AN OVERVIEW OF THAI ECONOMIC GROWTH IN THE POST-WAR PERIOD

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I. INTRODUCTION

The economic growth in Thailand since World War II can be divided into three trade cycle periods, each of about 15 years. The first period (period I) is from the end of the second world war until 1957, and is divided further into two sub-periods, i.e., the reconstruction period and the period of industrialization led by the government. The second period (period II) is from 1958 to 1971 and is characterized by the import-substitution industrialization. The third period (period III) is the period since 1972 with an economic policy shift from import-substitution to export-orientation.

This paper begins with a presentation of the three periods mentioned above and is followed by an analysis of the trade cycle, by expenditure and production. This shows that the gross domestic capital formation (GDCF) and a secondary sector, especially the manufacturing sector, caused the 15 year cycle; while a short cycle of a few years is caused by agricultural production. In Section V total factor productivity growth (TFPG) is measured, showing that TFPG is high in periods with a high growth rate and low in periods of a low growth rate. In Section VI it is shown that the GDCF and current account deficit, in terms of the ratio to GDP, fluctuate in the same manner although in the 1960s, the ratio of GDCF increased rapidly while the ratio of current account deficit remained stable.

II. TRADE CYCLE

We find trade cycles of about 15 years by analyzing the annual growth rate of GDP at constant prices. So far four kinds of trade cycle have been found:

The author wishes to express appreciation to Mr. Damrongsak Chindakul and other staffs of the National Economic and Social Development Board (NESDB) for their cooperation in collecting and analyzing data and has benefited from discussions with them. However, only the author is responsible for errors that remain.

The shortest is the inventory cycle, also called the Kitchin cycle, with a length of a few years; the cycle of equipment investment, called the Juglar cycle, with a length of about 7 years; the cycle of construction investment, called the Kuznets cycle, with a length of about 15 years; and the cycle with a length of 50 to 60 years, called the Kondratieff cycle.

This paper mainly analyzes the Kuznets cycle because the length of this cycle is suitable for an analysis of the economic policy in the post-war period. In this section the Kuznets cycle is shown from the GDP data covering the period 1950-1986. The whole period is then divided into three periods according to this cycle. This sub-section is followed by the same cycle shown by expenditure items and by production sectors.

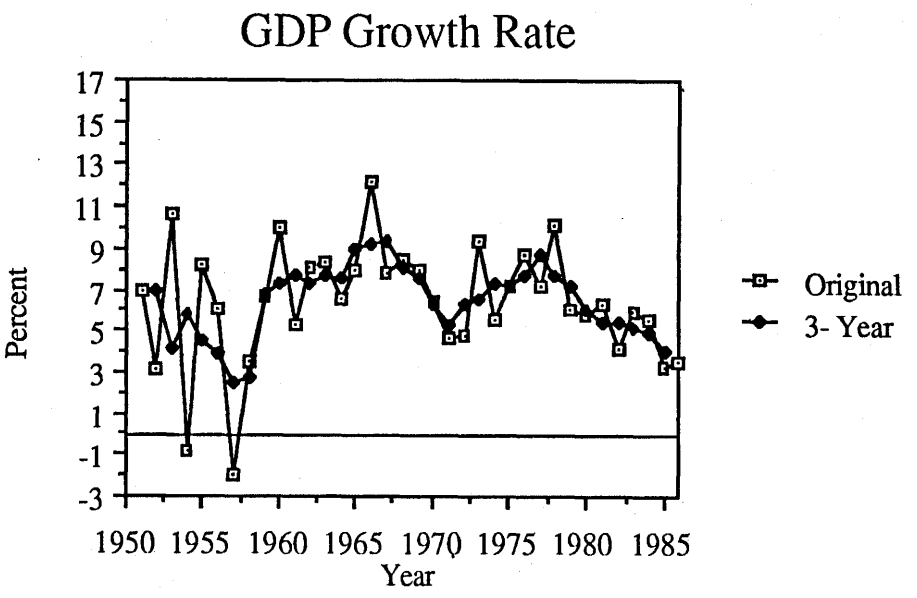
II-1. Kuznets cycle by GDP growth rate

Figure 1 shows the growth rates of GDP and its three-year moving average at 1972 constant prices. The three-year moving average is calculated in order to eliminate the short term fluctuation of a three year duration. It is shown later that this short cycle is caused by agricultural production. This cycle corresponds to the inventory cycle mentioned above. Though the inventory cycle exists in Thailand, the fluctuation of inventory investment is not enough to explain the whole short term fluctuation. The fluctuation of agricultural production seems to be a better explanation of the Kitchen cycle, as will be shown below.

The growth rate of the three-year moving average in Figure 1 clearly shows two and half cycles over the whole period. The peak years are 1952, 1967 and 1977, while the trough years are 1957, 1971 and 1984. With these results we can determine the exact year of peak and trough based on the original data before taking the three-year moving average. Thus the peak years are 1953, 1966 and 1978 and the trough years are 1957, 1971 and 1985. Table 1 summarizes these results.

In Table 1 each period is called I-1, I-2, II-1,... and I, I', II,...where 1 means a period from trough to peak and 2 means a period from peak to trough, and where I, I', II,... means a period from trough to trough, or from peak to peak. The length of period I-1 is only three years. This is because it was started from the year 1950, when the data is available for the present study. If we suppose that there was an upward trend since the end of the War, then the length of periods I-1 and I, would be eight years and twelve years, respectively. Thus we find three cycles of lengths of 12 to 14 years, the Kuznets cycle, in the post-war period.

Figure 1



Source) Appendix Table 1
Note) At 1972 Constant prices

The average growth rate of GDP in Table 1 supports the findings mentioned above. For a period of upward trend, which is noted as 1 after a I, II, or III, the growth rates are higher than the following periods noted as 2. It should be noted that the growth rate of period II-2 is so high that there does not seem to be a downward trend period.

This is because we determined the period from peak to trough, or from trough to peak. If we define the period around the peak and trough years, then the difference in the growth rates between them would be much greater.

The growth rates for the period of one cycle, i.e., the period I, I', II, II', III, meaning average growth rates eliminating the Kuznets cycle, increases from 4.5 percent for the period of I, to 7.4 percent for the period of II and then decreases to 6.4 percent for period III. This suggests that a cycle longer than the Kuznets cycle exists and that its length is longer than 35 years.

TABLE 1. GDP GROWTH RATE

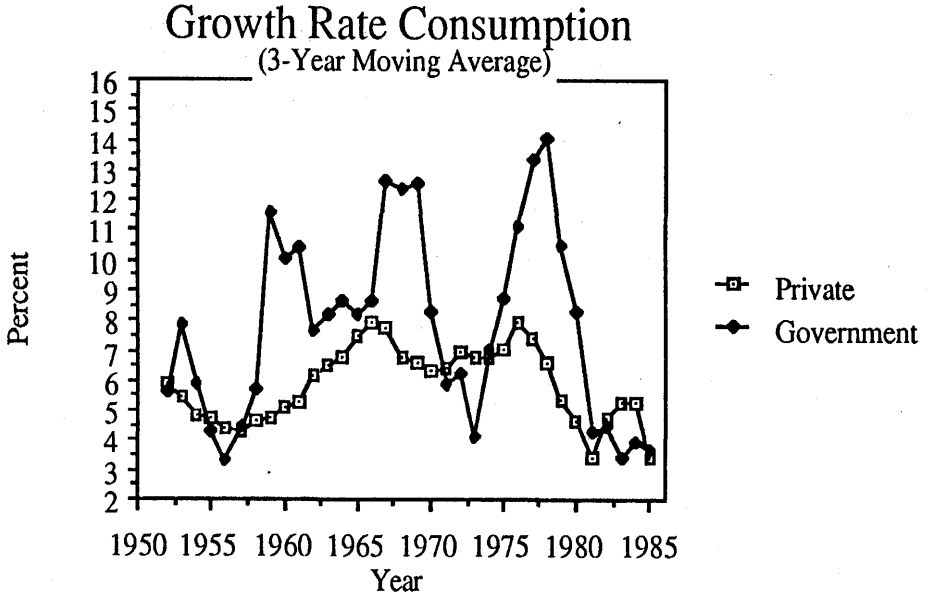
	Period	Length	Growth Rate
I-1	1950-53	3 years	6.8
I-2	1953-57	4	2.8
II-1	1957-66	9	7.6
II-2	1966-71	5	7.1
III-1	1971-78	7	7.5
III-2	1978-85	7	5.3
I	1950-57	7	4.5
I'	1953-66	13	6.1
II	1957-71	14	7.4
II'	1966-78	12	7.3
III	1971-85	14	6.4

Source) Appendix Table 1.

