

# TDRI

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Review

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*The more we develop, the poorer we are? The article on page 12 shades some light on the debate of development and poverty.*

# State Interventions in the Internet Market: Lessons from Thailand

Somkiat Tangkitvanich\*

## 1. THE DEVELOPMENT OF INTERNET IN THAILAND

The Internet was first adopted in Thailand in 1987. Following similar patterns of other countries, initially, the Internet was used as a communication tool by the academia. Among early Internet users are the Asian Institute of Technology (AIT), Prince Songkhla University, Chulalongkorn University and the National Electronics and Computer Technology Center (NECTEC). Commercial Internet was introduced in the year 1995, when Internet Thailand was established as the nation's first Internet Service Provider (ISP). Other commercial ISPs made their foray into the market in subsequent years. Currently, there are 18 providers operating as commercial ISPs and the four public service providers are: School Net (school network), GITS (government information technology network), PubNet (academic research network) and UniNet (inter-university network). All these commercial and non-commercial networks are currently linked to the global Internet through a bandwidth speed of over 500 Mbps in both the inbound and the outbound directions. They are also domestically interconnected through two public interchanges: NIX and IIR, which are operated by the Communications Authority of Thailand (CAT) and the NECTEC, respectively.<sup>1</sup>

Today, the Internet has become a crucial part in everyday lives of many Thais. According to a household survey by the National Statistical Office (NSO) in the first quarter of 2001, there were about 928,000 computers in use in 16.1 million households. This is equivalent to 5.75 computers for every 100 households or 1.48 computers for every 100 people. The same survey also found that there were about 3.54 million Internet users. Loosely defined, they are persons who used the Internet at least once during the past year. This is equivalent to a penetration ratio of 5.64 percent of the population (See Table 1). The survey also revealed that about 21.5 percent of the household with Internet users accessed the Internet from their homes, while the remaining 78.5 percent from Internet cafés, schools, and workplaces.

According to the NSO survey, about 48.3 percent of the Internet users are male and 51.7 percent female, and most of these users fall in the age bracket of 15-24 years. In terms of regional break-up, the survey reveals that about 34.9 percent of the users are located in Bangkok, 23.5 percent in the Central region, 14.6 percent in the North, 15.8 percent in the Northeast, and 11.2 percent in the South. The data further reveals that 34 percent are university graduates, 30.2 percent high-school graduates, 22.9 percent junior high-school graduates, and only 4.2 percent primary school graduates.

**Table 1 Internet and IT Equipment Ownership/Usage in Thailand (As of January-March, 2001)**

IT Ownership/Usage	Total Number	Penetration per 100 people	Penetration per 100 households	Households with ownership/usage
PC Ownership	927,875	1.48	5.75	812,565
Internet Usage	3,536,000	5.64	3.04	490,158
Facsimile Ownership	264,052	4.21	1.64	259,528
Mobile Phone Ownership	2,442,821	3.89	15.14	1,894,100

Source: National Statistical Office.

\* Dr. Somkiat is Research Director for Information Economy, Science and Technology Development Program, TDRI.

The author thanks Dr. Tim Kelly of the International Telecommunication Union (ITU) for inviting him to write this paper for the Workshop on Internet in South East Asia ([www.itu.int/asean2001](http://www.itu.int/asean2001)), which was organized in Bangkok, Thailand during 21-23 November 2001. The author also extends his appreciation to Mr. Kriengkrai Veerarithiphan for the excellent assistance provided in the preparation of the paper.

The analysis in Section 3.3 is drawn from research work that the author had undertaken for the National Information Technology Committee (NITC). The analysis in Sections 3.1, 3.2 and 3.4 are revised versions of the author's previous papers, which he had written for seminars organized by the Thai Information Technology Press Club (ITPC) in June 1997 and July 2001.

As regards Internet users aged over 15 years, the study shows that 44.6 percent have at least one job while about 41.5 percent are students and 3 percent are unemployed. Dividing them further according to their occupations; among the employed, 46.2 percent are private employees, 34.4 percent are public employees and 9.7 percent are non-paid home workers.<sup>2</sup>

The provision of non-commercial Internet services through public funded projects, such as School Net and UniNet have helped to promote Internet usage in Thailand. However, other forms of state interventions, such as monopolization of the international telecommunication market and its ownership in every ISP, have retarded the development of commercial Internet services.

The paper describes the structures of the Internet markets in Thailand so that background information is provided to readers (Section 2); analyzes the impact of state monopolization of the international telecommunication market on retail prices, the levels of Internet and e-commerce adoption, the locations of web servers and quantifies the impact by estimating welfare losses incurred to the society due to monopolization (Section 3); assesses the impact of state intervention in ISPs' ownership and structure on prices and market development (Section 4); the conclusion discusses the implications of the research (Section 5).

## 2. THE STRUCTURES OF INTERNET MARKETS IN THAILAND

There are three market segments of Internet services in Thailand. The first segment is the market for international Internet access. The CAT, a state-owned enterprise, statutorily monopolizes this segment. The second market is the market for domestic ISPs. All commercial ISPs are required to apply for a built-transfer-operation (BOT) type of concession from the CAT. The third market segment is the resale market, which is composed of schools, universities and numerous Internet cafés. Operators in this market purchase access services from the ISPs and resell them to their clients.

The market segment most familiar to Internet users is the commercial ISP market. As mentioned earlier, there are currently 18 ISP operators, who can be further classified into four groups. The first group consists of independent providers that are early movers. Most of the ISPs in this group have managed to acquire sufficient market shares to sustain their businesses. Examples of such ISPs are Internet Thailand, KSC Commercial Internet, Loxley Information Services and A-Net. The second group consists of independent operators that are latecomers and have become marginal players. Examples of the ISPs in this group are Data Line Thai, Idea Net and E-Z Net. The third group is composed of the ISPs that are affiliated with telecommunication operators. Examples of such ISPs are Asia Infonet, a

subsidiary of a fixed-line telephone operator in the Bangkok Metropolitan Area, and CS Internet, a subsidiary of a telecommunication conglomerate, Shin Corporation. The ISPs in this group have managed to penetrate the market by using their vertically integrated telecommunication infrastructures and financial clouts. The last group is composed of the ISPs with foreign shareholders that entered the Thai market during the dot-com boom. ISPs in this group are Pacific Internet (Thailand) and Cable and Wireless.

The total international capacity of ISPs expanded rapidly from 20.9 Mbps in August 1997 to over 500 Mbps in mid-2001. At present, six companies have at least 45 Mbps of international bandwidth, the largest capacity currently available from the CAT (Table 2). The six-firm concentration ratio, defined as the ratio of international bandwidth of the six largest ISPs to the total bandwidth, has risen from 82 percent in June 1998 to 91 percent in June 2001. However, demand has not caught up with supply. As a result, there is a significant excess capacity among the six largest ISPs and competition in the market has heated up. Dial-up service for individual users has already become a commodity, with the cheapest prepaid access package priced less than Bt 10 (less than USD 0.25) per hour. However, prices in the leased-line market for corporate users are still high in comparison with other Asian countries. This issue will be addressed in more detail in the next section.

## 3. IMPACT OF STATE MONOPOLY

Compared with other Asian countries of similar level of development, the penetration of the Internet in Thailand is relatively slow. In terms of Internet hosts per capita, Thailand is ahead only of Indonesia and the Philippines, but lags behind all other East-Asian countries. This reflects the low rate of Internet adoption in Thailand. The problem is largely due to the monopoly in the telecommunication sector. As noted above, the domestic Internet market is relatively competitive. However, in the international Internet market, all domestic ISPs must connect to the CAT's network in order to link to the global Internet. This ensures CAT's total monopoly, and the rates therefore, charged by CAT is not subject to any competition.

### 3.1 High Access Prices for Leased Line

A comparison of average Internet prices for dial-up and leased-line services in seven Asian economies is depicted in Table 3. It shows posted access prices charged by ISPs in each economy exclusive of telecommunication connection charges. While the cost of dial-up Internet service in Thailand is comparable to that of other Asian countries; the cost of its leased-line Internet access is about 1.1 to 2.9 times higher.

**Table 2 International Bandwidth of ISPs (Mbps)**

ISP	Jun 2001	Jan 2001	Jun 2000	Jan 2000	Jun 1999	Jan 1999	Jun 1998
CS Com	83	46	14	10	4	3	0.75
Loxinfo	69	36	22	15	7.5	5.5	4
KSC	58	50	50	42.5	12	6	4
Internet Thailand	55	44	42	42	10	10	8
Asia Infonet	54	29.5	9.5	7.5	2.5	2	2.5
A-net	45	45	4	8	4	3	2
Jl-Net	8	8	6	2			
Samart	8	8	6	2	4.5	2.5	2
WorldNet	5	5	2.5	2.5	2.5	2	2.5
CWT	4.5	2.5					
Idea Net	2	2	0.25	0.25	0.25	0.25	0.5
SGA	2	4	3.5	2.5	2.25	0.75	0.75
Data Line Thai	2	0.4375	0.1875	0.1875	0.125	0.125	0.0625
Asia Access	2	3	1	1	0.5	0.5	0.75
CWN	0.5	0.5	0.5	0.5	0.5		
Roynet	0.5	2	2				
Far East	0.5	0.75	0.75	0.25	0.25	0.25	0.125
EZNet	0.375	1	0.5	0.125			
Total	399.375	287.6875	164.6875	136.3125	50.875	35.875	27.9375
Bandwidth share of the 6 largest ISPs (%)	91.1	87.1	87.1	91.7	82.6	83.6	82.3

Source: NECTEC ([ntl.nectec.or.th/internet/](http://ntl.nectec.or.th/internet/)).

**Table 3 Internet Access Prices in Asian Economies (As of September 2001)**

Economy	64 Kbps Leased Line		20-Hour Dial Up Service	
	ISPs	Average Price (\$ US/month)	ISPs	Average Price (\$ US)
Thailand	KSC, Pacific Internet, Roy Net, Idea Net, Asia Access, CS Internet	780.3	Internet Thailand, KSC, Loxinfo, CS Internet	4.5
Hong Kong	Cyber Express, Chevalier Internet	267.3	Pacific, Global Link, iChannel, Cyber Express	15.3
India	Balasai Net, Southern Online	627.5	Pacific Surf, Sigma Online, Bharat Connect	3.3
Indonesia	Indosat Net, Central Online, GlobalNet, D-Net, Centrin Online	419.3	Indosat net, UniNet, CBN, RadNet	8.1
Malaysia	Jaring, Malaysia Online, Timenet, Tmnet, The Putra.net	524.5	Jaring, Tmnet	3.2
The Philippines	Asia Gate, Nsclub	705.2	Pacific Surf, Manila-Online, MilStation Net, Iconnex, PhiWorld Online	10.7
Singapore	-	NA	SingNet, Pacific Surf	6.8

Source: The author.

