

The Impact of the Economic Crisis on the Labor Market in Thailand 1997-1999

By
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Abstract

The economic crisis of 1997 has had an adverse effect on the Thai economy. The most severely affected section of the economy was the labor market. This paper intends to point out that the economic crisis was not a sudden shock, but rather result of mismanagement during the preceding decades. The paper also records the immediate impact on the Thai labor market. The hardest hit sector was without a doubt the construction industry, with its sudden lay-offs. The total number of unemployed reached 5.73 percent of the total labor force as shown by survey data. Time is necessary for adjustment in the labor market, as there might be migration, as well as absorption in particular sectors and in the rural labor market, especially, in the agriculture sector, which can absorb large numbers of laid-off persons. An input-output model is formulated to compute this direct and indirect adjustment in the labor market. We compute changes in employment as indicators of the labor market in response to crisis. Assuming a final demand expansion of 1.41, -1.73 and 7.35 percent (at constant prices) in 1996, 1997, and 1998 respectively, we estimate the direct and indirect effects of employment generation. When economic crisis broke out in 1977, employment decreased from its previous level by 411,261 persons, and by 1998 it had been restored to this level. The labor market has responded differently to the economic crisis and recovery according to sector. It can be shown that the inter-industrial relationship structure of the Thai economy has long-run stability as far as the labor market is concerned.

1. Introduction

The Asian currency and financial crisis started in Thailand due to its own macro economic mismanagement as the immediate impact on the social sector, especially with the severe loss of employment at the beginning of crisis. Lay-offs and unemployment were mitigated during the first quarter of 1999, due to a self-correction in the labor market as a surplus of blue collar workers went back to the agriculture sector and because of a series of counter measures launched by the government to foster stabilization in the labor market.

The objective of this paper is as follows: first, to discuss briefly the impact of the crisis on the labor market; and second, to estimate the impact of the crisis on sub-sectors, using an Input-Output formulation. In the second section, we describe how the Thai

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economy has behaved. With stylized facts, we give a chronology of the crisis in Thailand after the 'liberalization of capital account' policy. In the third section, we give an overview of the development of the labor market in the past two decades, mentioning the conditions prior to the crisis in the labor market. We describe the labor market in terms of the structure of the labor force, employment, unemployment and wage. In the last section, we estimate the impact on labor market, using an Input-Output formulation.

2. Overview of the Macro-Economy Prior to the Crisis

Rapid economic development in Thailand after 1985 was caused by a huge influx of foreign direct investment, which occurred as a result of the realignment of the exchange rate between the yen and the dollar and other key currencies following the Plaza Accord meeting in 1985. Improved economic conditions caused an increase of private consumption, leading to a lessening in households' saving potential, which has declined significantly to just 6-8 percent of GDP in recent years. The rapid economic growth needed a stimulus from rising investment, thus the Investment-Saving gap has been widened. Incidentally, this is a current account gap, which had deteriorated to the level of 8-9 percent of GDP in 1996.

The national economic policy set a rather high average growth rate target of 8 percent per annum. With this growth rate during 1996-2000, Thailand would need a huge source of investment which it could not finance with its own savings. Clearly, the too rapid growth we aimed for has exacerbated the deteriorating of the current account position we face. Foreign saving has been our primary source of investment finance. Thus, before the crisis breakout in July 1997, Thailand had external debt of 90 billion US dollars, 70 billion of which belonged to the private sector. Forty percent of the debt was short-term in nature and must be rolled over every three months. Planners seemed to enjoy eight consecutive years of cash surplus on the fiscal side. Thus, the private sector is allowed to borrow funds cheaply from off-shore institutions through an organization called BIBF (Bangkok International Banking Facilities) and then re-lend these funds to finance local projects, thereby earning a high interest gap. The everlasting planned growth target implies rising domestic income and consumption. This has made the domestic market for non-tradables expand significantly, as the reversed terms-of-trade between tradable and non-tradable price ratios has turned out favorable for non-tradable goods and services such as services derived from having mobile telephones, private cars, and private property. Easy funding has caused a boom in speculation in the began to stock market, land and other durable goods.

When the government began to believe that private provision was feasible of public goods such as telephone services, electricity, toll ways and expressways, capital accumulation in the public and private sectors shifted from previous trends laid down in a National Plan. Easy money has caused firms to be over leveraged and deeply indebted. Commercial banks and the non-bank financial sector were in the center of the bubble, as they were active in financial deals. Under the Bangkok International Banking Facility (BIBF), whereby the financial market was liberalized, only incoming funds were welcomed, and outgoing funds were frowned upon. The flow of easy money had come to

an end when export earnings showed signs of deterioration in 1995/96, with large current account deficits, revealing weaknesses in economic policy. These were the high interest rate policy to attract foreign capital while the exchange rate was fixed to stabilize export earnings. Financial markets were partially liberalized to allow the influx of financial capital without proper supervision by the authority of the concerned, as mentioned earlier. This clearly meant that funds could be shifted in and out of the country without exchange risk, despite a large margin of interest gap between on-and off-shore.

Despite frequent outcries from exporters and academics that the Thai baht was overvalued, the response was minimal from the Bank of Thailand, which oversees exchange rate policy. The Bank of Thailand mistakenly formulated a mixed policy, on the one hand to have a stabilized exchange rate (to drive exports), and on the other hand to lure funds from abroad to finance investment locally by having a high domestic interest rate. This policy sought conflicting goals. Thus, the exchange rate signaled that Thailand would never devalue the baht and/or float its currency. Neither was the Ministry of Finance careful enough to implement a strict counter cyclical policy; rather it was satisfied only with the automatic stabilization of the tax revenue increase as a result of over booming economic activities.