II-2. Cycles by Expenditure Items

Table 2 shows average growth rates by expenditure items for the same periods as Table 1. From this table it is found that only private equipment investment displays the cycle, but this is because the period around the peak and the trough was not defined as mentioned before. However, if written in figures, we find that many of the expenditure items follow the trade cycle. Figure 2 is a graph of growth rates of three-year moving averages of private and public consumption expenditures. Private consumption expenditure shows the same curve as the GDP, except for a peak around 1983. On the other hand, the government consumption expenditure shows a different curve with four peaks in the period from 1950-1985. The peak in 1960 is earlier than the peak of GDP growth, and coincides thereafter. Given the fact that the fluctuation of government consumption expenditure is much larger than that of the GDP, this means that the government consumption expenditure aggravates the fluctuation of GDP growth.

Figure 2



Source) Appendix Table 1
Note) At 1972 Constant prices

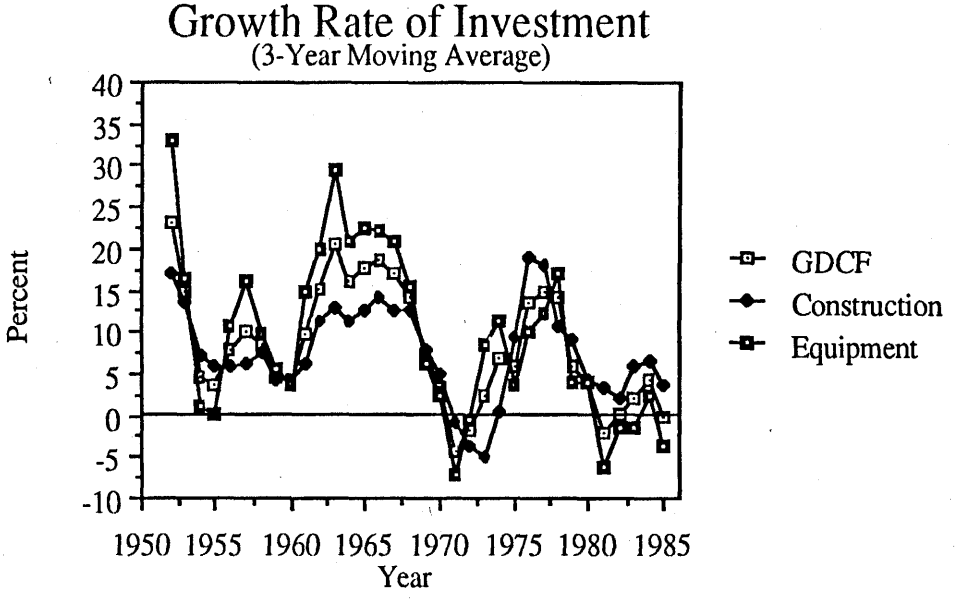
TABLE 2. AVERAGE GROWTH RATE OF GDE AND EXPENDITURE ITEMS

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
Consumption Expenditure											
Private	5.9	4.5	6.1	6.7	7.0	4.7	5.1	5.6	6.3	6.9	5.8
Government	5.5	3.9	8.9	10.7	8.9	5.7	4.5	7.3	9.6	9.6	7.3
GDCF	24.3	6.4	12.3	8.3	7.2	2.1	13.7	10.4	10.8	7.7	4.6
Construction	17.6	6.2	9.3	7.6	7.2	4.3	11.0	8.3	8.7	7.4	5.8
Private	11.4	9.7	10.4	11.6	7.9	2.1	10.4	7.5	7.2	8.5	5.0
Public	28.2	1.2	8.6	4.7	6.4	6.7	12.0	8.9	10.8	6.6	6.6
Equipment	36.8	6.7	15.5	8.8	7.3	0.1	18.7	12.7	13.1	7.9	3.6
Private	46.3	5.3	19.7	3.5	6.9	-0.7	21.2	18.6	12.9	6.7	3.0
Public	1.4	16.1	14.6	10.1	9.1	3.1	9.5	11.6	13.7	8.2	6.0
Increase in Stock	34.5	-	-	-6.9	11.9	-5.8	-	3.6	-	3.6	2.6
Export	19.1	9.9	8.1	6.8	8.7	9.8	13.7	8.6	7.6	7.9	9.3
Import	48.3	5.0	10.1	7.6	7.2	3.5	21.7	8.5	9.2	7.3	5.3
GDE	6.7	3.2	8.0	7.0	7.7	5.3	4.7	6.5	7.6	7.4	6.5

Source) Appendix Table 1.

Figure 3 shows the growth rates of the three-year moving averages of gross domestic capital formation (GDCF), construction investment and equipment investment. GDCF shows the same cycle as GDP, though the fluctuation is much greater in the case of GDCF. As mentioned before, the equipment investment follows a shorter, i.e. Juglar cycle, even in the case of Thailand with a length of seven or eight years. The peak of equipment investment is seen in the years, 1952, 1957, 1963, 1974, 1978 and 1984. The intervals between these years are 5, 6, 11, 4, and 6 years, respectively. This means that the cycle in the 1960s is much longer than others. Also, as mentioned before, the construction investment, except for a small peak in 1984, seems to follow the Kuznets cycle.

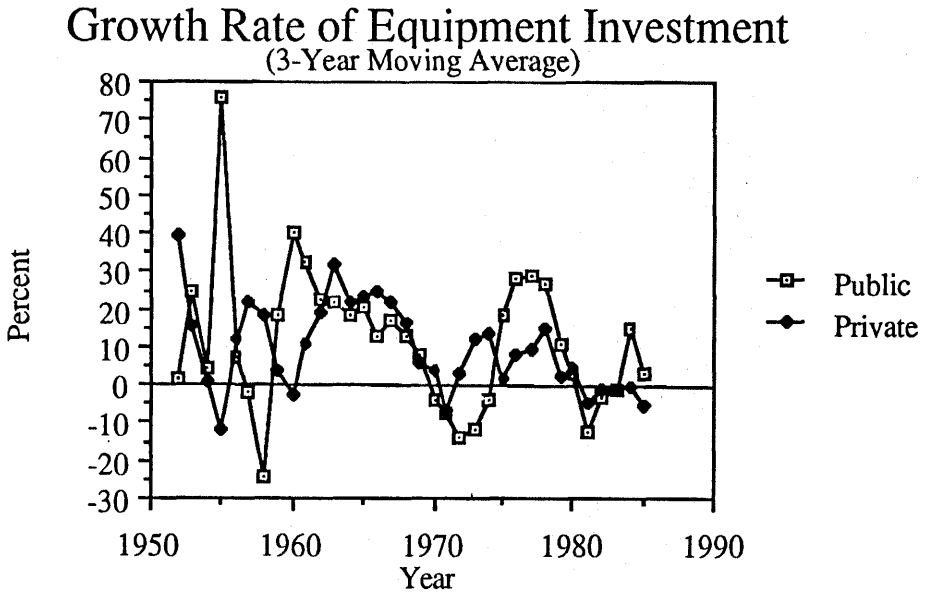
Figure 3



Source) Appendix Table 1
Note) At 1972 Constant prices

Figure 4 shows the growth rates of three-year moving averages of equipment investment by private and public sectors. Since the major part of equipment investment (Table 4) is in the private sector the the private sector curve is similar to the total equipment investment in Figure 3. On the other hand, the cycle of public equipment investment is longer than that of the private sector making the total equipment investment seen in Figure 3 similar to the Kuznets cycle.

