

# Access Price Benchmarking

A Study Produced for the  
Asia Pacific Carriers' Coalition  
(APCC)

By

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## Executive Summary

1. This report follows similar APCC Access Benchmarking reports in 2003 and 2006. This report covers 14 economies, two more (Japan and Vietnam) than the 2006 report. The economies are:

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

2. The 2006 report provided comprehensive data for leased lines and limited data for Ethernet access, but the data for DSL was insufficient to make comparisons. This report provides a sufficiently wide range of data for each category, which indicates the spread of the use of both Ethernet access and DSL.
3. The prices reported are not list prices but the prices actually paid by the seven respondent international carriers. However, it is not possible to judge from the data how representative overall they are of any particular economy. Clearly the actual prices will be influenced by, among other factor, discounts for bulk-buying and for strategic marketing purposes.
4. When making an assessment of price changes it is important to bear in mind changes in dollar exchange rates and local rates of inflation. This report on occasion uses deflators to translate from 2009 current or market prices to constant or real 2006 dollar prices for comparison purposes. A table of deflators is provided in Table 2.1.
5. The prices used for comparative purposes 2006-2009 are simple averages across all bitrates of leased circuits. This follows the practice of the 2006 report. There was insufficient data to weight these prices according to the number of circuits used in each bitrate category, but from the returns received it would seem that the outcome would show little difference.
6. Key issues are:
  - Leased lines remain the most widely used leased circuits. With five notable exceptions (India, Malaysia, Philippines, Taiwan and Thailand) prices *in real terms* have fallen since 2006.

- Installation charges relative to the first year of rental appear to have changed little since 2006, rising marginally in some cases which may be an artifact of falling MRC (monthly recurrent charges). Mostly they are below 10% and in some cases waived, but in Australia, for example, they reach 32%.
- The demand for Ethernet access has not only continued to rise but the demand for higher bitrates is also rising, including 10 Gb/s. 12 economies are represented in the 2009 report compared with 11 in 2006. The 2009 report extends the coverage of the 2006 report to include point-to-point (P2P), point-to-multi-point contended (PMP) contended and uncontended.
- One country, Malaysia, stands out as being consistently charging the highest or second highest prices for Ethernet access. Thailand is overall the second highest. Unlike 2006, Singapore is no longer the most expensive but is consistently more expensive than Hong Kong, the lowest priced, by a factor of at least two or three.
- Reports of leasing DSL circuits came from more economies, 6 for symmetric and 8 for asymmetric, than in 2006 which reported from 5 economies. Hong Kong appears as the lowest priced for symmetric and Japan for asymmetric, but the appearance of China for the first time is significant.

## 2. Introduction

In 2009, the Asia Pacific Carrier's Coalition (APCC) commissioned TRPC Pte Ltd (Singapore) to produce a report benchmarking the price of access circuits across 14 economies in the Asia Pacific region. The report is an update of a 2006 report commissioned by the APCC from Teligen, which was also an update of a similar report commissioned by the APCC from Teligen in 2003.

As the 2006 report notes, the cost of local access which is necessary for the completion of an international circuit is often disproportionately high as a percentage of the total international connection price. While it is a reasonable assumption that where the local market is characterized by competition local access prices are likely to be lower, the determinants of local access prices are far from transparent. Regulatory and ownership issues can be an influence on prices, and there can be significant differences between list prices and actual prices after discounts are given for strategic market reasons, or because of bulk buying or long term contracts.

This report covers 2009 prices across 14 Asia Pacific economies as reported by APCC members, and provides tables comparing these prices with those reported in 2006, as well as between economies in 2009. It does not investigate the cause of particular price levels, nor changes in them, nor possible explanations behind economy comparisons.

The coverage of cities in each economy included (i) primary or major cities and (ii) secondary named cities or 'others'. The tables in this report focus upon the major cities for comparison purposes. A list of secondary cities is included in the Appendix, and named in Table 3.1 below.

### *Methodology*

To enable meaningful comparisons with the 2006 report, this 2009 report does not represent the individual prices offered in each market but composite prices based upon contributing APCC members. It also follows the 2006 report by using simple averaging ('median') of the reported prices, despite some respondents reporting 'weighted average prices' which should better reflect bulk-buy discounts.<sup>1</sup> Insufficient data was available to use 'weighted average prices' (where the weights are the number of lines leased at different speeds) and it would appear that using simple average prices (the average of the lowest and highest prices reported for each category of leased circuit) makes little overall practical difference to results. There are two advantages in doing so. First, data from all respondents can be used rather than selecting data from only those reporting weighted average prices. Second, it makes more transparent a direct comparison with the 2006 report.

The 2006 report included leased lines and Ethernet access, but due to lack of available data was unable to provide prices for Digital Subscriber Line (DSL) circuits. The use of DSL has clearly increased across the region since 2006, and this 2009 report has managed to cover all three categories.

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<sup>1</sup> The median is preferred over the mean as it more readily reflects the range of price levels.

The data generating process is always the most critical link in a chain of statistical analysis. If the data is not available, or not available in the form required, the statistical outcome is inevitably limited and possibly compromised. Ideally, statistical analysis requires careful quality control over where the data is collected, how it is collected and how it is represented for input into an analytical process. It is in the nature of the beast that where commercially sensitive data is involved from a variety of competing sources that necessitate confidentiality, the data will not knowingly meet all these requirements. Working within these limitations, this 2009 report is a fair representation of the data as reported by respondents.

### *Price Deflators*

All 2009 prices are reported in 2009 US dollars. For real comparisons with 2006 data two factors should be taken into account: the change in the dollar exchange rate and the local rate of inflation. Other things remaining equal, a rise in the dollar exchange rate (a fall in the dollar value of the local currency) will make 2009 prices appear lower than in 2006, and vice-versa. Other things remaining equal, a rise in the local rate of inflation (higher prices in 2006 dollar terms) will make 2009 prices appear higher than in 2006, and vice-versa. The two moving in the same direction together will counteract each other, whereas the two moving in opposite directions will reinforce each other. To arrive at real (or constant dollar) 2006-equivalent prices for 2009, the percentage change in the dollar exchange rate should be deducted from the percentage change in the local inflation rate. Table 2.2.1 summarises the deflators for each of the 14 economies in the 2009 report. Rates are measured from November 2006 and November 2009.

Table 2.1  
Dollar Value Currency Deflators for each economy

Economy	Currency 2006-2009	Inflation 2006-2009	Deflator 2006-2009
Australia	-16.7	12.3	29
China	-25.2	14.7	39.9
Hong Kong	0	7.4	7.4
India	-4.7	33	37.7
Indonesia	-5.5	38.2	43.7
Japan	-22.9	-0.2	22.7
Malaysia	6	11.2	5.2
New Zealand	-6.4	11.8	18.2
Philippines	5.6	22.7	17.1
Singapore	10.1	9.6	-0.5
South Korea	-25.2	12.7	37.9
Taiwan	1.8	5.5	3.7
Thailand	9.1	11.4	2.3

Rates are measured from November 2006 and November 2009 using IMF and national statistics.

## 2.1 Scope of Study

The 2006 report covered 12 economies, compared with six in the 2003 report. Japan was excluded from the report on the grounds of ‘price inconsistencies’ (page 8). This 2009 report extends to 14 economies, including Japan and Vietnam. The objective of the study was to assess local access prices charged by domestic operators to international carriers in the following 14 economies:

Economy	Number of Reporting Telcos	Economy	Number of Reporting Telcos
Australia	6	New Zealand	5
China	5	Philippines	6
Hong Kong	6	Singapore	7
Indonesia	6	South Korea	7
India	5	Taiwan	6
Japan	7	Thailand	7
Malaysia	7	Vietnam	3

Seven international carriers contributed to the input of price data. Respondents reported from individual economies where they had a presence. The reported prices ranged from those of a single domestic carrier to those from competing domestic carriers.

### 2.1.1 Leased Lines

Leased line speeds reported by respondents correspond exactly to those of the 2006 report.

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

Prices for leased circuits include the installation fee and the monthly recurring cost (MRC) or rental. Installation fees, or one-off access fees, in some cases are waived entirely; in other cases show considerable variation. Purely for purposes of comparison with the 2006 report, installation fees are presented divided by 12 for the first year of operation and added to the MRC. Respondents were also asked to distinguish prices between 2 km and 5km leased circuit lengths, but this proved unnecessary (see Section 3.1 below).

Groomed leased circuits are those which multiplex lower speed leased circuits into a single larger leased circuit. Their use is reported in the same five economies as in 2006 (Australia, Hong Kong, New Zealand, Singapore and Taiwan), with additional three economies for 2009 (China, India and Thailand).

## 2.1.2 Digital Subscriber Line (DSL)

Numerous downlink and uplink speeds for DSL, included both symmetric and asymmetric combinations, were reported in 2009. In 2006 data for DSL was insufficient to compare between economies. The reported speeds used were as follows:

64 kb/s	640 kb/s	1538 kb/s	3072 kb/s	10 Mb/s
128 kb/s	768 kb/s	2000 kb/s	4000 kb/s	12 Mb/s
256 kb/s	1000 kb/s	2048 kb/s	6000 kb/s	15 Mb/s
512 kb/s	1024 kb/s	2200 kb/s	8000 kb/s	

## 2.1.3 Ethernet

The use of Ethernet access circuits was more widespread in 2009 than in 2006 and generally higher speeds were in use. The reported speeds were as follows:

2 Mb/s	50 Mb/s	1 Gb/s
10 Mb/s	100 Mb/s	10 Gb/s

## 2.2 Data Coverage

The data used in this report, provided on a confidential basis by seven international carriers, all members of APCC, is based as we understand it upon the prices they actually paid during, that is wholesale prices, in 2009 rather than the price lists of the domestic carriers providing the access circuits.

Table 2.2  
Data available

	Leased Circuits		DSL		Ethernet	
	2009	2006	2009	2006	2009	2006
Australia	Y	Y	Y	Y	Y	Y
China	Y	Y	Y	N	Y	N
Hong Kong	Y	Y	Y	N	Y	Y
India	Y	Y	N	N	Y	Y
Indonesia	Y	Y	N	N	Y	N
Japan	Y	N/A	Y	N/A	Y	N/A
Malaysia	Y	Y	N	N	Y	N
New Zealand	Y	Y	N	Y	Y	Y
Philippines	Y	Y	N	Y	Y	N
Singapore	Y	Y	Y	Y	Y	Y
South Korea	Y	Y	Y	N	Y	Y
Taiwan	Y	Y	Y	Y	Y	Y
Thailand	Y	Y	Y	N	Y	N
Vietnam	Y	N/A	N	N/A	N	N/A



Note: Japan was excluded from the 2006 report due to 'price inconsistencies'; N/A= country not included in 2006; N = no data for 2009<sup>3</sup>.

## Leased Line Access

This report covers fourteen economies, including Japan which was excluded from the 2006 report due to 'price inconsistencies' (page 8) and Vietnam which was not covered in 2006.

### 3.1 Coverage

The following speeds were used as the basis of services:

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

Respondents were asked to distinguish prices between 2 km and 5km leased circuit lengths, but this proved unnecessary. In some cases leased circuit lengths for distances up to 1 km from the local exchange were priced lower than distances beyond 1 km, and thereafter prices rose according to longer distances, for example below and beyond 6km, 12 km, etc. In other cases, the shortest distance covered by the lowest prices extended across an entire Central Business District (CBD) or city or metropolitan area. In some economies there are major price differences between circuits leased to cover city areas and national long distances. The prices in this report refer to leased circuits covering city areas on the grounds that these are the most representative of the requirements of international carriers. This 2006 similarly adopted this procedure.

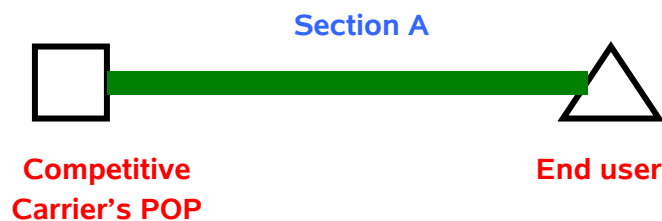
Table 3.1

	Major cities	Secondary cities
<b>Australia</b>	Sydney, Melbourne	Adelaide, Brisbane, Canberra, Darwin, Hobart, Perth, Others
<b>Indonesia</b>	Denpasar, Jakarta	Bandung, Java, Surabaya, Others
<b>Japan</b>	Tokyo, Osaka	Fukuoka, Kyoto, Sapporo, Others
<b>Malaysia</b>	West Malaysia	East Malaysia
<b>New Zealand</b>	Auckland, Wellington	Hamilton, Others
<b>Taiwan</b>	Taipei	Hsinchu, Kaoshiung, Taichung, Tainan, Taoyuan, Others
<b>Thailand</b>	Bangkok	Non-Bangkok areas

### 3.2 Simple and Groomed Circuits

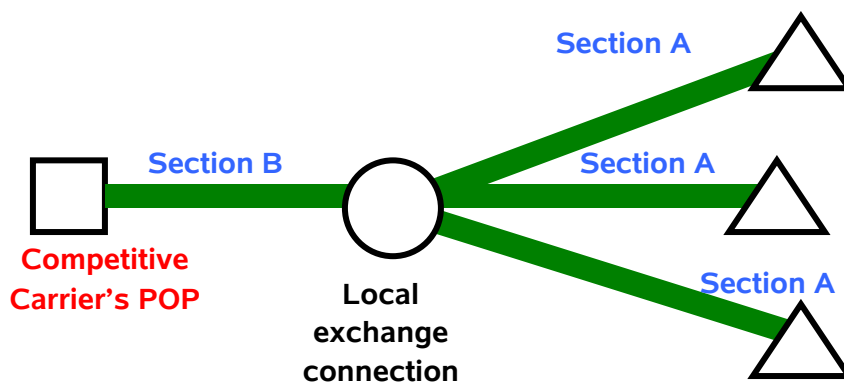
Most leased line circuits are simple point-to-point direct connections between a customer’s premises and an international carrier’s Point-of-Presence (POP). Diagram A illustrates this situation where the leased line can be of any commercially-available bitrate.

Diagram A: Simple Leased Line



In some cases operators offer a service whereby two or more lower-speed leased line circuits that pass through the same local exchange of a domestic carrier can be multiplexed into a higher-speed circuit connecting directly to an international carrier’s POP. This saves on the cost of renting multiple end-to-end simple leased line circuits, but a grooming charge may be levied by the domestic carrier. Diagram B illustrates this situation, where the combined bitrates of the leased lines is typically no more than 80% of the bitrate of the larger multiplexed circuit.

Diagram B: Groomed Leased Lines



Grooming services in 2009 were reported for Australia, China, Hong Kong, India, Singapore, Taiwan and Thailand. In the 2006 report five economies were involved in the price study (Australia, Hong Kong, New Zealand, Singapore and Taiwan).

