

Figure 3.3.3a Installation Charge relative to annual Rental



Please note: The graph has been truncated at 100%. The value for India is 171%.

Figure 3.3.3b Monthly Rental with Installation Charge, 2km, simple circuit, 64 kb/s

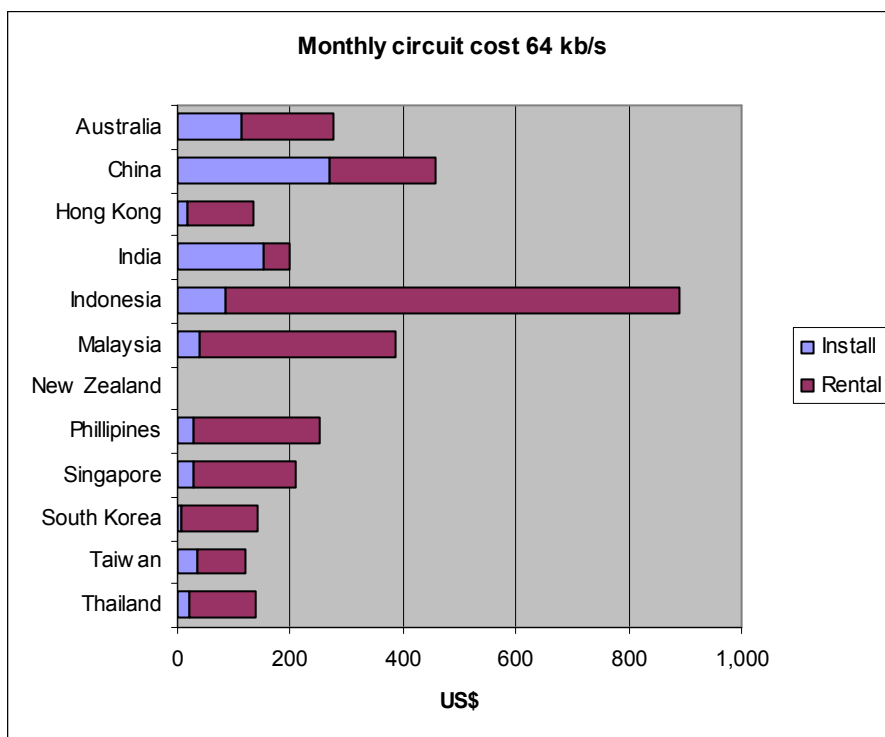


Figure 3.3.3c Monthly Rental with Installation Charge, 2km, simple circuit, 2 Mb/s

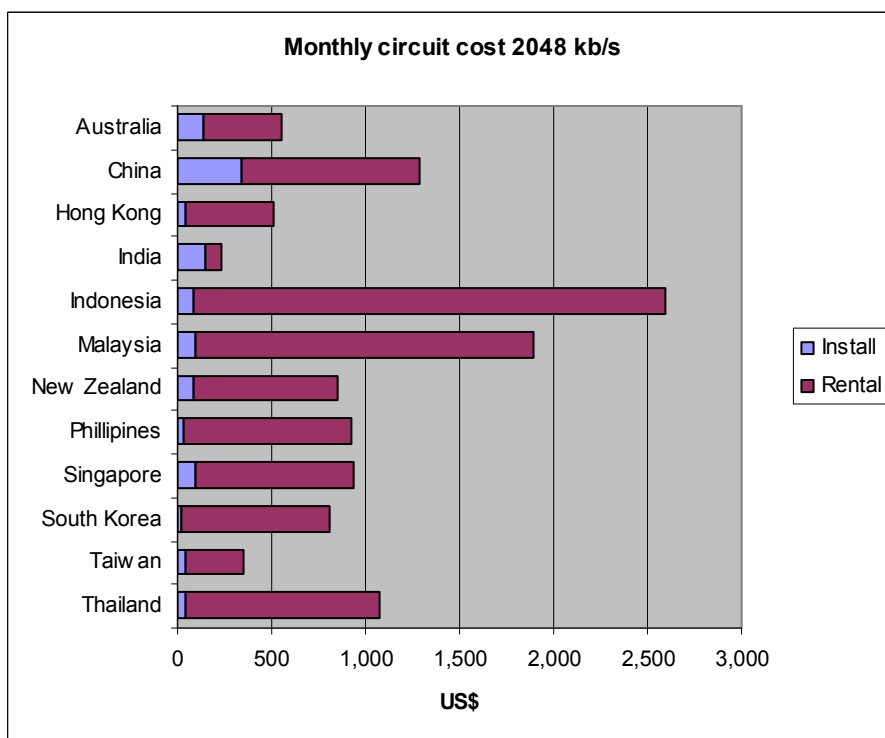


Figure 3.3.3d Monthly Rental with Installation Charge, 2km, simple circuit, 45 Mb/s