The main reason for high leased-line prices in Thailand is the monopolization of CAT in the international market. Table 4 compares the half-circuit prices charged by the CAT and MCI WorldCom, an international ISP, for connecting between Thailand and the U.S. The monthly price of the CAT's half circuit at 45 Mbps is 159,167 Bt (USD 3,581) per Mbps. The price is about 43 percent higher than that of MCI WorldCom. The difference would be more significant if prices offered by competitive regional operators, i.e., Singapore Telecommunications and Dacom are used as benchmarks. The wide price gap is due to the fact that the CAT has always been slow to reduce its half-circuit prices. In fact,

its prices were reduced only twice during 1997-2001: the first time in March 1997, the second time in January 2001. These reductions amount to an average rate of only 6 percent per year.

Given that the cost of international bandwidth contributes to about 50-60 percent of the total cost of a large ISP in Thailand, if the CAT's prices were lowered by 43 percent to the MCI WorldCom's level, the retail leased-line price in Thailand would automatically be reduced by 10 percent. This is because the domestic ISP market is already competitive and any reduction in cost will translate into price reduction.

**Table 4 Comparing CAT's and MCI WorldCom's Half-Circuit Prices for Thailand-USA Routes (July 2001)**

International Bandwidth (Mbps)	CAT's Discount Rate (Bt/Month)	MCI WorldCom's Rate (Bt/Month)
2	716,250	567,000
4	1,289,250	1,125,000
8	2,220,375	1,710,000
16	3,939,375	2,700,000
45	7,162,500	4,050,000

Note: \$US 1 = Bt 45

Sources: 1. CAT's rates are from CAT's Announcement (Sixth Revision, January 2001).  
2. The MCI WorldCom rate is from the company's quotation.

As discussed in Section 1, about 78.5 percent of users access the Internet from places outside their homes. These places are Internet cafés, schools and workplaces, which usually require leased-line connections. High leased-line prices therefore not being competitive, would seriously limit the use of Internet. In fact, a survey by a market research firm in the year 2000 revealed that 37 percent of public agencies, schools and companies in the sample indicated that the high cost of leased lines was one of the key factors that prohibited their access to the Internet.

### 3.2 Low Penetration of Internet Use

A previous study (Somkiat and Deunden 1997) confirmed that the CAT's monopoly also resulted in low Internet penetration in Thailand. The researchers analyzed the Internet markets in 14 Asia-Pacific economies that are founding members of the Asia Pacific Economic Cooperation (APEC).<sup>3</sup> A regression analysis was used to study the relationship between the number of Internet hosts in an economy, its GDP and a dummy variable, *Monopoly*, representing whether the economy has a monopolistic (*Monopoly* = 1) or competitive (*Monopoly* = 0) international telecommunication market. The result of the study is as follows:

$$\text{Number of Host}_i = 772.6 \text{ GDP}_i - 557.2 \text{ Monopoly} \cdot \text{GDP}_i - 41,201$$

The regression has an adjusted  $R^2$  of 0.484 and F-statistics of 7.11. T-statistics for the three variables are 3.74, -2.66 and -0.68, respectively. In other words, the analysis shows that, at a confidence level of 95 percent, an economy with a competitive telecommunication market will have additional 772.6 Internet hosts with an additional billion dollars of GDP. An economy that had a monopolistic international telecommunication market will have 557 fewer Internet hosts.

The same technique was used to analyze the impacts of monopoly in the international telecommunication market on the number of servers with secured socket layer (SSL) protocol in each economy. Such servers are usually used to conduct secured transactions in e-

commerce. Thus, the number of SSL servers in each economy can be used as a proxy for the level of e-commerce development in the economy. The data set in Table 5 is that of the same 14 APEC economies used in the above analysis. There are 10 economies with competitive international telecommunication markets and three with partially competitive markets as classified by the International Telecommunication Union (ITU). Thailand is shown as the only monopolistic market. In our analysis, the three economies with partial competitive regimes are treated as monopolistic ones, with the dummy variable, *Monopoly*, set to 1. However, the result still holds even if the dummy variables are set to 0.5.

The regression analysis results in the following relation.

$$\text{Number of SSL Server}_i = 4.25 \text{ GDP}_i - 4.00 \text{ Monopoly} \cdot \text{GDP}_i - 49.94$$

The regression has an adjusted  $R^2$  of 0.327 and F-statistics of 4.16. T-statistics for the three variables are 2.78, -2.47 and -0.1, respectively. In other words, the analysis shows that, at a confidence level of 95 percent, an economy with a competitive telecommunication market will have additional 4.25 SSL servers with an additional billion dollars of GDP, while an economy with a monopolistic international telecommunication market will have 4.0 fewer SSL servers. It is striking that the effect of the monopoly on the number of SSL servers is almost as strong as the effect of the size of the economy as measured by GDP. In other words, the impact of market liberalization on the adoption of SSL servers in an economy is almost as strong as the impact of increasing the economy's GDP by one billion dollar. Similar conclusion still holds even though the dummy variables of economies with partial competition are set to 0.5.

### 3.3 Losses of Web Hosting Businesses

High Internet prices also result in the loss of web hosting businesses. To evaluate the degree of the loss, we trace the physical locations of 92 Thai web portals. The portals are selected from the list of web sites that participated in *Thailand Web Awards 2000*, organized by

**Table 5 The Relationship between the Number of SSL Servers, Real GDP and the Level of Competition in Selected APEC Economies**

Economy	#SSL Servers in Jan 2001	Real GDP in Year 2000 (\$ billion)	Level of Competition in International Market
Australia	3,423	393.70	C
Canada	5,055	678.70	C
Chile	141	70.54	C
China	184	1,080.01	P
Hong Kong	538	163.27	C
Indonesia	60	136.87	P
Korea	345	457.22	C
Malaysia	146	85.57	P
Mexico	259	575.50	C
New Zealand	609	49.80	C
Philippines	68	75.18	C
Singapore	525	92.26	C
Taiwan	372	310.10	C
Thailand	116	124.91	M

Notes: M = Monopoly, P = Partial Competition, and C = Competition

Sources: 1. Numbers of SSL-Servers are from Netcraft ([www.netcraft.com](http://www.netcraft.com)).  
2. GDP data are from (IMD 2001).  
3. Competition levels are from Regulatory Table 6 in (ITU 2001).

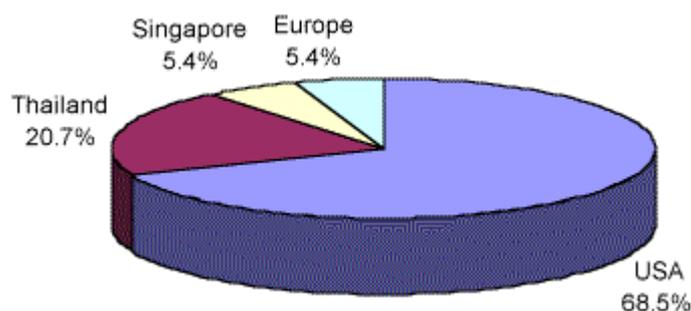
the Nation Multimedia Group. There are two reasons for choosing Thai web portals as the objects of the study. Firstly, their contents are in Thai language since the sites are expected to serve local customers. Thus, there is no inherent need to relocate the sites to foreign countries to speed up access. Secondly, portal sites are most sensitive to Internet access prices. They, therefore, best demonstrate the impact of high prices on the choice of site locations. This is because few, if any, transaction-related activities, such as shopping and payment, are conducted in the portals.

The procedure to locate physical locations of the selected web portals involves two steps. In the first step, we use *tracert*, a DOS-based program, to translate the portals' URLs into the corresponding IP addresses. Then, we query the *ARIN Whois* database ([www.arin.net/whois](http://www.arin.net/whois))

to find the location of the IP address found in the first step.<sup>4</sup>

Results of the survey are shown in Figure 1. The Figure illustrates that nearly 80 percent of the Thai portal sites are located in foreign countries. In particular, 68.5 percent are located in the U.S., 5.4 percent in Europe and 5.4 percent in Singapore. Only 20.7 percent of the sites are located in Thailand, even though most of their intended customers are in Thailand. This generates unnecessary international traffic and drives up the bandwidth cost of domestic ISPs. In addition, with a large number of web sites physically located in foreign countries, the domestic web hosting and data center service providers are losing their business opportunities.

**Figure 1 Locations of Thai Web Portals**



Source: TDRI 2001.

### 3.4 Quantifying the Impacts of the Monopoly

Section 3.1 shows that a monopoly in the international telecommunication market leads to high leased-line prices. Sections 3.2 and 3.3 demonstrate that these excessive prices prevent some potential consumers from using the Internet or they force existing consumers to move their business overseas. This creates losses in consumer benefits that are not fully captured by higher profits for the monopolist, and in a larger context, it also results in net welfare loss for the society. How much loss is incurred by CAT's monopolization of the Internet market in Thailand? Following (Cowling and Mueller 1978), we quantify the size of welfare losses due to the monopoly in the Internet market by using the following formula:

$$\text{Welfare Loss} = \frac{1}{2} \Delta P \cdot P_m \cdot Q_m$$

Where  $P_m$  is the price charged by the monopolist. In this case, it is the price that the CAT charges domestic ISPs for 1 Mbps of its international half circuit.

$\Delta P$  is the difference between prices charged by the monopolist and that by a competitive operator normalized by the monopolist's price. In our study, the price that MCI WorldCom charges for 1 Mbps of its half circuit is used as the proxy for the competitive price.

$Q_m$  is the quantity supplied by the monopolist. In this case, it is the international half-circuit bandwidth supplied by the CAT.

By substituting the relevant values into the above formula, we can estimate the welfare loss due to the CAT's monopolization of the Internet market. For example, if the average bandwidth supplied in the year 2001 is assumed to be 555.6 Mbps, which is the capacity supplied in July 2001, the welfare loss for the year is estimated to be:

$$\begin{aligned} \text{Welfare Loss} &= \frac{1}{2} \Delta P \cdot P_m \cdot Q_m \\ &= \frac{1}{2} (0.43) \cdot (159,167) \cdot (555.6) \\ &\quad \text{Bt per month} \\ &= 230.6 \text{ million Bt per year} \end{aligned}$$

In other words, it is estimated that the monopoly results in an annual welfare loss of about Bt 230 million. The loss will increase significantly as the differences in rates charged by CAT and the competitive market price,

grows wider. It will be further compounded with the expansion of the Internet, which is expected to grow at a rate of 33 percent during the period 2001-2005, assuming that the GDP growth rate is 4 percent per year (Somkiat 1999).

