

Comparative Deregulation of Far Eastern Telecommunications Markets¹

Economic Incentives and International Competitive Strategies

Terrence P. McGarty
The Telmarc Group, Inc.²

and

Jacob Davidson
Delta Three³

Abstract

The deregulation of telecommunications has taken a major step with the WTO agreements in February of this year. Namely, each of the major Far Eastern countries has agreed to open their market in some form of planned entry. These markets will allow for the introduction of competition of local and international services now currently restricted to the local PTT as well as allowing the entry of new services in what are generally closed markets. This paper analyzes the implications of changes in several key Far eastern countries and discusses how this will impact the U.S. economy and the overall policy implications that this will focus on.

1. INTRODUCTION

This paper discusses the entry into a set of dominant Far Eastern markets. It discusses the current status, the proposed changes in those markets and what is anticipated in terms of new entrants. In addition the paper reviews the overall economy of each of these countries and presents an overview of the economic impact that changes in regulation will have on each specific market. The paper also presents several case studies relating to each of these markets to demonstrate the changes that are occurring and by focusing on specific example attempt to project changes in these markets based upon actual results that have already occurred. The examples focused upon are competition in local telephony, competition in wireless/cellular, competition in the LMDS areas, and competition in international telecommunications.

The paper analyzes each of the opportunity segments across each of the target countries. The target countries include the following: China, Hong Kong, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan, Thailand, Vietnam. It discusses the potential economic impact upon the United States as well as between and amongst the target countries that the proposed changes in deregulation may have. The differing policy positions are reviewed and the relevance to the proposed current FCC positions are analyzed in detail.

In the paper we specifically address the following questions:

- *Does the "Trade in Services" resulting from the settlement rates have a significant positive influence on the growth of telecommunications services?*
- *Does the growth in telecommunications services relate to the GDP or similar measures of the country's economic development status?*
- *Does the growth rate of a country's economy correlates with the openness of that country's market for Trade in Services as relates to telecommunications?*
- *What should the U.S. position be regarding its ability to influence access to markets by its unilateral power on settlements?*

¹ Presented at the Telecommunications Policy Research Conference, Alexandria, VA, September 28-30, 1997.

² Mr. McGarty is Chairman of Telmarc, Florham Park, NJ, and is also Chairman of Zephyr Telecommunications an International Record carrier, and Chairman of COMAV, a Competitive Local Exchange Carrier, Framingham, MA. He is also a member of the Advisory Council of the MIT Internet Telephony Group.

³ Mr. Davidson is Chairman of Delta Three which is located in Jerusalem, Israel.

- *Does there exist a set of economic efficiencies in the use of telecommunications via enhanced services, value added services, or Internet services that will allow such providers to have economic advantages to side step the settlement process?*
- *What will be the effect of Internet and Internet like voice, video and data services wherein the “path” of the message has no definition? Does any country have the right to regulate a “mixed” message format?*

2. TRADE IN SERVICES: SETTLEMENTS

The GATS, General Agreement for Trade in Services, which is a part of the current WTO structure, has developed a set of rules and regulations and a schedule of timetable to open up the member markets to trade in telecommunications services. There are three dimensions for such trade in services. The first two are basically for the intra country markets and represent the local and long distance telephony market. The third is the international telecommunications market. In all three cases we can further break this up into voice, data, video, value added services, and other types and classes of services. The breakout is shown as follows:

	<i>International</i>	<i>Long Distance</i>	<i>Local</i>
<i>Switched Voice</i>	Generally tightly controlled	Generally controlled by internal ownership.	Generally controlled by internal ownership.
<i>Switched Data (Off Net to Off Net)</i>	Generally tightly controlled	Generally controlled by internal ownership.	Generally controlled by internal ownership.
<i>Non Switched Data (On Net to On Net)</i>	Generally there is limited control.	Limited to little control.	Limited to little control.
<i>Video (CATV)</i>	Issue is ownership and content.	Not Applicable in General	The control is limited to any entity having a franchise or similar license
<i>Internet</i>	Generally open and limited by Government controls on content.	Generally open and limited by Government controls on content.	Generally open and limited by Government controls on content.
<i>Value Added Services</i>	Generally controlled as an On Net Service	Generally controlled as an On Net Service	Generally controlled as an On Net Service

The main concern is two fold; first, if there is a significant amount of trade differential flowing to these countries perforce of the accounting irregularities and second there is a need to expend the market for US services in international traffic that the accounting rules are a barrier to entry to.

2.1 Settlements as Part of Trade

The current International Record Carriers, IRCs, enter into bilateral agreements with other IRCs, namely the PTTs of the foreign entities to agree to settlement or accounting rates between each other. Generally these are bilateral agreements performed one at a time. The following is the FCC’s current estimate of the size of the settlement process.⁴

“The United States paid roughly \$5 billion in settlements to the rest of the world in 1995, up from \$2.8 billion in 1990. The U.S. out-payment results in part from the fact that U.S. consumers make more telephone calls to foreign countries than foreign consumers make to the United States. In fact, the size of the imbalance between U.S.-outbound and inbound minutes has

⁴Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates , IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 17.

accelerated in recent years, as the chart in Appendix C demonstrates. To the extent that these settlement payments exceed the actual costs foreign carriers incur in terminating U.S.-originated calls, they represent a significant subsidy to foreign carriers. Based on our estimate of the costs of international termination services, we estimate that at least three-quarters of the \$5 billion in out-payments is such a subsidy from U.S. consumers, carriers and their shareholders to foreign carriers."

The system works in the following fashion. One carrier negotiates with another for the right to terminate traffic. For example Canada negotiates with the Ivory Coast. They agree on a settlement rate of say \$0.40 per minute. This applies only to voice traffic. Say it is Teleglobe Canada and the Ivory Coast PTT. Now any traffic between the two is a \$0.40 per minute. At the end of the year they add the traffic up and if there is more traffic from Canada to the Ivory Coast then the difference must be paid by Canada to the Ivory Coast at \$0.40 per minute.

Now let us assume that Teleglobe Canada wants to place a call to Uganda. It places the call in transit through the Ivory Coats which charges a transit fee of say \$0.020 per minute and the Ivory Coats has an agreement with Uganda for terminating at say \$0.15 per minute. The Teleglobe gets charged the sum.

The following is Teleglobe Canada perception of this process:⁵

"For an international telecommunications service provider international telecommunication accounting practices distinguish between remuneration of the corresponding carrier in the country of destination or transit for the delivery of its traffic and the charge in national currency collected by an operator from its customers for the international facilities and services provided. According to CCITT Recommendations D.150 and D.155, which concern tariff and accounting practices in the international telephone service, the carrier in the destination country can be remunerated on the basis of a flat-rate price per circuit, on the basis of the traffic units carried, or through a procedure whereby accounting revenue is shared between terminal operators.

Under the flat-rate price and traffic unit price procedures the carrier at the destination establishes its prices broadly based on the cost of the international circuit section it provides, the use of its international exchange (gateway) and the national extension. Under the accounting revenue division procedure the value of traffic in each direction between two corresponding international carriers is multiplied by a mutually agreed tariff or "accounting rate" to give an accounting revenue which is "in principle, shared equally between the (carriers) of the terminal countries in respect of each traffic direction".

In theory, international carriers can agree on other than equal shares when their costs or the extent of the facilities that each provides vary significantly; however, in practice accounting rates are shared 50/50. If during a given settlement period (say a month or a quarter) there is more traffic flowing in one direction than the other, the carrier which receives more traffic than it sends will receive a greater amount of compensation from the corresponding operator for delivering its traffic than it has to pay out. The direction of the traffic imbalance, therefore, determines which operator has to pay its partner in a bilateral relation more than it receives.

If, for example, the accounting rate between Canada and a given foreign destination is SDR 1.66 and the accounting rate is divided 50/50 then Canada pays its foreign partner $1/2 \times 1.66 = \text{SDR } 0.83$ per minute of traffic to deliver that call to its destination from the mid-point (say mid Atlantic) to the destination subscriber; to facilitate accounting, however, partners in a bilateral relation look at the sum of the traffic in both directions for a given period and apply the accounting rate only to the difference.

If, therefore, during the period there are more minutes of traffic flowing out of Canada than flowing in, the imbalance obtained by multiplying by half of the accounting rate gives the "traffic settlement" which is due to the foreign administration. The greater country's traffic imbalance with another country, the greater its net payments outflow.

⁵ See: "THE INTERNATIONAL TELECOMMUNICATIONS SETTLEMENTS PROCESS: WHAT'S NEEDED? DESTROY AND REPLACE IT OR ADJUST IT?", Peter A. Stern, Teleglobe Canada Inc., Montreal, IIC Telecommunications Forum, 25 - 26 October 1990. Washington.

If traffic levels are equal in both directions the out-payments are the same in both directions. In certain relations where traffic levels are more or less equal, carriers may agree to not exchange international accounts. Contrary to the result of most other international trade in goods and services transactions where a net export results in a net payment inflow in international telecommunications a net outflow of traffic will result in a net payments outflow from the country that "exports" that traffic.

Collection charges are considered to be a purely national matter fixed by the provider of the international services subject to government, regulatory, financial and competitive constraints. The International Telecommunication Regulations like CCITT Recommendation D.150 emphasize the need "to avoid too great a dissymetry between charges applicable in each direction of the same relation". 10

The key issue however is that Teleglobe has an agreement that any traffic that it terminates is voice and that it will pay the Ivory Coast at the agreed to rate. It cannot generally go back and say, this is Internet voice and I do not want to pay the Ivory Coast. A new entrant can start that way but an existing entrant places their existing agreements in jeopardy. Thus there is a general agreement that if there is an existing settlement agreement between two parties that the Parties shall honor the terms of the agreement and that any termination or transit of traffic shall be via the agreement and thus will require the payment of the pre-agreed settlement fees. This therefor places and existing carrier at jeopardy in view of attempting to get Internet terminations.

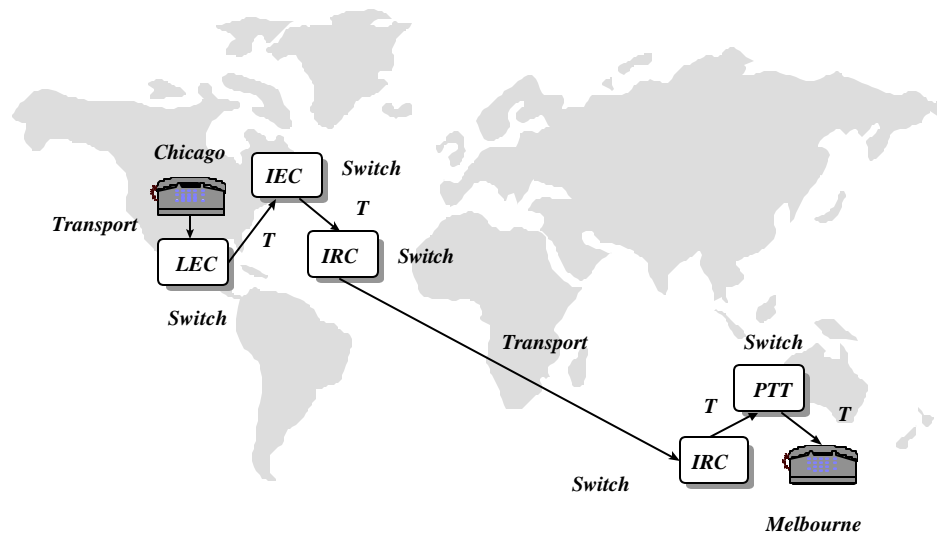
2.2 Accounting Rates and Settlements⁶

To understand the principles of accounting rates and settlement costs it is necessary to understand how a call is made in an international call. The accounting rules are to international traffic what the access fees are to domestic. The senior author has discussed this issue in detail elsewhere.⁷The following Figure depicts that process.