This economic policy, incongruent with the rapid pace of globalization in the financial world, could be justified by the belief that financial institution could never be bankrupted, a belief that was insistently held by our monetary authority. This policy would have been correct if and only if the world financial market were not interdependent as it is today, with global financial markets linked through computer networks, and with trading activities going on 24 hours a day. Besides, the dollar, while apparently only paper money, is actually a store of value as well as an exchange medium. The trading of the dollar as a commodity in itself is much larger than its use as a medium nomination for goods trading. The foreseeable devaluation trend has called in the currency attackers, who really did win the battle. The central bank had lost a huge sum from the total currency forward and swap of 23.4 billion US dollars. Before July 1997, when the baht was de facto devalued, Thailand had 33 billion US dollars of foreign currency reserved.

A summary of economic epoch and trend before crisis can be shown as follows:

Time Frame	Economic Epoch and Trend
1975-1985	It was a period of high economic growth after the first oil crisis and the commodities boom. The Thai economy was severely affected by the <i>second oil crisis</i> . The business cyclical downswing was alternating with recovery. In 1984/85, the economy entered its most depressed state. The Thai baht was devalued twice and later pegged under the basket currency with 70% of dollars.
1986-1990	After the <i>Plaza Accord</i> , the re-alignment of key currency, the yen was forced to appreciate. There was an Influx of foreign direct investment to Southeast Asia. Private investment growth of 20-30%, and export growth of 29% were observed in Thailand. The domestic market grew considerably as a result of income expansion in export oriented activities.
1990-1992	<i>Financial liberalization phase I</i> , by relaxing the controls on interest rates, allowed more flexibility in capital accounts and the emergence of a capital market. As a result, capital flowed in to finance domestic demand-oriented activities. Firms now could seek to raise capital by leveraging in money and capital market. As conspicuous consumption rose, savings of households went down, making the current account deficit deteriorate.
1993-1994	<i>Financial liberalization phase II</i> , under the international banking facility <i>BIBF</i> , capital inflows were intended to be manipulated through Bangkok's called 'out-out' facilities. However, in most cases, it was an

Time Frame	Economic Epoch and Trend
	'out-in' flow, with very scant 'in-out' activities. The excess supply of capital inflow both FDI and Portfolio investments created a situation of excess liquidity supply, real estate and stock market booming. Most firms with access to international money and capital markets through BIBF fell into high leveraged corporations. The monetary policy was ineffective, the high interest rate policy could not squeeze liquidity as capital inflow was indefinitely increasing. High domestic interest rates caused interest rate arbitrage and large capital inflow, while a pegged exchange system intended to stabilize export earning was contradictory. It reduced the exchange rate risk of capital inflow and outflow to virtually 'risk free'. High interest rates did not hamper domestic demand expansion as liquidity could be raised from foreign funds. Terms-of-trade has shifted in favor of non-tradable sectors such as real estate and consumers' durable goods through the hire purchase system. Thus, households' saving was clearly deteriorating, overburdening the current account deficit.
1995-1996 (1 st half)	Most large firms with capital investment (mostly in the stock market) faced an over-capacity situation as they turned to the domestic market. However, as relative prices are in favor of domestic demand as a result of overvaluation in the exchange rate, imports still increase, while exports have shown a weakening trend. Corporate operating performance has been deteriorating. Unfortunately, massive capital inflows have prolonged bad business from the crash. Bad performance companies had to seek refinancing. Investors started to notice the inability to pay back loans, as exports did not show signs of increasing, and later collapsed to non-positive growth.
1996(2 nd half) – 1997	The non performing loans of the financial sector were increasing rapidly, portfolio quality was deteriorating, currency was attacked. Authorities tried to defend the currency with counter intervention into markets. Financial crisis and credit crunch were overwhelming, with systemic risk and the contagion effect spreading throughout the economy. Authorities have resorted to swapping instruments to counter the currency attack, while opening up baht accumulating channels to attackers, mounting attacks with huge mobilized international funds. They had finally defeated Thailand in its currency war by May 1997. In July 1997, the Thai currency was floated or <i>de facto</i> devalued. Thailand had to ask for a bail out package from the IMF soon after the float.

3. Overview of the Country's Labor Market

A look at the labor market in Thailand during the decades of 1960-1990 shows that employment was mainly determined by effective demand of the market. As there was always an excess supply of labor in the agricultural sector, demand for labor in this sector determined the level of employment of the abundant labor supply. There was no virtual labor market in the modern sense in the agricultural sector, since most laborers were self-employed farmers. There was also seasonal fluctuation in demand for labor as well. In the dry season, labor was underemployed and waiting for the agricultural season. Some searched for jobs in an off-farm employment program of the government, such as in road and other infrastructure construction. Others chose to go to urban areas to find jobs in the service sector, especially in the construction industry and in household service.

This situation continued until land area diminished in supply, and no further forest area could be exploited. Since 1960, land fertility has started to decline, reflecting the declining average and marginal land productivity and land-labor ratio. This hypothesis was proved by the fact that during 1961-1985 the growth of value added per head of labor input was 1.88 percent per year on average. The land per head of labor input has accounted for 99.50 percent of the growth rate. The rest of 0.50 percent was contributed by the Total Factor Productivity Growth (TFP) which measured an unexplained residual of growth accounting (Limskul 1988). As a result, rural-urban migration has occurred to bridge the gap of excess supply of labor in the agricultural sector (See Chulalongkorn University, 1996). At the same time, industrial development policy in urban areas has

Table 1: Structure of GDP and Employment 1960-1990

	GDP Share				Employment Share			
	1960	1970	1980	1990	1960	1970	1980	1990
Agriculture	38.2	27.0	20.6	14.4	82.4	79.3	72.2	64.0
Mining	1.4	2.8	2.6	2.9	0.2	0.5	0.4	1.7
Manufacturing	11.6	15.9	21.7	24.7	3.4	4.1	5.6	10.2
Construction	3.7	5.3	4.5	5.2	0.5	1.1	1.5	3.3
Electricity & Water Supply	0.4	1.0	2.0	3.0	0.1	0.1	0.3	0.4
Transport	6.6	6.5	6.7	7.1	1.2	1.6	1.8	2.4
Commerce	17.9	17.4	16.9	17.6	5.7	5.1	6.9	9.6
Banking Insurance & Real Estate	2.2	2.4	2.8	5.3	-	0.1	0.5	-
Ownership of Dwellings	4.5	5.6	4.8	3.6	-	-	-	-
Public Administration	4.7	4.4	5.1	3.8	-	-	-	-
Other Services	8.7	11.5	12.3	12.3	4.7	7.1	8.1	9.9
Activities not adequately described	-	-	-	-	1.7	0.8	2.8	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Employment figures for 'Other Services' include Public Administration. There is also overlapping of definition.