It should be noted that the above welfare loss could be significantly underestimated. This is because only losses in static efficiency, those related to resource misallocation, are taken into account. There are also losses in dynamic efficiency, which is related to adoption of latest technology. In this case, dynamic efficiency is related to the use of the Internet to develop new or better production or sales methods; these are by means of supply chain management (SCM) or customer relationship management (CRM). Faced with high costs, many small and medium-sized enterprises (SMEs) are deprived of the opportunity to use the Internet for such activities. These companies, therefore, lose the opportunity to innovate. Thus, if the monopoly is not abolished in due time, many enterprises in Thailand will have difficulties in increasing their productivity as they will fail to adopt new technology, and this will result in the competitive edge being further weakened.

### 4. IMPACTS OF SHARE TRANSFER REQUIREMENT

As part of the BTO concession, an ISP must transfer to CAT about one-third of its shares without any capital payment. The only two ISPs exempted from the condition are Internet Thailand and CS Internet. In the case of Internet Thailand, the company is the first ISP in the country and was allowed to operate before the condition was set up. In the case of CS Internet, the company operates as part of its parent company's satellite concession. In both cases, the CAT actually contributed to the companies' equity. In this section, the impact of the CAT's share transfer requirement on Internet retail prices and ISPs' corporate structures is investigated.

- Let  $P$  be the retail Internet price charged by an ISP, in the absence of the share transfer requirement.
- $P'$  be the retail Internet price charged by the ISP, in the presence of the share transfer requirement.
- $C$  be the cost of the ISP in providing the service.
- $x$  be the rate of return that the ISP expects from its operation.
- $X$  be the absolute value of profit expected by the ISP.

From the definition of profit,

$$P - C = X \quad (1)$$

To maintain its profit at  $X$ , the ISP has to adjust its price upward when it is required to give the CAT one-third of its share without any capital payment.

$$2/3(P'-C) = X \quad (2)$$

Since (1) = (2),

$$3P = 2P' + C \quad (3)$$

$$(P-C)/C = X \quad (4)$$

$$C = P/(1+x) \quad (5)$$

By substitute (5) into (3), we get

$$3P = 2P' + P/(1+x) \quad (6)$$

Or equivalently,

$$P'/P = (2+3x)/(2+2x) \quad (7)$$

According to the above analysis, an ISP with an expected rate of return of 30 percent ( $x=0.3$ ) will mark up the price of its Internet service by 20 percent to cover this condition.

However, the real world is more complicated than what the model may suggest. Table 6 shows the revenues and profits during 1998-2000 of 16 active ISPs as reported to the Ministry of Commerce. Even during the period when the Internet market experienced a very high growth rate, at least half of the companies in operation made losses. The numbers of companies that showed profit in 1998, 1999 and 2000 are 7, 8 and 4, respectively. The only two companies that were consistently profitable are Internet Thailand and KSC Commercial Internet.

While some companies may have incurred losses as reported because they could not compete in the market, others may under-report their profits in order to avoid full profit sharing with CAT. In economics termi-

nology, this is a manifestation of the principal-agency problem, with the principal (the CAT) having difficulties in monitoring its agents (the ISPs). Apparently, some ISPs have tunneled their profits out of the companies. One obvious way of channeling funds is through transactions with connected companies. Thus, it comes as no surprise that many ISPs have set up complex shareholding structures. Figure 2 shows such an example where a holding company used three subsidiaries to tunnel profits out of the ISP.

This results in CAT not getting its one-third share of profits that it expects. Excluding Internet Thailand and CS Internet, the two companies to which CAT has contributed real equity, CAT received its one-third entitlement a total of Bt 42.9 million only from the three profitable ISPs in 2000. This amount is equivalent to a share of merely 0.8 percent of the total revenue of Bt 1,646.5 million.

Another stipulation as part of the BTO concession is that the chairperson of the ISP's board of directors must be a representative from CAT. In addition, if the chairperson objects to any business plan proposed by the ISP's management, he/she is empowered to cast a veto vote. Even though such a power has never been exercised in practice, the condition makes it difficult for many ISPs to find foreign partners, and this was true even during the dot-com boom period. Although some ISPs did manage to find foreign partners, it seems likely that significant discount in share prices was needed to compensate for the risk related to CAT's interventions.

It is thus seen that CAT's interventions in ISPs' ownership as well as governance structures results in both CAT and ISPs being the losers. The problems are now recognized and re-negotiation of the contracts between CAT and the ISPs are going on. However, no tangible results have been achieved during the past few years and the problem is likely to remain unsolved in the foreseeable future.

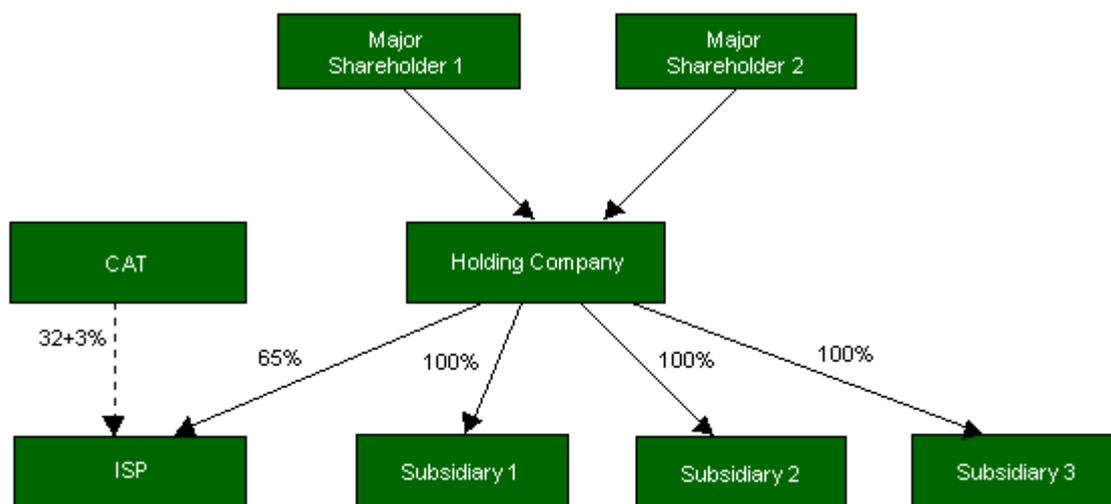
**Table 6 Total Revenues and Net Profits of Thai ISPs during 1998-2000**

(Unit: million Bt)

ISPs	1998		1999		2000	
	Total revenue	Net profit	Total revenue	Net profit	Total revenue	Net profit
A-Net	56.4	4.9	134.2	7.4	205.4	(7.0)
Asia Infonet	53.1	(29.8)	126.5	8.4	150.4	16.0
Chomanan Worldnet	1.7	(7.1)	3.5	(8.8)	-	-
C.S. Communications	211.7	7.5	243.9	(144.6)	495.1	(71.7)
Data Line Thai	3.7	(2.8)	5.1	(2.7)	8.8	(0.2)
E-Z Net	-	-	0.1	8.9	-	-
Idea Net	9.1	0.9	8.0	(2.7)	3.9	(13.1)
INET (Thailand)	29.7	(7.8)	39.6	4.2	48.3	4.1
Internet Thailand	140.1	24.6	214.2	52.8	310.0	51.2
Jasmine Internet	18.2	(7.5)	29.2	(10.0)	80.0	(14.7)
Loxley Information Services	224.3	7.2	331.6	(15.5)	445.0	(146.8)
Pacific Internet (Thailand)	-	-	26.5	3.0	71.1	(94.9)
Roynet	0.8	(1.4)	1.9	(4.1)	8.9	(8.9)
KSC Commercial Internet	149.7	12.1	292.2	16.4	438.9	22.8
Samart Infonet	55.8	(29.2)	90.2	(33.7)	150.9	(12.3)
Siam Global Access	29.0	2.7	41.7	1.3	34.9	(5.1)
<b>Total</b>	<b>983.3</b>	<b>(25.7)</b>	<b>1,588.4</b>	<b>(119.7)</b>	<b>2,451.6</b>	<b>(280.6)</b>

Source: The Department of Business Registration, the Ministry of Commerce.

**Figure 2 An Example of a Share Holding Structure of an ISP**



## 5. CONCLUSION

Despite undesirable state interventions in the Internet market, the adoption of the Internet in Thailand has expanded steadily. Thanks to many public projects, a number of schools, universities, central and local governmental agencies have been connected to the Internet. Broadband Internet services through ADSLs and cable modems have finally arrived, although the prices are still not affordable for most users. Unlimited access services were recently launched by ISPs. Free Internet is about to be provided by the Telephone Organization of Thailand, another state-owned enterprise. Without distortionary interventions, however, the country would have been much better off.

To promote the use of the Internet, Thailand obviously needs a competitive and undistorted telecommunication market. The best way to achieve these goals is to allow more competition from new entrants, both domestic and foreign, and to set up an independent regulatory body that works in the interest of the consumers. The lessons of the past mistakes should be well recognized and other developing countries should be warned against repeating similar mistakes.

## ENDNOTES

<sup>1</sup> More detailed treatments of the history of the Internet in Thailand can be found in (Sirin et al. 1999) and (Thaweesak 2000). Further information on the commercial and non-commercial networks and the two exchanges can be found in the home page of NECTEC's Network Technology Laboratory ([ntl.nectec.or.th/internet](http://ntl.nectec.or.th/internet)).

<sup>2</sup> The National Information Technology Committee (NITC) also conducts an annual survey on Internet

user profiles since 1999, the latest version of which (NITC 2001) is available from the NITC. However, the survey is considered less reliable since it is based on an Internet-based questionnaire, where systematic and unbiased sampling cannot be achieved.

<sup>3</sup> The economies included in the study are Australia, Canada, Chile, China, Hong Kong, Indonesia, Malaysia, Mexico, New Zealand, the Philippines, Singapore, South Korea, Taiwan and Thailand. Four APEC founding members are treated as outliers and excluded from the analysis. They are the U.S. and Japan, which are the two largest economies, and Papua New Guinea and Brunei, which are the two smallest economies among the founding members.