⁶ See FCC IB Docket No. 96-261 which describes the process of accounting rates and see R. Frieden, "International Toll Revenue Division", 17 Telecommunications Policy, No 3 pp. 221-233, April, 1993.

⁷ See McGarty references:

1. Alternative Networking Architectures; Pricing, Policy, and Competition, Information Infrastructures for the 1990s, John F. Kennedy School of Government, Harvard University, November, 1990.
2. Alternative Networking Architectures, B. Kahin Editor, McGraw-Hill (New York), October, 1991.
3. Access to the Local Loop; Options, Evolution and Policy Implications, Kennedy School of Government, Harvard University, Infrastructures in Massachusetts, March, 1993.
4. Access Policy and the Changing Telecommunications Infrastructures, Telecommunications Policy Research Conference, Solomon's Island, MD, September, 1993.
5. Internet Architectural and Policy Implications, Kennedy School of Government, Harvard University, Public Access to the Internet, May 26, 1993.
6. From High End User to New User: A New Internet Paradigm, McGraw Hill (New York), 1995.
7. "Disaggregation of Telecommunications", Presented at Columbia University CITI Conference on The Impact of Cybercommunications on Telecommunications, March 8, 1996.
8. The Economic Viability of Wireless Local Loop, and its Impact on Universal Service, Columbia University CITI seminar on "The Role of Wireless Communications in Delivering Universal Service", October 30, 1996.
9. Communications Networks; A Morphological and Taxonomical Approach, Private Networks and Public Objectives (Noam, Editor),Elsevier (London), 1996.
10. The Economic Viability of Wireless Local Loop, and its Impact on Universal Service, Telecommunications Policy, Elsevier (London), 1997.
- 11.



A customer in Chicago desires to place a call to Melbourne, Australia. The customer first uses the transport and switch of Ameritech, who then connects to MCI. MCI provides transport and switching. The international record carrier chosen by the customer is AT&T. MCI then hands the call off to AT&T and AT&T has an agreement with the Australian IRC, International Record Carrier, namely an accounting agreement, to handle all traffic at the net rate of say \$0.55 per minute. For that, the Australian PTT then handles the call and places it to the terminating point in Melbourne. The customer is billed \$1.55 per minute. The IRC in the US charges the customer for their switching and transport and then adds on the costs of MCI and that of Ameritech, generally visa the access fee applied as a LEC.

The accounting rate is the rate agreed to by and between and amongst international record carriers for the provision of a unit, say a minute, of telecommunications, generally voice, between two locations or terminations. For example the United States carrier AT&T may agree to a number, say \$0.45 per minute, with France Telecom, for all traffic between the United States and France, no matter what the direction of the traffic. This fee is the full and complete fee for the delivery of that minute from the midway point of the cable to the end destination point in the called location. The accounting rates is supposed to represent the total cost of carrying the traffic from point of origin to point of destination.

The settlement rate is the mechanism that any pair of carriers select to divide up the number of minutes from and to each other based upon the accounting rate already agreed to. Namely, if AT&T provides France Telecom with 500 million minutes, and France Telecom provide AT&T with only 400 million minutes, and the agreed accounting rates if \$0.045, then at the end of a period, AT&T owes France Telecom, 500 million less 400 million, namely 100 million times \$0.45, or \$45 million dollars.

There is the third factor of why a call is \$0.55 from the US to Israel but is \$1.90 from Israel to the US. The answer is quite simple. The US and Israeli carriers have agreed to a settlement fee of say \$0.35 per minute. The US market is competitive for barriers thus there cannot be an excessive distortion in price. Thus the \$0.55 represents a fair demand based price subject to the \$0.35 "subsidy" paid in the accounting rate. However, in Israel there is a pure monopoly and thus there is no clearing of the market and the PTT charges a rate based upon a social and fiscal policy that states that this is a means to subsidize those who cannot afford to call internationally. It is social policy and not economic policy that dictates the actual price.

The FCC states that the accounting rate system has the following characteristics:⁸

⁸ Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates , IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 6

The current accounting rate system was developed as part of a regulatory tradition that international telecommunications services were supplied through a bilateral correspondent relationship between national monopoly carriers.⁹ An accounting rate is the price a U.S. facility-based carrier negotiates with a foreign carrier for handling one minute of international telephone service. It was originally intended to allow each carrier to recover its costs for terminating an international call.¹⁰ Each carrier's portion of the accounting rate is referred to as the settlement rate. In almost all cases, the settlement rate is equal to one-half of the negotiated accounting rate. At settlement, each carrier nets the minutes of service it originated against the minutes the other carrier originated. The carrier that originated more minutes of service pays the other carrier a net settlement payment calculated by multiplying the settlement rate by the number of imbalanced traffic minutes.¹¹

There is also some discussion of the sender keeps all system or the bill and keep approach. This has been discussed by Tarjane the head of the ITU as follows:

Call termination fees offer a methodology which fits well with the World Trade Organisation's trade liberalisation framework. They fulfil many of the principles defined earlier for accounting rate reform. The idea would be that each country, or operator, would define one standard charge for terminating calls, irrespective of where those calls come from. The call termination charge would be comparable to the national interconnection charge levied, for instance, on mobile operators interconnecting with the public telephone network. The system would be transparent, flexible, non-discriminatory and (hopefully) cost-based. The latter will probably depend on the degree of market competition which is allowed in each national market.

Call termination fees have received the blessing of the OECD and are currently under discussion in the WTO and the ITU. They are opposed by some carriers who are unwilling, or unable, to disclose their cost structures for terminating calls. They are also opposed by those carriers who feel that they should not be required to pay more for having their calls terminated in foreign countries than they themselves charge for terminating calls. But the fact is that providing telephony service is more expensive in some countries than others. The accounting rate system, which is based on a 50/50 revenue sharing agreement, implicitly assumes that costs are equal in all countries. This is patently not the case. The possibility exists for countries to agree on a split which departs from 50/50 but in practice this is never adopted except in "sender keeps all" arrangements. A system, such as call termination fees, which does not pretend that costs are equal in all countries would be much to the advantage of developing countries.

Thus under the existing settlement agreement, bilateral and multilateral, the existing carriers have generally affirmed and agreed to pay settlements on their voice circuits and that any change by them directly or otherwise would put their agreements in breach and could result in the immediate termination of their traffic from their home locations to the countries with whom they have agreements. The existing agreements are generally and in most cases expressly for the provision of voice traffic and have followed the generally accepted terms in existence for the past one hundred and thirty years.

2.3 Technological Challenges

We will focus initially on voice telecommunications since it represents the bulk of the telecommunications market. There are several technologies that can be used to provide voice communications; the standard approach plus those whom we shall call the new entrants.

⁹We note that this tradition is not compelled by the international legal regime. See Article 9, *International Telecommunication Regulation* (Melbourne, 1988) and Article 31, *Constitution of the International Telecommunication Union* (Nice, 1989).

¹⁰See, e.g., *Regulation of International Accounting Rates*, CC Docket No. 90-337 (Phase II), *Second Report & Order and Second Further Notice of Proposed Rulemaking*, 7 FCC Rcd 8040, n.3 (1992).

¹¹Every carrier is required to file a copy of its settlement agreements with the Commission. 47 C.F.R. § 43.51.

Standard Telecommunications: This approach is as described above. It is the standard way that telecommunications, especially voice telecommunications is provided.

The new entrants are comprised of the following:

Call-Back: The call back approach assumes that a call from a foreign country, say Israel, is charged at the rate of \$1.90 per minute to the United States. However, in the United States the charge for a call to Israel is \$0.50 per minute. Thus if the caller could call the United States From the United States, and call himself from the United States he could lower the costs dramatically. The system then allows the caller to call a data node which then places a call back to him from the United States and completes the call.

On Net to On Net: This is a standard corporate network and generally is at dramatically lower rates. Hotels also use this approach for in hotel to foreign connections. Generally these circuits are on a private network that is outside any settlement agreement. Frequently they carry voice, data and even video.

Leaky PBX, On Net to Off Net: The leaky PBX is the source of much concern from foreign countries. A hotel may allow calls to “leak” from the hotel to other locations, thus bypassing the local telephone companies termination rates.

Internet: This is the newest possibility. It allows for the call to be placed over the Internet or Internet like/connected network. These are generally free of settlements and also generally cannot even assess settlements since they go over different routes for each packet. Namely, in a TCP/IP packet type network, it is possible that a call from the US to Israel, may in one packet go through London, and in the very next packet to Warsaw, then to Rome, and then to Tel Aviv.

Of all of the above new entrants, the Internet and Internet like entrants are those with the greatest innovative potential and thus we argue latter they should be the one the most free of regulation.

3. ECONOMIC FACTORS

The following is a summary of the economic factors relating to each of the countries that we have addressed as well as a brief status of their telecommunications infrastructure. We have selected several of the key countries and have depicted the key economic factors as well as the key telecommunications factors. It is clear that there are significant opportunities in each of these nations but that they are clearly divided into four categories depending upon the state of economic development and the state of political development. We argue that these states can be divided into the extremes as follows:

3.1 Basic Economic and Telecommunications Demographics

The population of these countries estimated in 1998 is shown in the following Table. Clearly the largest is China and the second being India. The place of Indonesia, the Philippines, Thailand, Vietnam, and even Malaysia make them a significant player in the evolving markets. The relative positing of each country using 1998 estimates of population is shown below. Despite Singapore’s significant advanced economic success it is an almost insignificant player in the overall set of market players.

The telecommunications sector in this region of the world is a dominant sector of the international trade in services. In this sections we present a summary overview of the sizes of that sector for the Asian market of focus. In this section we evaluate several key issue regarding telecommunications infrastructure and the international market for services as represented by the initiation and termination of international traffic. Each of the countries in question has demonstrated a rapid growth potential but each country has taken the position of handling entry into the international market in a different fashion. Japan has been the most liberal in opening up its international market and the Philippines has been the most restrictive.

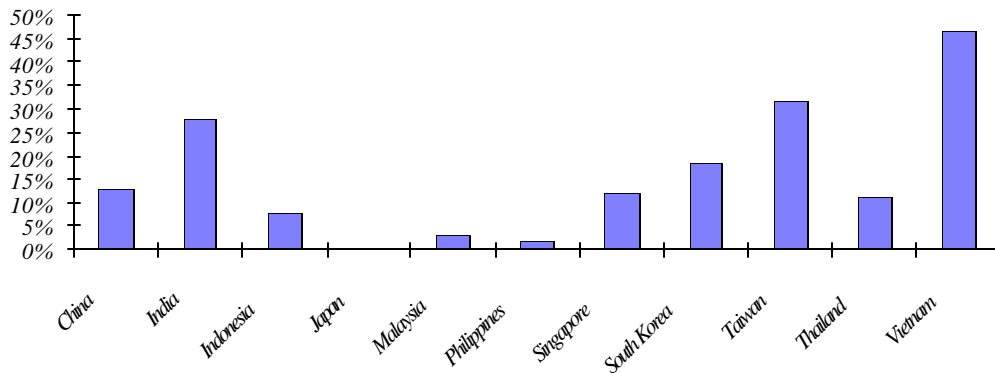
The detailed economic factors relate strongly to the overall telecommunications environment. The following Table summarizes the results for the countries described above. The following Table is a detailed summary of these countries.