Source: Sungsidh and Kanchada Piriyaangsan (1996), *The Industrial Relations in Thailand*, in Sungsidh Piriyaangsan, and Shigeru Itoga *Industrial Relations System in Thailand*, Table 6, p.31.

derived demand for labor in urban areas, with the manufacturing and service sectors' demand for unskilled labor causing structural change in the labor market in Thailand.

The labor supply is determined basically by population size and fertility rate together with labor force participation rate. In Thailand, total fertility rate (TFR) was recorded to be 6.48, 6.30, 6.19 percent during 1960-1964, 1964-1965, and 1965-1969, respectively (NSO, 1970 Population and Housing Census with NESDB own children estimate, Survey of Population Change). It then decreased to 5.41, 4.90, 3.88 percent during 1970-1974, 1974-1975, 1975-1979, respectively (NSO, 1980 Population and Housing Census with NESDB own children estimate). In the 1980's, Thailand's TFR has further decreased to a very minimal level of 3.36, 2.73, 2.28, and 2.17 percent in 1982-1984, 1985-1986, 1989-1991, respectively (Contraceptive Prevalence Survey by P. Kamnuansilpa and A. Charatritrong, and NSO 1990 Population and Housing Census with Bogue and Palmore Estimate).

In 1960, 82.4 percent of the work force was employed in the agricultural sector. This share has decreased to 79.3, 72.2 and 64.0 percent, respectively. On the contrary, the employment share in the manufacturing sector has increased from 3.4 percent in 1960 to 4.1, 5.6 and 10.2 percent, respectively. As a matter of fact, the employment share in agriculture has decreased as its GDP share has decreased from 38.2 percent in 1960 to 27.0, 20.6 and 14.4 percent in 1970, 1980 and 1990, respectively. Employment in non-tradable sectors (sectors other than agriculture, mining, and manufacturing) has increased as shares in these sectors have increased significantly, especially in commerce, transport, and other services.

In 1970, the population of Thailand was 34.40 million, an increase of 2.74 percent from 1960. It increased to 44.82, 53.60, and 57.03 million persons in 1980, 1987 and 1991, respectively. The labor force was thus determined from the supply side equivalently as 17.20 million persons in 1969. They were 18.25, 22.72, and 26.84 million persons in

1975, 1980, and 1985, respectively. It should be noted also that the labor force participation rate, which determines how an active labor force will be engaged in supplying their labor to the market, was 72.5 percent in 1971. It was 68.2, 73.4 and 72.7 percent in 1975, 1981 and 1985, respectively. The most active members of the labor force were those in the age group of 35-39 year olds.

4. Impact of the Crisis on the Economy

4.1. General Impact Estimated from Official Statistic

4.1.1. Immediate Impact on the Financial Sector

The financial and economic crisis in Thailand can be said to have immediate effects on non-bank finance companies. Before the currency devaluation, 56 out of 91 non-bank finance companies were closed down, necessitating an immediate lay-off of their personnel, most of whom were white collar, middle class and between 35 and 45 years old, still servicing debts from housing and car loans. The crisis has virtually derailed their lives, forcing many to find different jobs such as operating food stalls, or trading on a small scale, etc. Their wage income has certainly been reduced, to the point where many have been forced to default on housing and car loans.

4.1.2. Differences in Impact on Tradable and Non-Tradable Real Sector

After devaluation, economic sectors were affected differently. Import substitution industries like automobile and related spare parts were quite hard hit. Non-tradable industries like real estate, such as housing and office buildings, totally collapsed. Consequently, construction work came to halt. The automobile industry had to reduce its production line to 25-30 percent that of the peak period, and the spare parts industry had to reduce their production capacity by 50 percent. Employers responded to this downturn first by firstly relying on voluntary retirement. After production lines were reduced, employers had to ask for voluntary lay-offs. As a last resort, firms unable to withstand economic hardship owing mainly to banks' failure to provide continuous loans, many firm had to close down.

Tradable industries like electronics were hardly hit, as they rely more on export markets, while electrical machinery and home appliances were hit to a certain degree, as the latter had relied heavily on the home market before the crisis. Some industries even produced positive records, owing to substantial devaluation. The agricultural sector was shown to have a favorable record in the 1997/98 crop year. Rice and other exportable crops' and agricultural commodities' prices, such as for cassava, sugar, processed food etc., have shown a remarkable increase in their export earning in baht terms as a result of devaluation. Farmers responded to this overshooting by increasing farming activity. Rice prices have induced farmers to grow a second crop of rice in 1998 by relying on the underground water supply. It should be noted that the tourism sector has been revived from its slump as a result of a fixed and appreciated currency policy before the crisis, and this business is now booming.

Devaluation also produced indirect effects that spilled over into other related industries as well. Even though tourism in general is said to be flourishing, some areas (beach resorts) are doing much better than others. This has induced a significant increase in hotel tariffs, and the wide margin has invited fierce competition from other destinations as well. We can conclude that all these tradable sectors can survive and demand more seasonal employment as long as the price of each particular product or service is not suppressed by appreciated currency. However, macro economic management targets still do not make clear whether stabilization and debt payment are preferable to export earning to sustain trade and the current account surplus.