### 3.3 Simple Leased Lines, 2009 and 2006

This section summarises the data on simple and groomed leased lines, showing the average Monthly Recurring Charges (MRC) or monthly rental, and the average one-off installation charges for each of the economies in 2009 and compares these prices with 2006<sup>2</sup>.

#### 3.3.1 Monthly Rental Simple Leased Lines

The following tables show the 2009 results and then comparisons with 2006. In 2009 data for simple leased lines was reported for 14 economies, including Japan and Vietnam which were absent for their 2006 report.

Table 3.3.1a  
2km MRC simple line prices, (USD) major cities, 2009

	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia
<b>64kbps</b>	229	259	113	23	639	400	517
<b>256kbps</b>	405	380	182	171	1251	2482	1044
<b>512kbps</b>	443	565	210	209	2020	2003	1187
<b>1536kbps</b>	545	377	195		2523	1242	1863
<b>1984kbps</b>	666	611	193	88	3941	1883	2180
<b>2048kbps</b>	475	549	212	247	3544	1596	1921
<b>34Mbps</b>	2739	2188		691			8344
<b>45Mbps</b>	2856	2967	1468	1752	10421	3392	10583
<b>155Mbps</b>	5687	6046	3018	4814	13500	5750	17924

	New Zealand	Philippines	Singapore	South Korea	Taiwan	Thailand	Vietnam
<b>64kbps</b>	132	289	236	202	101	334	214
<b>256kbps</b>	535	464	493	288	141	264	406
<b>512kbps</b>	712	667	717	481	143	384	593
<b>1536kbps</b>	1004	1044	1296	830	377	819	1127
<b>1984kbps</b>	926	1317	1586	1200	412	843	566
<b>2048kbps</b>	836	1067	520	1012	383	1472	1715
<b>34Mbps</b>		5679	2891			4775	14419
<b>45Mbps</b>		4747	2859	3665	1949	5883	18201
<b>155Mbps</b>		8037	6266	8645	3335	10551	

Note: Japan and Vietnam were not covered in 2006 report

<sup>2</sup> In the case of India, the data from one respondent was not cleared stated as either monthly or annual. This report assumes the data is annual, which makes it comparable with data from other respondents.

Table 3.3.1b

2km MRC simple leased line prices including installation, (USD) major cities, 2009

	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia
<b>64kbps</b>	368	474	114	23	712	459	559
<b>256kbps</b>	524	583	185	207	1332	2560	1147
<b>512kbps</b>	548	779	216	319	2164	2072	1290
<b>1536kbps</b>	657	604	200		2615	1305	1962
<b>1984kbps</b>	774	822	193	88	4011	1965	2284
<b>2048kbps</b>	625	850	215	339	3747	1659	2027
<b>34Mbps</b>	3506	2677		691			8774
<b>45Mbps</b>	3684	3490	1504	2326	11078	3471	11059
<b>155Mbps</b>	7113	6716	3018	5466	13792	5833	20202

	New Zealand	Philippines	Singapore	South Korea	Taiwan	Thailand	Vietnam
<b>64kbps</b>	208	321	265	212	127	353	267
<b>256kbps</b>	599	497	561	303	181	285	463
<b>512kbps</b>	785	701	787	496	183	416	650
<b>1536kbps</b>	1051	1082	1370	845	425	853	1184
<b>1984kbps</b>	1002	1335	1655	1216	463	863	624
<b>2048kbps</b>	933	1105	606	1027	434	1506	1737
<b>34Mbps</b>		5846	3202			4837	14665
<b>45Mbps</b>		4990	3265	3806	2045	5945	18234
<b>155Mbps</b>		8343	6927	8782	3479	10634	

Note: 1. Prices are simple averages of monthly rental plus 1/2th of the installation charge  
 2. Japan and Vietnam were not covered in 2006 report

Table 3.3.1c  
Comparison of 2km MRC simple leased line prices with 2006

	Australia		China		Hong Kong		India		Indonesia		Malaysia	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps	161	229	188	259	117	113	44	23	805	639	348	517
256kbps	406	405	462	380	198	182	70	171	1222	1251	900	1044
512kbps	487	443	593	565	248	210	93	209	1617	2020	986	1187
1536kbps	760	545		377	264	195			2349	2523	1391	1863
1984kbps	606	666	756	611		193	51	88		3941		2180
2048kbps	411	475	950	549	469	212	87	247	2507	3544	1804	1921
34Mbps	2609	2739	2354	2188				691				8344
45Mbps	2652	2856	4267	2967	3206	1468	1320	1752		10421	6096	10583
155Mbps	6059	5687	8692	6046	5787	3018	3220	4814		13500		17924

	New Zealand		Philippines		Singapore		South Korea		Taiwan		Thailand	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps		132	223	289	178	236	135	202	86	101	116	334
256kbps		535	364	464	441	493	260	288	110	141	267	264
512kbps		712	473	667	728	717	367	481	110	143	439	384
1536kbps		1004	635	1044	1019	1296	595	830	304	377	879	819
1984kbps		926	632	1317	1097	1586	773	1200	307	412		843
2048kbps	772	836	898	1067	832	520	786	1012	305	383	1028	1472
34Mbps				5679	3372	2891	4461				4427	4775
45Mbps			4380	4747	4736	2859	4609	3665	1376	1949	6434	5883
155Mbps				8037	9959	6266	8632	8645	2499	3335	10616	10551

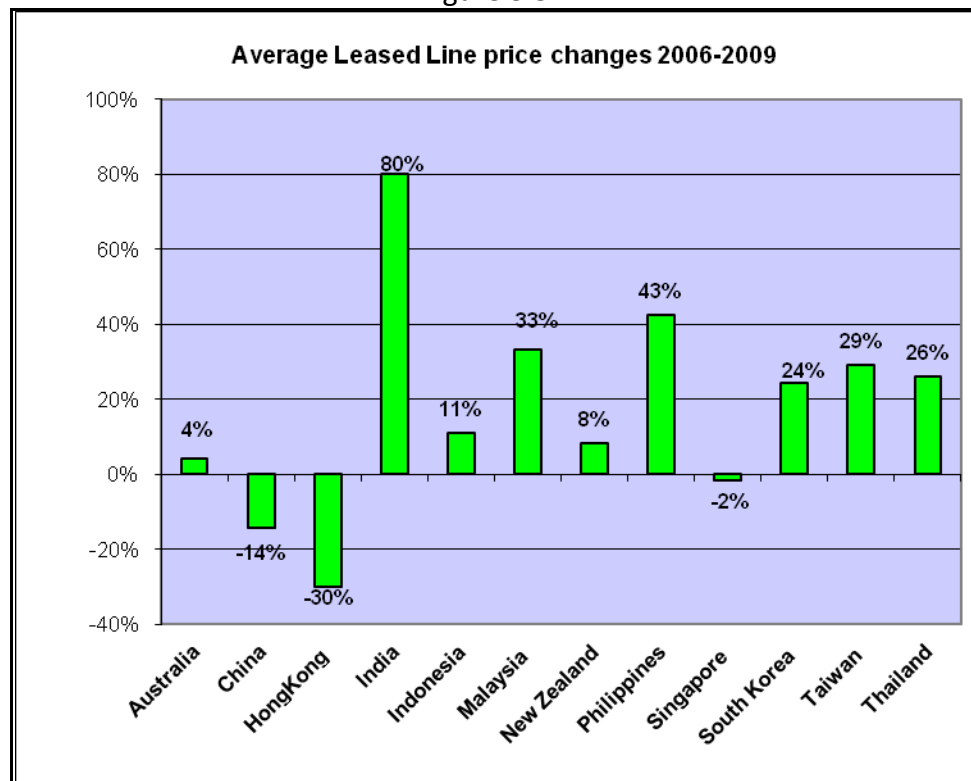
Table 3.3.1d  
Comparison of 2km MRC simple leased line prices plus installation charges with 2006

	Australia		China		Hong Kong		India		Indonesia		Malaysia	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps	276	368	458	474	124	114	198	23	891	712	387	559
256kbps	524	524	730	583	206	185	224	207	1307	1332	1055	1147
512kbps	605	548	861	779	256	216	246	319	1703	2164	1140	1290
1536kbps	878	657		604	272	200			2434	2615	1546	1962
1984kbps	719	774	1221	822		193	180	88		4011		2284
2048kbps	553	625	1285	850	485	215	235	339	2593	3747	1895	2027
34Mbps	3236	3506	2998	2677				691				8774
45Mbps	3227	3684	4880	3490	3302	1504	1665	2326		11078	6553	11059
155Mbps	7217	7113	9409	6716	5878	3018	3666	5466		13792		20202

	New Zealand		Philippines		Singapore		South Korea		Taiwan		Thailand	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps		208	251	321	204	265	140	212	121	127	138	353
256kbps		599	392	497	496	561	273	303	153	181	293	285
512kbps		785	501	701	787	787	380	496	153	183	473	416
1536kbps		1051	663	1082	1079	1370	603	845	348	425	920	853
1984kbps		1002	657	1335	1158	1655	779	1216	347	463		863
2048kbps	837	933	931	1105	931	606	799	1027	346	434	1069	1506
34Mbps				5846	3896	3202	4518				4455	4837
45Mbps			4594	4990	5497	3265	4695	3806	1462	2045	6479	5945
155Mbps				8343	11376	6927	8689	8782	2604	3479	10660	10634

Figure 3.3.1



Note: Simple (mean) average of changes across all speeds of leased lines (also see Appendix 2 for a breakdown by bitrate)

Tables 3.3.1 to 3.3.4 and figure 3.3.1 indicate that

- As in 2006, Indonesia and Malaysia continue to have significantly higher prices for leased lines, and this extends from the lowest to the highest speeds. Deflating the price increases by local rates of inflation and exchange rate movements nets out at nearly 44% for Indonesia – in other words, the current price increase of 11% (see figure 3.3.1) represents a real price *decrease* in constant 2006 dollar terms of 33%. However, the same exercise nets out at just over 5% of the price rise in Malaysia - in other words the average leased line price in real terms in Malaysia *rose* 28%.
- Leased line prices in India appear to have risen substantially over their 2006 levels, by 80% using simple averaging, and especially at the higher speeds. The combined effect of exchange rate depreciation and the inflation rate nets out at nearly 38% and therefore in real terms, India's average leased circuit prices *rose* around 42%.
- Increases in the real (deflated current dollar prices) price of leased lines 2006-2009 seem to have taken place in India (42%), Malaysia (28%), Philippines (26%), Taiwan (25%) and Thailand (24%).