0000001050000000000000

Country	Population (000)	GDP/Capit a	GDP (\$000,000,000)	Settlement Payout	Settlement/ GDP	Telephones (000)	Settlement/ Telephone
China	1,282,510	\$2,900	\$3,719,279	\$309,753,604	0.0083%	36,364	\$8.52
India	937,851	\$1,500	\$1,406,776	\$256,291,264	0.0182%	20,434	\$12.54
Indonesia	205,833	\$3,500	\$720,417	\$54,945,148	0.0076%	2,137	\$25.71
Japan	125,960	\$21,300	\$2,682,937	\$275,446,516	0.0103%	66,016	\$4.17
Malaysia	19,768	\$9,800	\$193,722	\$26,815,150	0.0138%	3,261	\$8.22
Philippines	71,222	\$2,530	\$180,191	\$184,285,405	0.1023%	902	\$204.25
Singapore	2,902	\$22,900	\$66,463	\$46,527,312	0.0700%	1,375	\$33.83
South Korea	45,622	\$13,000	\$593,086	\$224,585,206	0.0379%	19,683	\$11.41
Taiwan	21,511	\$13,510	\$290,609	\$162,976,907	0.0561%	13,480	\$12.09
Thailand	60,078	\$6,900	\$414,540	\$71,958,693	0.0174%	3,259	\$22.08
Vietnam	73,185	\$1,300	\$95,141	\$65,305,158	0.0686%	3,712	\$17.59

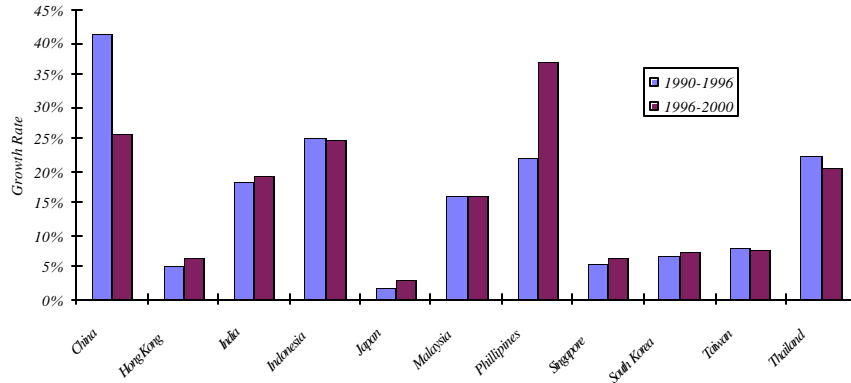
The following depicts the annual growth rate in telephone lines for each of the above countries for 1998. This is based upon an analysis of ITU, CIA, World Bank and other sources and as with the other analysis in this paper is preliminary in form and does not reflect any commitments by the governments involved. Vietnam has the largest growth rate and is expected to remain that way for a while.

Annual Growth Rate Estimates 1998



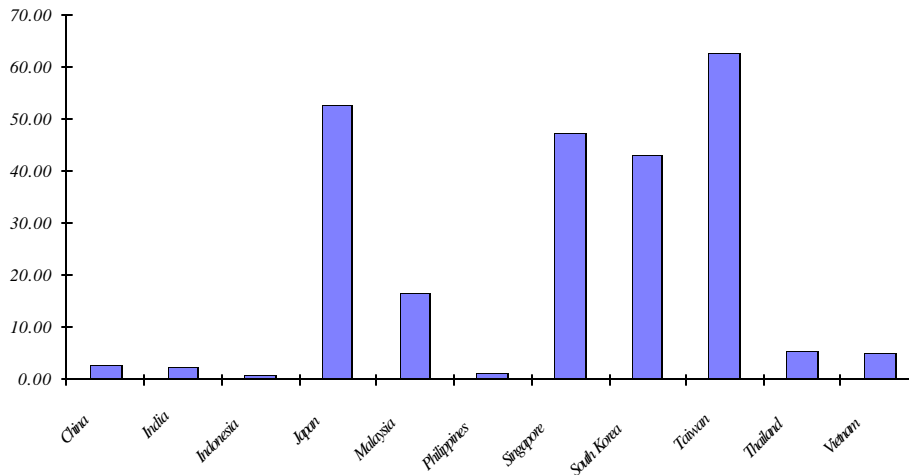
The following Table presents the growth rate for two periods based upon the DLJ report. Note the differences in key countries such as China. They argue that China has a CAGR in excess of 40% over the past seven years. Note that the prior chart was a projection for 1998 alone. They project a CAGR for China in excess of 25% for the next three years. The Philippines is the greatest over the next period but that is generally because of the low base level. China is clearly adding one or more RBOCs per year. Clearly Indonesia, Thailand, and Malaysia are good growth markets.

Growth Rate vs. Country (DLJ Report, May 1997)



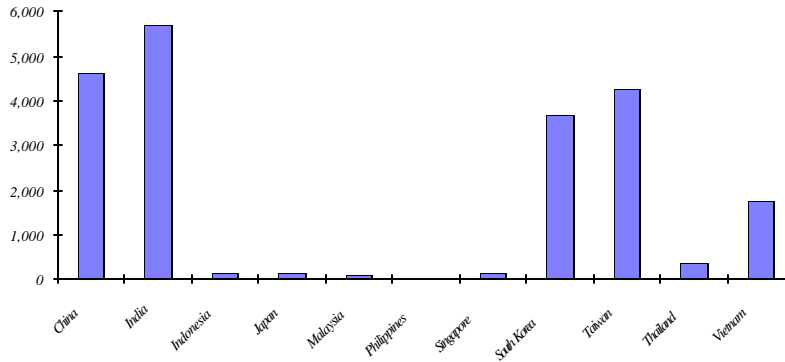
The following Table depicts the telephone density in telephones per 100 people. Clearly Taiwan, Korea, Singapore and Japan are on a par with the Western developed countries. In contrast the other countries are at least an order of magnitude lower in scale.

Phone Density per 100 Person Estimates 1998

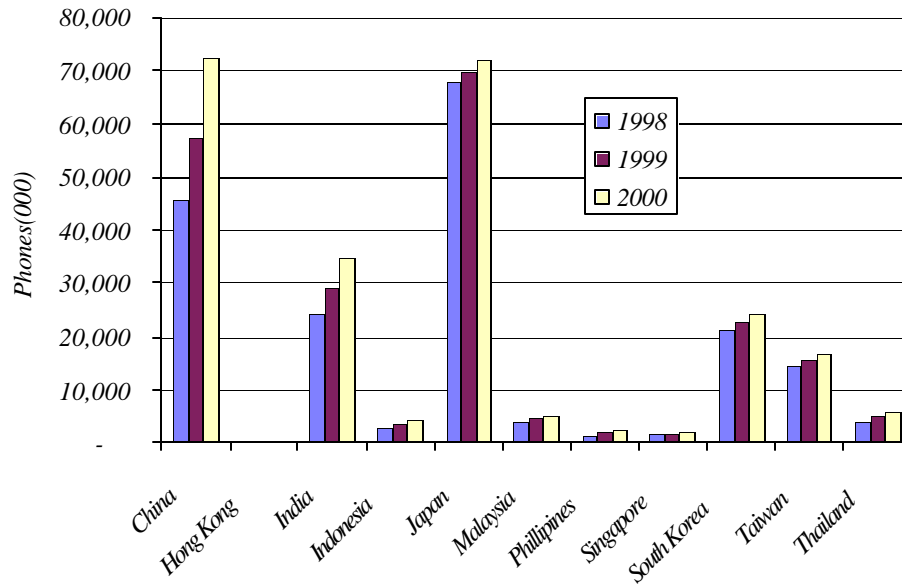


The following is an estimates of the number of new phone lines to be installed in 1998. The total number is in excess of 26 million and each line generally costs \$2,000 US to install with a total investment of in excess of \$52 billion just in new growth. This does not include the growth of new wireless lines, be they cellular or wireless local loop. These estimates are based upon the more conservative numbers and not the DLJ numbers

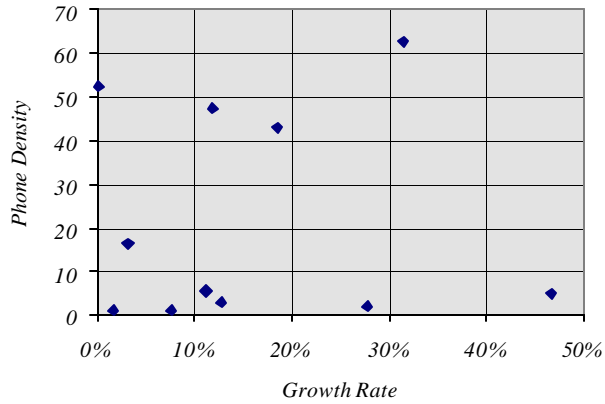
New Phones (000) Estimates in 1998



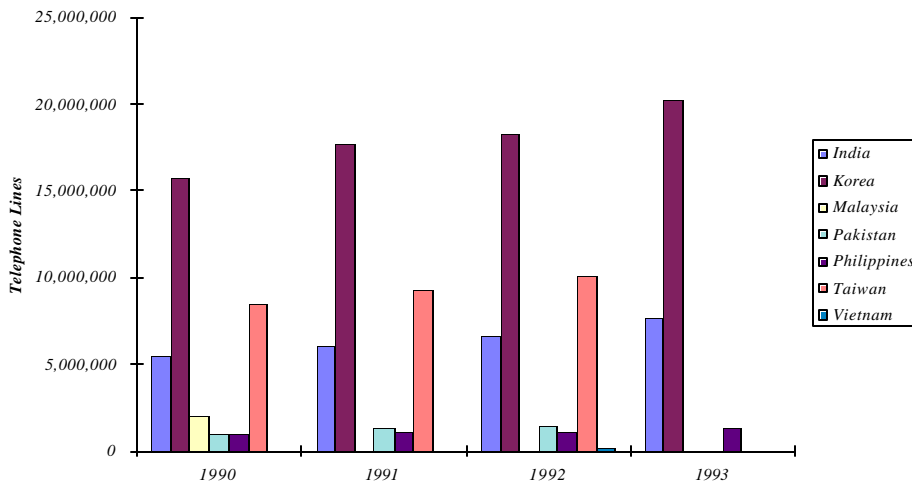
What this shows is that China, India, Thailand and Vietnam appear to have the greater growth rate, Malaysia, Indonesia, and the Philippines are not growing as rapidly. Using the DLJ data the following chart depicts the growth projections for the next three years in total lines.



The following chart depicts the phone density versus annual growth rate of telephone lines. It clearly demonstrates that there is no significant correlation between infrastructure growth rate and total market availability. Namely, densely populated telephone markets may grow as fast or as slow as the less densely populated. Thus it is not necessarily the case that the current status is a predictor of the further potential.