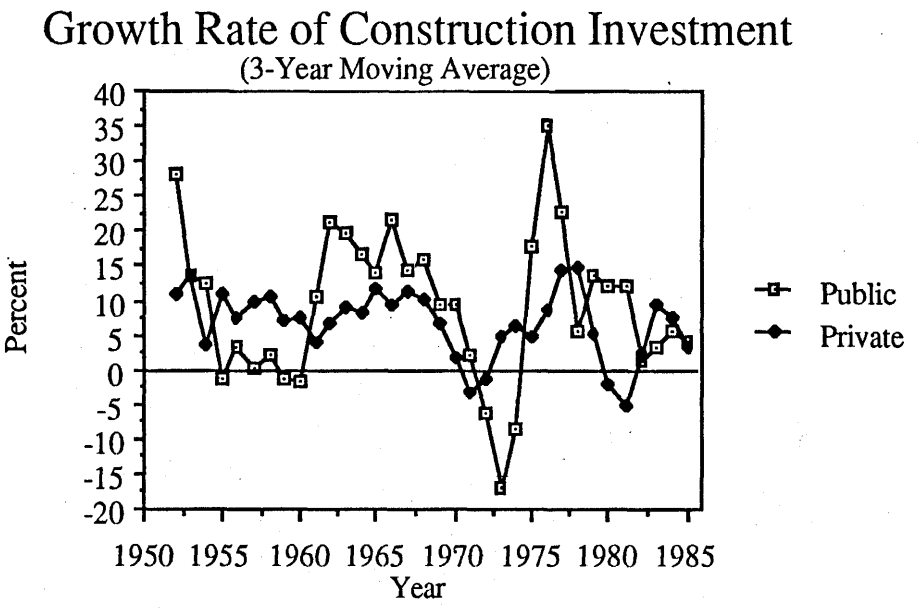
Figure 4



Source) Appendix Table 1
Note) At 1972 Constant Prices

Figure 5 shows construction investment by private and public sectors. In the case of construction investment the public and the private sectors are about the same size (Table 4) and the cycle of the total construction investment (Figure 3) reflects both. The fluctuation of the public construction investment is much greater than in private construction investment and the public sector therefore aggravates the fluctuation of construction investment.

Figure 5

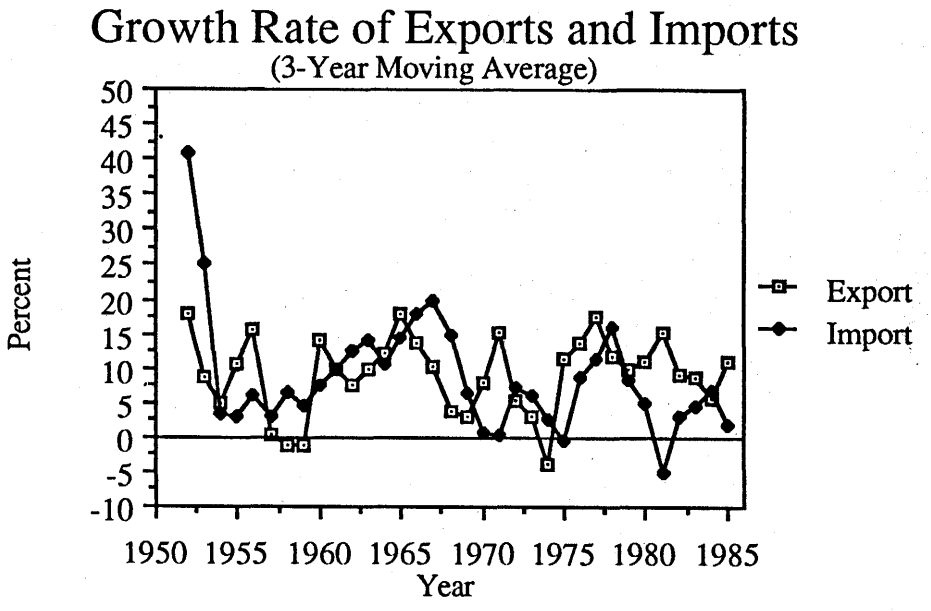


Source) Appendix Table 1
Note) At 1972 Constant Prices

For export and import, Figures 6-1 and 6-2 show growth rates of three-year and five-year moving averages. From these two figures it is evident that the three-year moving average is not enough to eliminate short-term fluctuation and that the five-year moving average shows the same Kuznets cycle as GDP.

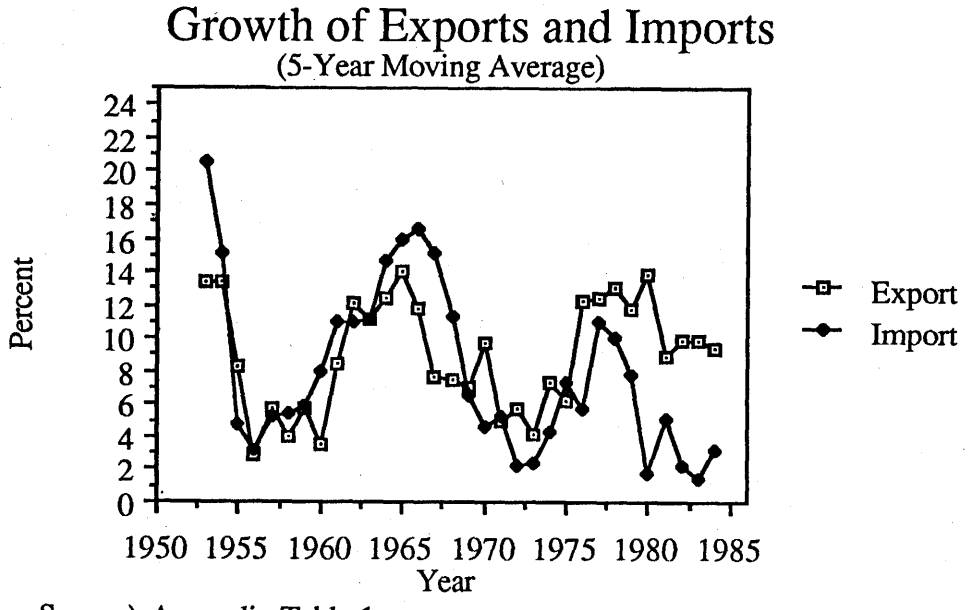
From Figure 6-2 it can be said that in the 1960's the growth rate of imports is higher than that of exports, while in the latter half of the 1970's and 1980's the growth rate of exports is greater than that of imports. It should be noted that these findings are based on the data at 1972 constant prices and are not necessarily found in terms of the current price data.

Figure 6-1



Source) Appendix Table 1
Note) At 1972 Constant Prices

Figure 6-2



Source) Appendix Table 1
Note) At 1972 Constant Prices

II-3. Cycles by Industrial Sector

Table 3 shows the average growth rates by industrial sector in each phase of the trade cycle. The industries showing the same fluctuation as GDP are agriculture, the secondary industry, construction and transportation and communication. The agricultural sector, however, shows a different picture when drawn in figures, as can be seen in Figure 7. Figure 7 shows three phases; a low growth phase in the 1975's, a high growth phase in the 1960's and early 70s, with a year of exceptionally low growth rate in 1971, and then a low growth phase in the 1980's.

Though the manufacturing sector does not show a cycle in Table 3, Figure 8 clearly shows a cycle similar to that of the GDP, shown in the same figure.