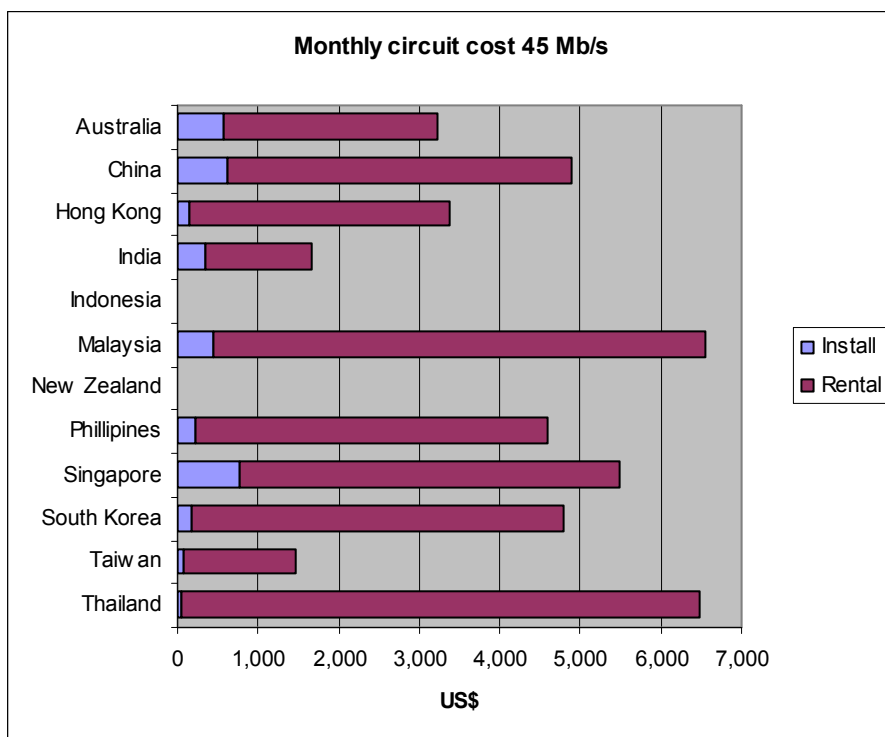
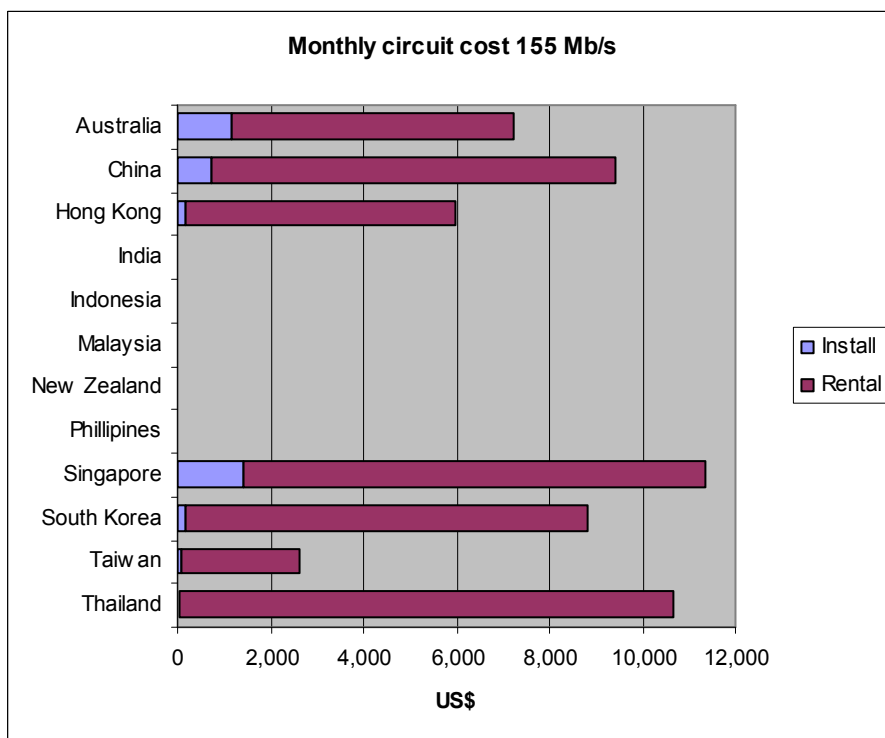


Figure 3.3.3e Monthly Rental with Installation Charge, 2km, simple circuit, 155 Mb/s



3.3.4 Comparison with 2003 prices including installation charges

The tables below compare monthly rental costs for simple circuits in 2006 and 2003 - including a monthly installation charge element of 1/12th of the installation charge.

The 2003 data below is taken directly from the results tables produced in the previous study.

Table 3.3.4a Monthly cost for 2 km, simple circuits

	Australia		Hong Kong		South Korea	
	2003	2006	2003	2006	2003	2006
64 kb/s	348	276	349	124	111	140
256 kb/s	592	524	684	206	241	273
512 kb/s	651	605	799	256	301	380
1536 kb/s	702	878	1,026	272	549	603
1984 kb/s	1,011	719	1,709	-	-	779
2048 kb/s	653	553	1,485	485	658	799
34 Mb/s		3,236				4,518
45 Mb/s	4,969	3,227	8,188	3,302	4,954	4,695
155 Mb/s	11,452	7,217	14,537	5,878	9,303	8,689
	Malaysia		Singapore		Taiwan	
	2003	2006	2003	2006	2003	2006
64 kb/s	274	387	199	204	144	121
256 kb/s	676	1,055	708	496	165	153
512 kb/s	717	1,140	1,020	787	165	153
1536 kb/s	509	1,546	1,903	1,079	393	348
1984 kb/s	511		2,301	1,158	405	347
2048 kb/s	1,217	1,895	931	931	411	346
34 Mb/s				3,896		
45 Mb/s	5,193	6,553	5,676	5,497	1,729	1,462
155 Mb/s	7,024		12,651	11,376	3,204	2,604

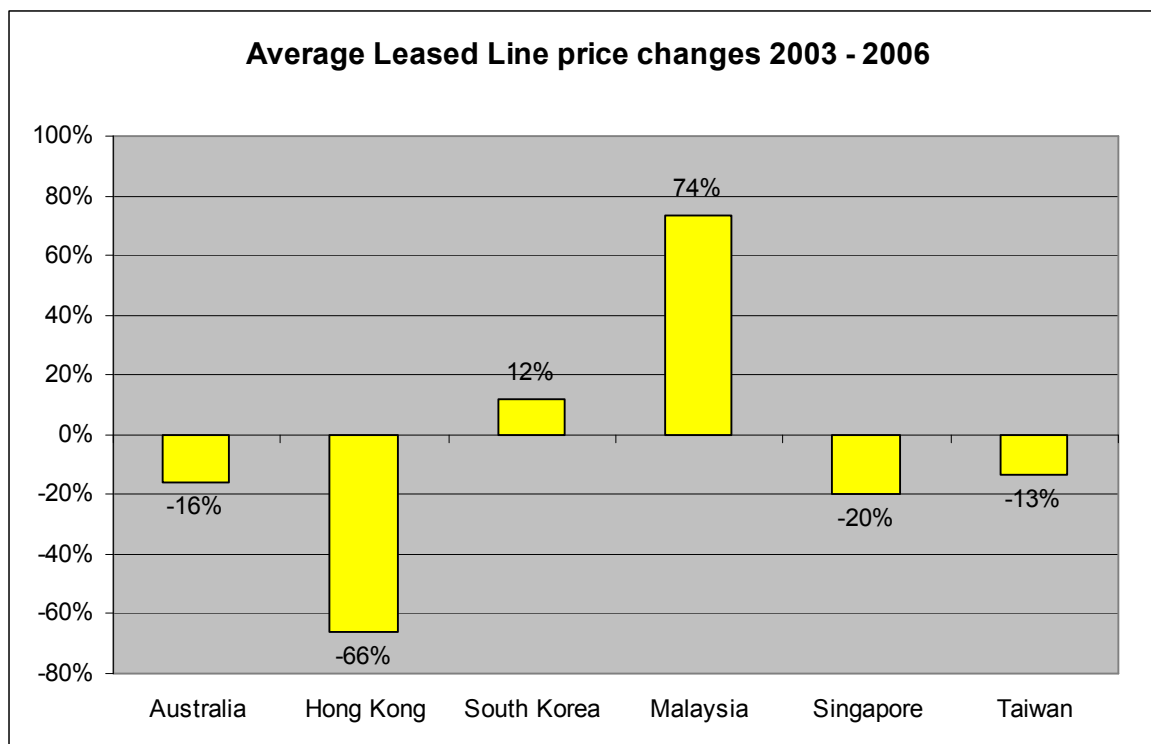
Prices are simple averages of monthly rental plus 1/12th of the installation charge, in US\$.