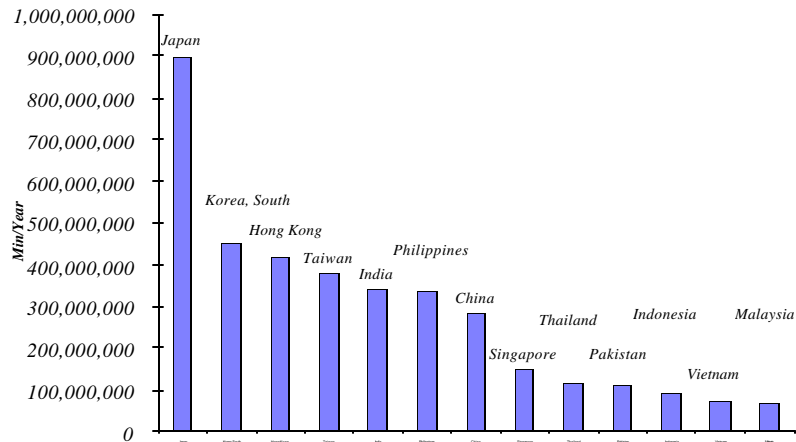
The following table depicts the growth in telephone sets over the past several years in the target countries.¹²



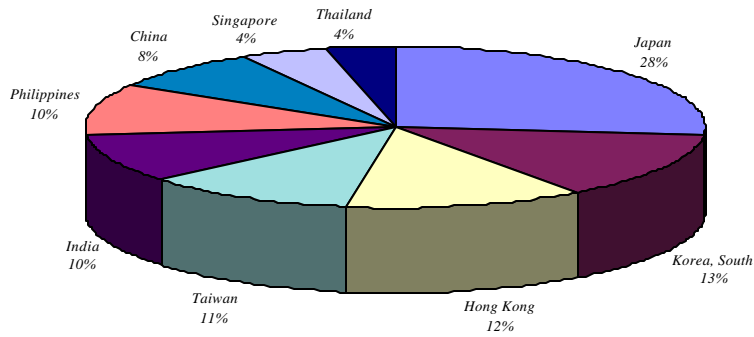
The following chart depicts the total traffic in minutes per year for each of these markets for 1995.¹³ The interesting fact is that Indonesia and Malaysia have much lower traffic to and from the US than does the Philippines. This may be understood better in that most of their traffic is intra regional in nature. For example Singapore to Malaysia is twenty sixth in total traffic volume inter-country in the world. This is shown latter.

¹² See ITU Database.

¹³ See FCC data base in the International Bureau.



This traffic usage is summarized below in terms of the overall share of this traffic flow by each of the key countries. What this shows is the currently Japan is still the dominant tariff producer and consumer. Korea, not surprisingly, is second. When we add Hong Kong to China, the combination now becomes number two and is probably the fastest growing in terms of both rate and volume.



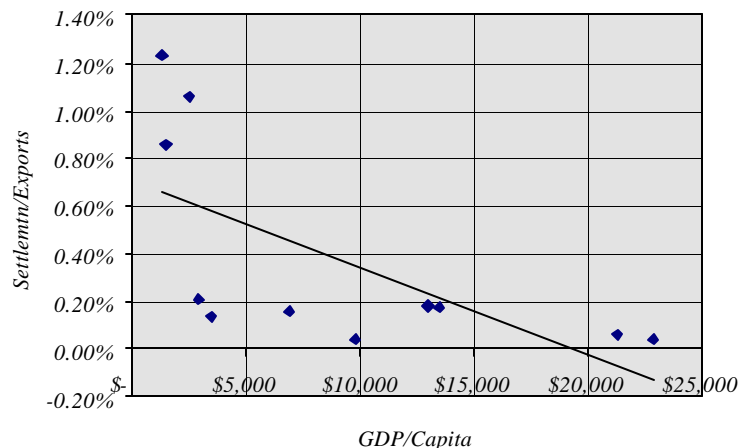
The following Table depicts the recent summary by Donaldson regarding the penetration of telephones as well as the growth rates in each of the target countries with the exception of Vietnam. The telephone numbers are in 000,000s and the most significant penetration expectations is in China, growing at the rate of several RBOCs per year.

Country	Telephones (000,000)				CAGR	
	1990	1996	2000	2005	1990-1996	1996-2000
China	6.90	55.30	137.90	170.00	41.4%	25.7%
Hong Kong	2.50	3.40	4.30	3.90	5.2%	6.4%
India	5.10	17.00	28.30	45.70	18.3%	19.2%
Indonesia	1.10	4.20	10.20	22.10	25.0%	24.7%
Japan	54.50	61.10	68.50	73.00	1.9%	2.9%
Malaysia	1.60	3.90	7.00	8.20	15.9%	16.0%
Philippines	0.60	2.00	7.00	12.20	22.2%	36.8%
Singapore	1.10	1.50	1.90	2.10	5.4%	6.5%
South Korea	13.30	19.60	26.10	25.10	6.7%	7.4%
Taiwan	6.30	10.00	13.40	12.80	7.9%	7.6%
Thailand	1.30	4.40	9.20	18.10	22.4%	20.3%
Total	2,084.30	2,178.40	2,313.80	2,398.20	15.7%	15.8%

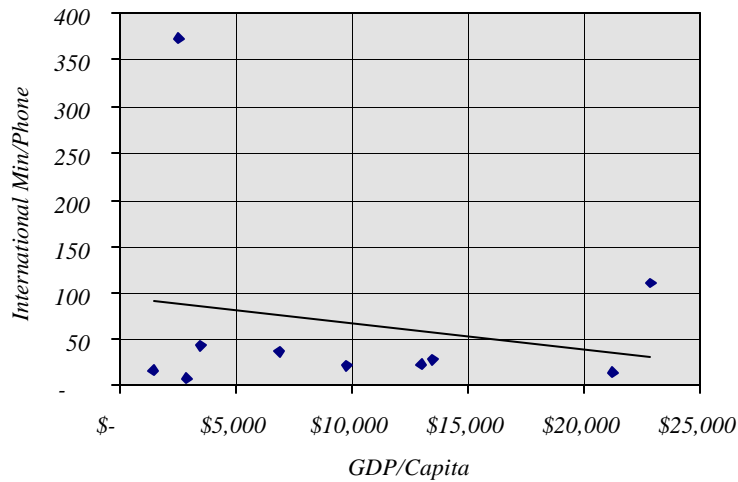
3.2 Settlement Demographics

Using the above data, we have related it to the settlement rates and to the overall settlement amounts on a per capita basis. It is through this analysis that we can develop a more detailed understanding of the economic impact of settlements and the distortions of this process on economic growth.

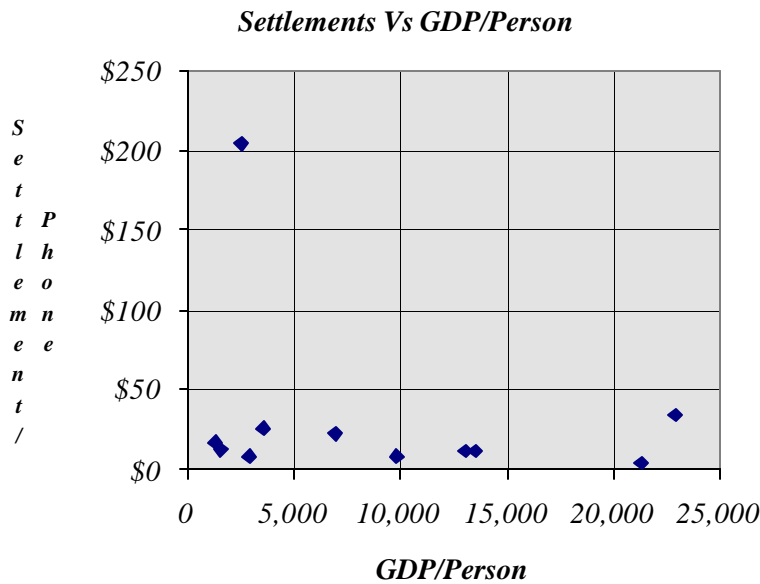
The following chart depicts the percent ratio of Settlements to Exports versus GDP per capita. What this clearly depicts is that there is a strong inverse relationship between settlements and GDP, albeit the causal relationship is still problematic. Namely such countries as Japan have strong economies and thus depict both low settlement rates as well as high GDP. However, such countries as the Philippines relies heavily upon the settlement as a means to “fund” telecommunications infrastructure.



The following chart depicts the total number of minutes per telephone versus the GDP per capita. Again it shows a negative slope indicating that more people are using the service and that the economies that are stronger are generally more open to usage.

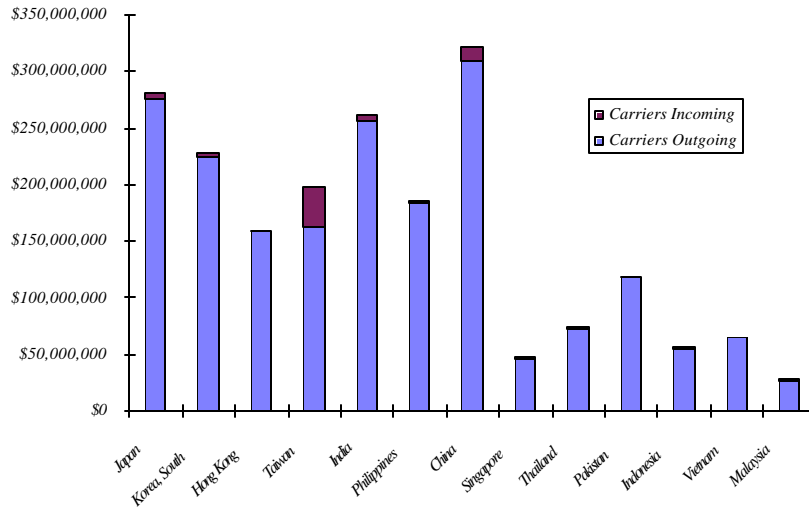


We have plotted Settlement per Telephone versus the GDP/Person. There seems to be no logical basis to the relationship. The exceptionally high value is the Philippines and the lowest is Japan. Even at high GDPs there is a high settlement fee. The argument has generally been that with lower infrastructure costs the costs of settlements were justifiably higher. This analysis seems to indicate that despite all reasonable variable being explored, there is a settlement rate agreed to solely on the basis of local custom.

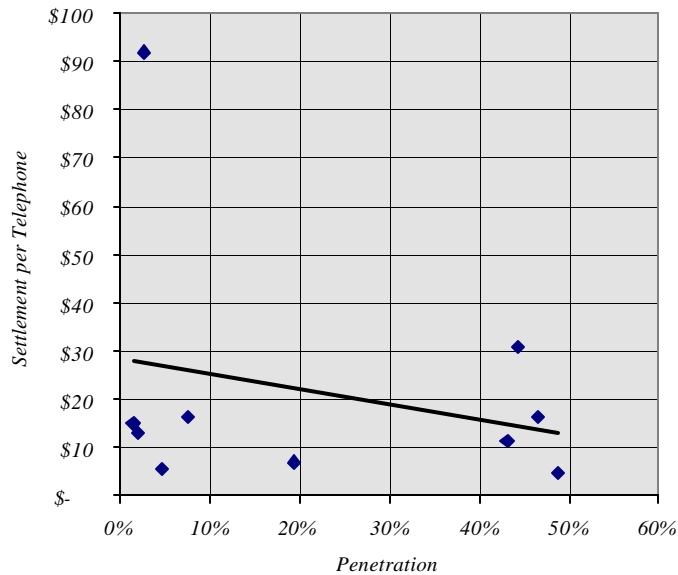


The following Chart depicts the total flow of funds based solely on telecommunications settlement fees.¹⁴ This chart shows the funds from settlement from and to the US in traffic flow.

¹⁴ See the FCC data base in the International Bureau.



The following Chart depicts the relationship between settlement rate and growth in GDP. There is an indication that an increase in settlement is a negative factor in growth of GDP. Namely that one may suspect that based upon this type of data that the more open the market is for trading the greater the possibility that the for growth.