<sup>4</sup> Alternatively, we can use *Neotrace*, a GUI-based software that performs the same function in a single step. The software is a shareware that can be downloaded from [Download.com](http://Download.com) for use in a trial period of 30 days.

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# Development and Poverty: Executive Summary\*

Somchai Jitsuchon\*\*

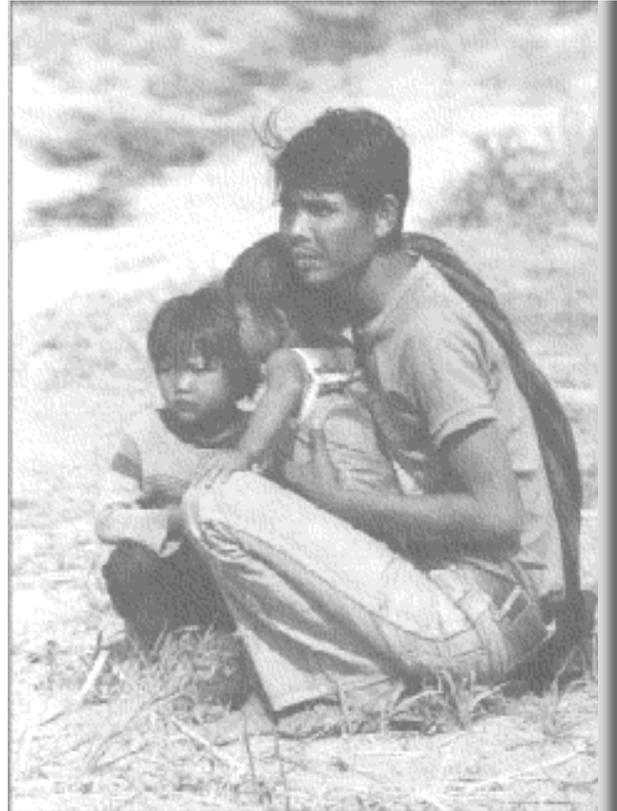
**“The More We Develop, The Poorer We Are.”**

The above statement is heard more and more often in Thailand. Regardless of the type of the evidence used, the background of the speakers, or how well it is received, it forces us to think and debate more on the true relationship between ‘development’ and ‘poverty reduction.’ This paper does not intend to give a definite answer to this extremely important question, but is aimed instead at identifying the on-going debate in more detail and offer a preliminary conceptual framework that could be useful for further discussion.

## THE CRITICISMS

The criticisms in the past are categorized into three broad categories: on general strategies of development, on its social impact and on its environmental impact. Within these three categories, the criticisms are also divided into those aimed at the fundamental problems of the development (which tend to be widely agreed upon) and those made more negatively and more specifically based sometimes on anecdotal examples. The criticisms include (those in parentheses are the more specific criticisms):

- Too much emphasis on growth has left other dimensions of less developed (other dimensions have indeed been deteriorated).
- Reliance on market mechanism does not ensure fair allocation of resources (the poor are made poorer by the market mechanism).
- Past policies are in favor of industrial development while agricultural sector has been much less promoted (agricultural sector never received any benefit from the past development, its resources are also drained to support industrial development).
- Developing of cash crops make the farmers more vulnerable to world and market prices (crop prices, and hence the farmers’ income, are made lower in the process).
- Trickle-down effect does not work, leaving higher income inequality as the early stage of the development is left uncorrected (its effect is not only a growing problem of relative poverty but absolute poverty as well).
- Rapid changes in production methods and life styles have made it difficult for the poor to keep informed of all the benefits and constraints of new opportunities (the poor can never keep abreast with the new information and are constantly fooled by the know-better agents).



\* Summary of paper presented at the 2001 Year-end Conference on Poverty Reduction Strategies held at the Ambassador City Jomtien, Chon Buri, on November 24, 2001.

\*\* Dr. Somchai is Research Director for Macroeconomic Development and Income Distribution, Macroeconomic Policy Program, TDRI.

- The quality of mind is deteriorated as more importance is put on material progress (the past development is mainly responsible for all sorts of social illnesses witnessed today. Without the development, these things would not have happened).
- Social capital, especially at the community level, is being destroyed by the development.
- When development is judged by the ability to lead a 'modern' lifestyle, poor people are usually socially secluded and viewed as 'abnormal' to the society (the rich and the middle-class usually look down on the poor, believing firmly that they are poor from own behavior).
- Natural resources and environment are deteriorated by the development.
- The concept of precisely defined property rights that underlines capitalism has made the poor more miserable and vulnerable by taking away the 'common resources' they once had the rights to use.

The general criticisms above are well accepted by most academics, economists and non-economists alike, and are also shared by the poor themselves.

Two of the major messages from the criticisms are highlighted and further discussed: the inadequacy of the economic growth as the single indicator of true development and the problem of rising income inequality.

### ECONOMIC GROWTH VERSUS DEVELOPMENT

The assertion 'economic growth does not mean development' are borrowed from Sen (1988), who made five points about economic growth measured by GNP:

1. It lacks distributional aspect;
2. The market values on which the GNP calculation is made fails to reflect externalities, both economically and socially;
3. Market allocation does not necessarily reflect the optimal social choices due to monopoly and disequilibria;
4. GNP measures a snapshot of the average person's life, whereas the quality of life needs a consideration of the entire lifetime;
5. Income and commodities are only means but not ends to the well-being.

Despite its many shortcomings, economic growth remains one of the most powerful 'tools' capable of lifting the standard of living and well-being. The question is then how to improve this tool—the growth strategy—to meet other demand of the true development, rather than turning our back entirely on growth.

### THE PROBLEM OF INCOME DISTRIBUTION AND POVERTY

The two problems are correlated, but not the same. Confusion must be avoided if any meaningful discussions are to follow. In fact, the assertion that economic growth and past development bring about more poverty is only acceptable when one means relative poverty rather than absolute poverty (where relative poverty is one manifestation of the overall problem of income distribution).

At the heart of the debate is the failure of the trickle-down theory mentioned above. The theory seems to suffer from two major false assumptions that countries do not trade and that there is no technological advancement. Both trade and skill-biased technological advancement can potentially cause higher inequality along with higher growth. But they are merely potential causes. Other structural problems must also be at play, namely, the social and political power structure within the country is hindering the benefits from both trade and technology. In fact, the recent discovery in the literature seems to overturn the prediction of the trickle-down theory, in that more equal distribution of income and assets can be instrumental to higher subsequent growths, thus untying the conflict between growth and distribution objectives of economic development.

Ideally, one might want to consider the (capitalist) social welfare state as the answer to the ultimate goal of development. Unfortunately, there are at least two prerequisites, both of which must be met simultaneously: the countries must be considerably rich to have adequate public funds for the social service outlays, and the political structure must be sufficiently equal to vote for such a state. Thailand at present is clearly far from such position.

### ISSUES TO DEBATE: DEVELOPMENT AND POVERTY

The debates on the relationship between development and poverty are very likely to be lengthy and controversial. It would be helpful to find a common ground first. For example, it should not be too controversial to state the following:

*People Are at the Heart of the Development.*

All paradigms of economic development must be tested and justified by how well they serve to enhance the quality of life of the people, and do so equally. The next question then is "what is the quality of life?" For this, we again turn to Amartya Sen who wrote in several occasions the meaning of the quality of life (for example in Sen (1988)). Sen argues that quality of life must be assessed with two basic properties: function and capability. Function is what a person can "do" or "be," e.g., being well nourished, being able to communicate. Capability is closely related to freedom, defined more

precisely as the availability of various functioning to choose from. For example, a person should be able to choose more than one type of food to keep him/her well nourished. The function and capability can form a basic requirement that the development must bring to the poor.

Issues for debate could consist of the following:

- Are all aspects of the past development contributing to the overall deterioration of poverty incidence?
- Which aspects of development made it better, which made it worse?
- How credible is the measurement of the absolute poverty?
- Can the poor escape poverty under the present economic and social structure?
- What proportion of the measured poverty is transient, what is chronic?
- How can we make the economic growth a better tool to fight poverty?
- What measures are there to mitigate the mounting problem of income inequality? Are economic measures alone sufficient, or are there more structural changes needed?

These are just a very short list of issues worth debating. They should serve as a good starting point, though.

#### APPENDIX: RELATIONSHIP BETWEEN DEVELOPMENT AND INCOME POVERTY

The following presents preliminary results of a study on the relationship between some dimensions of development and income poverty, at the rural level. We have linked the income poverty incidence (measured by using the data from the 2000 Socio-Economic Surveys (SES)) with the village evaluation of rural development, which has been collected under the 1999 NRD2C database.

The SES are the primary data source for computing the income poverty, however, they only provide information at the household level. Often, some aspects of development can be better evaluated at the village level. For example, issues like social capital or social cohesion are not very evident from the household data. Public service provisions (road, electricity, drinking water, etc.) are not normally asked in the SES. Yet these are important aspects of developments and certainly affect living standard and 'happiness' of all the members of the communities.

The NRD2C fills this gap. Better known as gor-chor-chor-2-kor database, the NRD2C contains a wide-range of variables, including: village physical and geographical characteristics, demographic structure, education, health, economic conditions, and social livelihood (the strength of social cohesion, culture and natural resources). The villages are classified into three distinct categories according to the level of achievement in these aspects and are categorized as follows:

- Category 1 - Least developed villages
- Category 2 - Less developed villages
- Category 3 - Developed villages

Before the linking, the SES poverty incidences at the household level are transformed into poverty incidence at the village level, so as to be comparable to the NRD2C. Only communities in rural areas in the SES are used because the NRD2C does not cover urban communities. The link is possible with the help of the SES's village name list obtained from the National Statistical Office. Chart 1 shows how the link is done.

The villages are classified as poor if more than 25 percent of households in that village are poor, and are classified as not-so-poor if poor households constitute less than 25 percent, and are classified as non-poor if none of their households are poor. See Table 1.

Once the link is completed, a model of logit log-linear with causality test is used to explore the relationship between the various aspect of development in the 1999 NRD2C and the 2000 SES. This type of model is suitable in dealing with categorical data, which is the nature of the NRD2C database. In a logit log-linear model with causality test, one can test whether the villages that are less developed (categories 1 and 2) compared to the most developed ones (category 3) are also poorer (being poor and not-poor) than the non-poor villages. By treating poverty status as dependent variable in this setup, one can test the following four hypotheses:

1. Whether being least developed causes being poor,
2. Whether being less developed causes being poor,
3. Whether being least developed causes being not-so-poor (but still poor),
4. Whether being less developed causes being not-so-poor (but still poor).