In 1998, however, exports were in trouble as a result of a stabilization policy put forward by the government in line with an IMF recommendation. Currency has become virtually appreciated as a result of first raising interest rates to counter high inflationary pressure and later lowering interest rates, but with a risk of deflation. Both policies have caused distortion in the exchange rate, i.e., appreciation of exchange by not less than 15 percent as compared with the currency of other countries who are competitors. If the currency target zone is not properly managed, it is likely that the price of agriculture and food processing products will be suppressed in local currency while inflating in terms of world currency, certainly reducing potential employment in the agricultural and food processing sectors. We expect to see a huge influx of immigration from rural to urban as a reversed 'U-Turn', which has occurred during crisis. People are told by the government to go back to agriculture to earn a living, but suppressed agricultural prices may offset the government's effort to induce people to go back to the rural agricultural sector.

4.1.3. Employers' Response and the Extent of Lay-Offs When the Economy Contracted 3-3.5 Percent in 1998

Employers responded to the economic crisis by reducing costs and rationalizing company structure toward more flexibility in management. Some launched new products into the market, some expanded new markets both domestically and abroad, and some finally had no choice but to lay off their workers.

The number of lay-offs and extent of unemployment depend heavily on the speed of business cyclical downswing. Based on the third letter of intent, the IMF predicted that the Thai economy would slow down to a GDP growth rate of -3.5 to -3.0 percent p.a. in 1998. The Thai economy shrank more than predicted, to -7.0 percent. With the growth rate of -3.5 percent, the level of employment is estimated by the NESDB as 0.977 million persons. Thus, as a credit crunch exhibited by high interest rates and tight liquidity in the real sector led to the imposition of austerity measures put forward by the IMF from 1997 until first half of 1998, Thai economy has declined substantially faster and deeper than expected. This implies that the estimated figures of unemployment should be not less than double 0.977 million persons as first predicted by NESDB. The true labor market is much more dynamic and volatile than authorities have perceived.

Unemployment figures are not stable at all and depend on unstable growth rates by sector, which are not truly observable. We first try to investigate the number of lay-offs. The government ordered the Ministry of Interior to invent a system of labor market information, while the NESDB in cooperation with the associated institutions made surveys on lay-offs during the third and fourth quarters of 1997.

Table 2: Labor Force, Employment and Unemployed 1998

(Unit: 1,000 Persons)

	1997 ²	1998 ^c
1. Economic Growth Rates	-0.4	-3.5
2. Population	60,602	61,201
3. Labor Force	32,836	33,095
4. Employment ¹	30,693	30,299
Agriculture	14,133	14,283
Non-Agriculture	16,560	16,016
5. Unemployment	626	977
Open Unemployment, seeking for job	182	362
Do not seek for job, but ready to work	444	615
6. Under Employment(work less than 35 hours/week and would like to work more)	945	1,194
7. Waiting for Agricultural Season (average)	572	625
Off-Season	1,036	1,100
During Season (August)	106	150
8. Population not in Labor Force	13,810	14,145
9. Population Age under 13 years	13,956	13,961
10. New Entrant into Labor Force	545	577
11. Total Unemployment Rate	1.91	2.95
Registered unemployment (Open Unemployed)	0.55	1.09
Not looking for jobs but Ready to Work	1.35	1.86
12. Waiting for Agricultural Season	1.74	1.89
13. Participation Rates	70.39	70.06

Notes: 1/ excluding underemployment

2/ Average of Labor Force Survey 2 rounds

3/ Economic growth rate was later revised to -7.0 percent.

Source: Sub-Committee on the Projection of Labor Force, Employment, and Unemployment. The Committee comprises representatives from the Ministry of Labor and Social Welfare, NESDB, NSO, the Bank of Thailand TDRI, NEC, and the Office of Agricultural Economics. (Released 24 April, 1998)

The number of employed in the surveyed firms are altogether 1.442 million persons, comprising 620,559 in manufacturing, 500,000 in construction, and 321,890 in the modern service sector as of the third quarter of 1997. Those who are 'out of work' defined as 'lay-off', forced retired, and voluntary retired during the third to the end of the fourth quarter combined amounted to 421,529, or 29.2 percent of total survey employment. Unemployment in manufacturing is 24.4 percent, while it is 50.5 percent in construction, but only 5.5 percent in the modern service sector, (although it is 49.5 percent in securities and the finance sector). It should be noted that these unemployment figures will surely be reflected in the tide of 'U-turn' employment to rural areas, if workers are allowed to relocate; unemployment is not a luxurious leisure.

In the tables, we intend to estimate the total unemployment level from the surveyed data of the Ministry of Interior. Regional unemployment reported by this ministry is 1.32 million persons across agriculture and non-agriculture sectors in 1998, not inclusive of 200,000-300,000 foreign guest laborers who have gradually returned to their homeland. Assuming that new entrants into the labor force from the education system are unfortunately jobless, the total estimate figure for unemployment is therefore 1.899 million persons. Given the number of labor force, unemployment over the current labor force will be approximately 5.73 percent as of April 1998. If this figure is adjusted by the

Table 3: Officially and Unofficially Reported Numbers of Lay-Off During the Third and Fourth Quarter of 1997

Sector	3 rd Quarter		4 th Quarter		Total	% ^{4/}
	Employed Persons	Out of work	Out of work	Out of work		
1. Manufacturing	620,559	119,620	31,837 ^{3/}	151,457	24.4	
1.1 Chemical	40,000	12,000	*	12,000	30.0	
1.2 Plastic	101,500	20,300	4,060	24,360	24.0	
1.3 Rubber	39,400	-	7,880	7,880	20.0	
1.4 Printing	57,357	20,000	*	20,000	34.9	
1.5 Automobile & Parts	114,102	40,000	**	40,000	35.1	
1.6 Electric & Electronics	120,000	-	12,000	12,000	10.0	
1.7 Shoes	54,000	2,828	***	2,828	5.2	
1.8 Food	94,200	24,492	10,456	34,948	37.1	
2. Modern Service	321,890	9,483	8,089	17,572	5.5	
2.1 Banking	122,979	615	*	615	0.5	
2.2 Finance & Security ^{1/}	24,594	5,304	6,000	11,304	45.9	
2.3 Life & Non-Life Insurance.	66,317	-	*	-	-	
2.4 Export Business	N.A	-	N.A	-	-	
2.5 Hotels	108,000	3,564	2,089	5,653	5.2	
3. Construction ^{2/}	500,000	87,500	165,000	252,500	50.5	
All	1,442,449	216,603	204,926	421,529	29.2	

Note: 1/ surveyed from 78 out of 91 security & finance companies, as of Oct. 1997

2/ Most of those who are laid off are migrants from the agriculture sector. After transplanting and harvesting, they are likely to return home and will be short of cash income earned.