3.3 Traffic Flow

The following Table depicts the international traffic for the top fifty rated links or routes as relates solely to the Asian market. These traffic links represent a significant portion of the overall world trade flow under the services portion of the WTO regarding telecommunications services.¹⁵

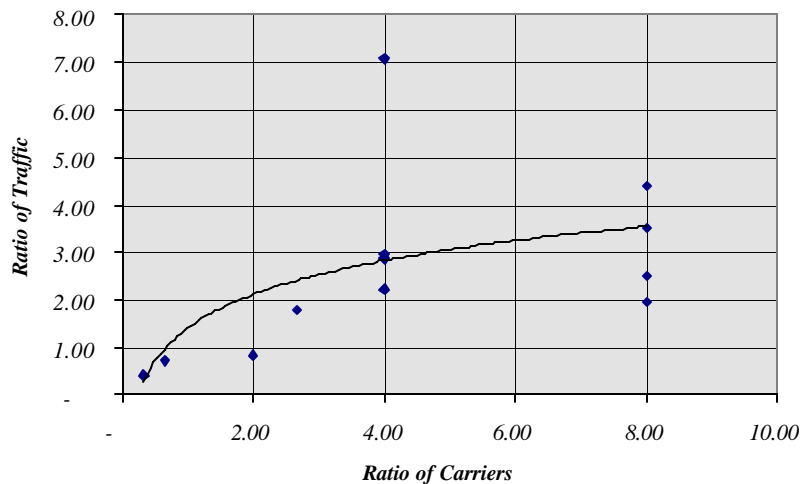
¹⁵ Notes: Outgoing and incoming refer to the first economy shown.* Million of minutes of telecommunications traffic. Source: ITU/TeleGeography Direction of Traffic database.

Rank	Route A	Route B	Outgoing*	Incoming*	Total*
1	United States	Canada	2,787.28	1,795.00	4,582.28
3	Hong Kong	China	821.00	707.00	1,528.00
6	United States	Japan	469.22	295.04	764.26
22	United States	Korea (Rep.)	283.45	123.99	407.44
26	Singapore	Malaysia	190.00	159.80	349.80
28	United States	Taiwan-China	225.99	93.54	319.52
30	United States	Hong Kong	213.86	100.55	314.41
31	United States	Philippines	267.34	41.77	309.11
41	Japan	Korea (Rep.)	150.28	106.50	256.78
44	United States	India	191.59	51.96	243.55
45	Japan	China	171.01	71.00	242.01
47	United States	China	169.54	64.00	233.54

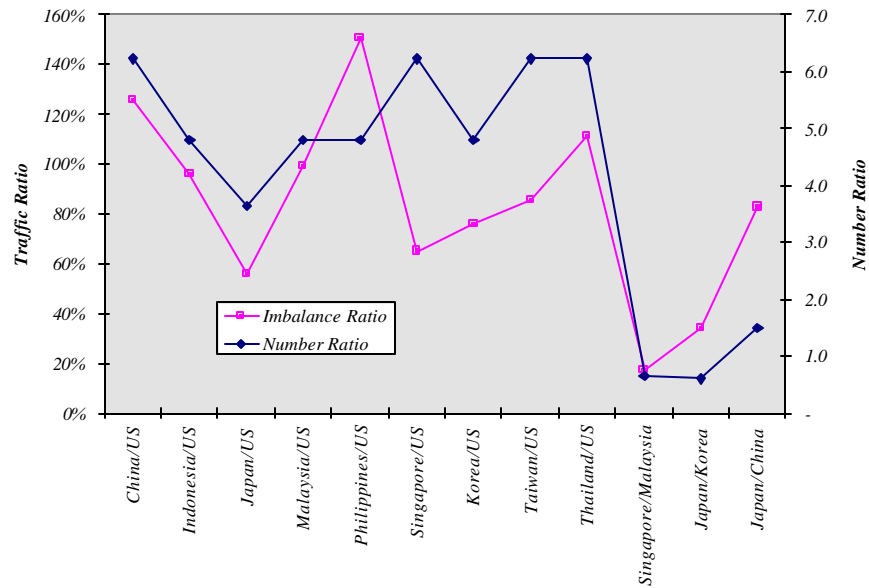
The above chart depicts several key facts. Namely:

- *If one looks at the traffic differences, namely the imbalance due to traffic from one country to another, generally the country with the greater internal costs has the lower traffic flow outbound. Namely, there is a 6:1 difference between the US and the Philippines. On the other hand Singapore and Malaysia are almost equal.*
- *If one looks at the economic development imbalance, namely the GDP per capita difference, and attempt to use that as a discriminate, there appears to be little GDP factor and the pricing of telecommunications internally is still the dominant factor.*
- *The dominant links based on total traffic are still to and from the United States even though there is significant intra region commerce. This is expected to change as liberalization of international termination rules are effected.*

In addition if we plot the ration of traffic from country A to country B versus the ratio of international carriers from country B to country A we obtain the following.



This clearly shows that as the distortion in the number of carriers in each market changes that the traffic is imbalanced proportionately. This is the essence of the trade imbalance. The following chart however depicts the traffic ratio and the number ratio by country pair. The traffic ratio is the normalized traffic imbalance, namely traffic difference. The number ratio is the normalized number imbalance between carriers in each country. Perfectly balanced traffic is a 0% traffic ratio. The greater the traffic ration the greater the settlement. The conclusion is simple, the more competition in carriers the more balance in traffic. Thus zero settlements.



3.4 Dominant Players

The dominant players in each market are summarized in this section. For the most part they are the PTTs and also for the most part the relationship between the government and the PTT is singular and thus is essentially an agent of the government policy. In many countries there is also the closely linked relationship between the manufacturers and the PTT. The following Table summarizes many of the key and dominant International, Long Distance and Local telecommunications players in the markets.¹⁶

Country	International	Long Distance	Local	Ownership
China	China Telecom		China Telecom Lian Tong Telecom Ji Tong	China Telecom (100% Government, MPT) Lian Tong (25% Ministry Electronic Industry, 25% Ministry Railways, 25% Ministry Energy, others) Ji Tong (100% Government, various)
Korea	Korea Telecom Dacom	Korea Telecom Dacom	Korea Telecom	Korea Telecom (80% Govt, public) Dacom (Lucky Goldstar, Samsung, KLB, others)
Indonesia	Indosat Satelindo	PT Telkom	PT Telkom	PT Telkom is 80% Govt and public. Indosat is 65% Govt Satelindo is PT Bimgraha, and 25% Deutsche Telekom
Malaysia	Telekom Malaysia Binariang	Telekom Malaysia Binariang Syrikat Telefon	Telekom Malaysia Binariang Syrikat Telefon	Telekom is 69% Govt. Binariang is 47% Burnhannudin/TF Stephens
Philippines	PLDT Digital Eastern Telecommunication s	PLDT Digital Eastern Telecommunication s	PLDT Digital Eastern Telecommunication s	
Singapore	Singapore Telecom	Singapore Telecom	Singapore Telecom	65% Govt. and public
Taiwan	Chunghwa Telecom	Chunghwa Telecom	Chunghwa Telecom	100% Govt.

¹⁶ See Donaldson, Lufking & Jenrette Report on Asia Communications, May 1, 1997.

Thailand	Communications Authority of Thailand	Tele. Organization of Thailand	Telecom Asia Thai Tel. & Tel. Tele. Org of Thailand	Telecom Asia (NYNEX 18%, Charoen Pokphand) Others all 100% Govt. of Thailand
----------	--------------------------------------	--------------------------------	---	---

The following is a summary of some of the major status factors for the countries discussed above. He primary focus is on each countries international settlement efforts.

- China*** China is a non-WTO country which has recently integrated what was Hong Kong into its overall structure. Recently the Chinese government carriers have commenced discussions with Hong Kong Telecom regarding the government telecommunications entity taking an equity position in the company. This seems to indicate that the Chinese government will be taking a stronger hand in the overall operations and control of that entity.
- Indonesia*** Indonesia's telecommunications entity has been focusing on using its telecommunications network as a critical factor in developing and expanding its economy.
- Japan*** Japan seems to be the most open market. For example KDD and AT&T have recently entered into an agreement for a settlement rate that differs from the standard that has been used. Namely, the rate will be adjustable and will reflect the "market conditions". In contrast NTT, the local telephone company, has vacillated from a position of breaking itself apart to keeping itself together. Government officials seem to now believe that a strong and dominant NTT is a strategic play for Japan in negotiating a position as a player in the interconnection of other carriers in Asian markets. This will potentially give NTT a strong negotiation position in becoming a dominant player in these markets.
- Malaysia***
- Philippines*** The Philippines is a developing nation and has the most strict controls on the ownership and openness of the telecommunications market. It is expected that this market, also being one of the slowest growth markets in economic terms, will also be the slowest in terms of telecommunications liberalization.
- Singapore*** Singapore Telecom is a major player in Asian Telecommunications markets. It tightly controls all of the internal Singapore telecommunications services and generally maintains a tight telecom market place. There seems to be a liberalizing trend as exhibited by WorldCom's bid for a fixed line telecommunications license. Singapore Telecom's monopoly ends on March 31, 1997.
- South Korea*** Korean Telecom has recently lost its local monopoly position. The Ministry of Information and Communications will award one new national license for basic telephone service. The potential winner may be a group led by Dacom, Hyundai, Korea Electric Power, Samsung, and other locals. Companies such as Sonkyong have also indicated an interest in getting into international telecommunications. Dacom has recently ventured into the Internet voice arena with agreements with Alphanet and VocalTec.
- Taiwan*** Taiwan is still a tightly controlled monopolistic telephone company controlled by the government.
- Thailand*** Thailand has a significant infrastructure and seems to have a rapidly growing set of interconnections driven by its growing industry. However there also seems to be a policy vacuum that has slowed rapid growth. Several years ago NYNEX along with a consortium of local companies established a new local telephone entity and have even set up a R&D facility in Bangkok.
- Vietnam***

4. WTO STATUS

The foreign PTTs, through their countries, generally have entered into the WTO agreements that generally place voice in the settlement arena and data in the non-settlement elements. The World Trade Organization (WTO) is the principal international body concerned with solving trade problems between countries and with negotiating trade-liberalizing agreements. WTO replaces of General Agreement on Tariffs and Trade (GATT) and is the embodiment of the results of the 1986-1994 Uruguay Round of trade negotiations conducted under the GATT. The Director General of the WTO is Renato Ruggiero of Italy.

4.1 *WTO Overview and Status*

WTO has a cooperative relationship with the United Nations but is not a UN specialized agency. It was established on January 1, 1995 as a result of the implementation of the Uruguay Round results. The WTO encompasses previous GATT legal instruments as they existed when the Uruguay Round was completed (known as GATT 1994), but also extends new disciplines to economic and trade sectors not covered in the past. Whereas the GATT's scope was limited to trade in goods, the WTO also covers trade in services, including such sectors as banking, insurance, transport, tourism, and telecommunications sectors as well as the provision of labor. In addition, the WTO covers all aspects of trade-related intellectual property rights (copyrights, patents, trademarks, etc.). Furthermore, while the GATT had a relatively ambiguous status as a multilateral agreement without any institutional provisions, the WTO is an international organization with a stature commensurate with that of the World Bank or International Monetary Fund (IMF).

WTO's precursor, the GATT, was established on a provisional basis after World War II. When the agreement took effect in 1948, it was expected to be the forerunner of the International Trade Organization (ITO) which would have been a UN specialized agency. But plans for the ITO were abandoned when it failed to get U.S. congressional approval, and the GATT remained the only international instrument laying down rules accepted by nations carrying out most of the world's trade.