For comparison, the price changes in percentage terms from 2003 to 2006 are:

Table 3.3.4b Price change for 2 km circuits

Simple channel	Australia	Hong Kong	South Korea	Malaysia	Singapore	Taiwan
64 kb/s	-21%	-65%	26%	41%	2%	-16%
256 kb/s	-12%	-70%	13%	56%	-30%	-7%
512 kb/s	-7%	-68%	26%	59%	-23%	-7%
1536 kb/s	25%	-73%	10%	204%	-43%	-11%
1984 kb/s	-29%				-50%	-14%
2048 kb/s	-15%	-67%	21%	56%	0%	-16%
34 Mb/s						
45 Mb/s	-35%	-60%	-5%	26%	-3%	-15%
155 Mb/s	-37%	-60%	-7%		-10%	-19%
Average	-16%	-66%	12%	74%	-20%	-13%

Figure 3.3.4 Average price changes for 2 km access circuits including Installation



The inclusion of installation charge does not alter the positions shown in section 3.3.2 significantly. The comments about South Korea and Malaysia still apply.

For further comments on the 2006 data see the individual economy summaries in Appendix A.

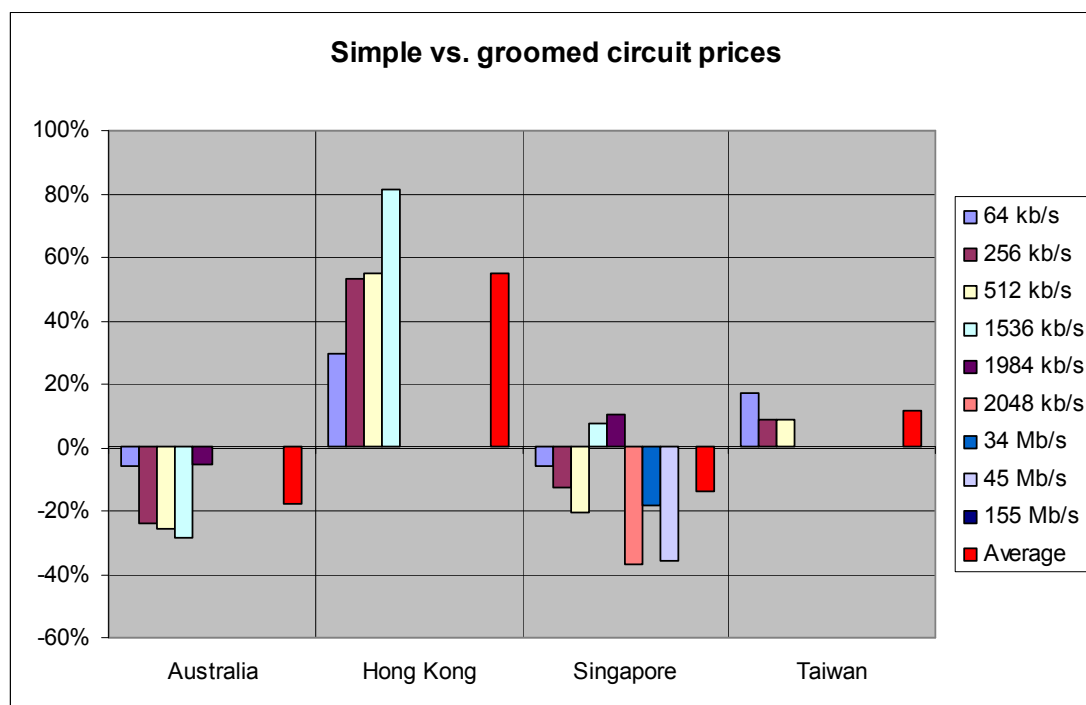
3.3.5 Comparing Simple and Groomed circuits

Prices for groomed circuits are provided for some economies. While such services appear to be offered in other economies as well, there has not been enough data to meet the criteria for inclusion in the study.

The graph below shows the relationship between the average prices for 2 km simple and groomed circuits. A positive relationship means that the groomed circuit is more expensive than a simple circuit, and a negative relationship means that the groomed circuit is less expensive than a simple circuit.

Installation charges are included in the cost data used in the graph below.

Figure 3.3.5 Price relationship simple vs. groomed circuits



The figure shows that for Australia and Singapore the groomed circuits will generally be less expensive than the simple circuits, while in Hong Kong and Taiwan the situation is opposite.

3.3.6 Price range analysis

This report shows the averages of individual inputs provided by the international carriers participating in the study, with higher and lower than average inputs by contributor, economy and circuit speed.

Summaries of the input ranges for selected speeds across all economies are shown below. Please note that these graphs merely indicate the position of the averages relative to the lowest and highest inputs received.