## 3.3.2 Monthly Rentals for Leased Lines

Figure 3.3.2a

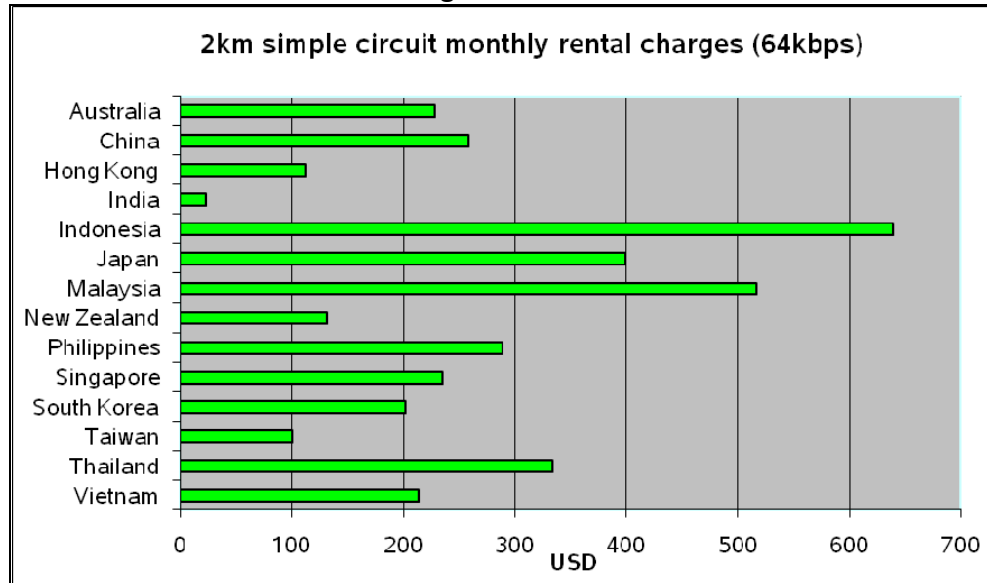


Figure 3.3.2b

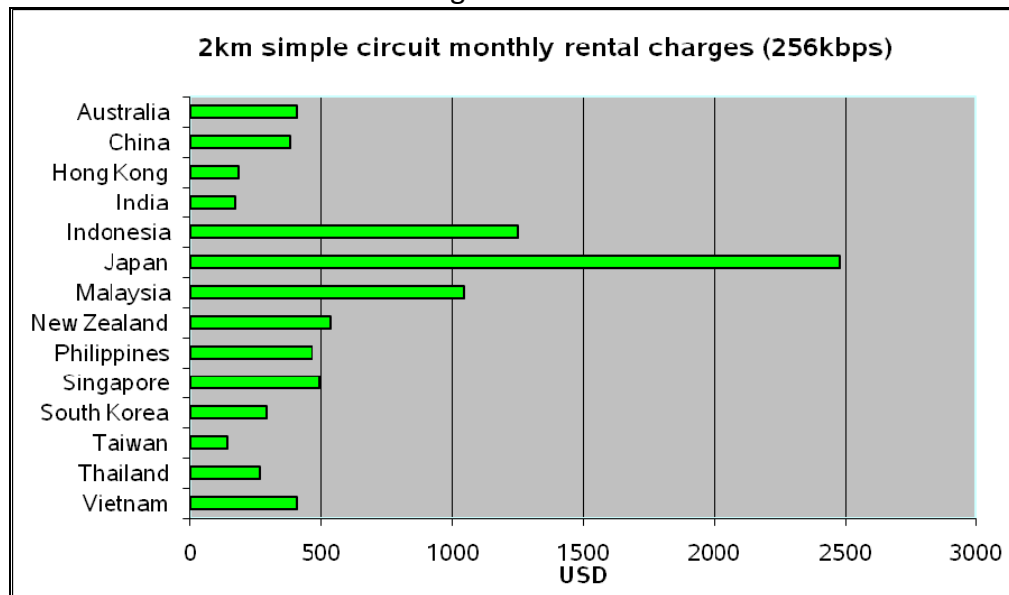


Figure 3.3.2c

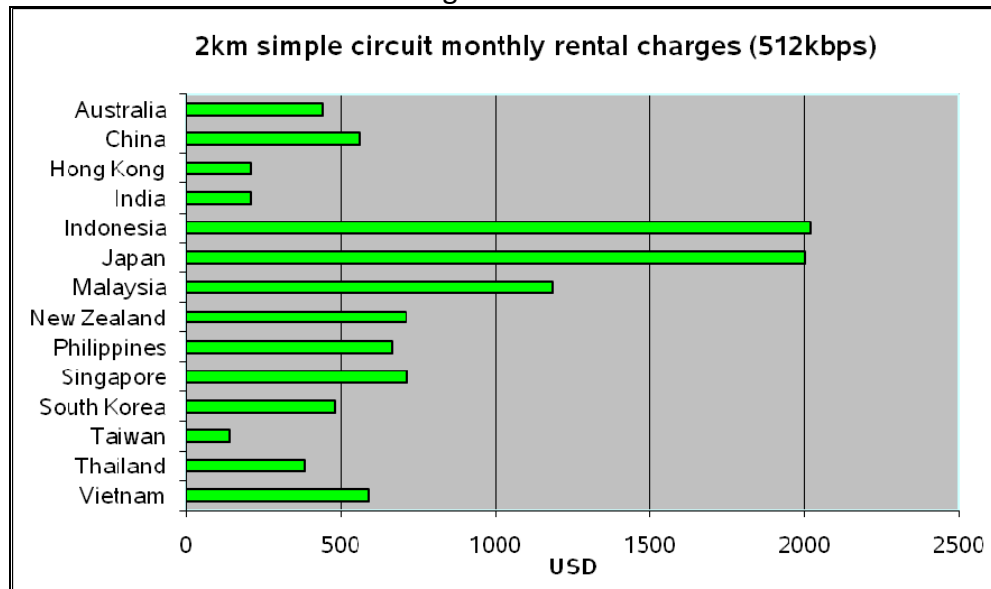


Figure 3.3.2d

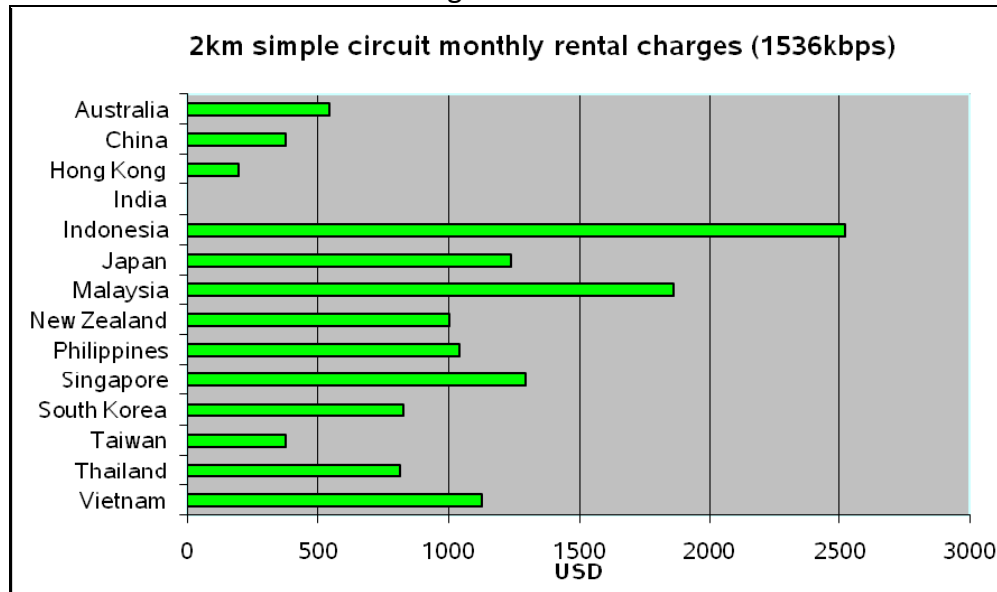




Figure 3.3.2e

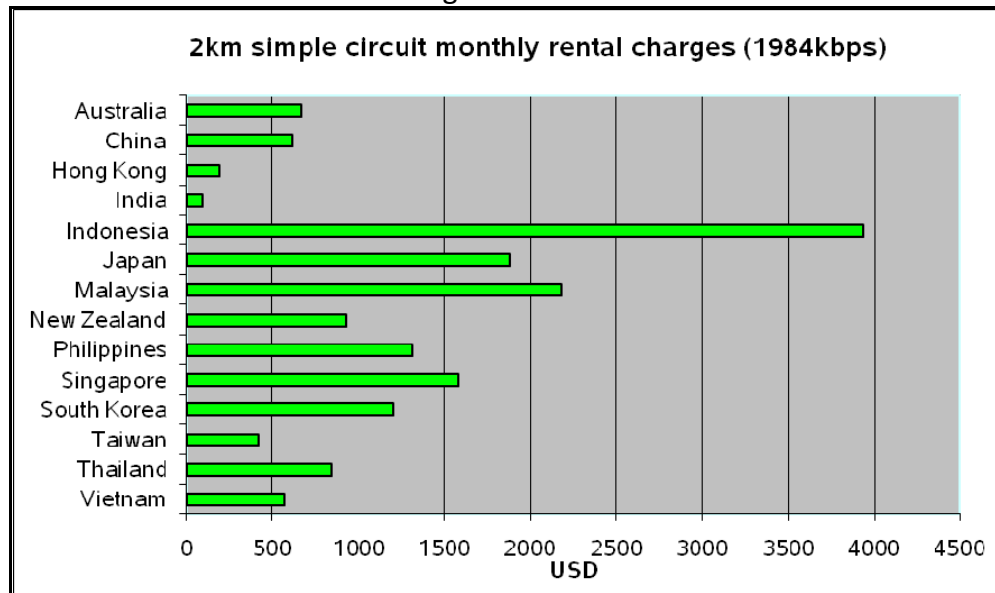


Figure 3.3.2f

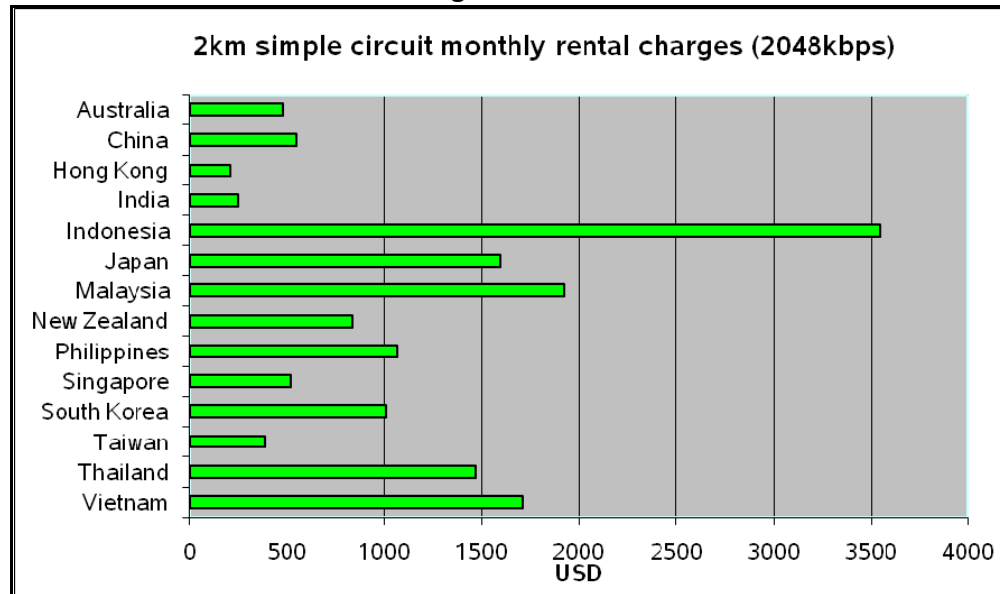


Figure 3.3.2g

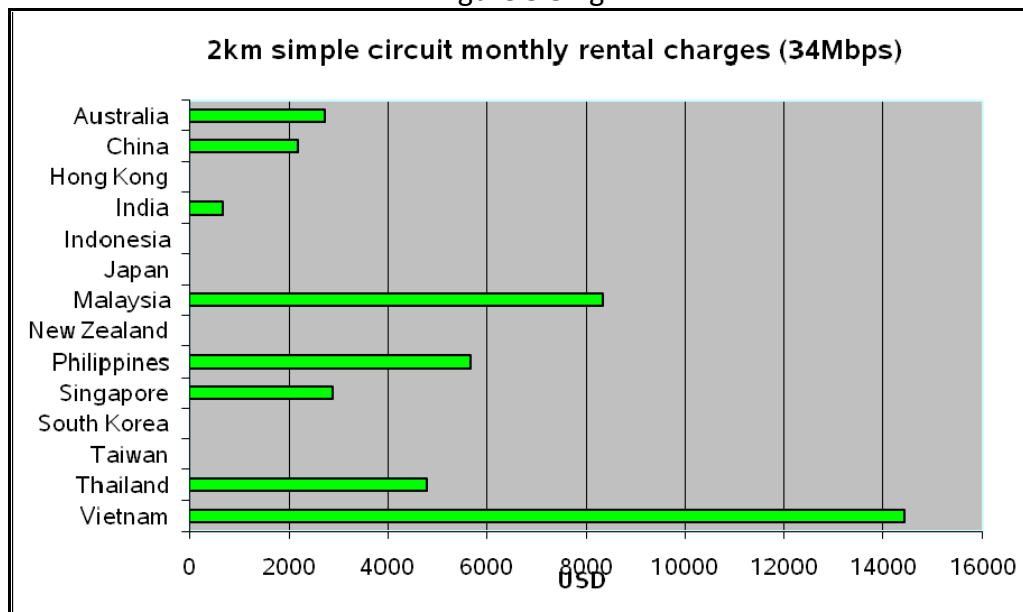


Figure 3.3.2h

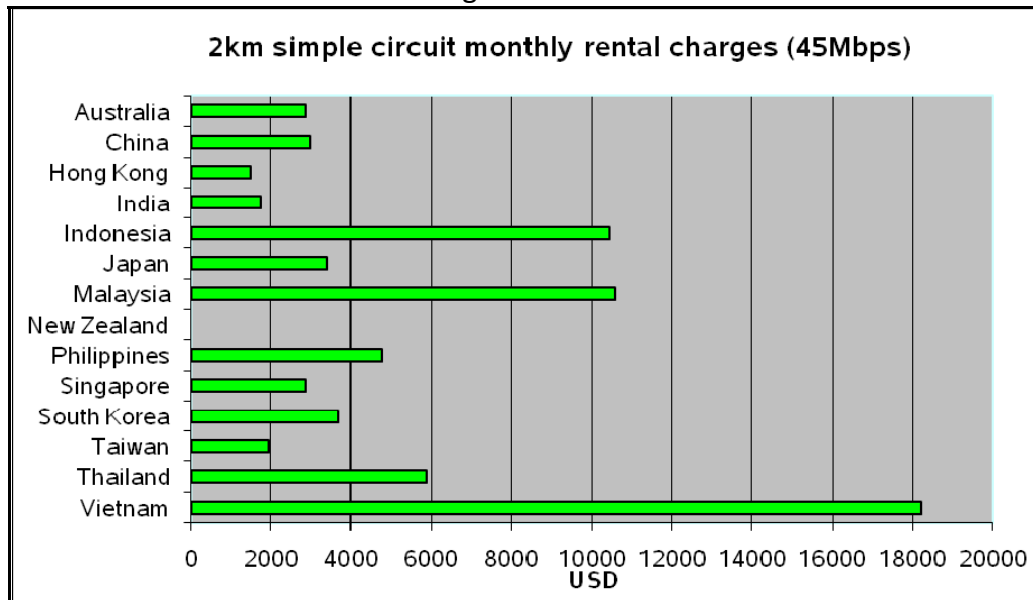
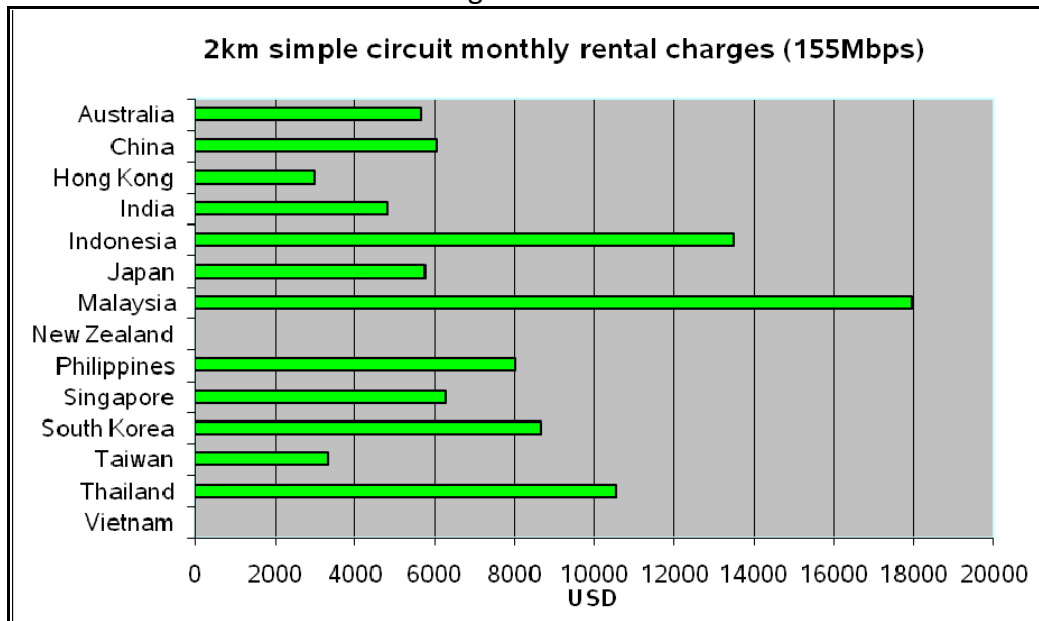


Figure 3.3.2i



### 3.3.3 Installation charge relative to annual rental

Installation charges as a proportion of the first annual leased line rental vary from over 30% in Australia to 1% in Hong Kong (although two of the Hong Kong carriers waive the installation charge). Since 2006 overall the percentages have fallen, or risen only slightly in the cases of Australia and New Zealand, but a dramatic fall appears in India, from 171% in 2006 to just 18% in 2009.