Table 2 presents the results of hypothesis testing of the above four hypotheses. For each row of development variables, the results of the four hypotheses testing are shown in the four columns respectively. The cells with ✓ indicate that the corresponding hypotheses are tested to be true at 95 percent confident level.

Chart 1 Linking SES Villages with NRD2C Villages



**Table 1 Classification of Rural Villages by Poverty Status (from 2000 SES)**

Village Poverty Status	No. Villages	%
Poor Villages (25% or more poor households)	309	22.1
Not-so-Poor Villages (less than 25% poor households)	303	21.7
Non-Poor Villages (no poor households)	784	56.2

Source: Calculated from SES.

**Table 2 Results of Hypotheses Testing that Low Development Explain Poverty (checkmarks indicate a significance at 95%)**

Variable	NRD2C Development Variables	Being Poor explained by development level		Being Not-so-poor explained by development level	
		Least	Less	Least	Less
idx	Overall Rating of the Village		✓		✓
<b>1) Infrastructure</b>					
i1	Land Title and Types	✓	✓		✓
i2	Electricity Accessibility				✓
i3	Transport and Communication	✓	✓		✓
i4	Right to Use Land	✓			
<b>2) Outputs, Income, and Employment</b>					
i5	Village Business		✓		
i6	Earning and Employment		✓		
i7	Wage Rate	✓	✓	✓	✓
i8	Outputs from Rice Farming	✓	✓	✓	
i9	Outputs from Other Plant-Farming			✓	
i10	Other Occupation	✓			
i11	Migration to Work	✓			
i12	Farmer Grouping and Cooperation				
i13	Off-Season Agriculture Activities	✓		✓	
<b>3) Health</b>					
i14	Protection in Drug Usage				
i15	Protection from Contagious Diseases	✓		✓	
i16	Mental Health				
i17	Environment Sanitary	✓			
i18	Work Safety				
i19	Participation in Health/Sanitary Activities				
<b>4) Water Sources</b>					
i20	Drinking Water			✓	✓
i21	Non-Drinking Water				
i22	Water for Agriculture				
<b>5) Knowledge, Education, and Culture</b>					
i23	Villagers' Education Level	✓	✓		
i24	Continuing Education Rate	✓	✓	✓	✓
i25	Knowledge Provided by the Government		✓		✓
i26	Places for Education				
i27	News and Information Service Places			✓	
i28	Activities in Religion, Cultural, and Sport	✓			
<b>6) Natural Resources and Development</b>					
i29	Forest				
i30	Soil Resources				
i31	Water Resource		✓		

### DEVELOPMENT DIMENSIONS THAT DO NOT EXPLAIN INCOME POVERTY

From Table 2, there are 10 dimensions of development that do not pass any of the four hypotheses above. They are as follows.

- Farmer Grouping and Cooperation (i12): There does not seem to be any relationship

between farmer grouping and cooperation and the level of poverty. However, this does not necessarily mean that cooperation does not help reduce poverty, but it may indicate that the current practices are not yet effective.

- Protection in Drug Usage (i14), Mental Health (i16), Participation in Health/Sanitary Activities (i19). The insignificance of these

health-related variables might indicate the more-or-less universal health protection across both the poor and non-poor villages.

- Work Safety (i18). It is likely that this variable fails the test because work safety is similarly problematic across villages with different poverty level.
- Non-Drinking Water (i21), Water for Agriculture (i22). Natural water is largely abundant (as opposed to the drinking water where there is still difference between the not-so-poor and the non-poor villages).
- Places for Education (i26). It is not clear whether this development dimension is universally satisfactory or universally unsatisfactory.
- Forest (i29), Soil Resources (i30). Contrary to the general belief, the quantity and quality of these two natural resources are not responsible for poverty. Clearly, there should be further study on this issue.

### DEVELOPMENT DIMENSIONS THAT EXPLAIN INCOME POVERTY

Table 3 shows the coefficients for all the remaining 21 development dimensions whose hypotheses

pass at least one. The positive coefficients mean the lower development in that aspect can explain the level of income poverty at the village level. Except for only four variables, all other development variables are found to be indicative for predicting the poverty level.

To see which development aspect plays the most important role in explaining poverty, we can compare the coefficient for the first hypothesis that the least developed in that aspect explains the poorest status of the village. Wage rate turns out to be the most important factor with the highest coefficient value (and has very high values for the remaining three hypotheses as well). One possible interpretation is that income from non-agricultural activities is crucial for the villages, at all level of poverty, to escape poverty. The next important factors are related to education (villagers' education level and continuing education rate). Again, the non-agricultural income seems to be the explanation.

One interesting development variable is transport and communication (i3), whose coefficient values are high for hypotheses 2 and 4, but not as high for hypothesis 1 and even fails the hypothesis 3. In other words, the availability and better service in transport and communication facilities seems to be more crucial to the not-so-poor villages, than to the poor villages, in taking them closer to the non-poor status. The possible explanation is that the economic benefit of additional transport and communication services is determined by how well the existing services are.

**Table 3 Coefficient Values for the Passed Hypotheses**

Variable	NRD2C Development Variables	Being Poor explained by development level		Being Not-so-poor explained by development level	
		Least	Less	Least	Less
<b>Idx</b>	Overall Rating of the Village		0.514		0.637
<b>i1</b>	Land Title and Types	0.519	0.872		0.814
<b>i2</b>	Electricity Accessibility				0.456
<b>i3</b>	Transport and Communication	0.798	1.327		1.101
<b>i4</b>	Right to Use Land	<u>-0.442</u>			
<b>i5</b>	Village Business		0.364		
<b>i6</b>	Earning and Employment		<u>-0.699</u>		
<b>i7</b>	Wage Rate	1.568	1.385	0.830	0.972
<b>i8</b>	Outputs from Rice Farming	0.773	0.591	0.874	
<b>i9</b>	Outputs from Other Plant-Farming			0.647	
<b>i10</b>	Other Occupation	0.792			
<b>i11</b>	Migration to Work	0.415			
<b>i13</b>	Off-Season Agriculture Activities	0.766		0.453	
<b>i15</b>	Protection from Contagious Diseases	0.796		1.270	
<b>i17</b>	Environment Sanitary	0.713			
<b>i20</b>	Drinking Water			0.591	0.617
<b>i23</b>	Villagers' Education Level	1.288	0.534		
<b>i24</b>	Continuing Education Rate	1.191	0.714	0.791	0.460
<b>i25</b>	Knowledge Provided by the Government		0.717		0.652
<b>i27</b>	News and Information Service Places			<u>-0.598</u>	
<b>i28</b>	Activities in Religion, Cultural, and Sport	<u>-0.627</u>			
<b>i31</b>	Water Resource		0.380		

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# Economic Recovery and Poverty Reduction in Thailand\*

Peter Warr\*\*

## I. INTRODUCTION

**P**overty alleviation is a central objective of Thailand's economic policies. This fact is reflected the Ninth Five Year Economic and Social Development Plan, just released by the government's planning agency, the National Economic and Social Development Board (NESDB). The Plan covers the period 2002 to 2006, inclusive, and sets a target for the level of poverty incidence to be achieved by 2006, along with other, closely related economic objectives. The latter include targets for the growth of aggregate real GDP, growth of sectoral outputs, inflation, export growth, growth of tourist arrivals, and so forth. The major elements of these targets include:

- poverty incidence, 2006: – 12 percent of total population
- growth rate of real GDP, 2002 to 2006: – 4 to 5 percent
- growth rate of agricultural output, 2002 to 2006: – 2 percent
- growth rate of industrial output, 2002 to 2006: – 5.5 percent
- inflation (growth rate of the average price level), 2002 to 2006: – 3 percent

The target for poverty incidence refers to the headcount measure of poverty incidence—the proportion of the total population whose incomes fall below a poverty line held constant over time in real terms. Using the government's official poverty line, poverty incidence in 1999 was 15.9 percent. The target thus means that by 2006 poverty incidence is to be reduced by at least 4 percent of the population; by 2006 the proportion of the population in poverty—defined in terms of the government's poverty line—is to be no more than three quarters of the proportion that obtained in 1999.

The above targets are not independent. Indeed, some are clearly intermediate targets directed toward the achievement of other, more fundamental targets. For example, growth of exports and tourist arrivals are not necessarily objectives in themselves, but vehicles for the

achievement of GDP growth. Similarly, GDP growth itself might best be regarded as an instrumental target for the achievement of more fundamental goals, including improvements in average standards of living and alleviation of absolute poverty.

The level of poverty incidence that might reasonably be expected will depend in part on the rate of growth of output—both the aggregate rate and its sectoral composition—and on the rate of inflation. Consequently, one question that might be asked about these aggregate projections is whether they are mutually consistent. That is, are the targets for poverty incidence consistent with the targets for growth and inflation? Answering this question requires looking at the historical record to obtain data on growth, inflation and poverty incidence and then estimating the statistical relationship between them. It then requires using this estimated relationship to simulate the changes in poverty incidence that are consistent with the growth targets specified in the Plan.

An analysis of this issue is provided below. It leads to the conclusion that the growth and inflation targets are insufficient to generate the reduction in poverty incidence which is also targeted. The past statistical relationship between poverty reduction on the one hand (dependent variable) and growth and inflation on the other (independent variables), indicates that even if these growth and inflation targets were achieved they would imply *no* reduction in poverty incidence relative to the level at the beginning of the Plan period (2002). This means that if the targeted reduction of poverty is to be accomplished, some other major changes of policy must be implemented to make up the difference.

## II. CONCEPTUAL FRAMEWORK

Macroeconomic recovery is often not considered a poverty-related issue, but the large reductions in poverty incidence which occurred when the Thai economy was growing rapidly, combined with the increase in poverty incidence which accompanied the economic contraction caused by the currency crisis of

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\*\* Australian National University, email: Peter.Warr@anu.edu.au.

1997, suggest strongly that the rate of growth is a highly significant determinant of the rate of poverty reduction. Analysis of the statistical evidence available for Thailand supports this contention.

At one level, drawing a causal connection between economic growth and poverty reduction may seem strained. Economic growth is not in itself a policy, nor is it exogenous to the economic system. Economic growth is an outcome, determined by policy, external forces and the way market participants respond to them. Poverty reduction is similarly an outcome of the economic system. Drawing a causal connection between the two may thus appear to be an example of attempting to find stable relationships among endogenous variables of a causal system. In general, such relationships do not exist. The conceptual basis for relating poverty to economic growth is summarized in Figure 1.