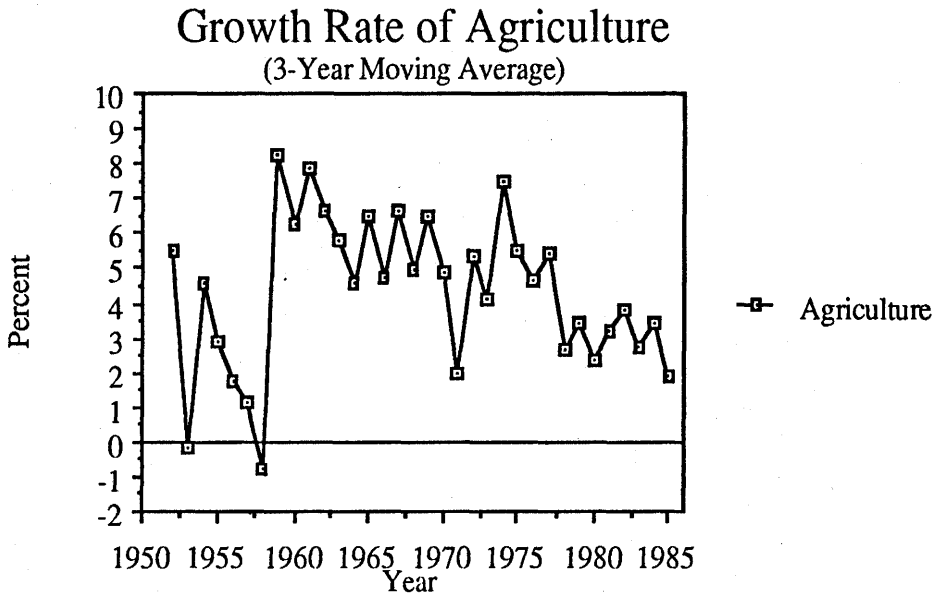
The difference is that in the 1960's and 1970's the growth rate of the manufacturing sector is three to four percentage points higher than the GDP growth rate.

TABLE 3. AVERAGE GROWTH RATE OF GDP AND BY INDUSTRIAL SECTOR

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
GDP	6.8	2.8	7.6	7.1	7.5	5.3	4.5	6.1	7.4	7.3	6.4
Agriculture	5.3	-1.2	6.9	4.3	5.3	2.6	1.6	4.4	6.0	4.9	3.9
Secondary	9.2	5.1	9.7	8.1	10.3	5.7	6.8	8.2	9.1	9.4	8.0
Mining	3.4	6.7	9.0	7.3	5.3	5.6	5.3	8.3	8.4	6.1	5.4
Manufacturing	7.8	4.1	8.4	9.6	11.1	5.7	5.7	7.0	8.8	10.5	8.3
Construction	17.9	7.3	12.8	2.2	8.5	3.9	11.7	11.1	8.9	5.8	6.2
Electricity	19.0	21.6	20.8	21.6	13.3	10.3	20.5	21.1	21.1	16.7	11.8
Tertiary	7.6	5.9	7.2	8.8	7.4	6.5	6.7	6.8	7.7	8.0	7.0
Transportation	15.5	7.6	8.3	6.3	8.1	6.9	10.9	8.1	7.6	7.4	7.5
Wholesale	12.3	6.7	6.4	8.8	7.0	4.4	9.1	6.5	7.3	7.7	5.7
Banking	17.5	20.0	15.4	15.7	10.8	10.9	18.9	16.8	15.5	12.8	10.9
Dwelling	2.7	2.7	3.0	4.6	3.9	4.7	2.7	2.9	3.6	4.2	4.3
Public Administration	-1.7	4.4	5.7	9.9	5.5	5.6	1.7	5.3	7.2	7.3	5.6
Service	3.6	4.0	7.8	8.4	7.7	7.5	3.8	6.6	8.0	8.0	7.6

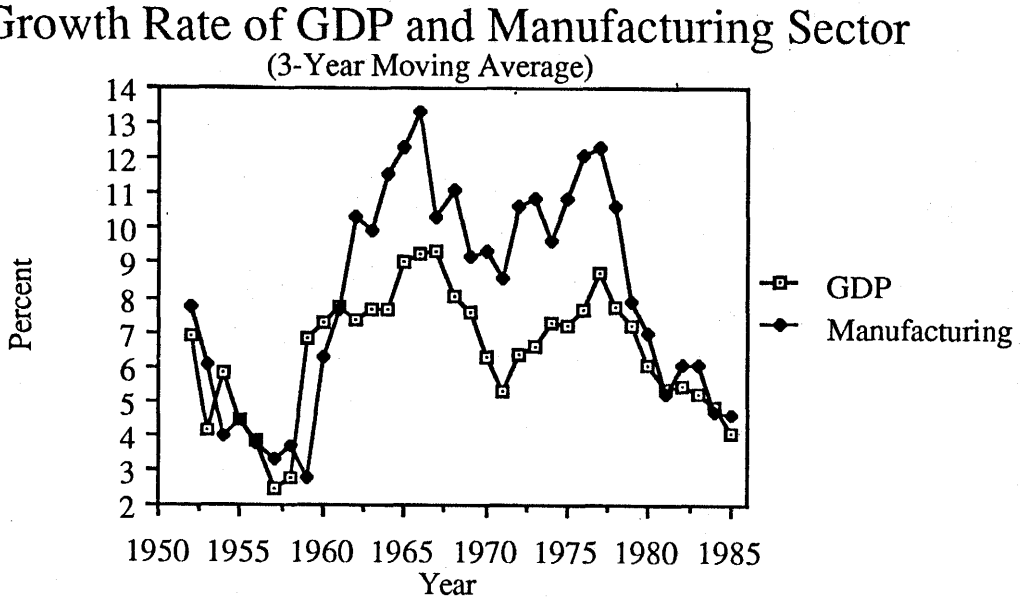
Source) Appendix Table 1.

Figure 7



Source) Appendix Table 1
Note) At 1972 Constant Prices

Figure 8

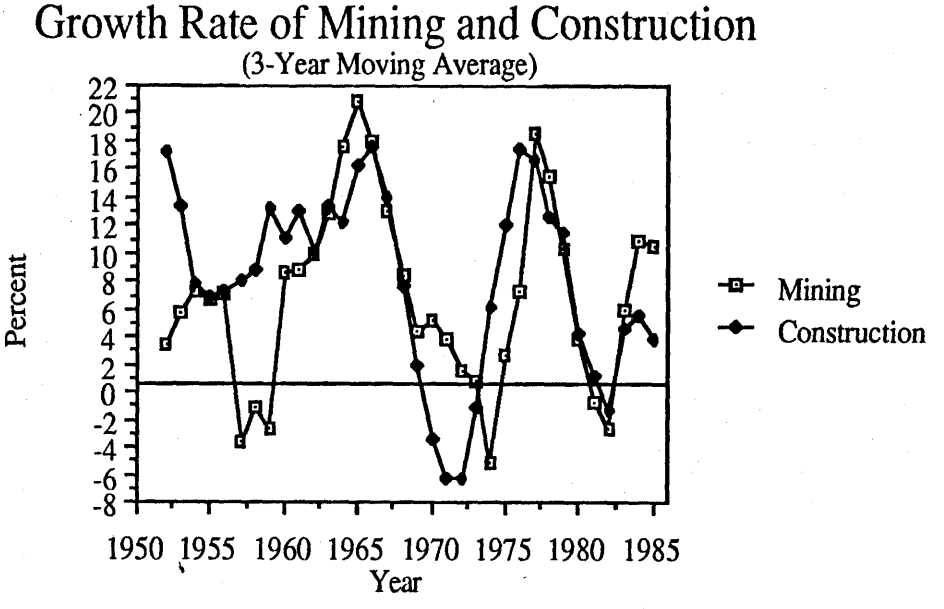


Source) Appendix Table 1
Note) At 1972 Constant Prices

Figure 9 shows the growth rates of both mining and construction. The curves for these two sectors are very similar to each other, except for the latter half of the 1950's and around 1970. This might be explained by the fact that the construction materials are used in the construction sector .

Industries which do not show any clear cycles are not presented as an output of the mining sector here.

Figure 9



Source) Appendix Table 1
Note) At 1972 Constant Prices

III. STRUCTURE OF EXPENDITURE AND INDUSTRY

III-1. Structure of Expenditure

Table 4 shows the percentage share in GDP by expenditure items. There are no clear cycles, except for "increase in stocks", which become higher in peak years than in trough years. A decreasing trend, from 76 percent in 1950 to 60 percent in 1985, can be seen for private consumption expenditures. On the contrary, an increasing trend can be seen for government consumption expenditures and exports. There is a dramatic increase of exports, with a rise from 9.3 percent in 1950 to 23.8 percent in 1985. Imports also show an increasing trend, though decreasing in 1978 and 1985, making its share in 1985 lower than that of exports. However, because they are measured at 1972 constant prices, this is not indicative of a trade surplus during this year .