Figure 3.3.3a

Installation Charge relative to annual rental

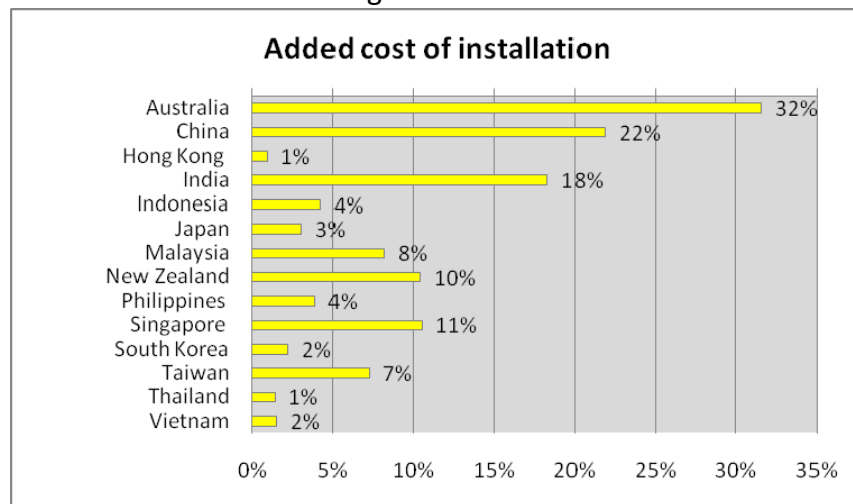


Figure 3.3.3b

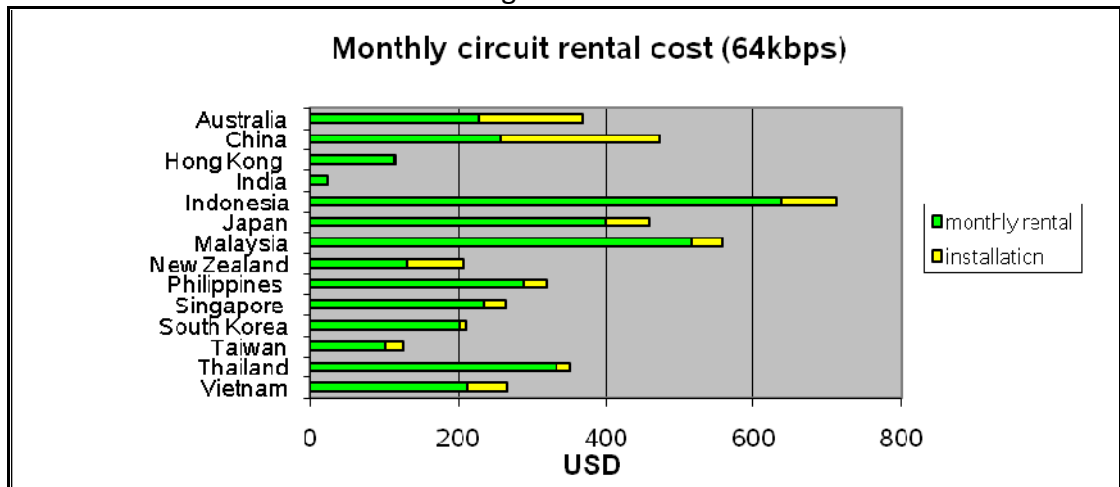


Figure 3.3.3c

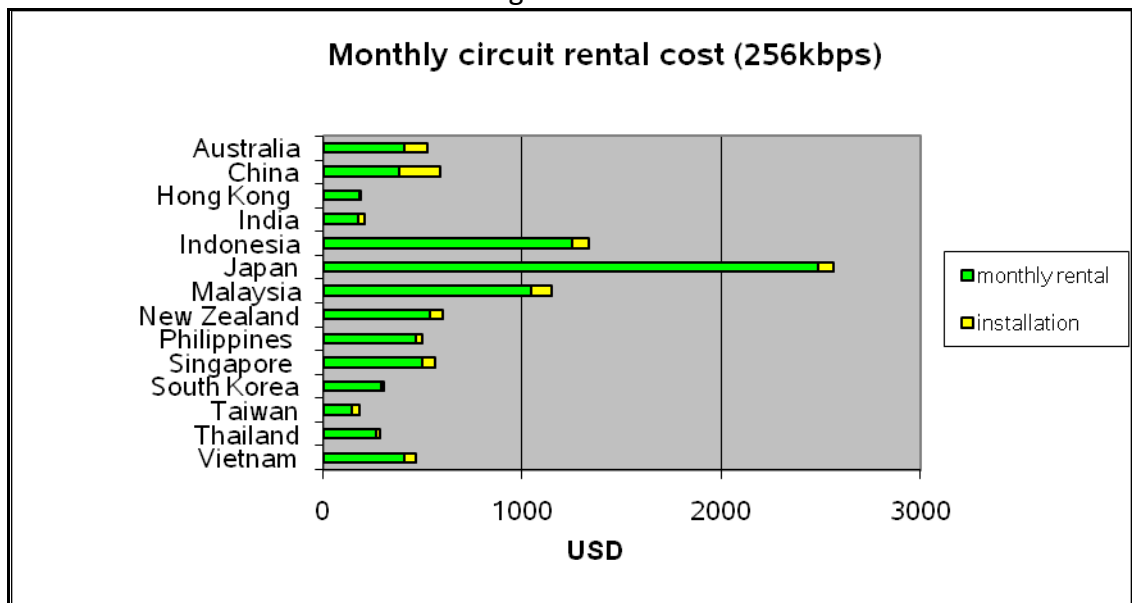


Figure 3.3.3d

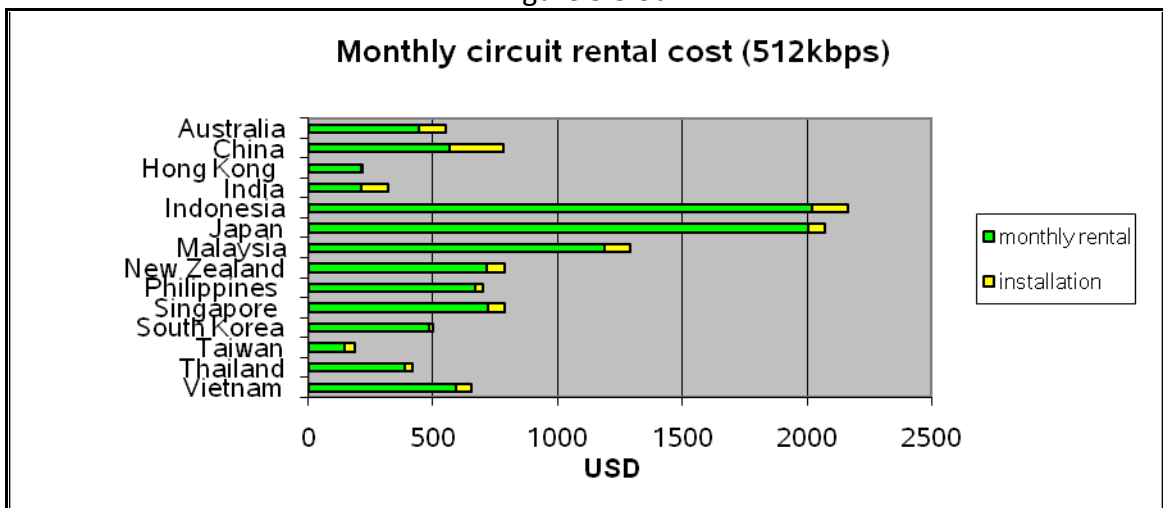


Figure 3.3.3e

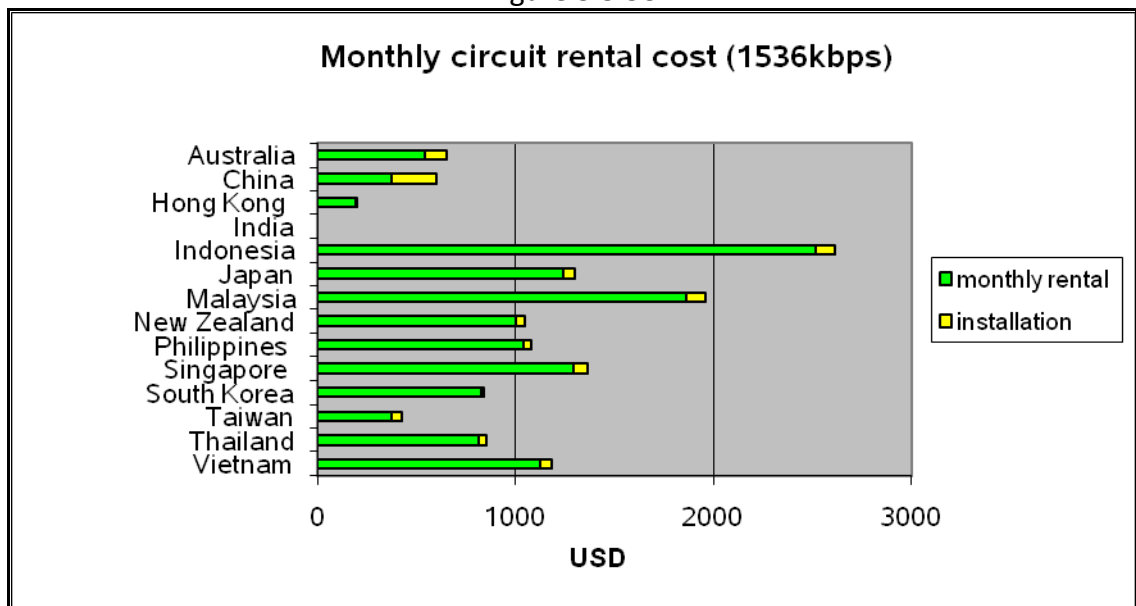


Figure 3.3.3f

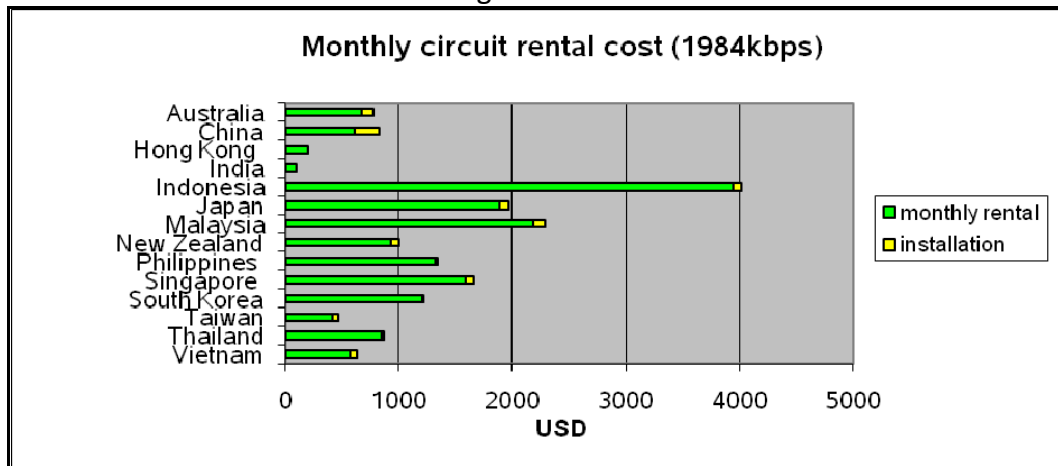


Figure 3.3.3g

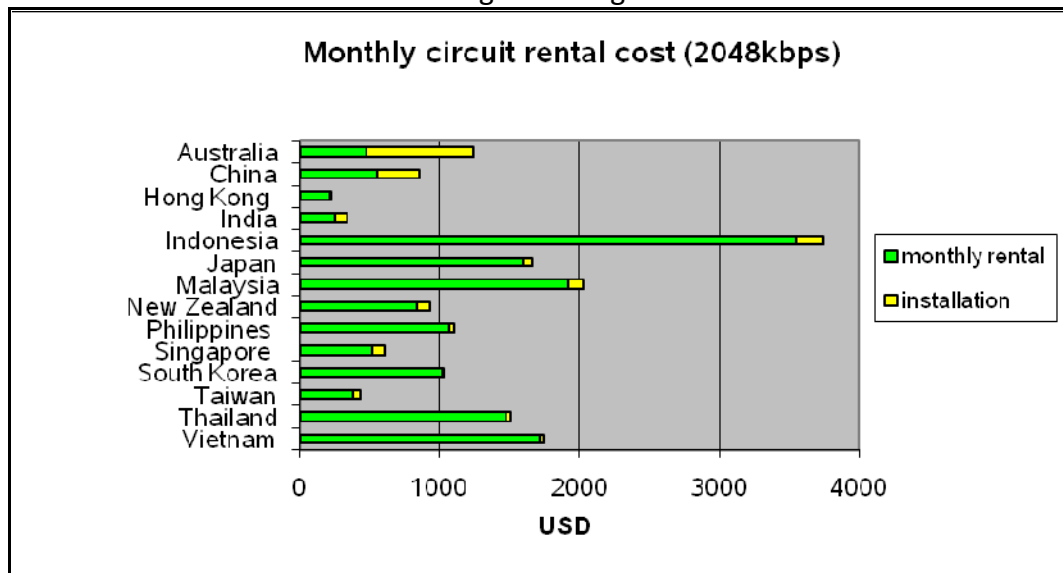


Figure 3.3.3h

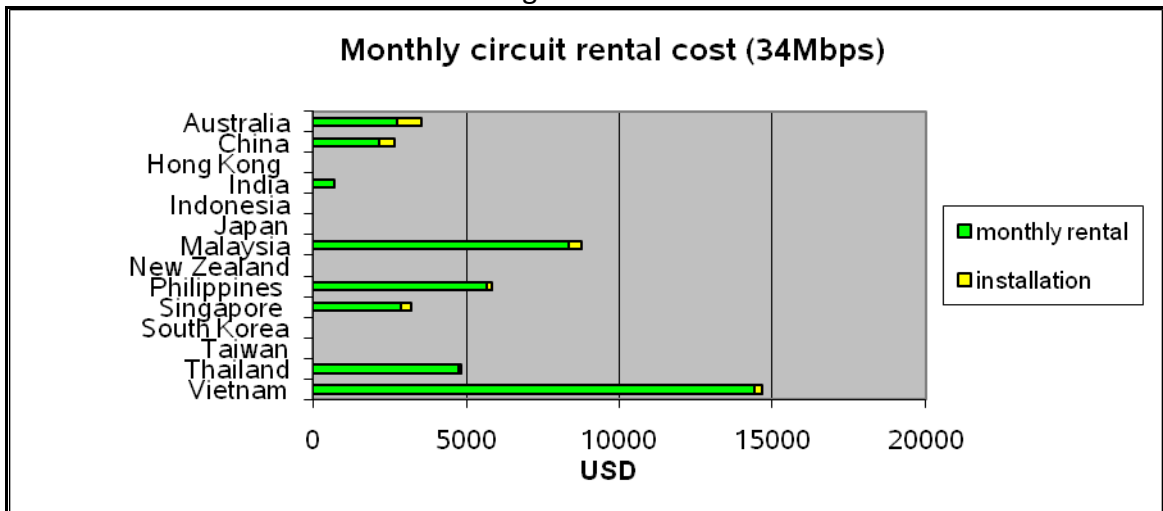


Figure 3.3.3i

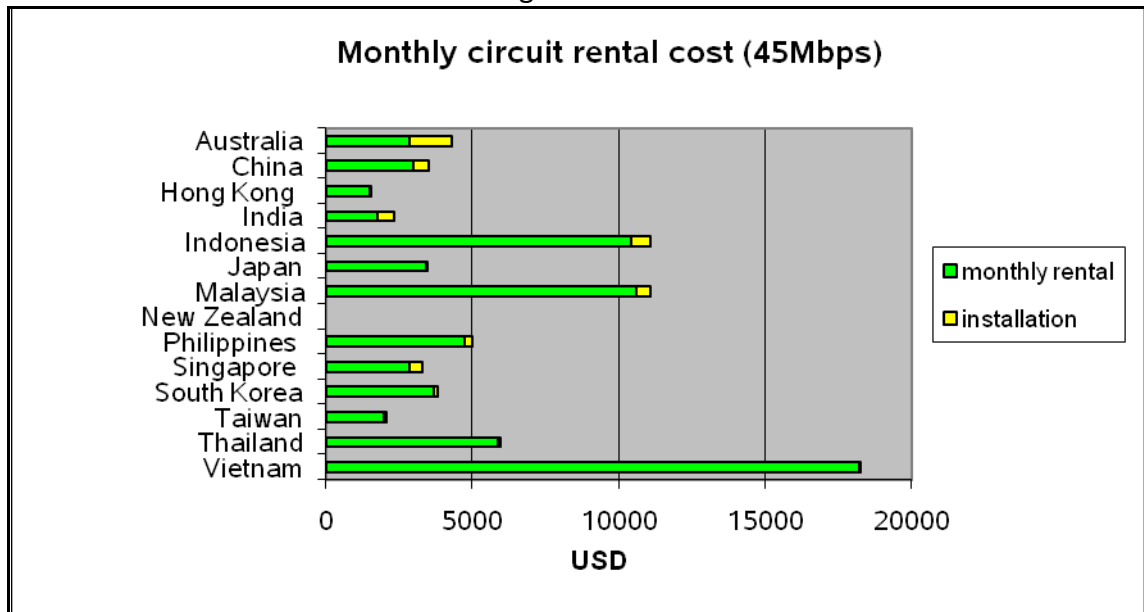
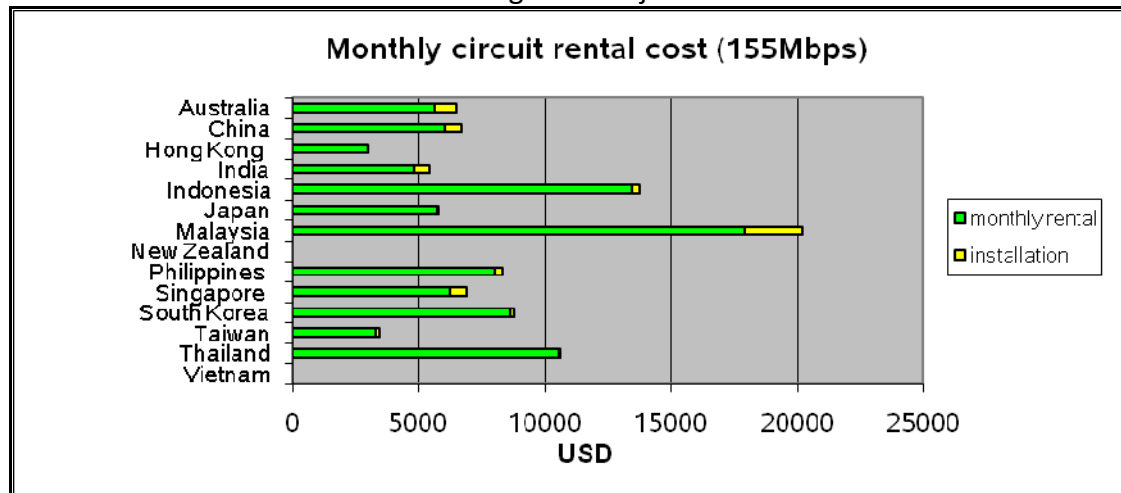


Figure 3.3.3j



### 3.3.4 Monthly Rental Groomed Leased Lines

In 2009 data was reported for groomed leased lines 8 economies, including China, India and Thailand which do not appear in the 2006 report.

Table 3.3.4a  
2km MRC groomed leased line prices, (USD) major cities, 2009

	Australia	China	Hong Kong	India	New Zealand	Singapore	Taiwan	Thailand
<b>64kbps</b>	175	264	95	30	305	178	122	112
<b>256kbps</b>	250	420	157	30	536	317	155	256
<b>512kbps</b>	315	621	194	30	625	452	155	400
<b>1536kbps</b>	479	695	198		1076	837	298	737
<b>1984kbps</b>	550	668	193	30	1123	911	298	843
<b>2048kbps</b>		367	225	30		445	298	874
<b>34Mbps</b>		2033		1187		2309		5252
<b>45Mbps</b>		2922	1757	1187		2432	1324	7623
<b>155Mbps</b>		5166	2921	3184		5058	2323	14034

Note: 1. Prices are simple averages of monthly rental  
 2. China, India and Thailand were not covered in 2006 report



Table 3.3.4b

2km MRC groomed leased line prices including installation, (USD) major cities, 2009

	Australia	China	Hong Kong	India	New Zealand	Singapore	Taiwan	Thailand
64kbps	271	494	95	30	330	197	151	122
256kbps	346	663	157	30	588	354	184	266
512kbps	411	872	194	30	696	489	184	420
1536kbps	575	940	198		2028	874	351	757
1984kbps	646	913	193	30	1144	948	351	863
2048kbps		677	225	30		498	351	894
34Mbps		2523		1187		2595		5289
45Mbps		3365	1757	1187		2815	1430	7660
155Mbps		5740	2921	3184		5529	2481	14108

Note: 1. Prices are simple averages of monthly rental plus 1/2th of the installation charge

2. China, India and Thailand were not covered in 2006 report

Table 3.3.4.1a

Comparison of 2km MRC groomed leased line prices with 2006

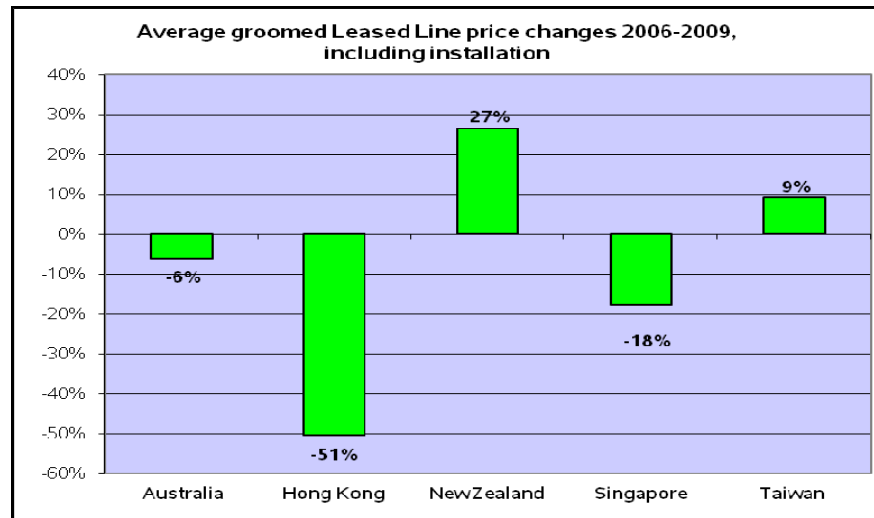
	Australia		Hong Kong		New Zealand		Singapore		Taiwan	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps	176	175	151	95	281	305	165	178	92	122
256kbps	314	250	305	157	479	536	377	317	117	155
512kbps	366	315	385	194	559	625	566	452	117	155
1536kbps	542	479	477	198	921	1076	1105	837		298
1984kbps	598	550		193	974	1123	1221	911		298
2048kbps				225			548	445		298
34Mbps							2839	2309		
45Mbps				1757			3132	2432		1324
155Mbps				2921			5058			2323

Table 3.3.4.1b

Comparison of 2km MRC groomed leased line prices including installation charges with 2006

	Australia		Hong Kong		New Zealand		Singapore		Taiwan	
	2006	2009	2006	2009	2006	2009	2006	2009	2006	2009