The assumption being made is that one of the ways in which economic policies and other variables influence poverty is via their effects on output, as measured by, say, gross domestic product. That is, output is a conduit through which policy acts on poverty. It may affect it additionally through other channels as well, as indicated by the box 'redistributional effects' in the figure.

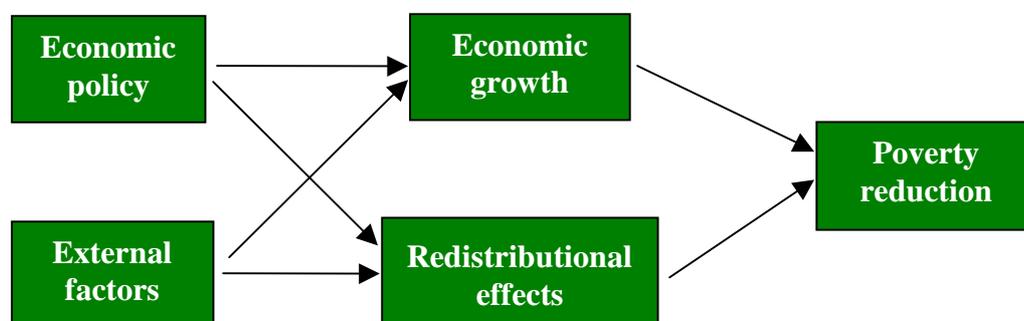
We do not expect that all changes in poverty can be attributed to changes in output, but it is being assumed that one significant channel through which policy influences poverty is through its effect on output. This is the channel between policy and poverty that is studied by looking at the statistical relationship between poverty and growth. The possibility that changes in poverty incidence could have causal feedback effects on the rate of growth is explicitly excluded. In this system, GDP is (causally) an intermediate outcome of policy, as well as other factors, and poverty is a subsequent outcome. By studying the causal link between output (growth) and poverty, we are thus studying one component of the link between policy and poverty.

### III. EVIDENCE FOR THAILAND

The statistical problem encountered in studying this relationship for Thailand, as for most other individual countries, is the small number of data points on poverty incidence available over time from official (or unofficial) data sources. The entire set of data available for Thailand at the national level is summarized in Table 1, covering 12 observations over the years 1962 to 1999. These data are summarized in Figure 2 and the data on inequality are summarized in Figure 3. Two measures of inequality are shown—the Gini coefficient and the income share of the richest quintile group (richest 20 percent of the population) to that of the poorest quintile group. Higher values of both measures mean greater inequality. Poverty incidence (headcount measure) declined significantly during the three decades preceding the economic crisis of 1997 and then increased following the crisis, but even during the pre-crisis period the decline in poverty incidence was far from uniform. Undoubtedly, many factors were responsible for this outcome. Economic growth could not be the sole cause of reductions in poverty, but it seems highly possible that it was an important contributing factor. If it was, then it might be expected that the rate at which poverty declined over time was related to the rate of growth at that time. If a relationship is found between these two variables, this is evidence that economic growth does indeed contribute to poverty reduction.

Figure 4 examines the relationship between poverty reduction and economic growth more systematically. The figure uses the data on aggregate poverty incidence in Thailand from 1962 to 1999 to compute the average annual reduction in poverty incidence between each of the years in which poverty incidence estimates are available. For example, in 1990 the official estimate of the aggregate level of poverty incidence was 27.2 percent of the population whereas in 1992 it was 23.2. Over this two year interval poverty

**Figure 1 Conceptual framework: Growth and poverty**



**Table 1 Thailand: Poverty Incidence, 1962 to 1999 (headcount measure,<sup>a</sup> percent of total population)**

	Aggregate	Rural	Urban
1962	88.3	96.4	78.5
1969	63.1	69.6	53.7
1975	48.6	57.2	25.8
1981	35.5	43.1	15.5
1986	44.9	56.3	12.1
1988 <sup>b</sup>	32.6	40.3	12.6
1990	27.2	33.8	1.6
1992	23.2	29.7	6.6
1994	16.3	21.2	4.8
1996	11.4	14.9	3.0
1998	12.9	17.2	3.4
1999	15.9	21.5	3.1

Notes: <sup>a</sup> The headcount measure of aggregate poverty incidence is the percentage of the total population whose incomes fall below a poverty line held constant over time in real terms; rural poverty is the percentage of the rural population whose incomes fall below a poverty line held constant over time in real terms, and so forth.

<sup>b</sup> The series shown is identical to the most recent data from the National Economic and Social Development Board (NESDB) for the years 1988 to 1998.<sup>1</sup> The data for the earlier years have been spliced together with this series from published sources so that the resulting series matches the NESDB series for the year 1988. The data from 1962 to 1988 are summarized in Medhi (1993).

Sources: National Economic and Social Development Board, Bangkok and Medhi (1993).

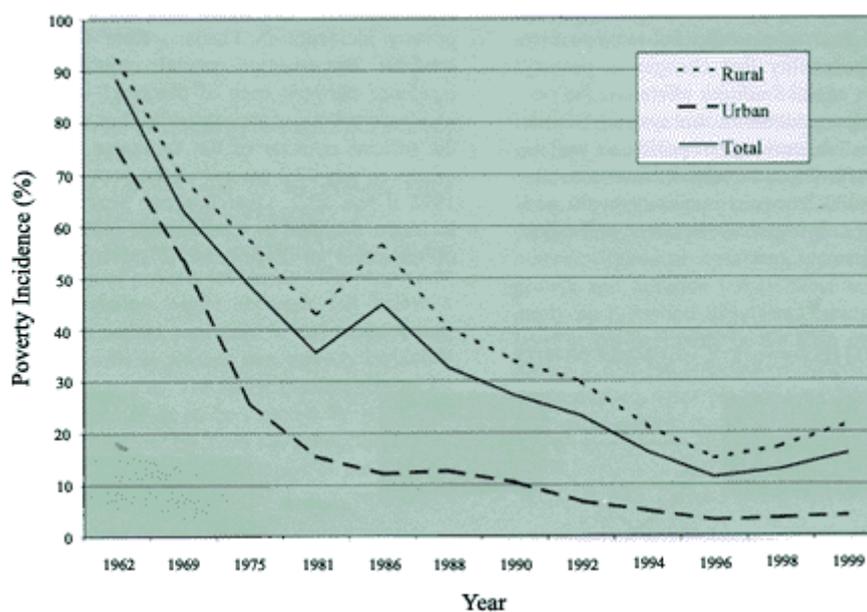
**Figure 2 Thailand: Headcount measure of poverty incidence, 1962 to 1999**

Figure 3 Thailand: Gini coefficient and quintile share measures of inequality, 1962 to 1999

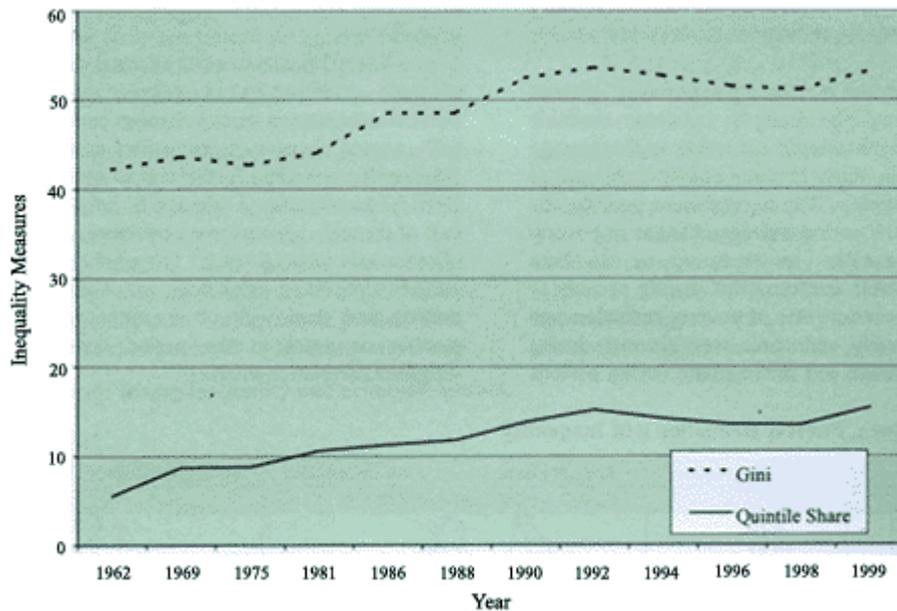
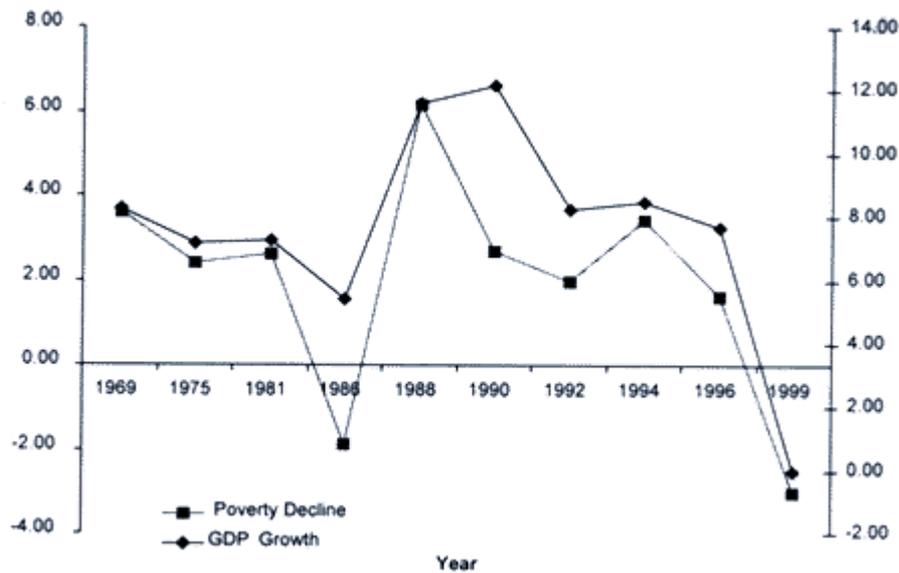


Figure 4 Thailand: Poverty reduction and economic growth



incidence declined by 4 percentage points, an annual rate of reduction of 2 percent. If poverty incidence had increased over this interval (as it did between 1981 and 1986 and again between 1996 and 1999) the annual rate of poverty reduction would of course have been negative. Figure 4 plots the results of these calculations against the average annual rate of GDP growth per capita over the corresponding period.