Other expenditure items, i.e., each of the GDCF shows increasing trends until around 1970, with decreases thereafter. The GDCF increased from 9.3 percent in 1950 to 24.9 percent in 1971 and then decreased to 19.5 percent in 1985. This is a decrease by 5.4 percentage points. Since the share of construction investment is rather stable, these changes in the share of the GDCF is brought about by equipment investment, which rose from 2.9 percent in 1950 to 14.0 percent in 1971, and then decreased to 9.6 percent 1985.

III-2. Structure of Industry

The most important change during the period of 1950 to 1985 is evidenced in the share decrease of the agricultural sector, from 47.1 percent in 1950 to 23.2 percent in 1985.

During this same period the secondary and tertiary sectors however, showed an increase from 16.5 percent to 29.5 percent, and from 36.4 percent to 47.3 percent respectively. In the secondary sector, manufacturing played a dominant role in that the share of the manufacturing sector accounts for approximately three quarters of the entire secondary sector. It can therefore be seen that share increase in the secondary sector is brought about by the increase in the share of the manufacturing sector which increased from 12.4 percent in 1950 to 20.7 percent in 1985. While in 1950 the share of the manufacturing sector represents only one fourth of the share of the agricultural sector, it is slightly smaller than that of the agricultural sector. This is true in terms of the 1972 constant prices. If measured at current market prices, the share of the manufacturing sector exceeded that of the agricultural sector in 1984 and has represented the biggest sector since then.

TABLE 4. PERCENTAGE SHARE IN GDE

	1950	1953	1957	1966	1971	1978	1985
Consumption Expenditure							
Private	75.9	74.3	78.0	66.5	65.6	63.0	60.5
Government	8.8	8.5	8.7	9.4	11.1	12.0	12.4
GDCF	9.3	14.7	16.6	23.4	24.9	24.2	19.5
Construction	6.3	8.5	9.5	10.6	10.9	10.6	9.9
Private	4.2	4.8	6.1	4.1	5.8	5.9	4.7
Public	2.1	3.7	3.4	6.4	5.1	4.7	5.2
Equipment	2.9	6.2	7.0	12.9	14.0	13.6	9.6
Private	2.1	5.5	5.9	2.8	11.6	11.0	7.3
Public	0.8	0.7	1.1	10.1	2.4	2.6	2.2
Increase in Stock	2.4	4.8	-3.6	3.3	1.7	2.2	1.0
Export	9.3	13.0	16.7	16.7	16.6	17.8	23.8
Import	5.7	15.3	16.3	19.3	19.9	19.3	17.1
GDE	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source) Appendix Table 1.

TABLE 5. PERCENTAGE SHARE IN GDP

	1950	1953	1957	1966	1971	1978	1985
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	47.1	45.2	38.7	36.6	32.2	27.8	23.2
Secondary	16.5	17.6	19.2	22.9	24.0	28.6	29.5
Mining	1.5	1.4	1.6	1.8	1.8	1.6	1.6
Manufacturing	12.4	12.7	13.4	14.2	16.0	20.1	20.7
Construction	2.5	3.4	4.0	6.2	4.9	5.2	4.8
Electricity	0.1	0.1	0.2	0.6	1.2	1.7	2.4
Tertiary	36.4	37.2	42.1	40.5	43.9	43.6	47.3
Transportation	3.8	4.8	5.8	6.2	6.0	6.2	6.9
Wholesale	13.1	15.2	17.7	16.0	17.3	16.7	15.8
Banking	0.6	0.8	1.5	2.8	4.2	5.1	7.4
Dwelling	3.7	3.3	3.3	2.2	2.0	1.6	1.5
Public Administratio	5.5	4.3	4.6	3.9	4.5	3.9	4.0
Service	9.6	8.8	9.2	9.4	10.0	10.1	11.7

Source) Appendix Table 1.

Though the share of the manufacturing sector is higher than that of agriculture, the agricultural sector involves a greater number of people. Approximately 70 percent of employed persons belong to the agricultural sector, whereas the manufacturing sector involves only 10 percent. The remaining percentages are involved in the tertiary sector. These distributions of GDP and employed persons means a wide gap in labor productivity. If we assume that income is dependent on labor productivity, this implies a large income disparity. This income disparity among industrial sectors can be considered as income disparity between rural and urban sectors and between regions. 1)

The share of the tertiary sector increased to nearly half of the GDP. In the tertiary sector, transportation, wholesale, banking and service increased their shares, and can be considered important factors in the process of economic development in Thailand, regardless of the emphasis on the manufacturing sector.

IV. CONTRIBUTION TO ECONOMIC GROWTH

IV-1. The Agricultural Sector and Trade Cycle

The short two or three year cycle relates to the fluctuation in the agricultural sector was discussed in a previous section and has also been mentioned by several researchers. Figure 10 shows the growth rates of the agricultural sector and GDP in the original data, which excludes the three-year moving average. It is very clear that both the agricultural sector and GDP show the same fluctuation. This is not so surprising as the agricultural sector constitutes a major component of GDP and the change in the agricultural sector directly affects GDP.

The process involving the elimination of agricultural factors from the fluctuation in GDP is the next step. Factors related to the agricultural sector are measured in terms of contribution, defined as the sectoral growth rate multiplied by the sectoral share. The GDP growth rate reduced by the contribution of the agricultural sector, hereafter referred to as "the contribution of the non-agricultural sector," is shown in Figure 11.

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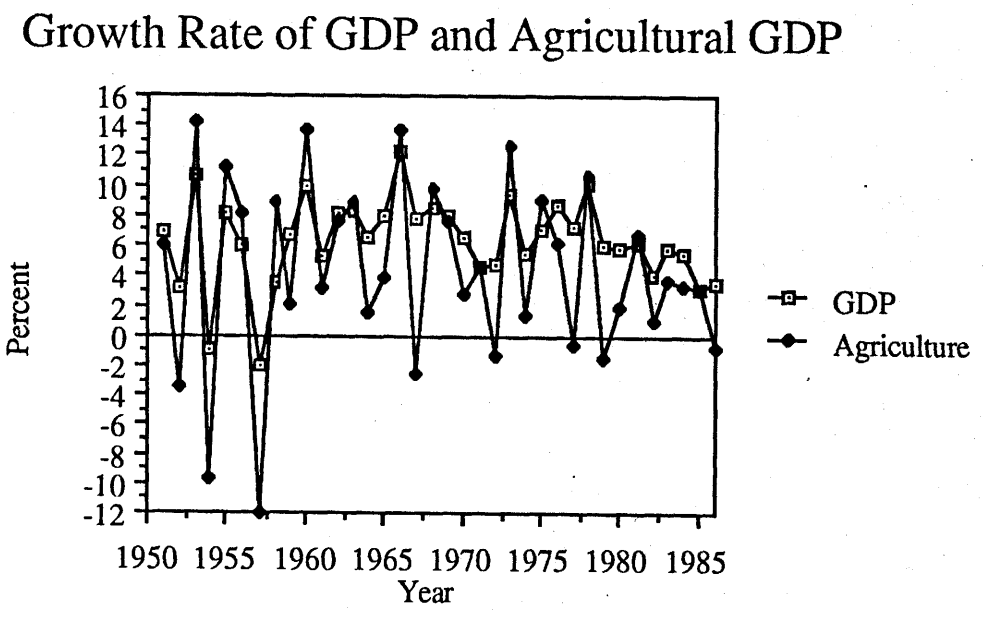
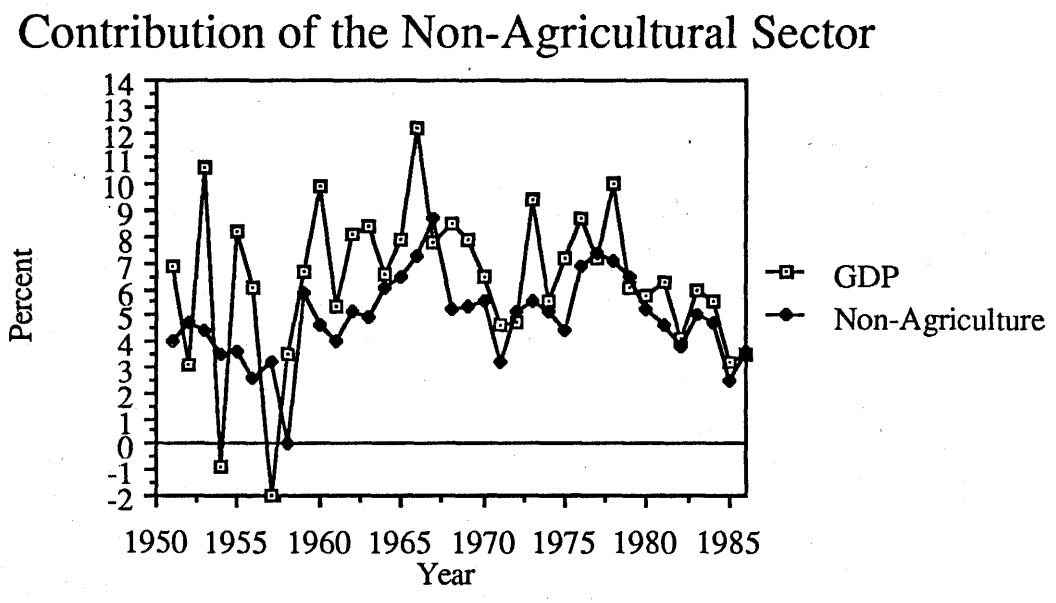
1) The disparity of household income between rural and urban areas and among regions is analyzed in Y. Ikemoto and K. Limskul,"Income Inequality and Regional Disparity in Thailand, 1962-81," Developing Economies Vol. 25, No. 3, September 1987.