Figure 3.3.6a Price range for 64 kb/s

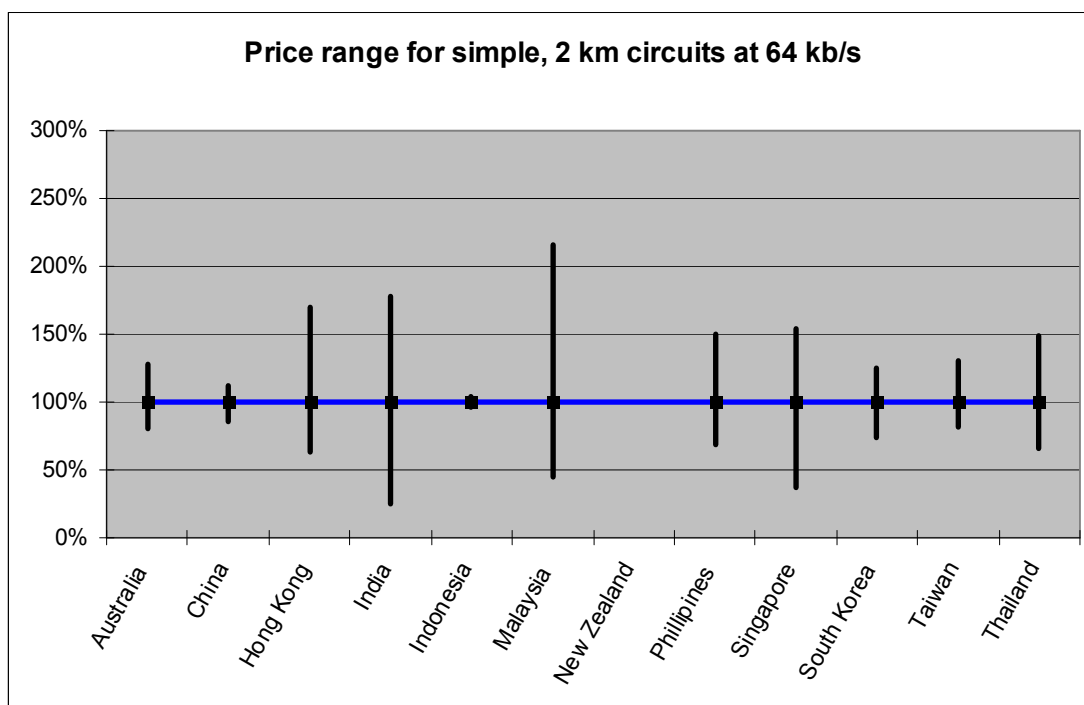


Figure 3.3.6b Price range for 256 kb/s

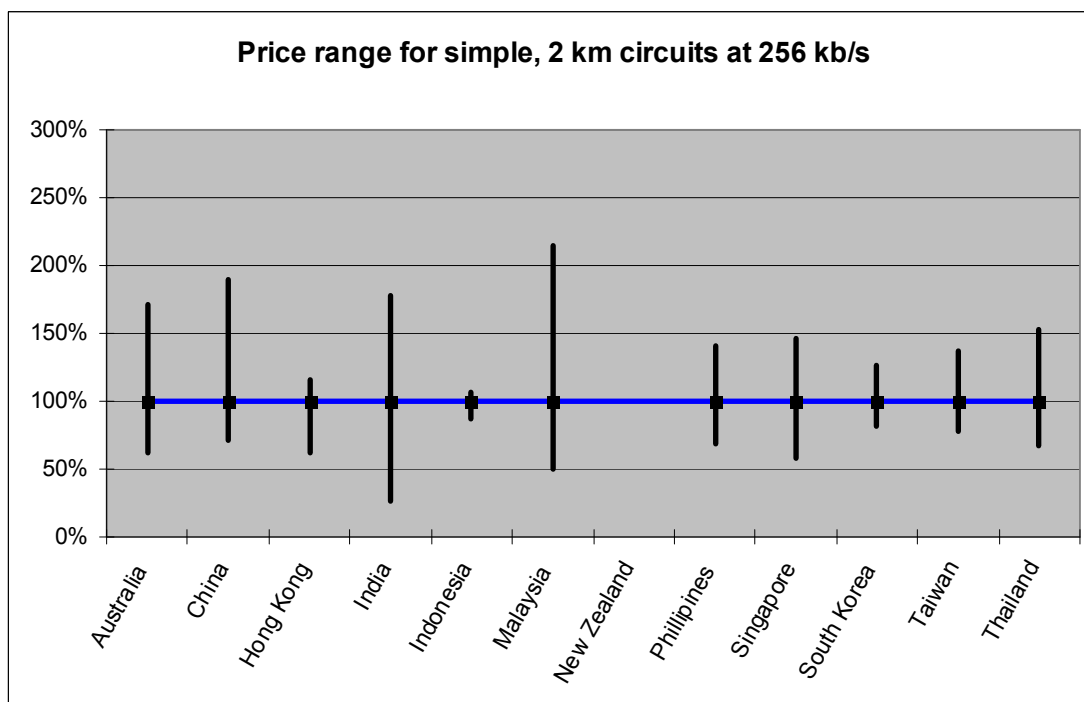
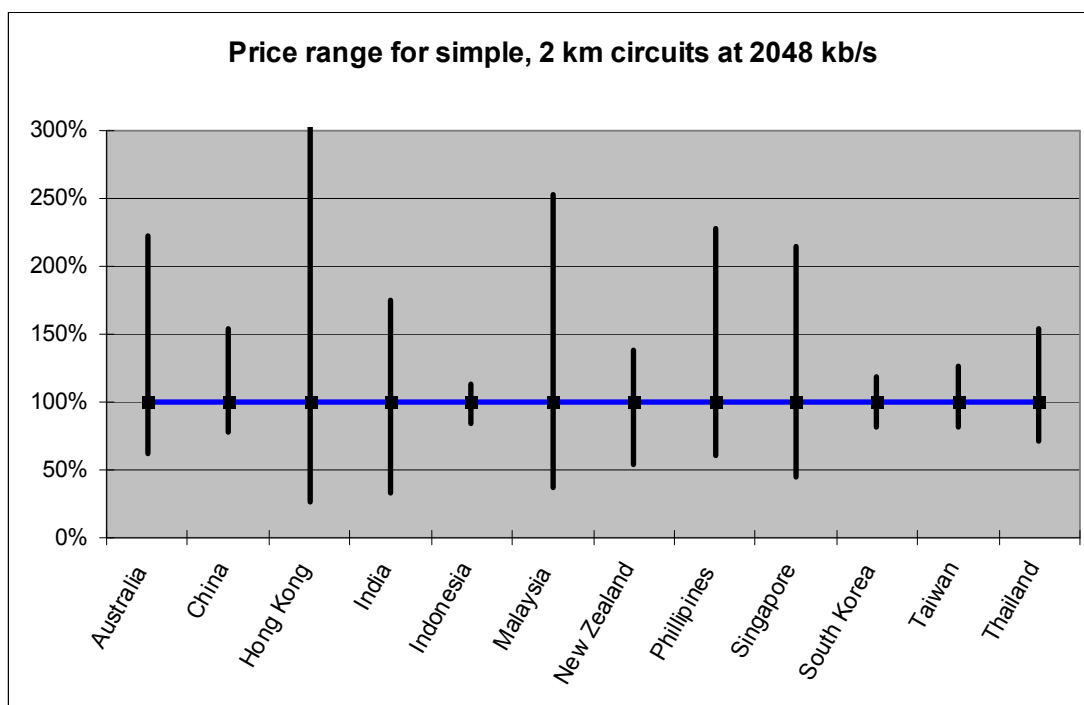
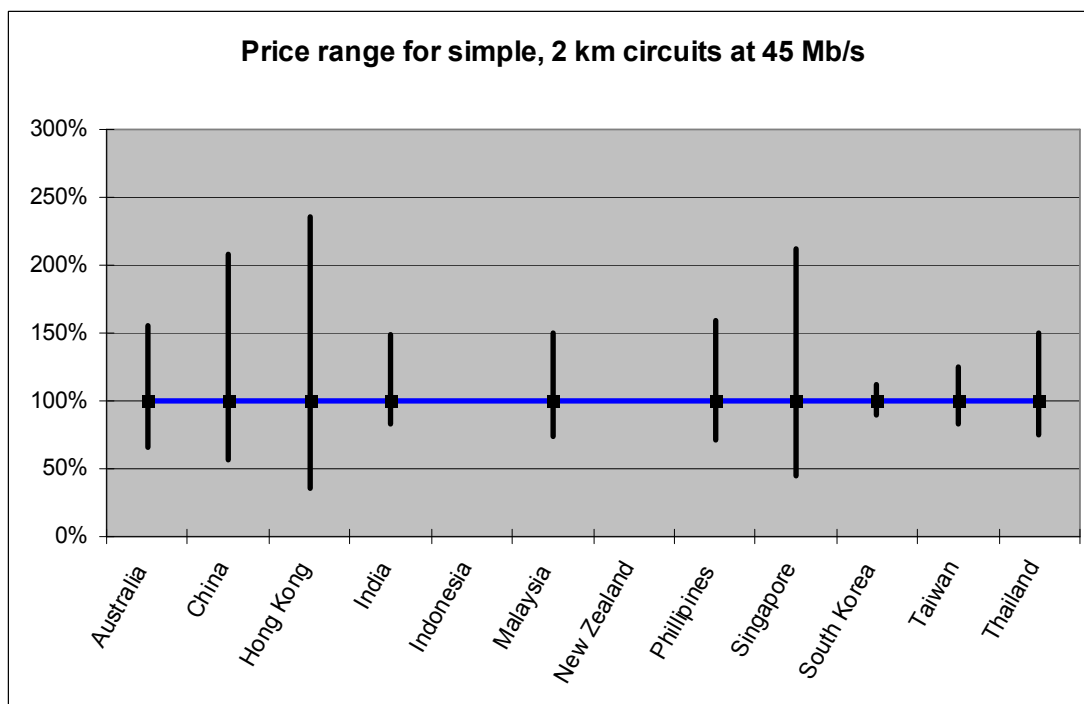