For 47 years the GATT provided the main international framework in which countries could discuss trade problems and, if need be, use the General Agreement's dispute-settlement provisions to solve trade disputes. The basic principles and rules of the WTO are much the same as those for the GATT, but with a broader scope, a more solid legal and institutional basis, and enhanced decision-making provisions which preserve individual members' national sovereignty while precluding the damaging single-country blockages which plagued GATT's dispute settlement system.

Like the GATT, WTO embodies many reciprocal rights and obligations for trading countries, and its core principle is the Most-Favored-Nation (MFN) clause. Under this, trade must be conducted on the basis of nondiscrimination -- all members are bound to accord each other treatment in tariffs and trade as favorable as they give to any other member-country.

A second principle common to both WTO and GATT is that, to the maximum extent possible, trade protection should be given to domestic industries only through the customs tariff and not through other measures (i.e. non-tariff measures such as quantitative restrictions, arbitrary technical standards, and health regulations), so that the extent of protection is clear and competition is still possible.

One of the most important accomplishments of the Uruguay Round was the establishment, for the first time, of a set of rules governing trade in services. GATT economists estimated in 1990 that services -- such as banking, insurance, tourism, construction, or telecommunications -- accounted for as much as 20 percent of total goods-and-services world trade. The GATS agreement establishes a multilateral framework for trade in services and provides a specific legal basis for future negotiations aimed at eliminating barriers that discriminate against foreign services providers and deny them market access. The principal elements of the GATS framework agreement include the most favored nation (MFN) treatment, national treatment (each government shall treat foreign services and service suppliers no less favorably than its own), market access, and free flow of payments and transfers. The rules are augmented by annexes addressing the special situations of individual service sectors (financial services, telecommunications, air transport, and movement of labor). The GATS' strong provision on national treatment specifically requires GATS countries to ensure that domestic laws and regulations do not tilt competitive conditions against foreign firms. Complementing the GATS rules are binding commitments to market access and national treatment in service sectors that

countries schedule as a result of bilateral negotiations. These commitments became effective upon entry into force of the WTO.

4.2 WTO Agreement Details

The following Tables summarize the WTO agreements that exist for countries in question. The Tables are for each country and correspondingly detail the services and time under which opening of the markets are to be expected.

Indonesia	Sector or Sub-sector	Limitations on Market Access
	<u>Local service:</u> Public switched telephone service Circuit switched public data network services	Local services are provided exclusively by PT Telkom and 5 regional joint operation scheme operators. Foreign equity participation is limited to 35 per cent.
	<u>Long distance:</u> Public switched telephone service Circuit switched public data network services	Long distance services are provided by PT Telkom exclusively. Foreign equity participation is limited to 35 per cent.
	<u>International:</u> Public switched telephone service Circuit switched public data network services	Only through networks of PT Indosat and PT Satelindo. Callback is not permitted. International services are provided exclusively by PT Indosat and PT Satelindo (duopoly). Foreign equity participation is limited to 35 per cent.
	Internet Access Services	Until 2005, only through networks of PT Indosat and PT Satelindo for international access. More than 30 licences have been issued Foreign equity participation is limited to 35 per cent.

Malaysia	Sector or Sub-sector	Limitations on Market Access
	<u>Basic Telecommunications</u> ¹⁷ Basic local, inter-exchange and international services; supplied over public telecommunications transport networks using any network technology; facilities-based; in each of the market segment. ¹⁸ Voice Service (wired or wireless) Packet-switched data transmission services, including frame-relay services Circuit-switched data transmission services Private leased circuit service International switching and other international gateway facilities	Only through acquisition of shares of existing licensed public telecommunications operators: Foreign shareholding of up to 30 per cent in these service providers is allowed. Unbound except as indicated in horizontal commitments.

¹⁷ Excluding broadcasting services as defined under Broadcasting Act 1988.

¹⁸ Pro-competition regulatory principle in respect of interconnection arrangement and competition (Refer to Annex I).

India	Sector or Sub-sector	Limitations on Market Access
	<p>Telecommunication Services^{19, 20} Voice telephone service (CPC 7521**) Limited to local/long distance, for public use over a public telecommunication transport network.</p> <p>Wire based (i.e. for fixed network of subscribers).²¹</p>	<p>The service will be permitted to be provided only after the operator gets a licence from the Designated Authority who shall determine the need, if any, for issuance of new licences. The terms and conditions of the licence will be as laid down by the Designated Authority or Government or the prevailing laws in the country.</p> <p>There will be one operator other than Department of Telecommunications (DOT)/Mahanagar Telephone Nigam Ltd. (MTNL) in each service area for a period of 10 years from the grant of licence after which the position will be reviewed. The private operator should be a company registered in India in which total foreign equity must not exceed 25%. Service operator will be permitted to provide long distance service within the licensed service area only. Also, the subject of opening up of international service to competition will be reviewed in the year 2004. Resale of voice telephone services will not be permitted. However, licensees can grant franchises on commission basis for providing public call offices (PCOs) service. The detailed terms and conditions for providing the service will be as per licence conditions</p>

Philippines	Sector or Sub-sector	Limitations on Market Access
	<p>The following services (a-g) are offered only on a facilities basis, for public use, using either wired or wireless technology except cable television (CATV) and satellite.</p> <p>Voice telephone services Local services Toll services Domestic International Packet-switched data transmission services and Circuit-switched data transmission services</p>	<p>Entry is subject to the following requirements and conditions:</p> <p>Franchise from Congress of the Philippines Certificate of Public Convenience and Necessity (CPCN) from the National Telecommunications Commission Foreign equity is permitted up to 40% Resale of private leased lines is not allowed Call back, dial back and other similar schemes which result in the same operation are not authorized. Subject to the availability and efficient utilization of radio frequencies.</p>

¹⁹ Excluding broadcasting services and measures affecting such services. Broadcasting is defined as a form of the uni-directional telecommunication intended for large number of users having appropriate receiving facilities and carried out by means of radio or cable network. This may include sound transmission, television transmission or other types of transmission.

²⁰ The definition and principles on the regulatory framework for the basic telecommunication services subscribed to by India are contained in the annex titled "Explanatory Paper on Additional Commitments by India".

²¹ The subject of opening up of national long-distance service beyond service area to competition will be reviewed in the year 1999.

Japan	Sector or subsector	Limitations on market access
	<p data-bbox="435 254 722 281"><u>Telecommunications services</u>²²</p> <p data-bbox="435 310 803 386">The following basic telecommunications services supplied by Type I or Type II Telecommunications Business:</p> <p data-bbox="435 415 828 491">Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services</p> <p data-bbox="435 520 836 848">Type I Telecommunications Business is the business which provides telecommunications services by establishing telecommunications circuit facilities. Type II Telecommunications Business is any telecommunications business other than Type I Telecommunications Business. Telecommunications circuit facilities are transmission line facilities connecting transmitting points with receiving points, switching facilities installed as inseparable units therefrom, and other facilities accessory to such facilities.</p>	<p data-bbox="873 247 1372 296">Foreign capital participation, direct and/or indirect, in NTT and KDD must be less than one-fifth.</p>

²² Japan undertakes the obligations contained in the reference paper attached hereto.

Korea	Sector or Sub-sector	Limitations on Market Access
	<p>C. Telecommunications services <u>Facilities-based:</u> Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services Private leased circuit services</p>	<p>None except that the provision of all services is subject to commercial arrangements with licensed Korean service suppliers</p> <p>None except that: (i) Each service supplier must be a licensed Korean juridical person. (ii) Until 31 December 1998, a licence, including radio station licence, may not be granted to a juridical person whose largest shareholder is: (a) Foreign government, (b) Foreign person, or (c) Juridical person 50 per cent (15 per cent, if the largest shareholder of the juridical person is a foreign government or a foreign person) or more of whose voting shares are owned by foreign governments or foreign persons. (iii) Until 31 December 2000, a license, including radio station licence, may be granted to a juridical person in whom no more than 33% of the aggregate voting shares are owned by entities identified in (a) through (c). From 1 January 2001, a license, including radio station licence, may be granted to a juridical person in whom no more than 49 % of the aggregate voting shares are owned by entities identified in (a) through (c). (iv) A licence, including radio station licence, may not be granted to a juridical person more than 33 per cent (10 per cent, in the case of wireline-based voice telephone services) of whose voting share is owned by a person²³ (v) The largest shareholder of KT must be Korean government or a Korean person. While KT's share owned by a person²⁴ must be no more than 3 per cent, the aggregate foreign shareholding in KT must be no more than 20 per cent until 31 December 2000, and no more than 33 per cent from 1 January 2001.</p> <p>(4) Unbound except as indicated in horizontal commitments</p>
	<p><u>Resale-based:</u> Voice telephone services Packet-switched data transmission services Circuit-switched data transmission services Private leased circuit services</p>	<p>None except that: Provision of all services is subject to commercial arrangements with licensed Korean service suppliers. Until 31 December 2000 resale of voice telephone services interconnected to the public telecommunications network can only be supplied by companies established in Korea.</p> <p>None except that: Each service supplier must be a licensed Korean juridical person. Foreign shareholding in suppliers of resale voice telephone services, interconnected to the public telecommunications network, will be permitted only after 1 January 1999. From 1 January 1999, foreign shareholding will be permitted up to 49 per cent. As of 1 January 2001, 100 percent foreign shareholding will be permitted.</p>

4.3 Summary of Agreements

The following chart summarizes the dates for the market openings for each of the WTO countries and summarizes it for the non-WTO participants such as China. It will be interesting to see how China deals with

²³ The definition of "a person" is in accordance with the relevant provision of the Presidential Decree of the Korea's Telecommunications Business Law.

²⁴ The definition of "a person" is in accordance with the relevant provision of the Presidential Decree of the Korea's Telecommunications Business Law.

the Hong Kong agreements and if they will be sustained and used as a basis for China's participation in a WTO agreement.

<i>Country</i>	<i>Start Date</i>
Countries In Agreement	
Australia	January 1, 1998
Hong Kong	January 1, 1998
Japan	January 1, 1998
Korea	January 1, 1998
Malaysia	January 1, 1998
New Zealand	January 1, 1998
Countries Beginning after Official Start Date	
Singapore	January 1, 2000
Brunei	January 1, 2004
Indonesia	January 1, 2005
Thailand	January 1, 2006
Countries Excluded from the Agreement	
China	NA
India	NA
Pakistan	NA
Vietnam	NA

5. US POLICY IMPLICATIONS

The FCC in its Docket IB Docket No. 96-261, adopted December 19, 1997, stated the major policy issue in a clear and precise fashion. Specifically it stated,

“U.S. consumers pay on average 16¢ a minute for a domestic long distance call, but they pay 99¢ a minute for an international call. Yet, the difference in cost between providing domestic long distance and international service is no more than a few cents. As a result of recent technological advances, the underlying costs of providing telephony are becoming virtually distance insensitive. For example, because of new fiber optic technology, the cost of undersea cables on a per circuit basis is only one eighth of what it was seven years ago. We anticipate that increased competition in international satellite services will bring similar potential benefits to countries that are not now served by undersea cables and comparable land facilities. Differences in underlying costs therefore do not explain why international services are so much more expensive than domestic long distance services. The difference is attributable in part to limited competition in the IMTS market and in part to the inflated settlement rates paid by U.S. carriers to terminate traffic in foreign markets.”

We address two policy areas in some detail; first is the issue of what should the accounting rate be and how should it relate to a cost based system, and second, what is the policy future of Internet like telecommunications which is currently free from any settlement process.