Figure 10



Source) Appendix Table 1
Note) At 1972 Constant Prices

Figure 11



Source) Appendix Table 1
Note) At 1972 Constant Prices

The curve representing contribution of the non-agricultural sector resembles the curve of the three-year GDP moving average. Thus it can be said that the Kuznets cycle is caused by the non-agricultural sector and that three-year moving average of GDP is used to eliminate the fluctuation of the agricultural sector. It should be mentioned that the contribution of the agricultural sector has been decreasing as the share of the sector decreases. The contribution of the agricultural sector is the vertical distance between the two curves in Figure 11. Until 1958 the contribution of the agricultural sector changes between positive and negative every one or two years and if this effect, i.e., the contribution of the non-agricultural sector, is eliminated a downward trend occurs, which is the same as the Kuznets curve in Figure 1. After 1958 the contribution of the agricultural sector was positive with the exception of a few years.

This means that the agricultural sector made a positive contribution to GDP growth, unlike in the 1950s. However the distance between the two curves, shown in Figure 11, narrows as time proceeds which means the contribution of the agricultural sector showed a decrease over time. Even though Thailand is an agricultural country, in the sense that the agricultural population is dominant, the agricultural sector is no longer an important contributor to GDP growth.

IV-2. Contribution by Expenditure Items

The aim of this sub-section is to identify those items which gave rise to the GDP cycle or the non-agricultural contribution. Table 6 shows the contribution to GDE growth, by expenditure items and by percentage contribution. 2)

From Table 6 we cannot determine any cycles except for the "increase in stock." "Increase in stock" shows a positive contribution when the growth rate accelerates and shows a negative contribution when the growth rate decelerates. The private consumption expenditure shows a higher percentage contribution when the growth rate is on an upward trend, except for the period between 1978-85. This indicates that private consumption expenditure remains stable throughout the business cycle. The percentage contribution of government consumption expenditure increased around 1970 and then decreased. The most important finding is that the contribution of GDCF has been decreasing since the 1960's. Its percentage contribution decreased from 39.9 percent in 1953 to 8.5 percent in 1978-85. The decrease can be found in all items of GDCF except for the government construction investment. The government construction investment was an important factor contributing to GDP growth for the period of 1978-85. During the same period the second largest contributor was export with a percentage contribution of 37.6 percent, considerably higher than in the 1960's and 1970's. The export promotion policy was emphasized during the 1980's period and may have influenced the high contribution.

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2) Precisely speaking this should be the contribution to GDP growth because the contribution of non-agricultural sector is defined as GDP growth rate minus contribution of the agricultural sector. However the difference between GDP and GDE growth rate is not considerable and is thus ignored.

TABLE 6-1. CONTRIBUTION TO GDE GROWTH

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
Consumption Expenditure											
Private	4.5	3.4	4.4	4.4	4.5	2.9	3.9	3.9	4.5	4.5	3.7
Government	0.5	0.3	0.8	1.1	1.0	0.7	0.4	0.7	1.0	1.0	0.9
GDCF	2.7	1.0	2.4	2.0	1.8	0.5	1.7	2.0	2.3	1.8	1.0
Construction	1.2	0.6	0.9	0.8	0.8	0.4	0.8	0.8	0.9	0.8	0.6
Private	0.5	0.5	0.4	0.5	0.5	0.1	0.5	0.3	0.4	0.4	0.3
Public	0.7	0.0	0.5	0.3	0.3	0.3	0.3	0.5	0.5	0.4	0.3
Equipment	1.4	0.4	1.5	1.2	1.0	0.0	0.8	1.2	1.4	1.0	0.4
Private	1.4	0.3	0.4	0.1	0.8	-0.1	0.8	0.3	1.1	0.2	0.3
Public	0.0	0.1	1.1	1.1	0.2	0.1	0.1	0.9	0.2	0.9	0.1
Increse in Stock	1.1	-2.1	0.8	-0.2	0.2	-0.1	-0.9	0.1	0.4	0.1	0.0
Export	2.0	1.4	1.3	1.1	1.5	2.0	1.7	1.3	1.3	1.4	1.9
Import	4.0	0.8	1.8	1.5	1.4	0.6	2.1	1.5	1.7	1.4	1.0
GDE	6.7	3.2	8.0	7.0	7.7	5.3	4.7	6.5	7.6	7.4	6.5

Source) Appendix Table 1.