64kbps	260	271	161	95	306	330	192	197	141	151
256kbps	398	346	315	157	552	588	434	354	167	184
512kbps	449	411	396	194	634	696	624	489	167	184
1536kbps	626	575	494	198	1005	2028	1162	874		351
1984kbps	682	646		193	1063	1144	1279	948		351
2048kbps				225			588	498		351
34Mbps							3188	2595		
45Mbps				1757			3545	2815		1430
155Mbps				2921			5529			2481

Figure 3.3.4



Note: Simple average of changes across all speeds of groomed leased lines

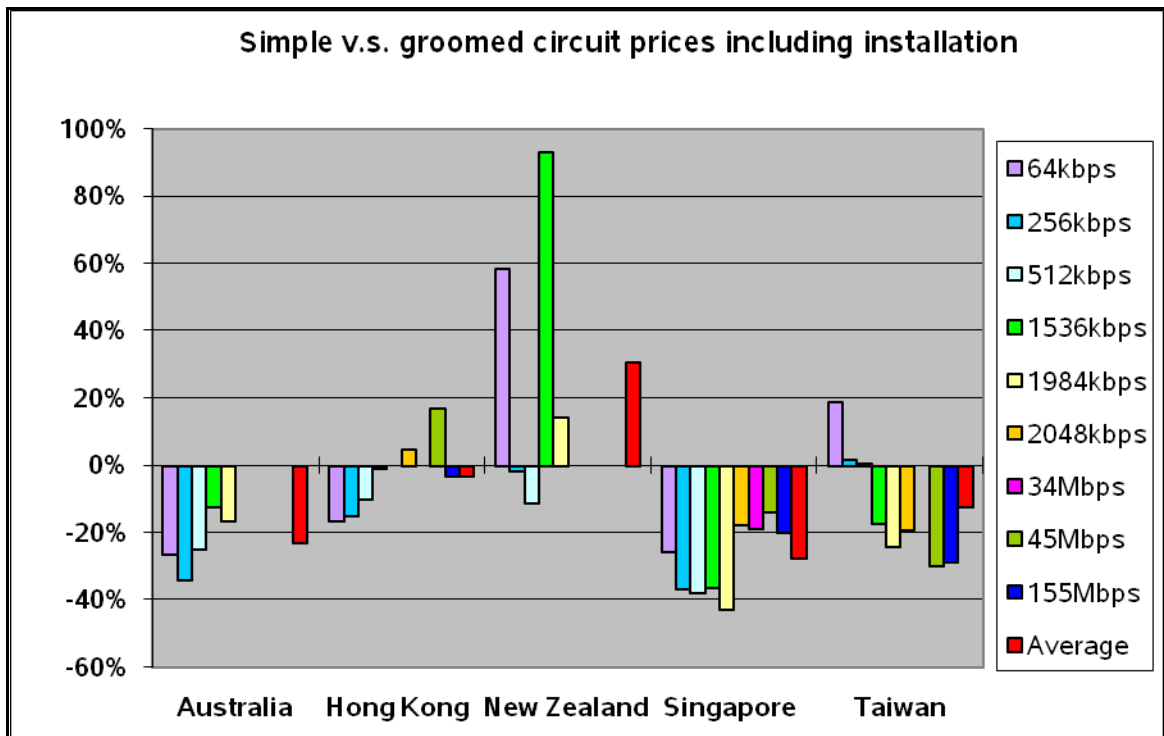
Tables 3.3.4.1a to 3.3.4.1b and figure 3.3.4 indicate

- The price of groomed circuits has fallen significantly in Australia, Hong Kong and Singapore, and has risen in New Zealand and Taiwan, but taking into account exchange rate movements and the local inflation rate, the MRC for groomed leased lines in New Zealand and Taiwan increased less, both by around 9% in real terms. In the case of New Zealand, the average price for groomed leased circuits excluding installation charges actually fell 5.2% in real terms. By contrast, in Taiwan, the leased circuit prices rose in real terms by 29.3%. However, the data for Taiwan is from one correspondent only (true also for Australia and Hong Kong).

### 3.3.5 Comparing Simple and Groomed Circuits

Of the five economies where groomed services were reported in 2009, only New Zealand shows a substantial average premium of groomed over simple leased lines, especially for 64kb/s and 1536kb/s. This is shown in Figure 3.3.5 which includes installation charges to be comparable with the corresponding Figure 3.3.5 in the 2006 report which showed groomed prices above simple leased line prices in Hong Kong and Taiwan.

Figure 3.3.5



### 3.3.6 Price range analysis

The following graphs show ranges (minimum and maximum) of prices below and above the average price for leased lines at different bitrates offered in each economy as reported in 2009. Average prices are indicated by the 100% line. Prices below that line show the percentage of the lowest price to the average price, and prices above that line show the percentage of the highest price to the average price.

Nine bitrates are represented across 14 economies in 2009 compared to 4 across 12 economies in 2006. In all cases the range of prices above the simple average is greater than the range of prices below, the lowest variance being for 34 Mb/s leased lines. This seems to imply a weighting in favour of prices lower than the average, maybe a reflection of discounts and/or of bulk buying by some international carriers. The ranges seem to be rather greater than those reported in 2006 for speeds for E1 and below and lower for the higher speeds when the max prices were as follows:

Table 3.3.6

Upper Price Range percentage differences over average prices, 2006 and 2009

Bitrates	2006	2009	Bitrates	2006	2009
64 kb/s	>200%	>400%	2048 kb/s	>800%	>1100%
256 kb/s	>200%	>800%	45 Mb/s	>1200%	>300%