Figure 3.3.6c Price range for 2 Mb/s



Please note: The vertical scale is truncated at 300%. The highest price for Hong Kong goes beyond that.

Figure 3.3.6d Price range for 45 Mb/s



3.3.7 Comparison with OECD benchmarking results

The OECD (Organisation for Economic Cooperation and Development) has collected similar information for leased lines in its member countries. There are 30 countries OECD member countries including countries from Europe, America and Asia. The latest available data is from August 2006 and an average price (for 2km circuits) across the OECD countries has been calculated. This is compared in table 3.3.7a below to the average data submitted by the APCC members.

The OECD price data is taken from the domestic incumbent operator's price lists and reflects the most basic service available. In contrast, the APCC data reflects the actual price for simple circuits obtained by APCC members from licensed domestic operators.

Table 3.3.7a APCC Leased Line price data compared to OECD average

	64 kb/s	2 Mb/s	34 Mb/s
Australia	1,935	4,937	31,312
China	2,251	11,395	28,246
Hong Kong	1,405	5,633	-
India	533	1,045	-
Indonesia	9,663	30,089	-
Malaysia	4,178	21,648	-
New Zealand	-	9,269	-
Phillipines	2,675	10,771	-
Singapore	2,140	9,979	40,464
South Korea	1,619	9,428	53,526
Taiwan	1,033	3,654	-
Thailand	1,391	12,342	53,122
OECD average	2,428	8,925	40,726

US\$ per year for 2 km circuit

When comparing the APCC price data with the OECD average it turns out that the prices experienced in most of the economies covered by this study are equal to or lower than the OECD published list price average. Only Indonesia and Malaysia stand out as being significantly more expensive than the OECD average for the lower speeds, i.e. for both 64 kb/s and 2 Mb/s.