Figure 4 shows clearly that reductions in poverty incidence are correlated with GDP growth. Periods when poverty incidence rose (see above) corresponded to recessions. Periods when poverty reduction was most rapid corresponded to booms. This is not to say that economic growth is all that matters for poverty reduction. The type of growth obviously matters and the policies and programs of the government also matter. But

it seems clear that growth of GDP is one of the most important factors driving reductions in measured poverty incidence.

Table 2 provides a summary exploration of these data by classifying the periods between available estimates of poverty incidence according to the average rate of GDP growth—high, medium and low. As well as average growth of real GDP during these periods, the table summarizes the period average changes in poverty incidence and inequality, as measured by the Gini coefficient. The table confirms that during periods of higher growth the average rate of poverty reduction was most rapid. Poverty reduction was slowest during periods of slow growth and intermediate during periods of medium growth. Reductions in poverty are positively

correlated with the rate of growth; equivalently, changes in poverty are negatively correlated with the rate of growth.

Table 3 presents a more formal statistical analysis of these relationships by calculating the correlation coefficients between annual changes in poverty incidence ( $dP$ ), annual changes in inequality, as measured by the Gini coefficient ( $dGini$ ), the annual growth rate of real GDP ( $y$ ) and the annual rate of CPI inflation ( $r$ ). The top half of the table shows these correlation coefficients with observations unweighted by the number of years in the period concerned (labeled unweighted correlation matrix) and then with observations weighted by the number or years in the period concerned (labeled weighted correlation matrix).

**Table 2 GDP Growth, Poverty Reduction and Inequality**

Year	Annual GDP growth	Annual change in poverty incidence	Annual change in Gini coefficient
<b>RAPID GROWTH PERIODS</b>			
1986-88	9.75	-6.15	0.00
1988-90	10.27	-2.70	1.95
1992-94	7.01	-3.45	-0.45
AVERAGE	9.01	-4.10	0.50
<b>MEDIUM GROWTH PERIODS</b>			
1962-69	5.08	-3.60	0.20
1975-81	4.86	-2.18	0.23
1990-92	6.47	-2.00	0.60
1994-96	6.44	-2.45	-0.60
AVERAGE	5.71	-2.56	0.11
<b>SLOW GROWTH PERIODS</b>			
1969-75	4.15	-2.42	-0.15
1981-86	3.67	1.88	0.88
1996-98	-6.50	0.80	-0.20
1998-99	4.16	2.90	0.04
AVERAGE	1.37	0.79	0.14

Source: Poverty and GDP data from the National Economic and Social Development Board, Bangkok.

**Table 3 Correlation Matrices: Poverty, Inequality, Growth and Inflation**

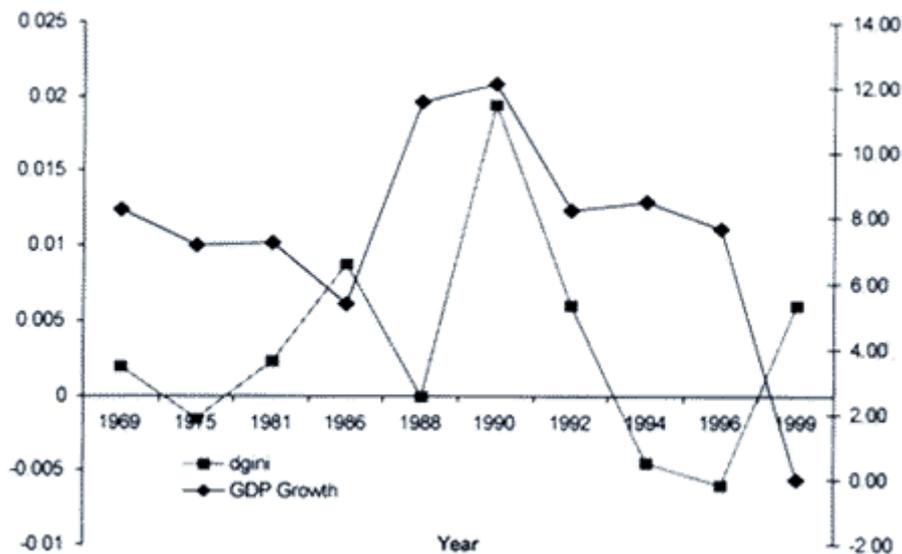
Unweighted correlation matrix				
	$dP$	$dGini$	$y$	$r$
$dP$	1.0000			
$dGini$	0.2831	1.0000		
$y$	-0.8532	0.1054	1.0000	
$r$	-0.0059	-0.0267	-0.0326	1.0000
Weighted correlation matrix				
	$dP$	$dGini$	$y$	$r$
$dP$	1.0000			
$dGini$	0.4004	1.0000		
$y$	-0.8408	-0.0147	1.0000	
$r$	-0.1071	-0.1566	-0.0104	1.0000

Is there a simple relationship of this kind between changes in inequality and economic growth? It is often claimed that economic growth benefits only the rich. If that were true, the faster the growth the greater would be the increase in inequality. That is, inequality and growth would be positively correlated. Do the data for Thailand confirm this? The relevant data are presented in Table 2 and Figure 5, using the Gini coefficient as the measure of inequality. These data reveal no clear relationship between changes in inequality and economic growth. During some periods rapid growth was associated with rising inequality, during other periods the reverse occurred. Although over the long term poverty incidence declined and inequality rose, during shorter periods these two variables are uncorrelated. If there were any

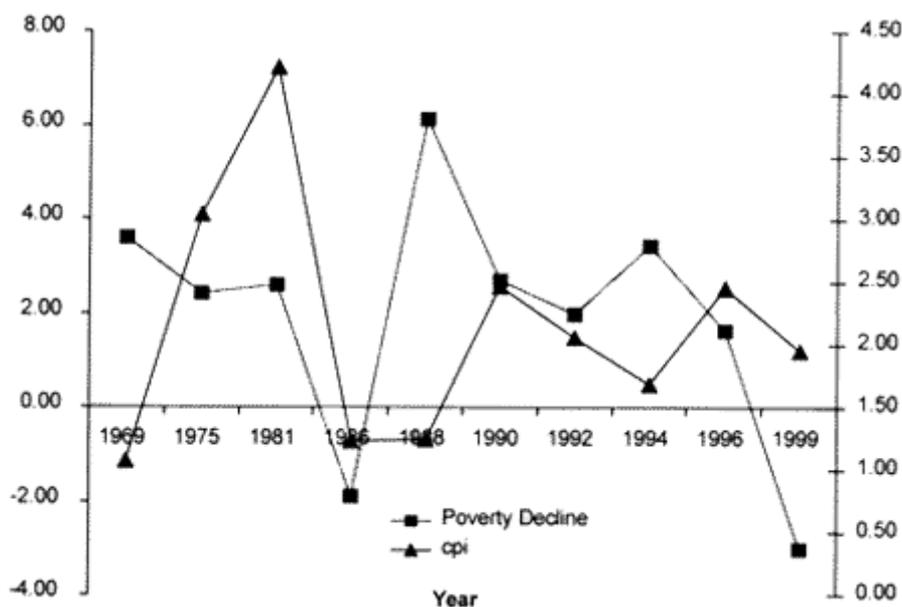
relationship at all revealed by these data, it would appear to be that faster growth is associated with reductions in inequality—not increases—but any such relationship is weak.

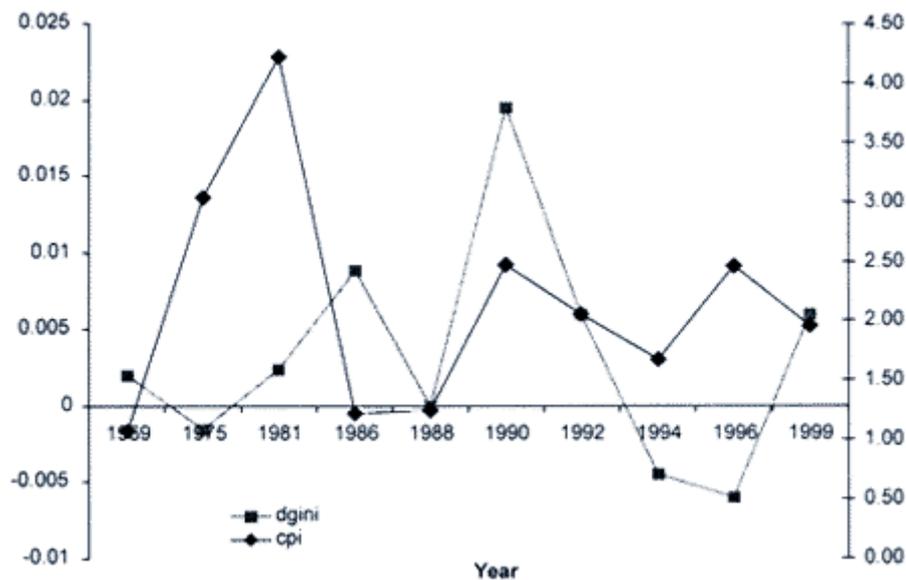
Is inflation harmful to the poor? On theoretical grounds, we may expect that it will be. The poor have less effective ways of shielding their real incomes from inflation than the rich. But do the data confirm this expectation? Figure 6 explores the relationship between changes in poverty incidence and the rate of inflation. The data confirm a weak but positive correlation between changes in poverty incidence and the rate of inflation. Finally, Figure 7 examines the relationship between changes in inequality and inflation. Again, no clear relationship is found.

**Figure 5 Thailand: Rising inequality and economic growth**



**Figure 6 Thailand: Poverty reduction and inflation**



**Figure 7 Thailand: Rising inequality and inflation**

The above results suggest that reductions in poverty incidence are strongly associated with rapid economic growth and more weakly associated with low inflation. However, changes in inequality are not systematically associated with either economic growth or inflation. These findings have one clear implication. The variables which drive reductions in absolute poverty incidence are different from those driving changes in inequality. It would be very dangerous to assume, for example, that whatever reduces poverty incidence will also reduce inequality, or vice versa.

#### IV. STATISTICAL ANALYSIS

To study the quantitative relationship between poverty reduction, economic growth and inflation at least 30 observations are required. The number of data points available for estimating this kind of relationship for Thailand is 12. This number is insufficient for statistical analysis with the number of independent variables we wish to include. This point applies even more strongly for the analysis of sectoral growth which follows. Consequently, the approach adopted here is to pool the data for four, relatively similar Southeast Asian countries—Thailand, Indonesia, Malaysia and the Philippines. For Indonesia the number of available observations is 10, for the Philippines 8 and for Malaysia 6. These numbers of observations are insufficient to sustain formal statistical analysis for any one of these countries, but when all four countries are pooled, the total number of observations is 36.