3/ This does not include those who will be retired from the spare parts and car assembly industries.

4/ This is the percentage of laid-off in two consecutive quarters over employed persons at the end of the third quarter.

5/ 'Out of work' includes laid-off, forced retired, and voluntary retired

6/ These mean '**' no additional recruitment, '***' will decrease further, '****' increase 5%.

Source: Human Resource Department, NESDB in cooperation with the Federation of Industry, Thai Chamber of Commerce, Thai Construction Association, Personnel Club of Security and Finance Company.

number of those who are waiting for the agricultural season, 0.6 to 1.0 million persons, the net unemployment would be lowered to 0.8-1.2 million persons. If the figures are subtracted again by those of open unemployment who are seeking jobs, 0.36 million persons, the net unemployment is 0.5-0.8, or roughly 0.6 million persons on average. Note that the whole estimates must be changed as sectoral lay-offs are accurately counted. So far, no institution in Thailand is able to demarcate the lowest point of the business cycle or of the declining sectoral growth rates.

4.2. An Input-Output Estimated Change in Employment Level from Past Trends, 1996-1999

We have tried to estimate the change in employment level during 1996-1999 under the economic crisis by applying an Input-Output Table, because we would like to see sectoral employment adjustment in a formal manner rather than an ad hoc collection of information on unemployment, as seen below.

Table 4: Estimated Unemployment from Surveyed Data

Region	Unemployed in Agriculture	Unemployed in Non-Agriculture	U-turn to Place of Origin	All
North	198,885	39,013	47,917	285,815
Northeast	706,167	98,036	120,871	925,074
Central	33,902	28,850	14,813	77,565
South	15,212	9,235	9,478	33,925
Sub-total	954,166	175,134	193,079	1,322,379
New Entrant into Labor Force				577,140
Estimated Total Unemployment				1,899,519
As % of total Labor Force (33.095 million)				5.73%

Note: Some laid-off workers are guest laborers; approximately 200,000-300,000 persons have retired and gone back to their countries. Thus, the figures above are exclusive of foreign laborers.

Source: Regional data are surveyed by the Ministry of Interior. New Entrant data are from NEC.

4.2.1. Methodology

Under simple Input-Output formulation, an assumed change in the final demand vector over the period of study (1996-1999) can induce a change in the output level:

$$X = [I - A]^{-1} F,$$

where

X : Gross output by sector,

$[I - A]^{-1}$: Leontief Inverse Matrix, and

F : Final Demand Vector.

It should be noted that this estimation was made when an official Input-Output Table 1995 was not available in Thailand. We therefore have to base our calculation on the I-O Table of 1990. We strongly have to assume a similar structure of inter-industrial relationship for 1990 and 1995. The employment (L) is simply the relation

$$L = l'X,$$

where

l : Employment -Output ratio.

In the analysis, we estimate a yearly change in employment level during the crisis of 1996-1999. The estimated figures stand for a change in demand for labor. The negative numbers indicate the *potential* lay-offs and unemployment. The reverse implies a recovery from crisis.

4.2.2. Assumptions

Final Demand

Given the economic growth rate of -3.1 percent p.a. closed to -3.0 to -3.5 percent cited in

Table 5: Growth of Final Demand at the Constant Price of 1988

Year	Government Expenditure	Growth Rate	Export	Growth Rate	Private Expenditure	Growth Rate	Gross Fixed Capital Formation	Growth Rate	Growth Rate of Final Demand
1990	171,944		709,649		1,110,935		759,870		
1991	182,589	6.19	817,090	15.14	1,171,164	5.42	856,227	12.68	9.98
1992	194,276	6.40	929,909	13.81	1,273,031	8.70	913,052	6.64	9.36
1993	204,210	5.11	1,048,338	12.74	1,378,790	8.31	997,746	9.28	9.63
1994	220,938	8.19	1,197,407	14.22	1,490,719	8.12	1,113,470	11.60	10.84
1995	233,377	5.63	1,382,846	15.49	1,601,030	7.40	1,237,848	11.17	10.75
1996	254,954	9.25	1,358,467	-1.76	1,697,732	6.02	1,308,617	5.72	3.69
1997	271,004	6.30	1,486,155	8.00	1,694,376	-2.04	1,306,308	-1.90	1.41
1998	213,090	-21.37	1,693,662	9.64	1,713,692	-3.10	1,319,763	-8.80	-1.73
1999	230,137	8.00	1,812,219	15.00	1,773,672	3.50	1,346,158	2.00	7.35

Note: In 1998, the budget was cut 182,000 million baht from 936,000 million baht. The growth of GDP is assumed to be -3.5%. Actual economic growth rates in 1998 are accepted by all institutions, including the IMF, to be -7.0 percent in 1998.

the letter of intent III, export is predicted to grow 8 and 9.6 percent at the constant price of 1998. Private consumption expenditure decreases with a rate of -2.04 and -3.10 percent p.a.. Gross fixed capital formation decreases with a rate of -1.9, and -8.8 p.a. percent during 1997 and 1998. The figures are at the constant price of 1998. Government expenditure decreases -21.37 percent p.a. in 1998, so that final demand growth would be decreasing at a rate of -1.73 percent in 1998 as compared with +1.41 in 1997. It is assumed, however, that final demand will have recovered to 7.35 percent in 1999.

Final demand at the constant price of 1988 was later transformed into final demand at the constant price of 1990 to be consistent with the I-O of 1990. Gross output and employment 1996-1999 are thus obtained from the above I-O formula.

Employment –Output Ratio

The vector on employment-output ratio was compiled from a Labor Force Survey from 1990-1997 to match with I-O 58 sector.