Figure 3.3.7a APCC prices vs. OECD average for 64 kb/s

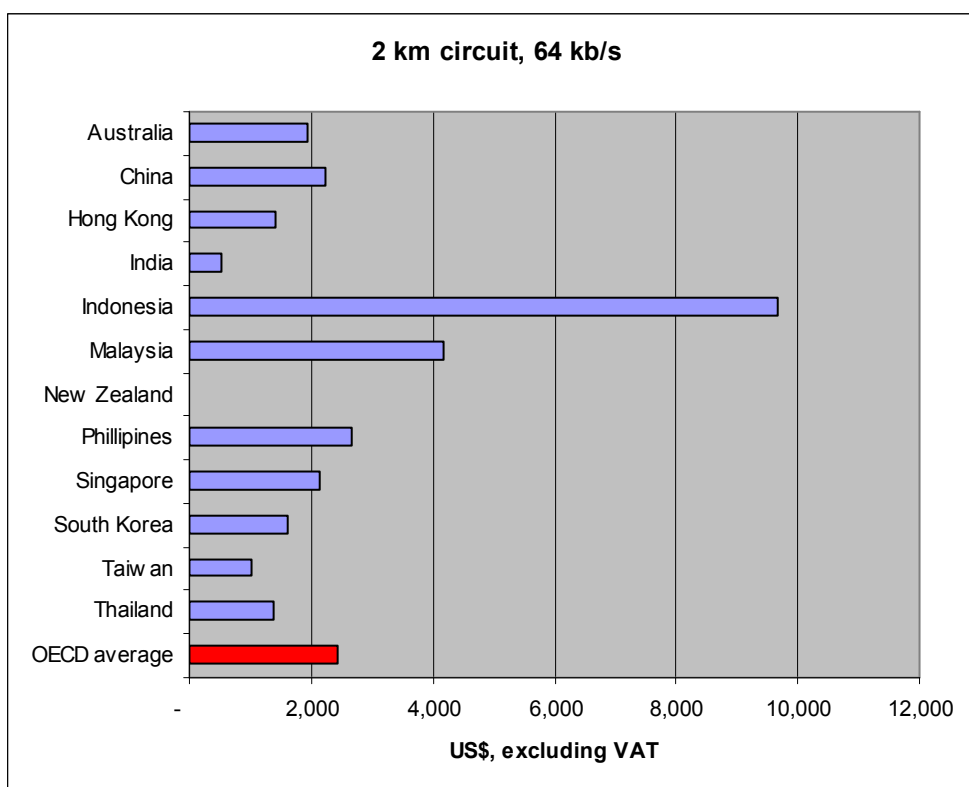


Figure 3.3.7b APCC prices vs. OECD average for 2 Mb/s

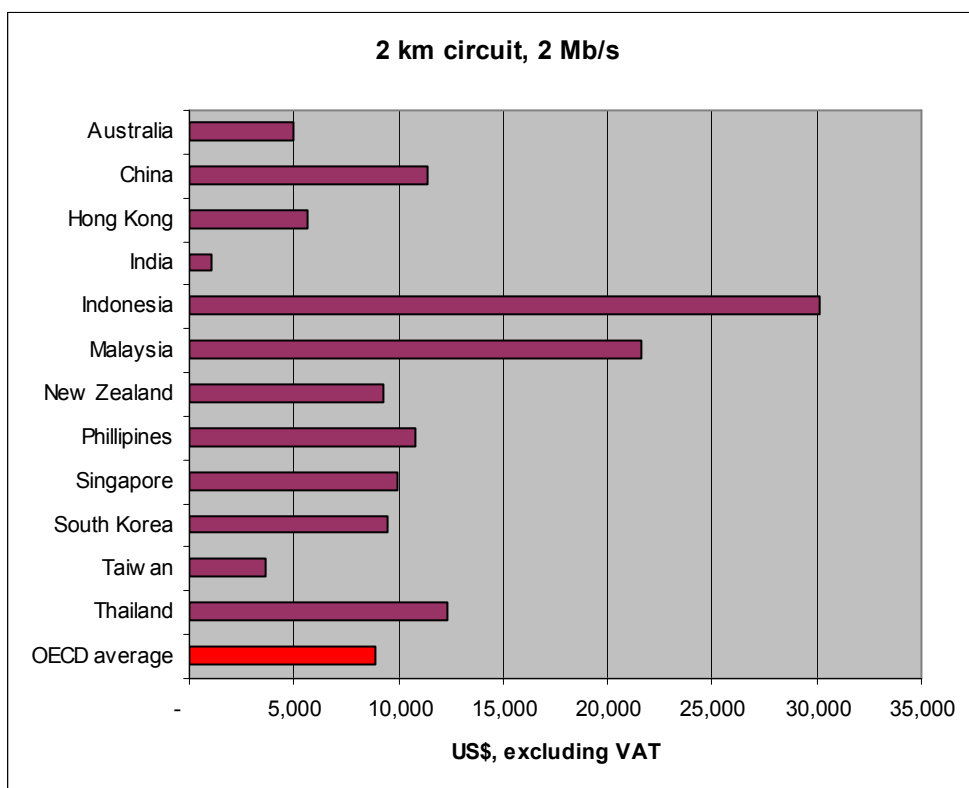
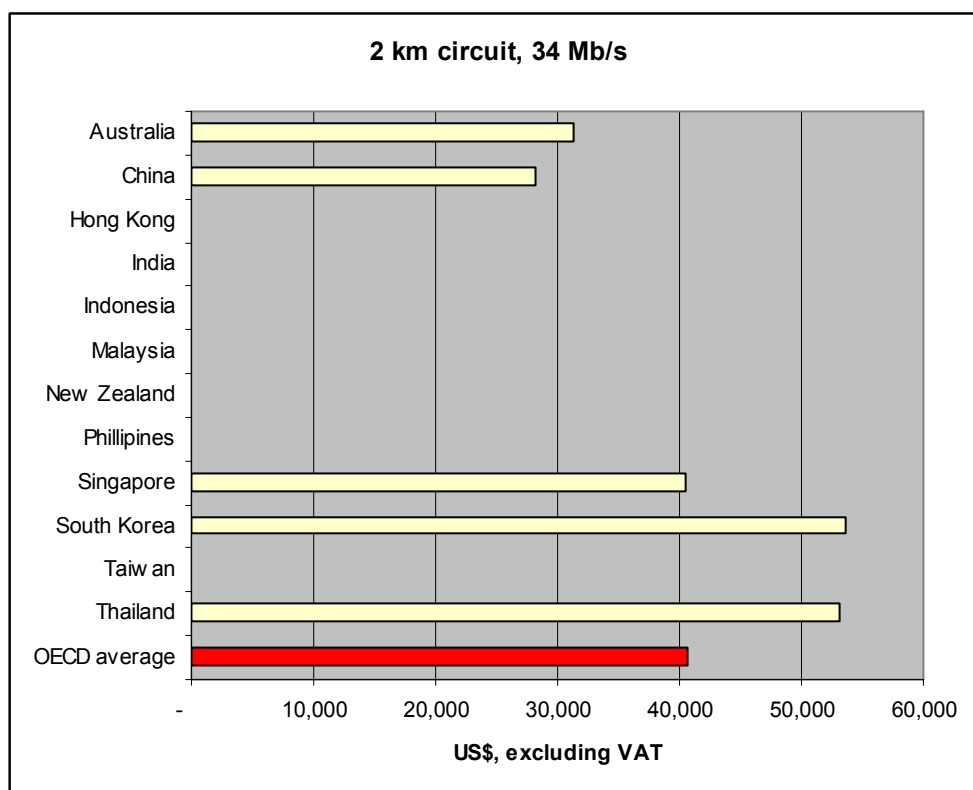


Figure 3.3.7c APCC prices vs. OECD average for 34 Mb/s

Three OECD countries are also covered in the APCC data: South Korea, Australia and New Zealand. A comparison of the data for these three countries has illustrated a number of anomalies between the incumbent list prices used by OECD and the actual commercial prices obtained by APCC members. In some cases the actual prices obtained by the APCC members are substantially lower (as can be expected) and in some cases the prices are higher (e.g. APCC prices for New Zealand 2Mb/s is 25% higher than the published OECD list price for New Zealand).

These variations may be a result of the inclusion of other domestic providers in the APCC data, selection of different service options in the two sets of data, and/or a reflection the differences in the relationships which APCC international carriers have with the domestic operators.

4 Ethernet Access

Sufficient price information for Ethernet access circuits was available for six economies. Data for the remaining six economies was provided, but this was insufficient for inclusion in this report. This infers that while Ethernet access circuits are available in all twelve economies, they are only used to a significant extent in six of them.

Price data was also received for a range of bitrates:

- 2 Mb/s
- 4 Mb/s *
- 6 Mb/s *
- 8 Mb/s *
- 10 Mb/s
- 20 Mb/s *
- 40 Mb/s *
- 100 Mb/s
- 1000 Mb/s

Those bitrates with an asterisk (*) are only available in a few economies, while the others are offered (and used) in most or all economies. Other bitrates are available in individual economies, but their limited availability has meant their exclusion from this 2006 Report.

4.1 Coverage

The table below shows the coverage of economies vs. bitrates presented in this report.

Table 3.1: Ethernet data coverage

	2Mb/s	10Mb/s	100Mb/s	1000Mb/s
Australia	No	Yes	Yes	Yes
China	No	No	No	No
Hong Kong	Yes	Yes	Yes	Yes
India	Yes	Yes	Yes	No
Indonesia	No	No	No	No
Malaysia	No	No	No	No
New Zealand	Yes	Yes	Yes	No
Phillipines	No	No	No	No
Singapore	Yes	Yes	Yes	Yes
South Korea	No	Yes	Yes	No
Taiwan	Yes	Yes	Yes	No
Thailand	No	No	No	No

Please note that a “No” in the table above does not mean that the service is not offered or used; simply that insufficient data was reported.

4.2 Comparing across economies

The following tables compare the prices across different economies per bitrate. Care should be exercised when considering this information as no assessment of the technical facilities provided in each economy has been made - so the circuits provided may have different properties.

Table 4.2.1: Ethernet 2 Mb/s access

2 Mb/s	Install /circuit	2 km /month	5 km /month
Hong Kong	409	237	237
India	1,304	34	34
New Zealand	425	536	536
Singapore	1,317	703	703

Prices are simple averages across the available data, in US\$.