The present study thus pools the data for these four countries, while still recognizing the possible differences between them. Since the meaning of the poverty lines is different in each of the countries and also since

the structure of the economies is different, we should not expect that the same relationship between poverty incidence and aggregate growth will exist in all these countries. We therefore experimented with intercept dummy variables for three of the four countries and with slope dummies. Intercept dummies fitted the data better and the statistical analysis is performed using intercept dummy variables<sup>2</sup> to isolate country-specific components of the overall relationship.

Poverty incidence and its changes over time obviously depends on many factors, of which economic variables are only part of the story and among the economic variables many issues aside from simply the overall rate of growth will be relevant. Changes in commodity prices will play a role, along with tax and public expenditure policies. The sectoral composition of growth may also be important. If so, this is important information.

#### Poverty and aggregate growth

We turn first to the relationship between poverty reduction, as a dependent variable, and aggregate growth and inflation as independent variables. This relationship has been estimated econometrically, using pooled data, as discussed above. The statistical results are summarized in a Technical Appendix to this paper, available from the author. Over the period of the data set the estimated relationship predicts the observed changes in poverty incidence reasonably well. The rate of growth of GDP is negatively and significantly related to the changes in poverty incidence—higher growth means lower poverty—and the rate of inflation is positively related to changes in poverty—higher inflation means higher poverty.<sup>3</sup>

We shall now use this estimated relationship, to project changes in poverty incidence resulting from different hypothetical rates of growth and inflation. All projections assume population growth of 1 percent per year. The procedure in making these projections is first to use Regression A to project the level of poverty incidence in 2001, starting with the most recent official estimate available—15.9 percent in 1999. Using the known values of real GDP growth, inflation and population growth for 2000 and 2001, we estimate poverty incidence in 2000 and 2001 to be 15.6 and 16.5 percent, respectively. We then project poverty incidence over the period of the Ninth Plan (2002 to 2006) using a range of hypothetical values of real GDP growth and inflation.

Table 4 shows the projections of poverty incidence resulting from this procedure. The important point is that when inflation occurs at the targeted rate of 3 percent, growth of just over 7 percent per year is required to reduce poverty incidence to the targeted level of 12 percent of the population. The level of GDP growth targeted in the Plan was 4 to 5 percent. According to the estimated relationship, the levels of poverty incidence in 2006 implied by these two growth rates are 18.7 and 16.5 percent, respectively. That is, if growth was 4.5 percent the projected level of poverty incidence in 2006 would be about 17.6 percent, slightly above the 2001 projected level. If growth was 5 percent, poverty incidence would remain the same (at 16.5 percent) at the end of the Plan period as it was at the beginning. The data indicate that growth of real GDP in excess of 5 percent is required to achieve any reduction of poverty incidence at all.

### Poverty and sectoral growth

The literature on economic development has emphasized the sectoral composition of growth as a possible determinant of its distributional implications, although this emphasis has been based primarily on a priori theorising, rather than empirical analysis. The argument is that in most poor countries a majority of the poor live in rural areas and are employed in agriculture. From this it has seemed probable that growth of agriculture is more important for poverty reduction than growth of industry or services.

This conclusion does not necessarily follow. Sectoral growth rates may not be independent. Expansion of capacity in one sector—say, food processing—may stimulate output growth elsewhere—say, fruit and vegetables. More important, people are potentially mobile; given sufficient time, even poor people can presumably move to whichever sector is generating the growth. Rural poverty may therefore be reduced by urban-based growth, drawing the poor away from rural areas at a rate which depends on the degree of labor mobility. When these issues of sectoral interdependence and intersectoral factor mobility are taken into account, it

is not obvious whether the sectoral composition of growth is or is not important for poverty reduction.

Even if labor was fully and instantaneously mobile, poverty incidence could still be affected by the sectoral composition of growth. To a first order of approximation, the level of absolute poverty presumably depends on the demand for the factors of production owned by the poor—especially unskilled labor and, to a lesser extent, agricultural land. Growth in different sectors has differential effects on the demands for these factors, depending on these sectors' factor intensities, and may therefore have different effects on poverty, inequality or both. Finally, we should note that the distinction rural/urban is not synonymous with the distinction agriculture/non-agriculture. Much agricultural production may occur in full or part-time farming on the fringes of urban areas and much industrial and services activity may actually occur in rural areas.

This issue has also been studied empirically using data from the same four countries as above. The null hypothesis that the sectoral composition of growth does not influence the rate of poverty reduction is rejected. Growth of agriculture is significantly related to poverty reduction but growth of industry is not. The strongest relationship between sectoral growth and poverty reduction occurs in the case of services growth. The reason is clear: the services sector is highly unskilled-labor intensive. Growth in this sector raises the demand for unskilled labor more than growth of any other sector.

Turning to the projections of the Ninth Plan, targets are set for growth of agricultural and industrial output, but the sectoral growth targets specified do not mention the services sector. In one sense, this is strange. Services industries comprise about half of Thailand's GDP. Nevertheless, a target growth rate of services output is implied by the other targets and it can be calculated as follows. GDP is the sum of value added in agriculture, industry and services. It follows that the growth rate of real GDP is the sectoral share-weighted sum of growth rates of output in these three sectors. Given the sectoral shares in 2000, for GDP growth to be 4.5 percent (midpoint of the target range), given the targeted growth rates of agriculture and industry of 2 and 5.5 percent, respectively, the growth rate of services output must be 4.25 percent.

Table 5 uses the estimated relationship discussed above to project the levels of poverty incidence which would occur in 2006 with various combinations of growth of agricultural, industrial and services output. All projections begin with poverty incidence in 2001 of 16.5 percent as above and assume inflation of 3 percent and population growth of 1 percent. The results are comparable with those obtained for aggregate growth above. The targeted growth rates of sectoral output (consistent with GDP growth of 4.5 percent) imply poverty incidence in 2006 unchanged at 16.5 percent (Scenario A in Table 5).

**Table 4 Projected Poverty Incidence in 2006 and Assumed Aggregate Real Growth Rate and Inflation, 2002 to 2006**

	Assumed Growth Rate of Real GDP (% p.a.)				Assumed Inflation Rate, 2002 - 2006 (% p.a.)				
	0	1	2	3	4	5	6	8	10
-2	29.3	30.1	30.9	31.7	32.5	33.3	34.1	35.7	37.3
-1	27.1	27.9	28.7	29.5	30.3	31.1	31.9	33.5	35.1
0	24.9	25.7	26.5	27.3	28.1	28.9	29.7	31.3	32.9
1	22.8	23.6	24.4	25.2	26.0	26.8	27.6	29.2	30.8
2	20.6	21.4	22.2	23.0	23.8	24.6	25.4	27.0	28.6
3	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.8	26.4
4	16.3	17.1	17.9	18.7	19.5	20.3	21.1	22.7	24.3
5	14.1	14.9	15.7	16.5	17.3	18.1	18.9	20.5	22.1
6	11.9	12.7	13.5	14.3	15.1	15.9	16.7	18.3	19.9
7	9.8	10.6	11.4	12.2	13.0	13.8	14.6	16.2	17.8
8	7.6	8.4	9.2	10.0	10.8	11.6	12.4	14.0	15.6

Note: Beginning with 15.9 percent poverty incidence in 1999, the projections for 2000 and 2001 are 15.6 and 16.5 percent, respectively. All projections assume a rate of population growth of 1 percent per year.

**Table 5 Projected Poverty Incidence in 2006 and Assumed Sectoral Real Growth Rates, 2002 to 2006**

Scenario	Assumed Growth Rate of Real Sectoral Output (% per annum, 2002-2006)			Implied Growth Rate of Real GDP	Projected Poverty Incidence in 2006a
	Agriculture	Industry	Services		
A	2	5.5	4.25	4.50	<u>16.5</u>
B	0	5.5	4.25	4.28	17.0
C	4	5.5	4.25	4.72	16.0
D	2	3.5	4.25	3.70	16.0
E	2	7.5	4.25	5.30	16.9
F	2	5.5	2.25	3.52	21.7
G	2	5.5	6.25	5.48	11.3

Note: See the note to Table 4. The projections commence from an initial poverty incidence in 2001 of 16.5 percent. They assume inflation of 3 percent and population growth of 1 percent.

The other six Scenarios shown in the table show the effects on projected 2006 poverty incidence of varying the targeted growth rates of agriculture, industry and services one at a time. Not surprisingly, the results shown in Regression B indicate that varying the assumed growth rate of services is by far the most important determinant of the rate at which poverty changes. If agricultural and services growth achieve their targeted rates, growth of services output of around 6 percent would be required to achieve the targeted poverty incidence in 2006 of 12 percent. This would imply overall GDP growth of about 5.4 percent.

## V. CONCLUSIONS

The above results confirm that the rate of economic growth and the rate of inflation have powerful effects on the rate at which measured poverty incidence changes over time. Faster growth and lower inflation imply more rapid poverty reduction. These results suggest that macroeconomic recovery is possibly the most important single determinant of the rate at which

poverty incidence can be reduced over the immediate future.

The results also suggest that the targeted rates of growth of GDP and targeted rates of inflation specified in the Ninth Economic and Social Development Plan (covering the period 2002 to 2006) would not achieve the targeted reduction of poverty incidence which also specified in the Plan. Achievement of the targeted growth rate (4 to 5 percent) would leave poverty incidence unchanged from its level at the beginning of the Plan period.

Many observers have commented that the targeted rate of economic growth is unrealistic given the current state of the global economy. Actual GDP growth during the Plan period which is below these targeted rates would mean that poverty incidence would increase, rather than decline. This does not necessarily mean that the targeted reduction in poverty is unachievable. Instead, it means that other policy instruments must be used in addition, instruments not used over the period captured by the above data series, if the targeted reduction in poverty incidence is to be achieved.

## ENDNOTES

- <sup>1</sup> The exception is that the published data for Municipal Areas and Sanitary Districts have been aggregated to an 'urban' category using their respective population shares in the total for urban areas (the sum of the two) as weights.
- <sup>2</sup> The appropriate statistical procedure is to use intercept dummy variables for three of the four countries (any three can be chosen). The constant term for the overall regression provides the intercept for the other (fourth) country and the intercept terms for each of the other three countries is obtained by adding the intercept dummy variable coefficient for that country to this overall constant term.
- <sup>3</sup> The estimated coefficient relating poverty reduction to the rate of growth of real GDP is significantly greater than zero at the 99 percent level of significance and the corresponding coefficient on inflation is significant at the 95 percent level.

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