4.2.3. Estimation Results

Employment level is estimated through I-O formulation and shown in the Appendix. The yearly changing level of employment that stands for flow of demand for labor is shown below.

As the crisis broke out in 1997, the flow of demand for labor decreased in various sectors: the production of crops other than paddy (-343,341); livestock; fishery (-65,553); rice milling; animal feed; spinning (-24,847); textiles (39,290); fertilizer & pesticide (-11,757); rubber products (-21,057); plastic products (-33,950); metallic products (-14,107); automobiles & parts and repair (-14,860); leather products (-34,191); sawmill (-29,848); electricity and gas; building and construction (-185,097); wholesale and retail trade (-147, 143), respectively. Demand for labor in paddy and vegetable and fruit production balanced the decline in labor demand in the mentioned sectors during 1997/96.

Table 6: Change in Employment Level Under the Economic Crisis 1996-1999

Sector	(Unit: Persons)		
	1996/97	1997/98	1998/99
Agriculture Sector	527,915	256,198	1,437,848
Non-Agriculture Sector	392,783	-666,360	833,884
Mining	-200	562	2,984
Manufacturing	-81,086	131,403	386,090
Utilities	-213	-3,764	7,501
Construction	-151,203	-207,392	61,857
Trades	-147,143	-135,398	111,937
Transport & Communications	9,019	-25,111	29,364
Banking & Finance and Other Services	292,505	-50,541	105,226
Business Services	471,104	-376,120	128,924
All Sectors	910,522	-411,261	2,272,559

Note: Mining = code 012-014; Construction = code 047-048; Banking & Finance = code 050, 053-055, 057; Manufacture = code 015-044 ; Trade = code 049; Business Services= code 056; Utilities= code 045-046; Transport & Communications = code 051-052

Source: Consolidated from Appendix Tables.

The labor market adjusted in a different direction in 1998 when demand for labor in business service decreased substantially (-376,120). Other sectors like vegetables, sugar cane, building and construction (-189,597), trade (-135,398), restaurants, automobiles & parts, and transportation had their flow demands for labor decline, in turn causing a significant slowdown in labor demand in the non-agriculture service sector. The manufacturing sector had revived again to absorb employment by 1998/97. Employment in the agriculture sector had declined by 1998 as compared with 1997.

By 1999, the economy had been recovered, with revived demand for labor in both the agriculture and the non-agriculture sectors. The major sources of revival in employment were the manufacturing, trade, and business services.

From the results of our estimation, we can conclude that the Thai economy has responded differently from sector to sector of production. With an I-O formulation, we can understand more clearly about how agriculture, manufacturing, and service responded to the crisis. The inter-industrial relationship structure of the Thai economy can be said to have stability as far as stock and the flow of employment is concerned. Even under rigid assumptions about industrial structure represented by the I-O 1990 Table, we are convinced that the economy will be recovered by 1999, as compared with 1996-1998. With normal expansionary trends in final demand, especially from exports, we think that the Thai economy will be out of danger by the year 2000 and will maintain its recovered economic health thereafter.

Appendix

Table A1: Employment Under Economic Crisis by Sector 1996-1999

		(Unit: Persons)			
		1996	1997	1998	1999
001	Paddy	9,800,856	10,706,451	11,087,770	12,143,038
002	Maize	244,656	246,101	250,478	279,193
003	Tapioca	507,300	511,826	508,115	546,858
004	Beans and Nuts	158,307	160,993	145,805	159,293
005	Vegetables and Fruit	1,596,972	1,635,915	1,608,848	1,671,203
006	Sugar Cane	766,347	774,974	715,648	752,285
007	Rubber	787,934	798,157	805,269	881,004
008	Other Crops	1,185,727	842,386	827,752	883,658
009	Livestock	486,552	450,261	447,988	485,649
010	Forest	110,971	112,026	102,782	115,371
011	Fishery	481,486	415,933	410,766	431,518
012	Crude Oil and Coal	6,002	8,885	9,031	9,460
013	Iron Ore	11,179	2,708	2,749	3,200
014	Other Mining	29,936	35,324	35,699	37,802
015	Slaughter	16,665	21,267	21,196	22,134
016	Food Preservation	263,490	276,764	295,270	332,825
017	Rice Mill and Other Milling	87,691	78,509	81,606	89,517
018	Sugar	43,798	42,705	44,600	50,209
019	Other Food Products	176,350	182,957	183,485	197,927
020	Animal Feeds	23,866	19,080	18,724	20,619
021	Beverages	62,753	51,086	49,554	52,607
022	Tobacco	17,554	12,374	12,046	12,615
023	Spinning, Weaving and Bleaching	234,734	209,887	214,406	223,759
024	Textile Products	684,189	644,899	662,624	727,011
025	Paper and Paper Products	44,881	60,597	61,741	66,740
026	Printing and Publishing	55,998	89,364	89,922	96,531
027	Basic Chemicals	2,944	4,573	3,495	4,086
028	Fertilizers and Pesticides	113,575	101,818	105,892	125,551
029	Other Chemicals	59,728	116,372	168,219	174,600
030	Petroleum Refineries	8,620	5,831	5,746	6,027
031	Rubber Products	91,575	70,518	75,064	83,699
032	Plastic Products	51,154	17,204	17,517	19,922
033	Cement and Concrete Products	92,367	90,245	90,404	92,683
034	Non-Metallic Products	176,022	169,876	175,961	188,054
035	Ferrous and Steel	116,518	130,257	133,722	142,611
036	Non-Ferrous Metal	110,222	105,382	101,860	117,527
037	Metallic Products	177,426	163,319	164,812	179,556
038	Industrial Machinery	14,586	18,093	17,972	19,305
039	Electrical machinery and Equipment	346,259	365,730	391,118	442,259
040	Production and Repair of Automobile	442,815	427,955	407,310	422,325
041	Other Transport Equipment	13,132	11,351	11,741	13,285
042	Leather Products	162,664	128,473	134,341	150,806
043	Sawmill and Wood Products	390,570	360,722	355,782	376,763
044	Other Products	252,082	275,932	288,412	319,081
045	Electricity and Gas	121,856	118,186	114,493	118,622
046	Water	21,033	24,490	24,419	27,792
047	Building Construction	1,996,359	1,811,262	1,621,668	1,676,116
048	Public Construction and Other	175,621	209,515	191,717	199,126
049	Wholesale and Retail Trade	4,341,523	4,194,380	4,058,982	4,170,919
050	Restaurant and Hotels	1,039,442	1,187,700	1,152,103	1,188,353