5.1 Cost Based Settlement

The FCC has argued in its recent NPRM on Settlements that costs should be the key factor in establishing settlement rates. The FCC proposes that the costs be based upon three elements; international transmission, local switching, and national extension.²⁵ The Commission then predicates all of its costs analyses on these numbers. While the author agrees with this approach for the current means and methods for switched based voice telecommunications, the author argues that such an approach fails when applied to alternative telecommunications approaches.

²⁵ See ¶ 35 of IB Docket No 96-261, FCC 96-484, December 19, 1996.

The specific model as proposed by the Commission for costing contained the elements mentioned above. The Commission applied a specific methodology to those elements to come up with certain costs.²⁶ The three elements are: international transmission, local switching, and national extension. The author argues that rather than using tariffs as the sole arbiter of setting settlement rates that there is also a method for setting those rates on a costs based basis that reflects the actual costs incurred by the in-country provider. This additional approach shows that there can be an argument made for costs based upon forward looking technology as well as obtaining returns on past investments, if such be the case.

5.1.1 International Cost Based Elements

The cost elements for each relate to the following elements:

Capital Equipment Costs: It can be argued that the capital plant and equipment is generally the same for any country exclusive of tariffs and other tax like costs that the country must pay on the procurement of the equipment. The country may also have a costs of capital, so then when the capital and plant and equipment is equated to an annualized leased rate the lease rate must reflect that changing costs of capital. For example, in Poland, the respondent sees a 25% excise tariff on any imported telecommunications equipment that increase the capital costs base by that amount. In addition there is a risk premiums on capital financing of 2% to 2.2% that raises the annualized effective lease rates. The following Table presents a typical example using Poland as a case. If we assume an effective life, a tariff or excise tax rate, an interest rate and a risk market premium, then for every dollar the costs of switching per month is as shown below.

Effective Life (Years)	Tariff Rate	Interest Rate	Market Premium	Monthly Fee
5	25%	8.00%	1.50%	\$0.0263
5	25%	10.00%	1.50%	\$0.0275
5	25%	12.00%	1.50%	\$0.0288
5	25%	14.00%	1.50%	\$0.0301
10	25%	8.00%	1.50%	\$0.0162
10	25%	10.00%	1.50%	\$0.0176
10	25%	12.00%	1.50%	\$0.0190
10	25%	14.00%	1.50%	\$0.0206
15	25%	8.00%	1.50%	\$0.0131
15	25%	10.00%	1.50%	\$0.0146
15	25%	12.00%	1.50%	\$0.0162
15	25%	14.00%	1.50%	\$0.0179

Now let us assume that each trunk associated with switching is approximately \$200.00 US. This is a reasonable costs for switching in large numbers. Then we further assume a usage of 100 minute per month per use or equivalently a 1% Erlang load, a trunk can then support 100 subscribers. Thus we find that the capital per subscriber per month, and corresponding per minute is:

Per Month Per Subscriber: Assume a ten year, 8% rate, and we have \$2.60 per trunk per month or \$0.0260 per subscriber per month.

²⁶ See ¶ 37, wherein the components are defines as: “**International facility component:** The international facility component consists of international transmission facilities, both cable and satellite, including the link to international switching facilities. This component includes only the half-circuit on the terminating end because originating carriers have traditionally been responsible for the half circuit on the originating end of a call. High capacity circuits, normally 1.544 Mbps or 2.048 Mbps circuits, are used for IMTS and most telephone administrations offer these circuits to customers on a dedicated basis. The cost element for this component, therefore, is based on foreign carriers' private line rates for dedicated circuits. Multiple 64 Kbps circuits are derived from the high capacity channels and multiplexed into voice grade circuits based on standard U.S. operating practices. This information, along with average monthly traffic volume per circuit, is used to convert the private line rates to a charge per minute for each country. **International gateway component:** The international gateway component consists of international switching centers and associated transmission and signaling equipment. Foreign carriers do not generally offer a separate tariff rate for the international gateway component, so the study relies on information published by the ITU. The cost of this component varies with the level of digital facilities. **National extension component:** The national extension component consists of national exchanges, national transmission, and the local loop facilities used to distribute international service within a country. Foreign carriers' domestic rates and the distribution of U.S. billed service within a country²⁶ are used to compute an average charge per minute for cost of this component.”

Per Minute Per Subscriber: On a per minute basis this is \$0.00026 per minute for switching.

The general conclusion is that switching is de minimis as a cost element.

Transport Costs: The transport costs are the costs for the fiber or other telecommunications facilities. They are generally distance sensitive but with fiber being more prevalent this distance sensitivity is no longer a significant factor. We assume a similar capital costs for transport but we double it, thus it is \$0.00052 per minute as with the above argument.

Direct Operations Costs: These costs include the provisioning of network management, customer services, billing, provisioning, inventory management, and repair and dispatching. These costs are generally personnel driven and thus are produced at local market rates. Frequently these costs dominate the overall costs element of the system. In US costs the total cost for these elements is between \$4.00 and \$8.00 per month per subscriber. This is allocated across all of the subscribers usage, local, long distance and international. If we assume that a typical international call represents 10% of the total usage, a high number, we have an average of \$0.60 per subscriber per month. This is \$0.006 per minute.

Overhead Operations Costs: Generally this represents a 40% to 70% overhead. We shall use 50% based upon the most likely costs as an overhead on the operations costs. This then is \$0.003 per minute.

Sales and Marketing Costs: These should relate solely to local in-country operations.

The summary of cost basis is as follows:

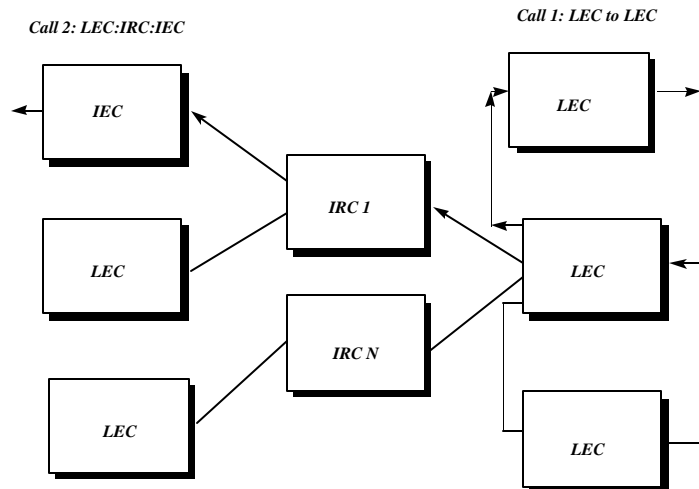
<i>Cost Element</i>	<i>Unit Cost</i>	<i>Number Units</i>	<i>Total Costs</i>
<i>Capital Plant</i>	<i>\$0.00026</i>	<i>3</i>	<i>\$0.00078</i>
<i>Transport</i>	<i>\$0.00052</i>	<i>2</i>	<i>\$0.00104</i>
<i>Operations Costs</i>	<i>\$0.00600</i>	<i>3</i>	<i>\$0.01800</i>
<i>Operations Overhead</i>	<i>\$0.00030</i>	<i>3</i>	<i>\$0.00090</i>
<i>Sales Costs</i>	<i>\$0.00000</i>	<i>1</i>	<i>\$0.00000</i>
<i>Total</i>			<i>\$0.02072</i>

In the above we have assumed that there are multiple Units of each element involved in any transmission. This is consistent with the model shown previously. If we further assume that the system is at best loaded at only 25% then the change to above model occur only in the Capital Plant and transport elements. We then quintuple those numbers, increasing the costs about \$0.0050 per minute, or at most 25 % increase. This is because the dominant costs are operations. We have kept the operations costs at US rates, and we know if we factor in local economy costs the rates drop a factor of four in most markets, thus reducing the costs to well less than \$0.0100 per minute. It should be noted that these costs are dramatically lower than AT&T costs. These costs do not include the sales costs, a significant factor, nor do they include any R&D, product development, marketing, legal or other similar costs. These elements may easily, along with profit, raise the rate to a number comparable to AT&T.

The point we seek to make is that a “bottoms up” analysis of costing is essential by a market by market basis. The Commission has taken the approach of doing a “top down” approach using the “answer” of the tariffs. We argue that a “bottom up” approach using the actual costs is the better approach.

5.2 Principle of Cost Based Pricing

We conclude this with the Principle of Cost based Pricing. The principle can be explained via the following example. Consider the interconnection shown in the following Figure. Here we have a CMRS, an I-LEC, a C-LEC, several IRCs, and their interconnection. The CMRS will be the focal point. The CMRS connects to the IECs and to the I-LEC and C-LEC as well as to other similar players on the other side of the IECs.



Consider two calls. Call 1 goes from the CMRS to the local I-LEC. Call 2 goes from the CMRS, over an IEC to a customer at a distant I-LEC. Both calls are originated by a CMRS customer and terminate on an I-LEC customer.

Today, any IEC call must pay an interconnection access fee to the I-LEC to terminate on their network. As we indicated this is a wealth transfer policy and does not reflect any true cost. The CMRS before the Act paid the I-LEC a termination or origination fee and there was no compensation from the I-LEC to the CMRS. As we have demonstrated that is no longer the case.

The Principle of Cost Based Pricing states the following: The consumer should pay for each link separately and they should pay only for those links for which they are customers of that link provider. The payment the customer makes should reflect a price that is in turn based on the costs of that link.²⁷

The basis for the Principle is the same basis for the Baumol Willig theorem, namely maximizing consumer welfare. The argument is based upon the theory of Ramsey pricing. The classic approach taken by Baumol and Willig is as follows:

$$\text{maximize } (P_1, \dots, P_m) [CS + PS]; \text{ subject to } PS = F$$

where CS is the consumer welfare and PS is the production surplus or the profit of the monopolist provider.²⁸ If however, we eliminate the monopolist totally, that is maximize it on the basis of consumer welfare alone, and if we assume a fully displaceable and commodicizable service, and if we further assume the change in technology that eliminate scale in toto, then the resultant position is the Principle of Cost Based Pricing. Namely, each separate provider sells their service on the basis on their own costs and the interconnection is free and reflects not costs to the consumer.

²⁷The issue here is a quid pro quo issue of parity in providing interconnection in a commodicizable market. For example, if two or more LEC or LEC like carriers enter a market, then there should be not interconnection fee and each carrier should price their services at the price based upon their costs and have no third party intervenor establish a de facto subsidization. If however, one carrier provides a service such ad aggregation to more efficiently interconnect, then this added non pari passu facility should be compensated at an equal, comparable, and costs based level, shared amongst all players. The Baumol-Willig approach can apply here if we merely eliminate the artifact of ensuring a profit to the monopolist as Baumol has consistently done. By maximizing consumer welfare at the expense of the suppliers, namely by creating a competitive market, one arrives at the principle of cost based pricing.

²⁸ See Brown and Sibley, *The Theory of Utility Pricing*, Cambridge University Press, 1986, p. 39.

5.3 *Interconnection Agreements*

The Commission has raised concerns about individual settlement agreements and the possibility of various large international carriers taking undue advantage of arbitrage opportunities within their own field of operations.²⁹ The author recognizes that the opportunities not only exist but lead to clear anticompetitive practices. The smaller nondominant carrier has no recourse to this procedure and no remedy under international law if the settlement agreements are allowed to be set on a company-by-company basis. The author argues that the rates must be set as if they were standard tariffs, and in fact similar to the benchmark rates for interconnect suggested by the Common Carrier Bureau in the Section 251 proceedings. The author argues that the Commission should itself or through an appropriate government agency establish and set those rates. In the case of interconnection, the Commission had established a process and procedure that has a default to the local PUCs. The respondent believes that this process is a common process. Without recourse or remedy however, the FCC should, if they are the entity of choice, set standard rates based upon the TSLIRC or similar pricing models.