Figure 3.3.6a

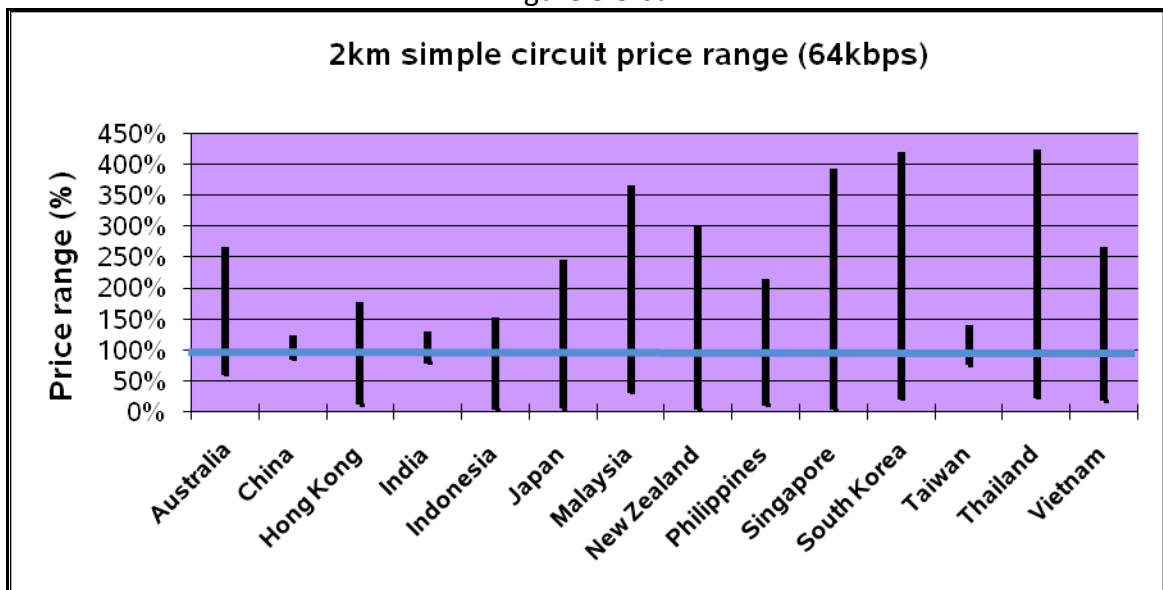


Figure 3.3.6b

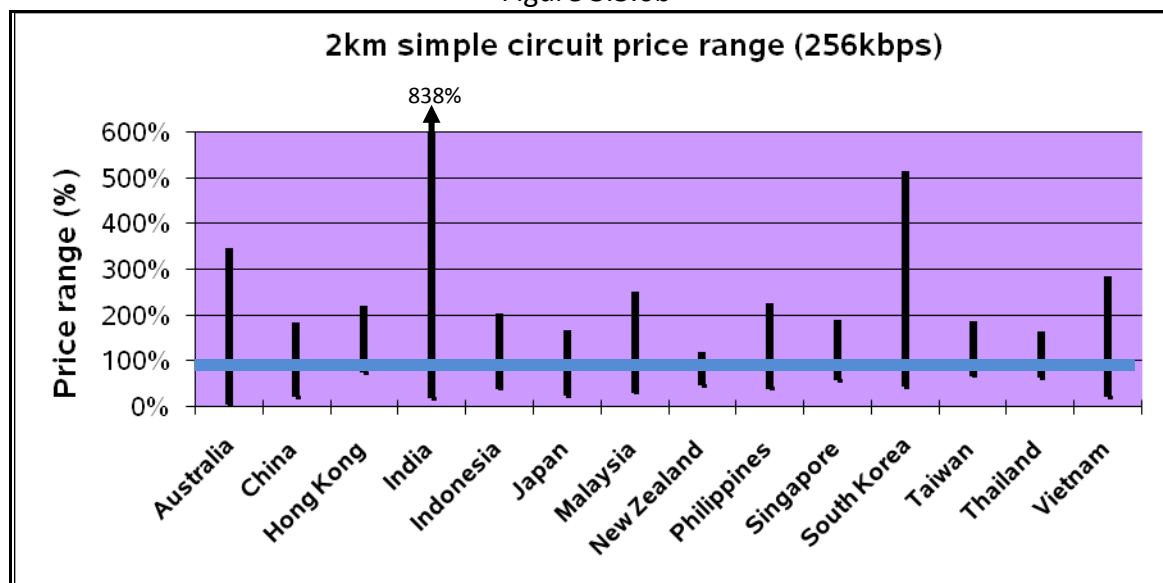


Figure 3.3.6c

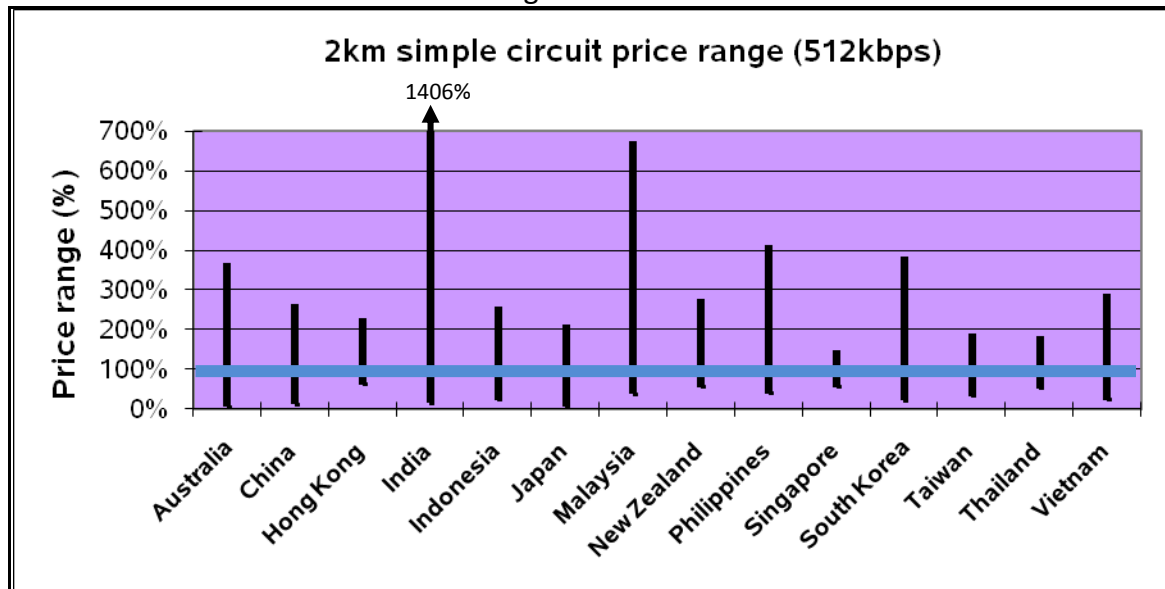


Figure 3.3.6d

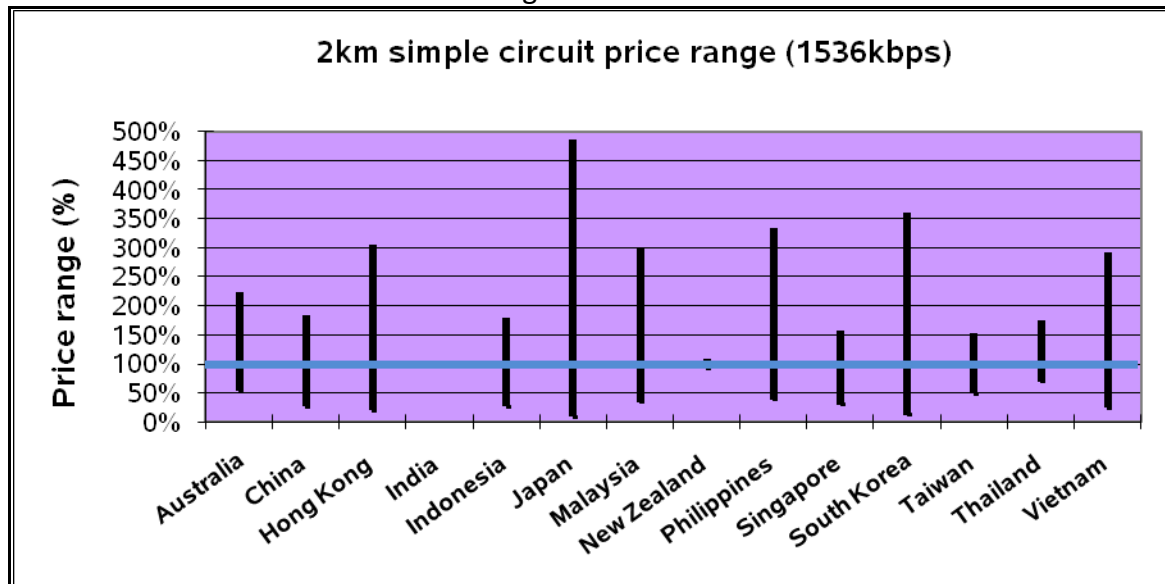


Figure 3.3.6e

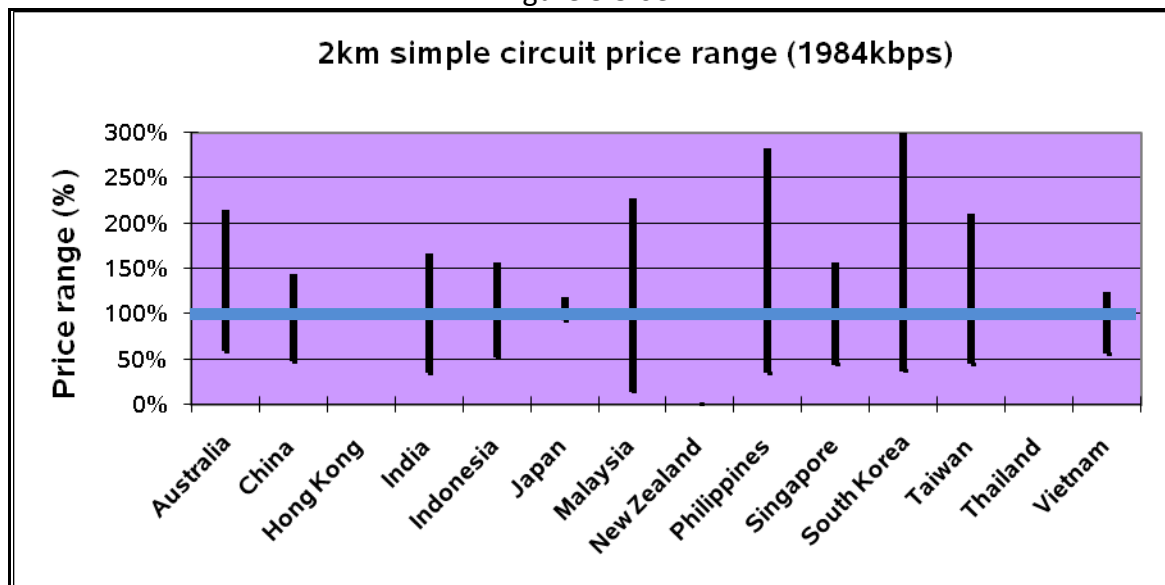


Figure 3.3.6f

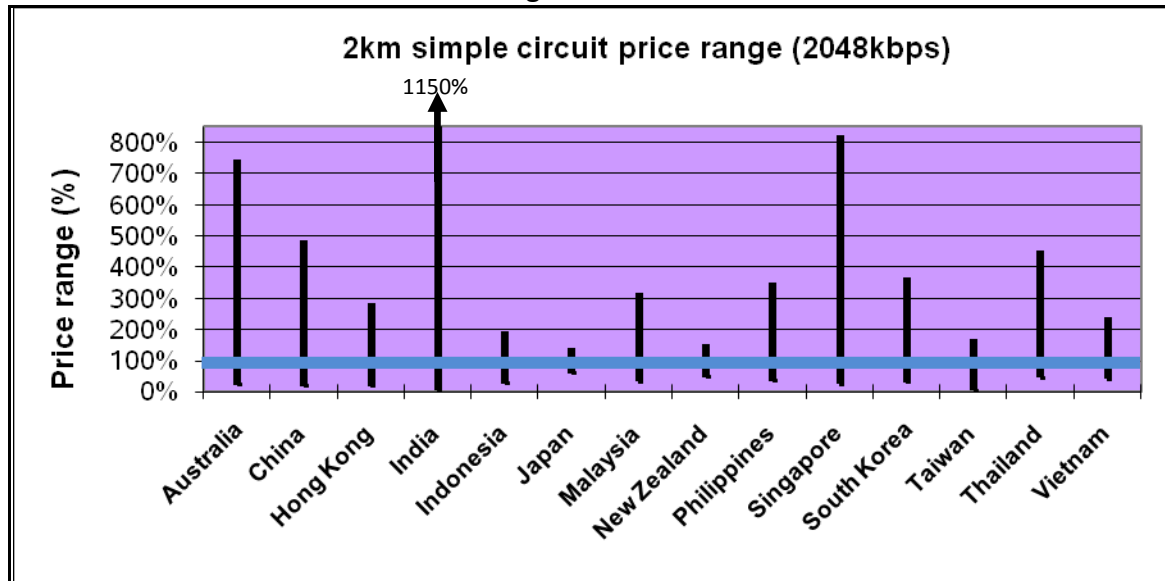


Figure 3.3.6g

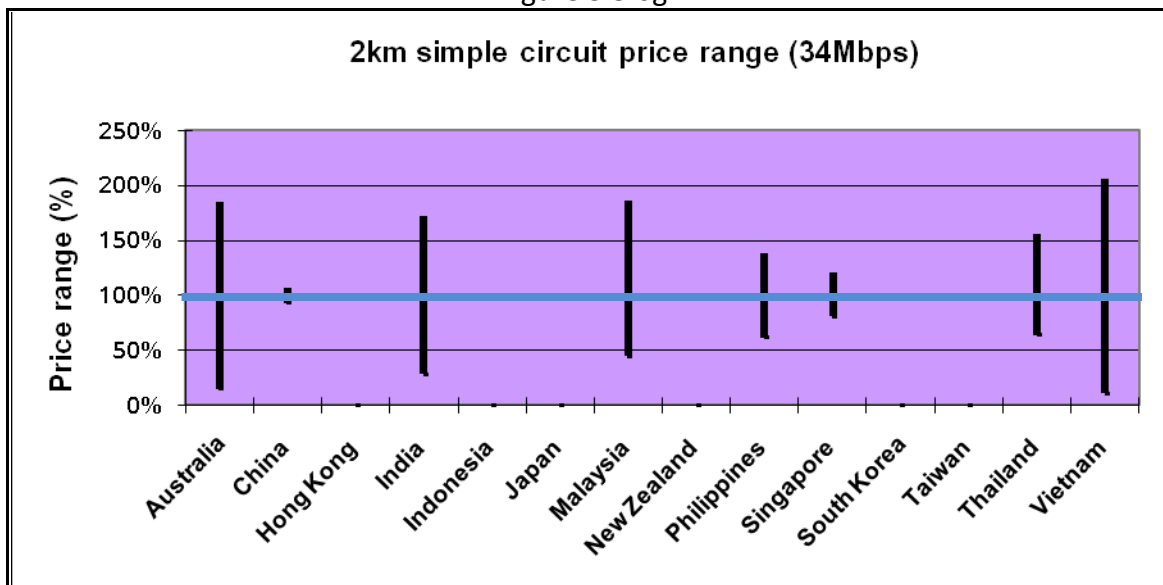


Figure 3.3.6h

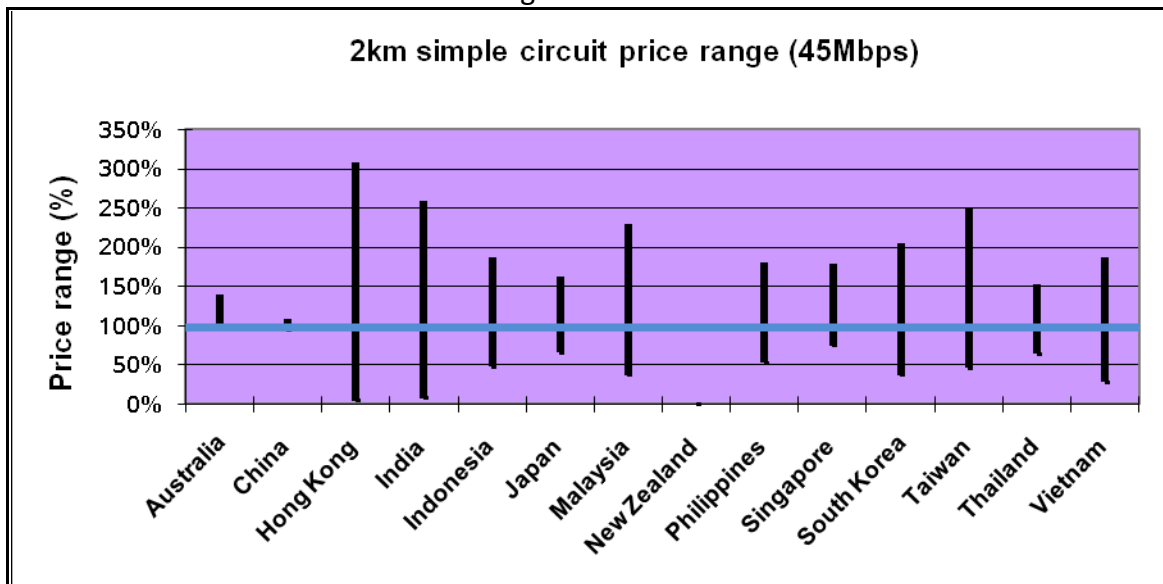
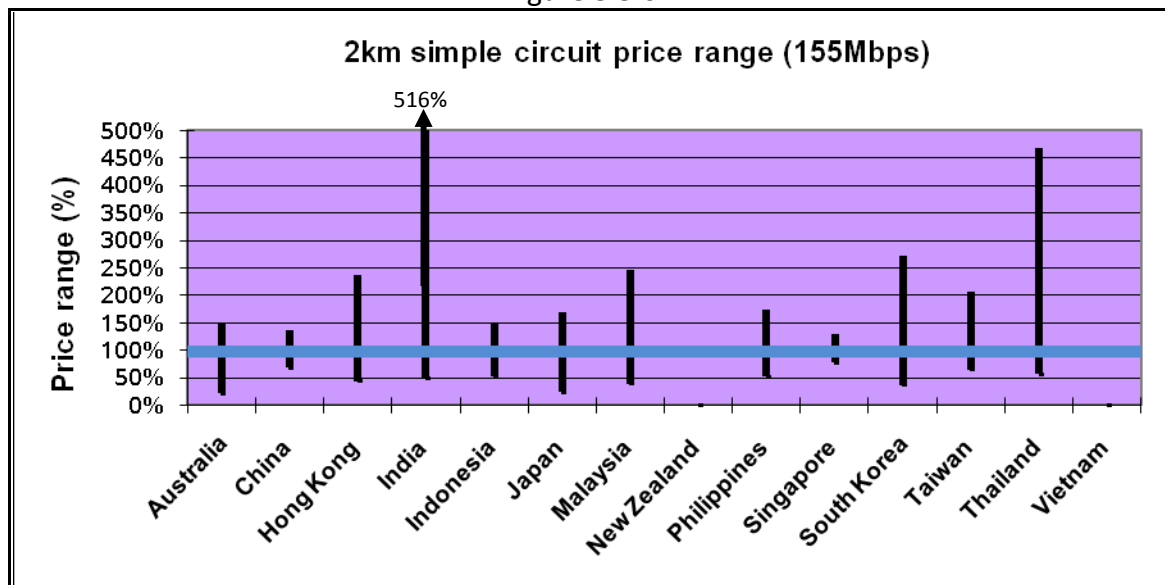


Figure 3.3.6i





## 4. Ethernet Access

In 2009 sufficient data was available from 13 economies, but none from Vietnam, compared to six economies in the 2006 report, although the inference was that Ethernet was available in all the 12 economies covered by the 2006 report. The bitrates reported in 2009 excluded some of the lower bitrates of the 2006 report and included 50 Mb/s as well as 10 Gb/s. In 2009 the speeds reported were the following:

2 Mb/s	100 Mb/s
10 Mb/s	1 Gb/s
50 Mb/s	10 Gb/s

Almost all these bitrates were used in the 13 economies reporting Ethernet access. In the 2006 report in some economies lower bitrates were in use of 4 Mb/s, 6 Mb/s, 8 Mb/s, 20 Mb/s and 40 Mb/s.

### 4.1 Coverage

Data from 13 economies was reported in 2009, excluding New Zealand or Vietnam. Eleven economies were reported in 2006, excluding Japan.

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

### 4.2 Point-to-Point (P2P) Ethernet

P2P Ethernet connections are dedicated circuits (uncontended) but may vary according to the technical facilities supplied by domestic operators. Only price information was reported in 2009, similar to 2006. Point-to-multipoint (PMP) information was separately identified in the 2009 report and is shown in section 4.3 below. The comparisons below assume that the information provided in 2006 relates to P2P.

Figure 4.2a

2 Mb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

2Mbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Australia				1412	602	631
China				3060	676	
Hong Kong	409	237	237	52	322	
India	1304	34	34		756	
Indonesia					1138	1000
Japan				593	1434	
Malaysia				3200	1364	
New Zealand	425	536	536	356	284	
Philippines				350	500	
Singapore	1317	703	703	1852	692	
South Korea				159	1647	
Taiwan				399	230	
Thailand				229	828	

Figure 4.2b

10 Mb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

10Mbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Australia	3874	1012	1211	3954	999	1207
China				3048	1170	
Hong Kong	362	739	739	89	661	
India	2319	169	169			
Indonesia						2222
Japan				774	1800	
Malaysia				1910	4204	
New Zealand	425	809	809	928	1614	
Philippines				3050	1978	
Singapore	2543	2884	2884	2971	2082	
South Korea	1038	1770	1770	879	2035	1646
Taiwan				438	798	
Thailand				297	1902	

Figure 4.2c

50 Mb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

50Mbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Australia				4501	1574	2285
China				5548	3071	
Hong Kong				0	1385	
Indonesia						4444
Japan				663	2758	
Malaysia				3520	8457	
New Zealand						
Philippines				500	500	
Singapore				2702	3705	
South Korea				1473	4826	1843
Taiwan				977	1458	
Thailand				448	5369	

Figure 4.2d

100 Mb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

100Mbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Australia	4903	2355	2828	4406	2107	3046
China				5756	4349	
Hong Kong	1170	1323	1323	204	1085	
India	5797	2952	2952	729	303	
Indonesia						7777
Japan				762	3513	
Malaysia				4587	11711	
New Zealand	823	1914	1914		983	
Philippines				3750	4947	
Singapore	3905	7103	7103	4031	5153	
South Korea	1038	5833	5833	1766	6099	5115
Taiwan				953	2138	
Thailand				448	7653	

Figure 4.2e

1 Gb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

1Gbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Australia	7498	5063	6370	8152	6203	6807
China				3971	24368	
Hong Kong	2272	3585	3585	0	1867	
Japan				576	5616	
Malaysia				6526	38937	
New Zealand						
Philippines				3750	16775	
Singapore	18435	10226	10226	5508	6414	
South Korea				2194	9968	11668
Taiwan				1970	13699	
Thailand				973	31283	

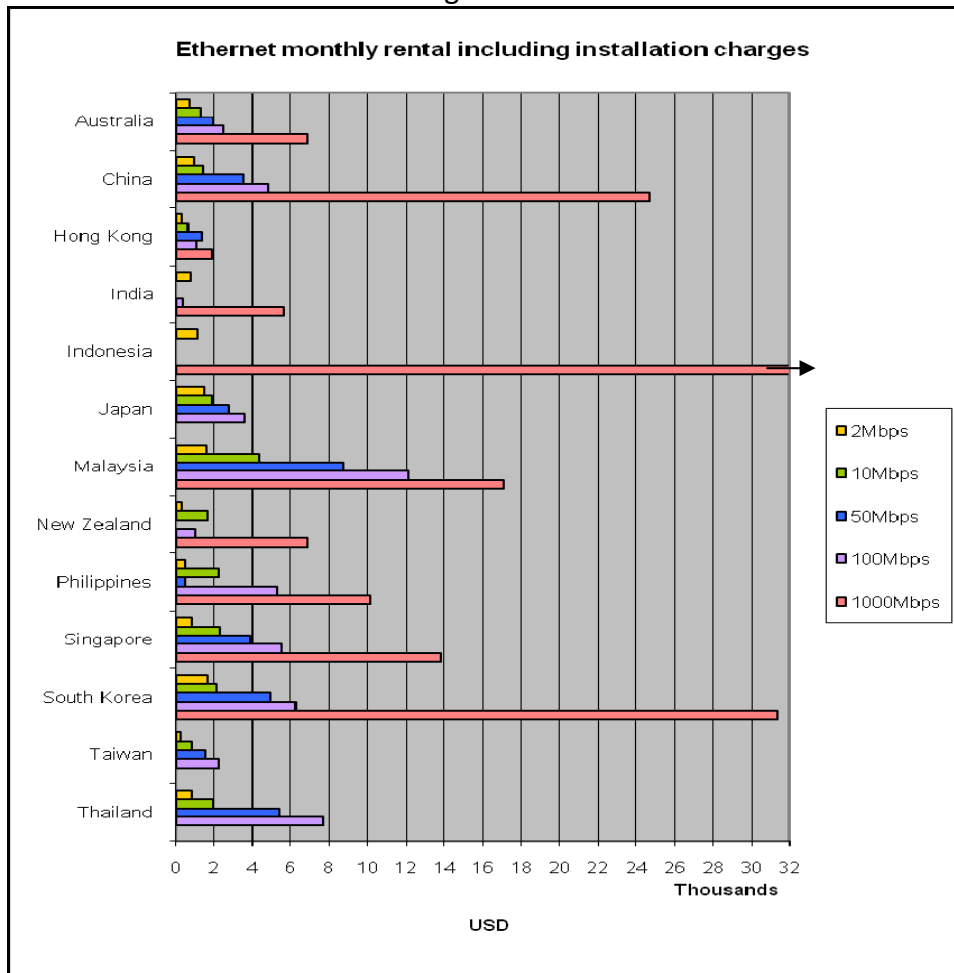
Figure 4.2f

10 Gb/s Ethernet P2P monthly rentals and installation charges, 2006 and 2009

10Gbps	2006			2009		
	Installation	2km	5km	Installation	2km	>2km
Japan				2337	13402	
Singapore				4845	23570	