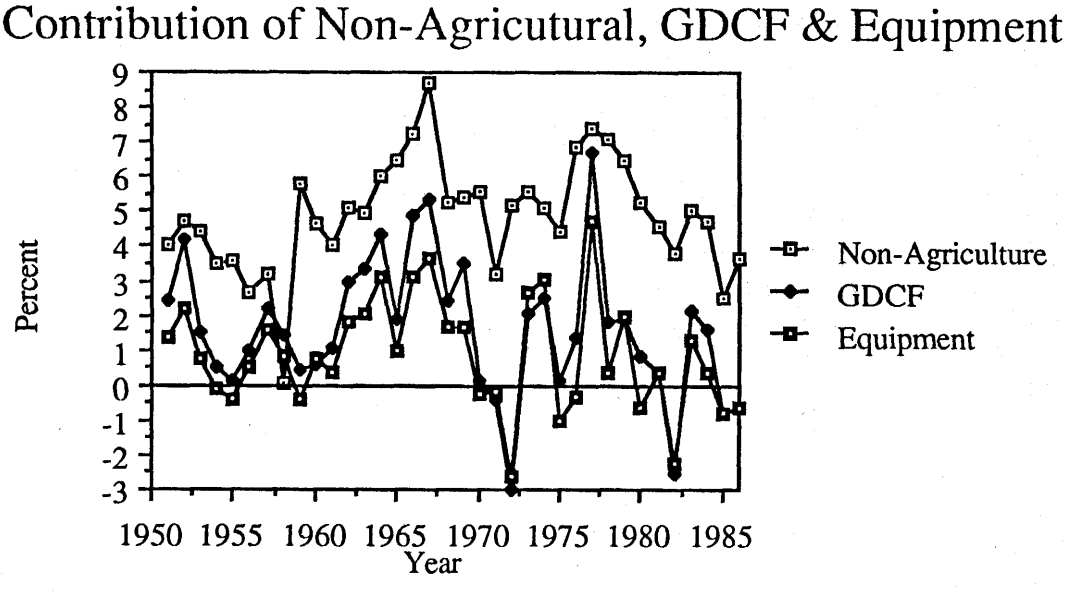
TABLE 6-2. PERCENTAGE CONTRIBUTION TO GDE GROWTH

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
Consumption Expenditure											
Private	66.9	105.2	54.9	63.5	59.2	54.6	83.6	60.3	58.8	60.5	56.8
Government	7.1	10.2	10.0	15.5	13.4	13.1	8.4	10.1	12.4	14.0	13.3
GDCF	39.9	30.6	30.3	28.5	23.3	8.5	35.8	30.3	29.5	24.8	15.6
Construction	18.6	17.2	11.6	11.7	10.2	8.3	18.0	12.2	11.7	10.6	9.2
Private	7.6	15.9	4.9	7.5	6.1	2.1	11.2	4.5	5.6	5.1	4.0
Public	11.0	1.3	6.8	4.1	4.1	6.2	6.8	7.7	6.1	5.5	5.2
Equipment	21.3	13.4	18.7	16.9	13.1	0.2	17.9	18.1	17.9	14.2	6.4
Private	21.2	9.2	4.5	1.3	10.2	-1.2	16.0	4.4	14.8	2.5	4.3
Public	0.2	4.1	14.2	15.5	2.9	1.4	1.9	13.7	3.1	11.8	2.1
Increse in Stock	16.1	-65.6	10.3	-2.5	3.0	-1.7	-19.5	2.2	4.6	1.3	0.5
Export	30.1	43.7	16.8	16.2	19.6	37.6	36.0	19.7	16.5	18.6	28.9
Import	60.0	24.1	22.4	21.2	18.4	12.2	44.4	22.5	21.8	19.2	15.1
GDE	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source) Appendix Table 1.

This section identifies those items responsible for the cycle of non-agricultural contribution. As previously mentioned, this cycle corresponds to the Kuznets cycle or the cycle of construction investment. Figure 12 shows the contributions of the non-agricultural sector, GDCF and equipment investment. Curves for GDCF and for the non-agricultural sector have showed similarities since 1960. However a large part of the contribution of GDCF is determined by equipment investment, as can be seen in Figure 12. In other words, the contribution of construction investment is smaller than that of equipment investment.

Figure 12



Source) Appendix Table 1
Note) At 1972 Constant prices

We may well conclude that the cycle of non-agricultural contribution is largely determined by the cycle of equipment investment, and that the cycle of non-agricultural contribution reflects not only of the Kuznets cycle but also the Juglar cycle. This cycle is also consistent in the equipment investment in Figure 3 and in the contribution of GDCF.

IV-3. Contribution by Industrial Sector

Table 7 shows the industrial sector contributions to GDP growth, by sector and by percentage contribution. Cycles for agricultural sector contributions are consistent with GDP cycles, whereas those for the manufacturing sector are not. This is similar to the effect mentioned in Section II-3. Though the manufacturing sector does not appear in cycles the secondary sector which includes the manufacturing sector as a component, shows the cycle more clearly than the agricultural sector.

Construction forms another component of the secondary sector and as demonstrated in the previous section, follows the Kuznets cycle. The tertiary sector appears rather stable. This can be seen in its contribution and anti-cyclical movement of percentage contribution. As can be seen from Figure 13, these facts mean that the secondary sector is responsible for the cycle of non-agricultural contribution. The vertical distance between the secondary and the manufacturing sector relates primarily to construction. While the manufacturing sector's contribution is relatively stable, the contribution of construction is higher in the neighborhood of peak.

Figure 13

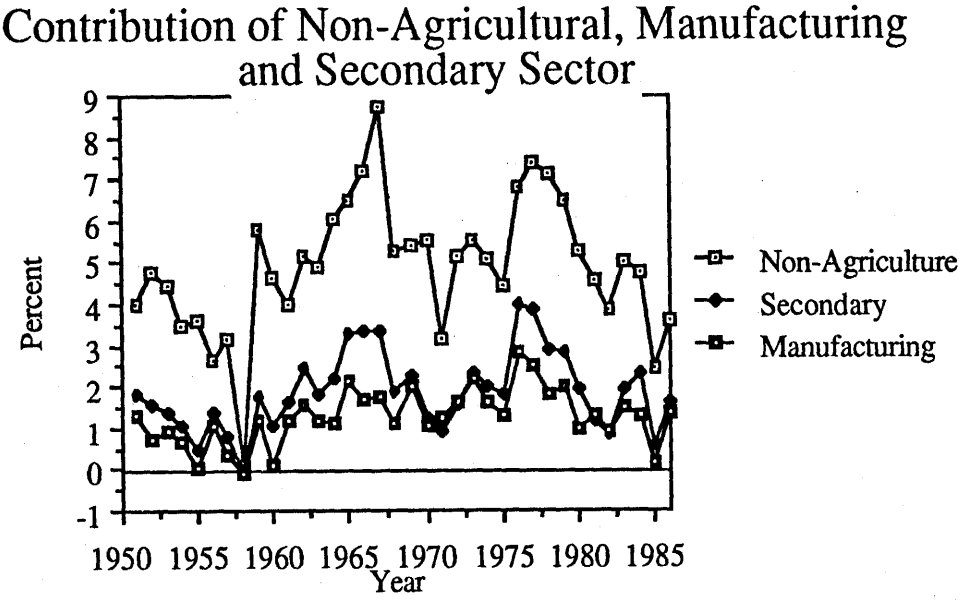


TABLE 7-1. CONTRIBUTION TO GDP GROWTH

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
GDP	6.8	2.8	7.6	7.1	7.5	5.3	4.5	6.1	7.4	7.3	6.4
Agriculture	2.5	-0.5	2.6	1.5	1.6	0.7	0.7	1.8	2.1	1.6	1.1
Secondary	1.5	0.9	2.0	1.9	2.7	1.7	1.2	1.7	2.0	2.4	2.1
Mining	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Manufacturing	1.0	0.5	1.2	1.4	2.0	1.2	0.7	0.9	1.3	1.8	1.5
Construction	0.5	0.3	0.6	0.1	0.4	0.2	0.4	0.5	0.4	0.3	0.3
Electricity	0.0	0.0	0.1	0.2	0.2	0.2	0.0	0.1	0.1	0.2	0.2
Tertiary	2.8	2.3	3.0	3.7	3.3	2.9	2.6	2.6	3.3	3.4	3.2
Transportation	0.6	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.4	0.5	0.5
Wholesale	1.7	1.1	1.1	1.4	1.2	0.7	1.4	1.0	1.3	1.3	0.9
Banking	0.1	0.2	0.3	0.5	0.5	0.7	0.2	0.3	0.4	0.5	0.6
Dwelling	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Public Administration	-0.1	0.2	0.2	0.4	0.2	0.2	0.1	0.2	0.3	0.3	0.2
Service	0.3	0.4	0.7	0.8	0.8	0.8	0.4	0.6	0.8	0.8	0.8

Source) Appendix Table 1.