Table A1: (continued) Employment Under Economic Crisis by Sector 1996-1999

		(Unit: Persons)			
		1996	1997	1998	1999
051	Transportation	903,079	890,940	865,661	890,740
052	Communications	50,695	71,853	72,021	76,306
053	Banking and Insurance	258,750	346,151	340,805	350,342
054	Real Estate	36,501	60,593	58,221	62,695
055	Public Service and Administration	310,679	383,265	382,017	394,464
056	Business Services	1,722,144	2,193,248	1,817,128	1,946,052
057	Other Services	746,227	706,395	700,418	742,935
058	Unclassified	19,487	9,311	8,212	9,039
001-011	Agriculture Sub-Sector	16,127,108	16,655,023	16,911,221	18,349,069
012-057	Non-Agriculture Sub-Sector	16,105,252	16,498,035	15,831,675	16,665,559
Total		32,251,847	33,162,369	32,751,108	35,023,667

Note: Calculated with Input-Output formulation. Employment = Output* Labor -Output Vector; Output = Leontief Inverse
 × Final demand.

Table A2: Change in Employment Levels 1996-1999

		(Unit: Persons)		
CODE	I/O	1996/97	1997/98	1998/99
001	Paddy	905,595	381,319	1,055,268
002	Maize	1,445	4,377	28,715
003	Tapioca	4,526	-3,711	38,743
004	Beans and Nuts	2,686	-15,188	13,488
005	Vegetables and Fruit	38,943	-27,067	62,354
006	Sugar Cane	8,627	-59,326	36,638
007	Rubber	10,223	7,112	75,735
008	Other Crops	-343,341	-14,634	55,905
009	Livestock	-36,291	-2,273	37,660
010	Forest	1,055	-9,244	12,588
011	Fishery	-65,553	-5,167	20,752
012	Crude Oil and Coal	2,883	146	429
013	Iron Ore	-8,471	41	452
014	Other Mining	5,388	375	2,104
015	Slaughter	4,602	-71	939
016	Food Preservation	13,274	18,506	37,554
017	Rice Mill and Other Milling	-9,182	3,097	7,911
018	Sugar	-1,093	1,895	5,609
019	Other Food Products	6,607	528	14,441
020	Animal Feeds	-4,786	-356	1,895
021	Beverages	-11,667	-1,532	3,052
022	Tobacco	-5,180	-328	569
023	Spinning, Weaving and Bleaching	-24,847	4,519	9,354
024	Textile Products	-39,290	17,725	64,387
025	Paper and Paper Products	15,716	1,144	4,999
026	Printing and Publishing	33,366	558	6,609
027	Basic Chemicals	1,629	-1,078	591
028	Fertilizers and Pesticides	-11,757	4,074	19,659
029	Other Chemicals	56,644	51,847	6,382
030	Petroleum Refineries	-2,789	-85	281
031	Rubber Products	-21,057	4,546	8,635
032	Plastic Products	-33,950	313	2,404
033	Cement and Concrete Products	-2,122	159	2,279
034	Non-Metallic Products	-6,146	6,085	12,093
035	Ferrous and Steel	13,739	3,465	8,890

Table A2: (continued) Change in Employment Level 1996-1999

		(Unit: Persons)		
	CODE I/O	1996/97	1997/98	1998/99
036	Non-Ferrous Metal	-4,840	-3,522	15,667
037	Metallic Products	-14,107	1,493	14,744
038	Industrial Machinery	3,507	-121	1,333
039	Electrical machinery and Equipment	19,471	25,388	51,141
040	Production and Repair of Automobile	-14,860	-20,645	15,015
041	Other Transport Equipment	-1,781	390	1,544
042	Leather Products	-34,191	5,868	16,464
043	Sawmill and Wood Products	-29,848	-4,940	20,981
044	Other Products	23,850	12,480	30,668
045	Electricity and Gas	-3,670	-3,693	4,128
046	Water	3,457	-71	3,373
047	Building Construction	-185,097	-189,594	54,448
048	Public Construction and Other	33,894	-17,798	7,408
049	Wholesale and Retail Trade	-147,143	-135,398	111,937
050	Restaurant and Hotels	148,258	-35,597	36,251
051	Transportation	-12,139	-25,279	25,079
052	Communications	21,158	168	4,285
053	Banking and Insurance	87,401	-5,346	9,538
054	Real Estate	24,092	-2,372	4,474
055	Public Service and Administration	72,586	-1,248	12,447
056	Business Services	471,104	-376,120	128,924
057	Other Services	-39,832	-5,977	42,517
058	Unclassified	-10,176	-1,099	827
001-011	Agriculture Sub-Sector	527,915	256,198	1,437,848
012-057	Non-Agriculture Sub-Sector	392,783	-666,360	833,884
	Total	910,522	-411,261	2,272,559

Note: Calculated from Appendix Table A1.