5.4 *Internet Telecommunications*

Data is generally free from settlements. This is the accepted result of the WTO negotiations and has been opined on by various entities. The FCC states its position in the following:

“There are other technological developments that accentuate the market distortions caused by above-cost settlement rates. For example, the routing of bilateral traffic through third countries has become increasingly prevalent as a means to arbitrage settlement rate differences. Such re-routing can be helpful in undercutting the settlement rate system, but it can also lead to inefficient traffic routing patterns that are not aligned with underlying economic network costs. Use of the Internet also has emerged as an alternative to higher priced IMTS. Though internet traffic and switched voice traffic are carried over virtually identical facilities, the price for internet service is far cheaper because switched traffic is subject to international settlement rates, while internet traffic is exchanged outside of the traditional accounting rate system.”³⁰

The Organization for Economic Co-Operation and Development, part of the European Common Union, ECU, in its recent report further opines on the introduction of Internet type telephony and its advantages in its ability to have zero settlements. The OECD Study states the following:³¹

“In the previous section, the call-back services which were examined provided service within the framework of the accounting rate and collection charge system. In this section, services which by-pass the international telecommunications charging system are examined. These services include international simple resale, which is already being offered in some countries. Other services, such as telephony using packet switched networks, including the Internet, would also be included in this group of services.

An overview of the different charging and settlement for a number of technologies is shown in Table 9. The services where there is no settlement are to a large extent used mostly by large business customers, but they are becoming increasingly available to the smaller customers given developments in technology, and regulation.

In general, the pricing structure for telecommunication services other than telephony does not depend on time and distance, and does not normally incur a settlement between the operators. Telephone collection charges have also shown a trend toward being less time and distance related reflecting the digitalization of networks. There is, therefore, precedence for using systems other than accounting rates. Despite different charging frameworks many of these other services based on technologies other than the PSTN are profitable.

²⁹ See ¶ 75, ID-96-261.

³⁰ See: Federal Communications Commission, FCC 96-484, Washington, D.C. 20554 In the Matter of International Settlement Rates, IB Docket No. 96-261, Adopted: December 19, 1996, ¶ 17.

³¹ Organization for Economic Co-Operation and Development, Paris, 1997, “New Technologies and Their Impact on the Accounting Rate System”, p. 35.

Table 9. Collection Charges and Settlement for Different Services³²

Service	Technology	Collection Charge Type	Settlement
		Subscriber Line/ Trunk Line	
Telephone	Switched Line	Time/Flat/ Time/Distance	Accounting rate system
Packet	Packet	Time/Volume/ Volume	Settlement by traffic volume
X 400	Store-and-Fwd	- /Volume	No settlement
Leased line	Leased Line	Flat	Half split (No settlement)
Frame Relay	Frame Relay, ATM	Flat	Half split (No settlement)
Internet	Packet / Others	PSTN, ISDN, L. lines, etc. / Flat	No settlement

The above table depicts the WTO agreements as reflected in the Uruguay round of GATT talks. Namely that Internet, namely TCP/IP, is free from settlements and is the only one free on a full circuit basis.

Tarjane, head of the ITU has also stated:³³

*“If market distortion were the only fault with the accounting rate system, it could probably survive. After all, economists usually agree on only one thing, namely that no market is ever perfect. The difficulty is that there are a growing number of other pressures for reform. **An increasing share of traffic bypasses the accounting rate system completely because it is carried by just one operator instead of two (end-to-end service), because it travels over private networks, or because it travels over the Internet.** Increasingly, owners of infrastructure wish to provide service directly to end-users instead of relying on correspondent partners. Furthermore, at the local level, callback operators and resellers exploit the fact that tariffs are not cost-based by arbitraging different prices between countries.”*

The OECD report goes on to state:³⁴

“Internet Telephony

The ability to provide voice services based on packet switched network technology is increasingly providing a competitive threat to traditional public switched telecommunication networks. Although the use of this technology for voice is only emerging, there is considerable interest in its potential. This interest is being fuelled by the fact that time-based usage charges are not traditionally used for packet switched networks. The Internet is providing the underlying infrastructure to begin experiments with providing international voice communications over networks based on packet switched network technology. Although initially voice communications tended to be computer to computer communications, developments are now emphasizing computer to telephone communications. The advantage of packet switched networks also includes, as well, the ability to handle integrated voice, data, and video services which many customers are increasingly requiring for day-to-day business. The fact that there are no international usage charges and only the price of local calls is paid is evidently providing an impetus to Internet telephony. Although arguments have been made that existing Internet capacity will not be able to handle an explosion of voice communication on these networks, it is not evident that the required capacity will not be forthcoming if the demand for services is there.

³² FR stands for Frame Relay Service. Source: OECD

³³ Rome, 25 March 1996, How will the accounting rate system need to be modified in a liberalised market? Liberalisation & Privatisation of the European Telecommunications Sector Preparing for 1998 & Beyond, Dr Pekka Tarjanne, Secretary-General, International Telecommunication Union (ITU), An International Conference arranged by IBC UK Conferences Ltd.

³⁴ OECD p. 39-40.

The development of Internet telephony (see Information Infrastructure and Pricing: The Internet, OECD/GD(96)73 for a comprehensive overview of pricing on the Internet) threatens the viability of the existing accounting rate system. The fact that telecommunication operators, and many governments, seem to continue to support high collection charges (and accounting rates) is in fact accelerating the development of new technologies which help by-pass the existing payments system. Long-term strategy by operators, if they wish to maintain their viability, would argue for lower, more competitive prices which would serve as well to slow down the development and diffusion of alternate calling procedures.

*Governments, given the increasing liberalisation of data networks and in PSTN markets, will have difficulty in regulating the entry of many new services which use packet switched network technology, including voice communications. First, there is the problem in differentiating one type of digital message from another. Second, there is the difficulty in disrupting communications with any one-to-one relation in that re-routing of traffic is a simple procedure. Third, there is the policy emphasis that many governments have placed on the diffusion of broadband infrastructures to create the information infrastructures of the future. To have an economic impact, usage prices on these infrastructures need to be low otherwise new services and on-line applications will be slow to develop. **Many of these new services will gravitate to packet switched networks because of price advantages***

Furthermore Tarjane further states:

“But such dependence on settlement payments is an unwise strategy. Experience shows that traffic stimulation and creating an attractive investment climate are more effective strategies for telecommunications development. By keeping charges high, developing country PTOs create incentives for callback and other forms of bypass which erode their competitive position. Furthermore, a new threat is emerging in the form of Internet telephony. The Internet famously does not employ the usage-based tariffing schemes on which the financial structures of PTOs are based, but instead employs flat-rate tariffs. Furthermore, the Internet has developed without any revenue-sharing mechanism between operators. In so far as there are payments from end-users, they are retained by service providers on a “sender keeps all” basis.

Internet telephony is based on packet switched rather than circuit switched networks. It would probably cost more to trace and bill the precise route taken by each data packet across the network than it would to send the call in the first place. The current state of the art in Internet telephony is quite primitive, attractive mainly to hobbyists and enthusiasts. But one can envisage a rapid evolution over the coming months. Already callback operators are offering to terminate calls originating from computers. Soon, those callback operators and resellers will use the Internet itself as a backbone for their calls.

If we lived in a rational world, few consumers would choose to have their conversations garbled by computers. But the prevailing price structures in international telephony are not rational. The ultimate commodity being sold is bandwidth. Voice traffic uses tiny amounts of bandwidth but is charged a high price. Data traffic uses huge amounts of bandwidth but is charged a low price. Consequently, “cross-over” technologies, such as voice over data networks, exploit these economically irrational tariff structures.”

Thus under the WTO and under the generally agreed to terms of the WTO agreements on services, especially in telecommunications, data is free from both transit fees and settlement fees, and TCP/IP is defined as a form of data and is thus free from such fees. If a country who is a signatory to the Uruguay rounds decides to unilaterally violate that terms then it subjects itself to the severest penalties under the WTO.

6. CONCLUSIONS

There will continue to be significant and dominant growth in these Asian markets. There are several major concerns for US companies ranging from market entry for products as well as for services. The WTO agreements open these markets for services in the next several years. The FCC has commenced its efforts in attempting to address the settlement and accounting rate issue. The growth in international telecommunications traffic and the pursuant growth in the internal economies will be strongly reliant upon

free and open trade. An element of that trade is telecommunications. The telecommunications market is internal and external. We have argued herein that the internal portion is generally under the control of the local country and as best we might try we can at best influence that in the normal course of trade and tariff discussions. The traffic in international voice, data, and other service however is a new development within WTO, being part of GATS, and thus demands closer attention. The trade barriers of telecommunications must be realigned to meet the changes in these markets.

- *Does the “Trade in Services” resulting from the settlement rates have a significant positive influence on the growth of telecommunications services?*

The answer seems to be that the more open the market the more growth. Settlement rates open the markets and the assumption that high settlement distortions are used for infrastructure growth are wrong. In fact infrastructure growth is exogenously fueled and open telecommunications markets are the elements of that fuel.

- *Does the growth in telecommunications services relate to the GDP or similar measures of the country’s economic development status?*

The analysis that we have performed seems to directly correlate open markets with high GDP per capita. This clearly is a questionable cause and effect relationship which needs further study. The answer however is clear that they are correlated.

- *Does the growth rate of a country’s economy correlate with the openness of that country’s market for Trade in Services as relates to telecommunications?*

The answer is the same as the above question. The best examples are Japan versus the Philippines. The Philippines has the most tightly controlled telecommunications market. The intent seems to be to provide financing from these market distorting mechanisms.

- *What should the U.S. position be regarding its ability to influence access to markets by its unilateral power on settlements?*

Trade in services is protected under the WTO and the US should take all steps as is necessary to secure the position of US companies in this trade process. Namely, the US should not take punitive actions against any US company that through technology effects an open market. If the company, via technology such as Internet telecommunications, can provide voice and similar services, then the US should, as it has already done in call back, support and not penalize those companies.

- *Does there exist a set of economic efficiencies in the use of telecommunications via enhanced services, value added services, or Internet services that will allow such providers to have economic advantages to side step the settlement process?*

The Internet options clearly are the best options available for opening telecommunications markets. The TCP/IP protocol supports voice, data, video and other options. Internet allows for the deployment of many types of services in a global market with the shortest deployment time and at the lowest capital costs. We argue that Internet applications are the most bandwidth efficient, are deployed in a fashion wherein the fixed capital is the lowest, and wherein the use of TCP/IP protocols allow for immediate integration of video, voice and data. There are dramatic economic efficiencies that we argue lead to enhancement of telecommunications infrastructures and this immediate economic gains to the country.

- *What will be the effect of Internet and Internet like voice, video and data services wherein the “path” of the message has no definition? Does any country have the right to regulate a “mixed” message format?*

The use of Internet is an enabling technology. Unlike call back, which is a true arbitrage situation, Internet and Internet like applications allow for rapid global expansion at an extremely low cost of entry for the backbone costs and arguable for the local switching costs. Regulation of Internet like telecommunications is highly problematic since there is an admixture of systems and services, and any regulation will result in immediate delimitation and eliminate and economic externalities that have been found to flow from Internet

applications. We further can argue that the recent FCC ruling on Settlements may actually have a negative effect on the growth of telecommunications in developing countries. We argue that in other papers.³⁵

³⁵ See McGarty, T.P. Telmarc Policy Paper 97.005, available from the author, August 9, 1997.