In the five tables above in which Malaysia appears, it charges the highest prices in four of them and the second highest in the fifth. Thailand comes second in three of them, while South Korea comes first once and second once. Unlike 2006, Singapore is no longer the most expensive but is consistently more expensive than Hong Kong, the lowest priced, by a factor of at least two or three. Figure 4.2 shows 2009 installation charges for P2P Ethernet connections across the range of bitrates. Installation charges generally increase according to bitrate. For 100 Mb/s installation charges are notably a step-change higher than for lower bitrates

Figure 4.2



Note: 1. Prices are simple averages across the available data, in USD  
 2. Installation is distributed over 12 months

### 4.3 Point-to-Multipoint (PMP) Ethernet

Data for uncontended PMP Ethernet connections in 2009 was available from 8 economies, and for contended connections from 5 economies. As with P2P connections, Malaysia and Thailand appear to charge the highest prices, while Singapore consistently charges more than Hong Kong.

Table 4.3a  
PMP Uncontended

PMP uncontended	Australia			Hong Kong		Japan			Malaysia	
	Install	2km	>2km	Install	2km	Install	2km	>2km	Install	2km
2 Mbps	1781	608	608	172	186	726	1223	882		
10 Mbps	1516	886	976	172	438	769	1483	882	1455	2553
50 Mbps	1516	1604	2009	430	1089	950	1321	1323	5818	7855
100 Mbps	3777	2070	2610	0	1376	769	3391	1323	5818	9818
1 Gbps	5652	5360	5964	0	2064	280	5944	13233	11636	39273
10 Gbps										

PMP uncontended	New Zealand		Singapore		S.Korea		Thailand	
	Install	2km	Install	2km	Install	2km	Install	2km
2 Mbps	1000	311	1275	636			451	1158
10 Mbps	1000	511	3501	1848	800	1382	451	2707
50 Mbps	1000	955	2648	3574	1552	3275	902	6749
100 Mbps	1000	1215	3622	4748	1552	4666	902	9417
1 Gbps	2000	3538	5611	5818	1552	9334	1504	32565
10 Gbps			6897	26897				

Table 4.3b  
PMP Contended

PMP contended	India		Japan			Malaysia		Philippines			S.Korea	
	Install	2km	Install	2km	>2km	Install	2km	Install	2km	>2km	Install	2km
2 Mbps		46	280	1697	882					1680		
10 Mbps		89	409	1125	882	1455	2553			3750	800	1382
50 Mbps		224			1323	5818	7855			4550	1552	3275
100 Mbps		368	409	1343	1323	5818	9818			5550	1552	4666
1 Gbps		3377	280	5944	13233	11636	39273			7350	1552	9334

## 5. Digital Subscriber Line (DSL)

Price information for the leasing of symmetrical DSL was reported from 6 economies and for asymmetric DSL from 8 economies. In 2006 price information was available from 5 economies but was insufficient 'to develop meaningful and reliable price benchmarks for DSL circuits.' (p. 32)

### 5.1 Symmetric/Asymmetric DSL

Tables 5.1a and 5.1b provide data on monthly rental prices and installation charges (in parenthesis). Hong Kong appears to charge the lowest prices for symmetric DSL bitrates, but Japan for asymmetric DSL bitrates. The appearance of China in table 5.2 is significant as the prices seem quite comparable.

Table 5.1a  
DSL Symmetric

Downlink / Uplink (Kbps)	Australia	Hong Kong	Japan	Singapore	Taiwan	Thailand
64 / 64			23(485)			
128/128						160(100)
256 / 256	40(369)					265(100)
512 / 512	83(346)			107	49(72)	360(100)
1000 / 1000			131(123)			
1024 / 1024	313		133(205)	184		
1538 / 1538	44(53)		398(412)			
2048 / 2048	409(2435)	57				
3072 / 3072			68(273)			
4000 / 4000		105				
6000 / 6000		432				
8000 / 8000		515				
10000 / 10000		600				
15000 / 15000	1628					

Installation charges shown in parenthesis

Figure 5.1b  
DSL Asymmetric

Downlink / Uplink	Australia	China	Hong Kong	Japan	Singapore	South Korea	Taiwan	Thailand
256 / 64kbps	30(175)							
256 / 128kbps					92(214)			
512 / 128kbps	37(175)	78(250)						
512 / 256kbps		119(250)			129(214)			
512 / 640kbps	110(270)							
640 / 1538kbps			32					
640 / 6000kbps			34					
1000 / 512kbps				18(215)				
1024 / 128kbps							36(91)	
1024 / 512kbps					217(214)			560(100)
1024 / 1538kbps	164(270)							
1538 / 256kbps	34 (80)							
1538 / 512kbps				27(215)				
1538 / 640kbps			488(600)					
1538 / 2000kbps	209(270)							
2048 / 256kbps							50(91)	
2048 / 512kbps	82(270)	289(206)						820(100)
2048 / 768kbps					457(214)			
2048 / 2200kbps	241(270)							
4000 / 768kbps					457(214)			
4000 / 1000kbps							43(52)	
4000 / 1024kbps							82(86)	
4000 / 2000kbps			65					
6000 / 768kbps					700(214)			
6000 / 640kbps						30(30)		
8000 / 512kbps	83(175)							
8000 / 640kbps							102(91)	
8000 / 1000kbps	114(270)			62(203)				
12000 / 1000kbps				28(215)				

Installation charges shown in parenthesis

## 5.2 DSL installation charges

According to tables 5.3a and 5.3b installation charges in the economies reported in 2009 for symmetric bitrate circuits do not exceed 17% (a simple average is 12%) and for asymmetric bitrate circuits do not exceed 0.6%.