Table A3: Selected Employment-Output Ratio 1990, 1995, 1997

	CODE I/O	1990	1995	1997
001	Paddy	0.215785	0.129270	0.085023
002	Maize	0.034208	0.011584	0.007551
003	Tapioca	0.049549	0.024232	0.017052
004	Beans and Nuts	0.032415	0.010886	0.008121
005	Vegetables and Fruit	0.017770	0.013903	0.018900
006	Sugar Cane	0.070105	0.031130	0.024649
007	Rubber	0.055164	0.009641	0.008876
008	Other Crops	0.041125	0.019740	0.014412
009	Livestock	0.008286	0.004976	0.003133
010	Forest	0.010529	0.004086	0.002371
011	Fishery	0.009044	0.005961	0.005749
012	Crude Oil and Coal	0.000064	0.000358	0.000248
013	Iron Ore	0.001558	0.000502	0.000092
014	Other Mining	0.002466	0.000378	0.000544
015	Slaughter	0.000217	0.000227	0.000207
016	Food Preservation	0.002582	0.001717	0.000972
017	Rice Mill and Other Milling	0.000803	0.000502	0.000331
018	Sugar	0.002718	0.000717	0.000339
019	Other Food Products	0.003753	0.003084	0.002931
020	Animal Feeds	0.000528	0.000290	0.000287

Table A3: (continued) Selected Employment-Output Ratio 1990, 1995, 1997

	CODE I/O	1990	1995	1997
021	Beverages	0.000827	0.000636	0.000416
022	Tobacco	0.000461	0.000573	0.000292
023	Spinning, Weaving and Bleaching	0.000872	0.001089	0.000905
024	Textile Products	0.002491	0.003391	0.001725
025	Paper and Paper Products	0.001450	0.001617	0.001280
026	Printing and Publishing	0.003069	0.002141	0.002023
027	Basic Chemicals	0.000199	0.000021	0.000299
028	Fertilizers and Pesticides	0.026552	0.002743	0.001059
029	Other Chemicals	0.001304	-0.017157	-0.038523
030	Petroleum Refineries	0.000013	0.000035	0.000047
031	Rubber Products	0.001093	0.001785	0.000926
032	Plastic Products	0.000622	0.000187	0.000108
033	Cement and Concrete Products	0.001054	0.000958	0.001009
034	Non-Metallic Products	0.005284	0.006048	0.003417
035	Ferrous and Steel	0.001362	0.001792	0.001552
036	Non-Ferrous Metal	0.003640	0.002100	0.001419
037	Metallic Products	0.002027	0.002191	0.001225
038	Industrial Machinery	0.000082	0.000322	0.000129
039	Electrical machinery and Equipment	0.000844	0.001253	0.000499
040	Production and Repair of Automobile	0.001021	0.001084	0.001093
041	Other Transport Equipment	0.002590	0.000605	0.000197
042	Leather Products	0.001538	0.000730	0.000489
043	Sawmill and Wood Products	0.005378	0.002795	0.002449
044	Other Products	0.001760	0.001289	0.000724
045	Electricity and Gas	0.000881	0.001194	0.001023
046	Water	0.000996	0.000545	0.000440
047	Building Construction	0.002652	0.002568	0.002809
048	Public Construction and Other	0.001050	0.001406	0.001139
049	Wholesale and Retail Trade	0.005784	0.006152	0.005876
050	Restaurant and Hotels	0.003367	0.003627	0.003205
051	Transportation	0.002416	0.002738	0.001972
052	Communications	0.001719	0.001154	0.001239
053	Banking and Insurance	0.001290	0.001403	0.001864
054	Real Estate	0.000252	0.000226	0.000207
055	Public Service and Administration	0.002932	0.005639	0.007204
056	Business Services	0.007749	0.007393	0.027077
057	Other Services	0.010968	0.008924	0.006452
058	Unclassified	0.000642	0.000097	0.000201
	Total	1.000000	1.000000	1.000000

Note: Compiled from Labor Force Survey 1990-1997, National Statistical Office

References

- [1] The Brooker Group Construction (1999), *ADB Capacity Building for Social Reform Technical Assistance*.
- [2] The Brooker Group Ltd., (1998), *Impact of Thailand's Economic Crisis on the social sector*.
- [3] Human Resource Department, NESDB with the cooperation with Federation of Industry, Thai Chamber of Commerce, Thai Construction Association, *Personnel Club of Security and Finance Company*.
- [4] Human Resources Program, TDRI (1997), ILO Conference Paper, 27-28 November 1997, UN Conference Center, Bangkok.
- [5] Kakwani, N. and Pothong, J. (1998), *Impact of Economic Crisis on the Standard of Living in Thailand*, NESDB, Indicators of Well-Being and Policy Analysis 1998.
- [6] Labor Review (1998), in Thai, Vol. 12, No. 4, April 1998.
- [7] Limskul, K. (1999), *Future Prospect of Selected Supporting Industries in Thailand*, APEC Study Center Institute of Developing Economies, IDE-JETRO, Japan March 1999.
- [8] Limskul, K. (1997), *International Baseline Study Thailand 1997*, Faculty of Economic Chulalongkorn University.
- [9] Limskul, K. (1998) *Labor Demand by Occupation and Labor Shortage*, Department of Employment Promotion, Ministry of Labor and Social Welfare.
- [10] Limskul, K. (1998), *Socio-Economics Restructures of Thailand 1998*, Faculty of Economics, Chulalongkorn University.
- [11] Limskul, K. (1998), *The financial and Economics Crisis in Thailand Policy response, Impact on Social Sector and Counter Measures 1998*, Faculty of Economics Chulalongkorn University.
- [12] Ministry of Interior Regional data are surveyed by Ministry of Interior, New Entrant data are from NEC.
- [13] National Economic and Social Development, (1998), *Proceeding of a Seminar 'Economic Crisis and its Impact on Employment Unemployment and Income' 1998*, Department of Development Evaluation Division, Bangkok.
- [14] National Statistical Office, *Labour Force Surveys*. Bangkok.
- [15] NESDB, NSO, Bank of Thailand TDRI, NEC, and Office of Agricultural Economics, *Sub-Committee on the Projection of Labor Force, Employment, and Unemployment*, The Committee comprises representative from Ministry of Labor and Social Welfare (Released on 24 April 1998).
- [16] Pitayanon, S. (1991), *Labor Market Change*, Faculty of Economics, Chulalongkorn University, January 1991.
- [17] Sungsidh and Kanchada Piriyaangsan (1996), "The Industrial Relations in Thailand", in Sungsidh Piriyaangsan, and Shigeru Itoga *Industrial Relations System in Thailand*.