Table 4.2.2: Ethernet 10 Mb/s access

10 Mb/s	Install /circuit	2 km /month	5 km /month
Australia	3,874	1,012	1,211
Hong Kong	362	739	739
India	2,319	169	169
New Zealand	425	809	809
Singapore	2,543	2,884	2,884
South Korea	1,038	1,770	1,770

Prices are simple averages across the available data, in US\$.

Table 4.2.3: Ethernet 100 Mb/s access

100 Mb/s	Install /circuit	2 km /month	5 km /month
Australia	4,903	2,355	2,828
Hong Kong	1,170	1,323	1,323
India	5,797	2,952	2,952
New Zealand	823	1,914	1,914
Singapore	3,905	7,103	7,103
South Korea	1,038	5,833	5,833

Prices are simple averages across the available data, in US\$.

Table 4.2.4: Ethernet 1000 Mb/s access

1000 Mb/s	Install /circuit	2 km /month	5 km /month
Australia	7,498	5,063	6,370
Hong Kong	2,272	3,585	3,585
Singapore	18,435	10,226	10,226

Prices are simple averages across the available data, in US\$.

Prices for the lowest speeds circuits appear to be the least expensive in India, although this changes for speeds above 10 Mb/s.

After India, Hong Kong and New Zealand are consistently the least expensive economies.

Singapore is consistently the most expensive, often twice the price of the next most expensive.

Combined installation charges element and monthly rental provide the following outcomes:

Table 4.2.5: Ethernet monthly rental including installation charge

	2Mb/s	10Mb/s	100Mb/s	1000Mb/s
Australia		1,334	2,763	5,688
Hong Kong	271	770	1,420	3,774
India	143	362	3,435	
New Zealand	572	844	1,982	
Singapore	813	3,096	7,429	11,763
South Korea		1,857	5,920	
Taiwan	292	938	2,656	

Prices are simple averages across the available data, in US\$. Installation is distributed over 12 months.

Figure 4.2.5a: Ethernet monthly rental including installation charge

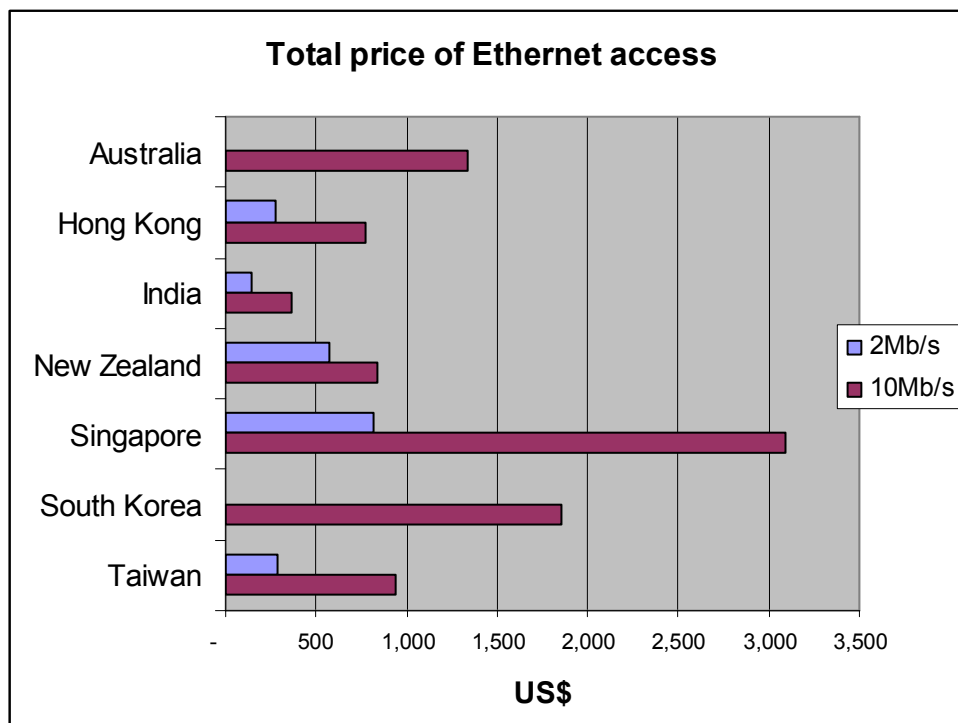
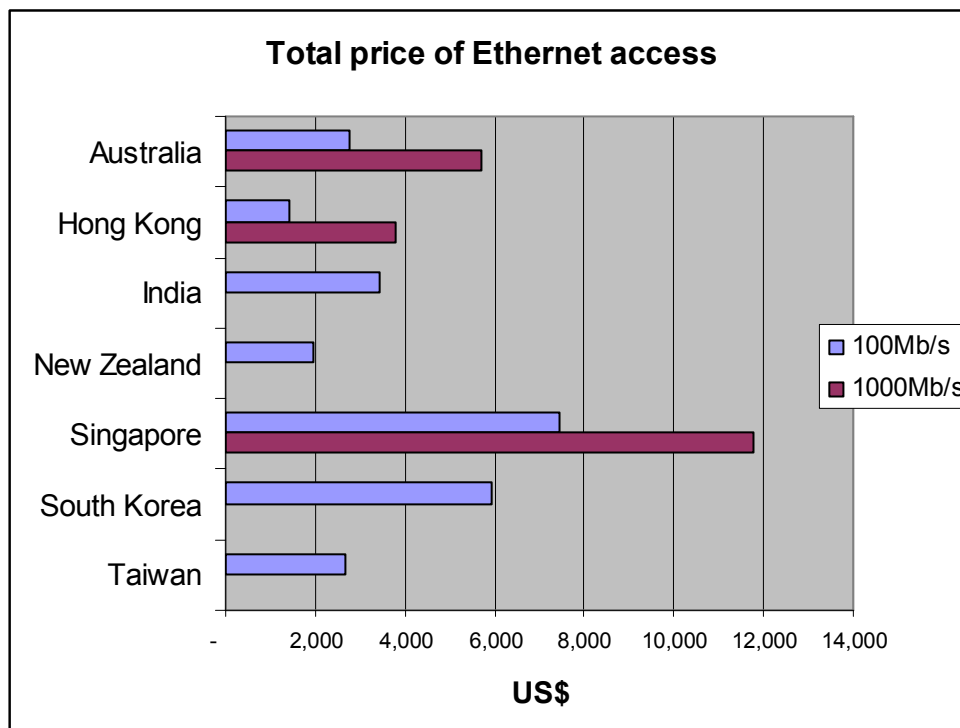


Figure 4.2.5b: Ethernet monthly rental including installation charge



5 DSL Access

There was insufficient data available to develop meaningful and reliable price benchmarks for DSL circuits. Nevertheless, certain observations can be made about the DSL markets in the region.