Figure 5.2a  
Installation charges as percentage of annual rental (symmetric)

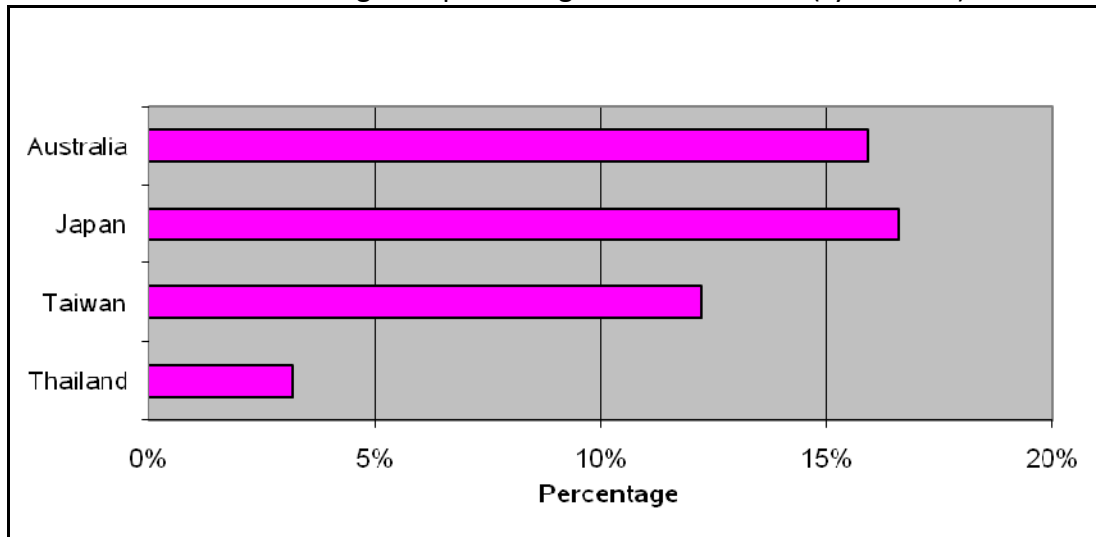
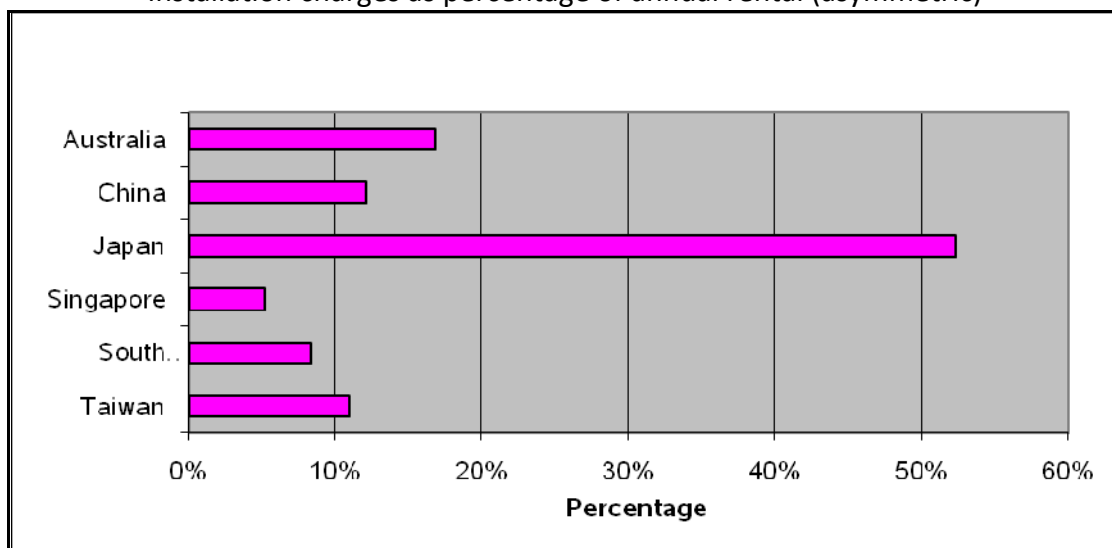


Figure 5.2b  
Installation charges as percentage of annual rental (asymmetric)





## 6. Leased Circuits vs. Ethernet

Following the 2006 report, Figures 6.1a and 6.1b compare leased line prices with Ethernet access prices, noting that although they are not necessarily substitutes many companies may be considering moving over to all-IP platforms in the future.

Figure 6.1a  
2 Mb/s Leased Line vs 2 Mb/s Ethernet

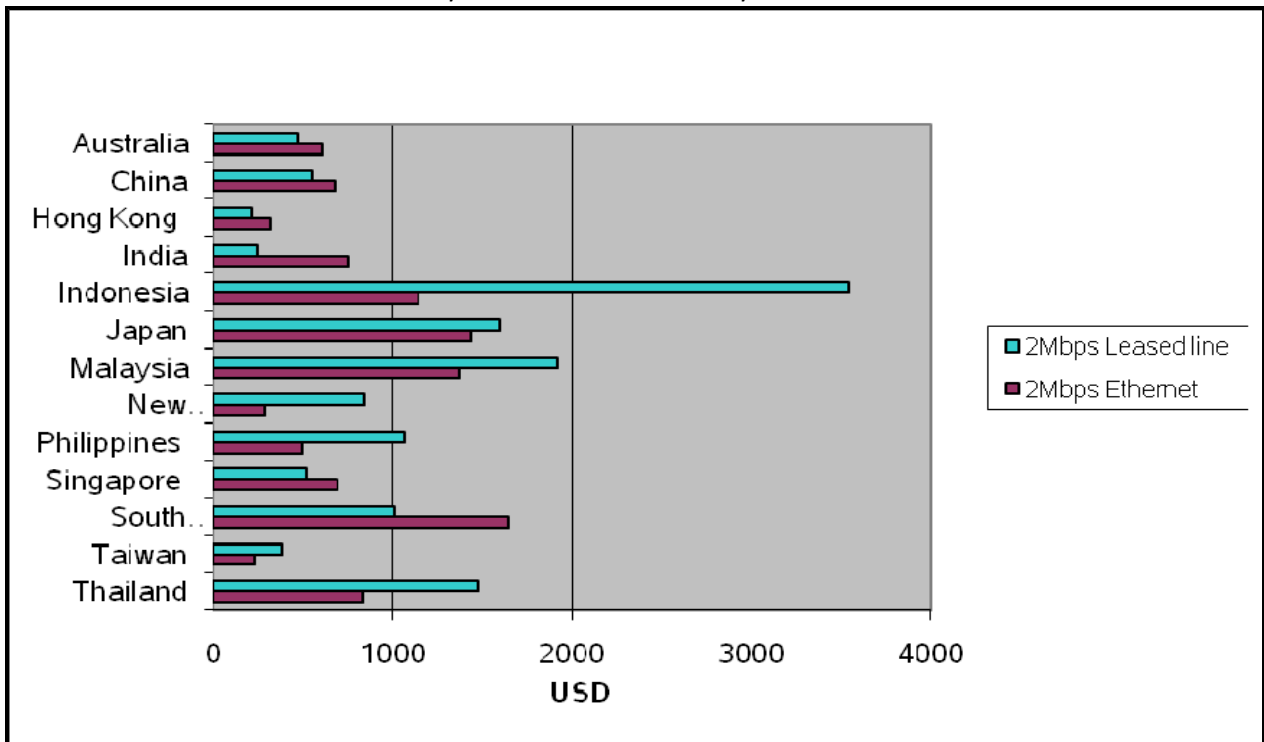
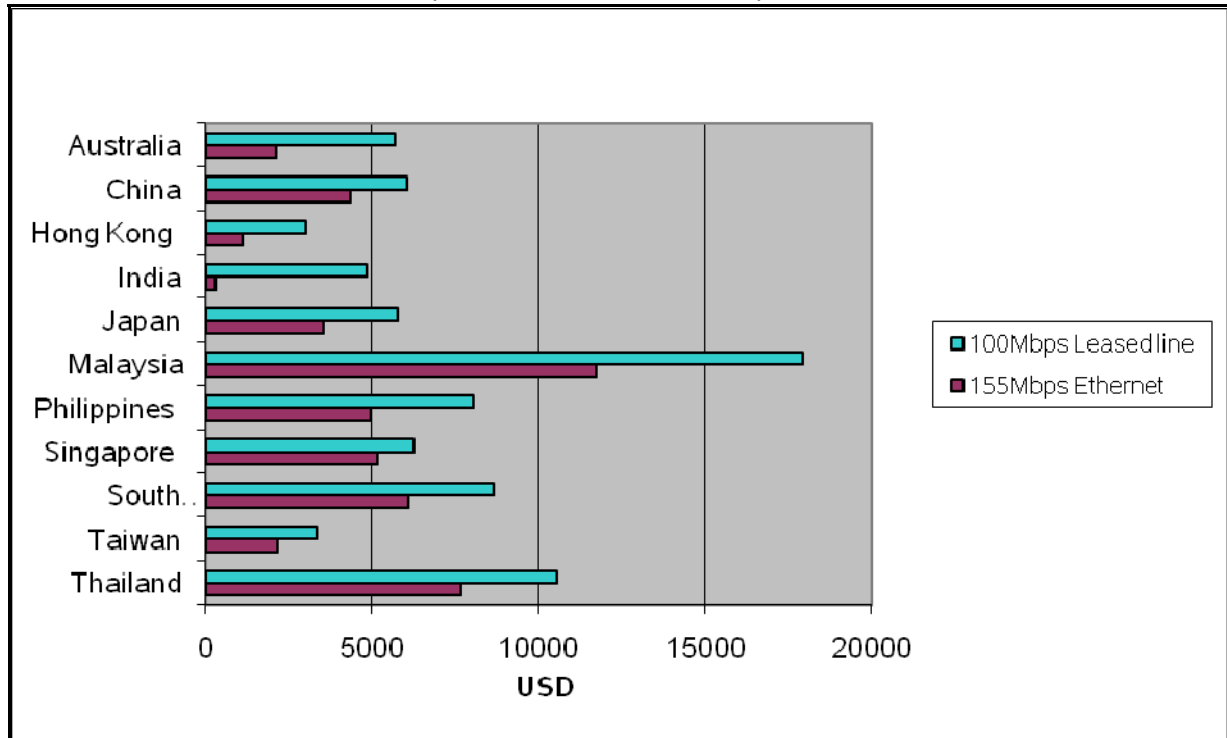


Figure 6.1b  
155 Mb/s Leased Line vs 100 Mb/s Ethernet



The 2006 report found no discernible relationship between the two sets of prices, and none appears in 2009. However, in 2006 Ethernet prices were lower than leased line prices in virtually all cases. In 2009 this is true for the higher speeds, but no longer the case for 2 Mb/s for India, Hong Kong and Singapore; nor for Australia, China and South Korea which were not represented in 2006.

## 7. Conclusion

The economies that appear to charge the highest prices for leased circuits in the three categories (leased lines, Ethernet access and DSL) are Indonesia, Malaysia and to a lesser extent Thailand. But Japan and Vietnam are also noticeable for being in the high range for simple leased circuit prices. As this list does not contain China, or, for example, the Philippines, this suggests that prices are mainly influenced by domestic factors in these economies rather than being directly correlated to levels of economic development. For example, even where domestic carriers are predominately state-owned there are known and marked differences between economies in policy, regulation, levels of investment and competition.

Some of the apparent price increases 2006-2009 are in fact reductions when measured in real or constant 2006 US dollars terms, and it is important to distinguish these elements from the more fundamental causes of price changes. The following is a summary of the main findings from the data for each category of leased circuit.

### Leased Lines

- As in 2006, Indonesia and Malaysia continue to have significantly higher prices for leased lines, and this extends from the lowest to the highest speeds. Deflating the price increases by local rates of inflation and exchange rate movements nets out at nearly 44% for Indonesia – in other words, the current price increase of 11% (see figure 3.3.1) represents a real price *decrease* in constant 2006 dollar terms of 33%. However, the same exercise nets out at just over 5% of the price rise in Malaysia - in other words the average leased line price in real terms in Malaysia *rose* 28%.
- Leased line prices in India appear to have risen substantially over their 2006 levels, by 80% using simple averaging, and especially at the higher speeds. The combined effect of exchange rate depreciation and the inflation rate nets out at nearly 38% and therefore in real terms, India's average leased circuit prices *rose* around 42%.
- Increases in the real (deflated current dollar prices) price of leased lines 2006-2009 seem to have taken place in India (42%), Malaysia (28%), Philippines (26%), Taiwan (25%) and Thailand (24%).
- The price ranges above the simple average price for leased circuits up to and including E1s are greater for 2009 than for 2006. This may suggest greater discounting and/or bulk buying.

## **Ethernet**

- Malaysia appears to charge the highest prices in 2009 in four of five bitrate categories, and comes second highest in the fifth. Thailand comes second in three of them, while South Korea comes first once and second once. Unlike 2006, Singapore is no longer the most expensive but is consistently more expensive than Hong Kong, the lowest priced, by a factor of at least two or three.
- There are not too many P2P Ethernet prices to compare between 2006 and 2009, but of those there are most show a decline in either unadjusted (current price) or adjusted (real price) terms. The only exceptions reported are for 2 Mb/s (2 km) in Hong Kong (28% real increase), a massive >2000% increase in India which (raises questions over the reported prices in the 2006 report) and for 10 Mb/s (2 km) in New Zealand (81% real increase). But it must be emphasized that it is not possible to know from the data alone just how representative reported prices really are.

## **Digital Subscriber Line (DSL)**

- Reports of leasing DSL circuits came from more economies, 6 for symmetric and 8 for asymmetric, than in 2006 which reported from 5 economies. Hong Kong appears as the lowest priced for symmetric and Japan for asymmetric, but the appearance of China for the first time is significant.