Price inputs were received for five of the twelve economies, namely:

- Australia
- New Zealand
- Philippines
- Singapore
- Taiwan

DSL price inputs for these economies were received from fewer than three international operators, except for Singapore where more pricing data was available. However, even where price inputs were received, the prices covered a range of different speeds or bitrate combinations that did not allow for a meaningful comparison.

Different market situations appear to exist in different economies, resulting in domestic service providers developing different products and solutions. The bitrates reported were:

Australia	New Zealand	Philippines	Singapore	Taiwan
128 / 128 kb/s	256 / 128 kb/s	256 / 128 kb/s	256 / 128 kb/s	256 / 64 kb/s
256 / 64 kb/s	512 / 256 kb/s	1024 / 512 kb/s	512 / 256 kb/s	1000 / 64 kb/s
256 / 256 kb/s	2028 / 512 kb/s	2048 / 512 kb/s	512 / 512 kb/s	2000 / 256 kb/s
512 / 128 kb/s		2200 / 768 kb/s	1000 / 512 kb/s	2000 / 512 kb/s
512 / 512 kb/s		2700 / 768 kb/s	1024 / 768 kb/s	8000 / 640 kb/s
1024 / 1024 kb/s		3072 / 768 kb/s	2048 / 768 kb/s	12000 / 1000 kb/s
1536 / 256 kb/s		3200 / 768 kb/s	2048 / 768 kb/s	
1536 / 1536 kb/s		3500 / 768 kb/s	6000 / 768 kb/s	
2048 / 384 kb/s		4000 / 768 kb/s		

Even though this information does not provide a full picture of the market situations in the different economies, it does suggest that higher speeds are required by end users in Singapore and Taiwan than are demanded in Australia and New Zealand. The availability of higher speeds in some countries can also be a result of provider price policy, but there is too little evidence to draw such conclusions.

6 Leased Lines vs. Ethernet

The following tables and graphs show the relationship between the prices for Leased Lines and Ethernet access. The two types of Access Circuits are not necessarily compatible, and may not always be substitutes, but such comparison of the price differences is still of interest.

The bitrates typically common to both Leased Line and Ethernet access services 2 Mb/s and 100/155 Mb/s, and are the most appropriate and relevant speeds for which to make such a comparison.

Figure 6a: Leased Line prices vs. Ethernet prices, 2Mb/s

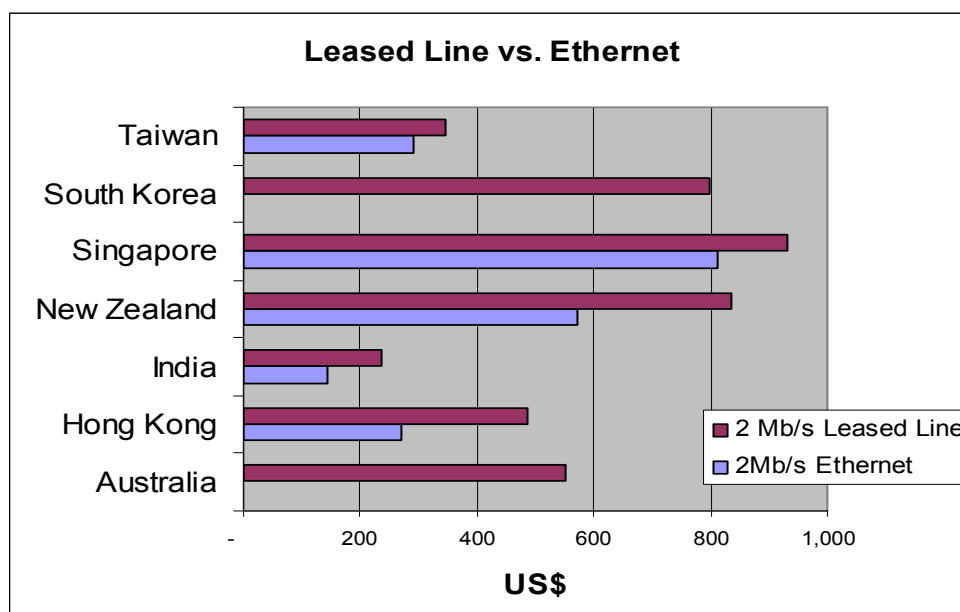
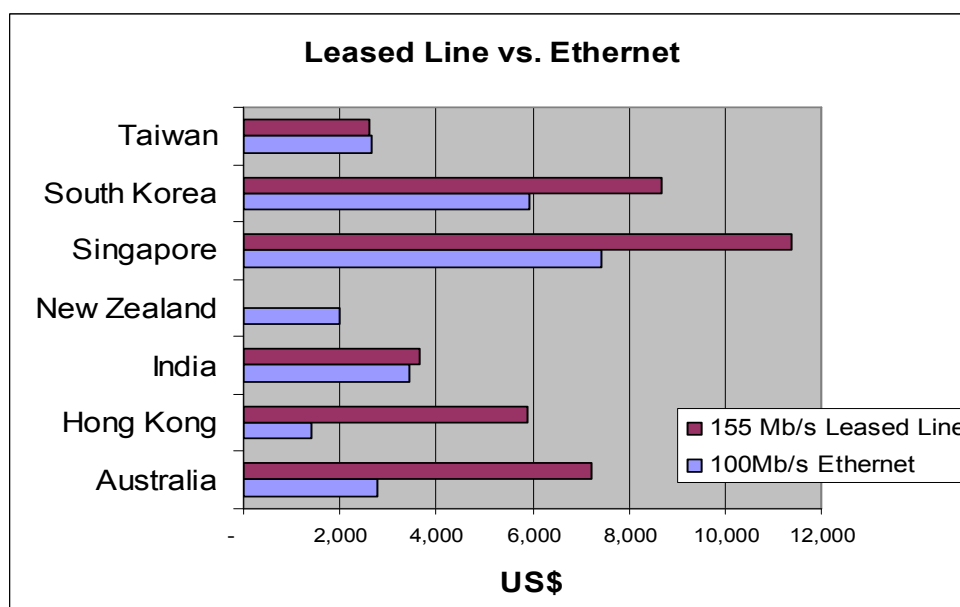


Figure 6b: Leased Line prices vs. Ethernet prices, 100/155 Mb/s



It is interesting to note that in many economies there does not appear to be a strong relationship between the pricing of the two types of circuits, with Ethernet being the less expensive of the two. Even for high speed circuits the price differences cannot be explained on a purely proportionate basis by the difference between 100 and 155 Mb/s speeds

7 Conclusion

There does not appear to be an overall correlation between the level of market liberalisation, openness of regulatory regimes, and price variation for Access Circuits.

Considerable price variation exists for access circuits offered by the domestic operators to the international operators, even where general regulation is more developed.

The factor that appears to have a more influential effect on price is the level of competition between the domestic operators.