TABLE 7-2. PERCENTAGE CONTRIBUTION TO GDP GROWTH

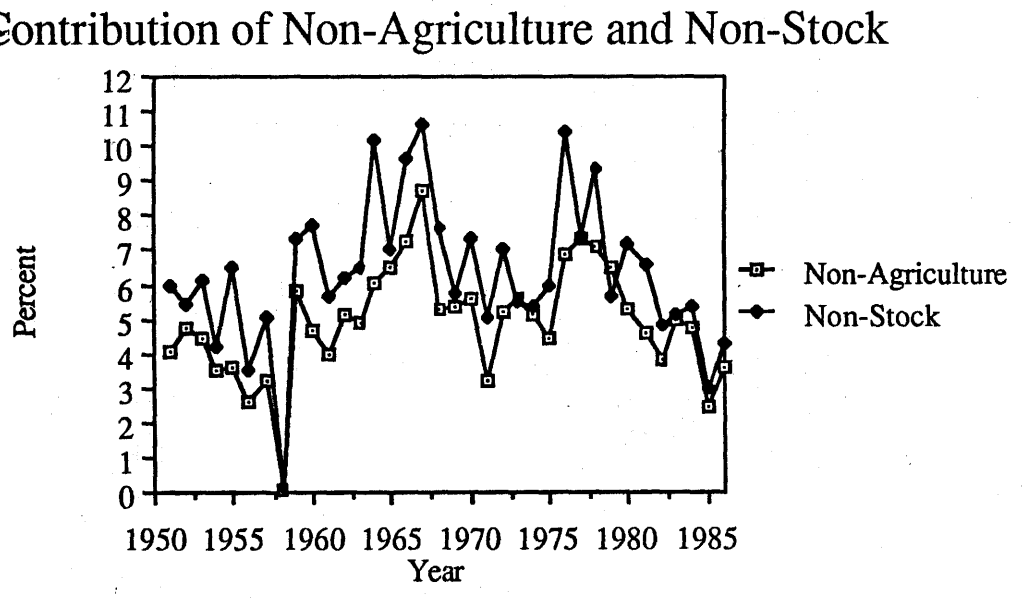
	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	36.2	-17.9	34.4	21.3	21.1	12.7	15.2	29.2	28.4	21.2	16.7
Secondary	22.7	33.6	26.7	26.6	35.7	31.4	26.9	27.4	26.7	32.9	33.4
Mining	0.7	3.6	2.0	1.9	1.2	1.7	1.8	2.2	1.9	1.4	1.5
Manufacturing	14.3	19.1	15.2	20.5	26.3	22.1	16.2	15.6	17.6	24.5	24.1
Construction	7.3	9.7	8.5	1.7	5.7	3.7	8.3	8.6	5.4	4.5	4.7
Electricity	0.3	1.2	1.1	2.6	2.5	3.9	0.6	1.1	1.8	2.5	3.2
Tertiary	41.0	84.4	38.9	52.1	43.2	55.9	57.9	43.4	44.9	45.9	49.8
Transportation	9.4	14.4	6.6	5.4	6.6	8.5	11.4	7.4	6.1	6.2	7.6
Wholesale	24.8	39.2	14.2	20.5	15.8	13.7	30.4	16.7	17.1	17.3	14.7
Banking	1.7	7.6	4.3	7.5	6.6	12.7	4.0	4.6	5.7	6.9	9.8
Dwelling	1.4	3.2	1.1	1.4	0.9	1.4	2.1	1.3	1.2	1.1	1.1
Public Administration	-1.3	7.1	3.2	5.8	3.1	4.2	2.0	3.5	4.4	3.9	3.6
Service	4.9	12.9	9.6	11.5	10.2	15.4	8.0	9.9	10.5	10.6	12.9

Source) Appendix Table 1.

IV-4. Agriculture and Increase in Stock

It was already mentioned in an earlier section that the short cycle of two to three years was probably due to the stock investment. In this section, we examine agricultural sector or increase in stock which explains better the short cycle. Figure 14 shows the contributions of the non-agricultural sector and non-stock items which is defined as the GDE growth rate minus the contribution of increase in stock. From this figure it is clear that the non-stock contribution still shows a short cycle while non-agricultural contribution shows a smoother curve. Thus in the case of Thailand we may conclude that the short cycle is better explained by the agricultural sector.

Figure 14

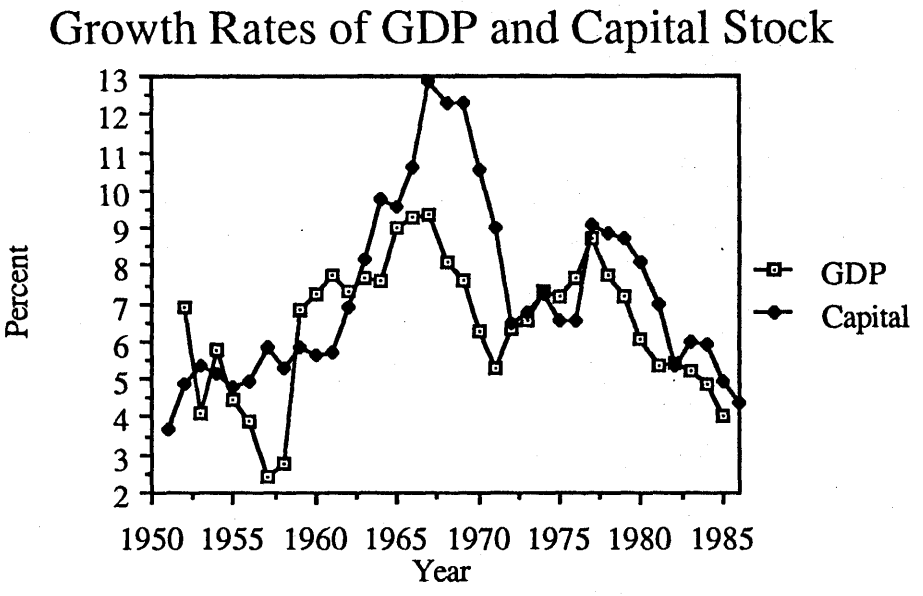


Source) Appendix Table 1
Note) At 1972 Constant Prices

V. PRODUCTIVITY

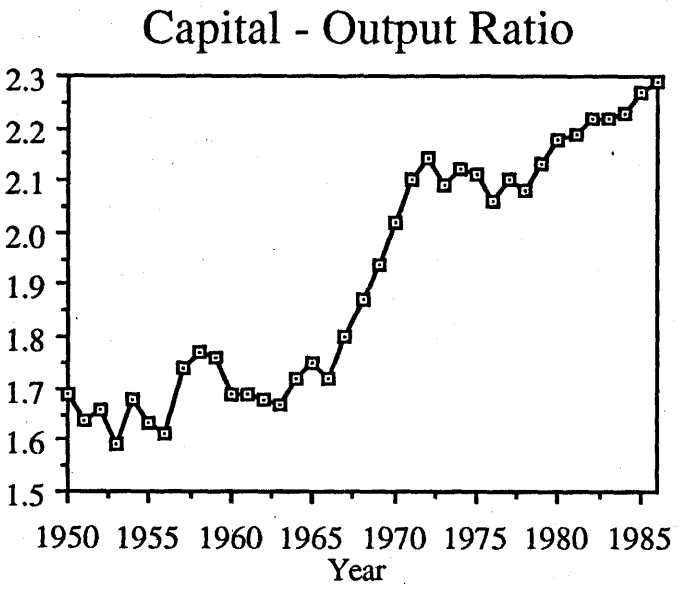
It is necessary to consider data such as GDP, labor and capital inputs in trying to estimate the total factor productivity growth (TFPG). Data on labor input is available from the National Economic and Social Development Board (NESDB). The data on capital stock is estimated by the series of investment. The methodology is as follows; first we estimate the capital stock in 1950, assuming that the capital-output ratio in the year is the same as the average marginal capital-output ratios throughout the year. Using this capital stock estimate, a series since 1950 is estimated using the perpetual inventory method. The growth rate of the capital stock and the GDP is shown in Figure 15. This figure shows that the capital stock growth rate is much higher than that of the GDP in the 1960's but has since been reduced to the same GDP level. This means that capital-output ratio increased rapidly in the 1960s, as can be seen in Figure 16.

Figure 15



Source) Appendix Table 1 and the author's estimate
Note) At 1972 Constant prices

Figure 16



Source) Appendix Table 1 and the author's estimate
Note) At 1972 Constant prices

In the latter half of the 1960's the ratio increased from 1.7 in 1966 to 2.1 in 1971. Before 1966 and after 1971 the ratio remained relatively stable. Table 8 shows capital-output ratio, labor productivity and capital-labor ratio. Labor productivity in the agricultural sector doubled from 2.34 in 1950 to 4.89 in 1986, while that of the manufacturing sector almost tripled from 13.75 to 38.77 in the same period. This means the productivity gap between the agricultural sector and the manufacturing sector increased, from six times in 1950 to about eight times higher in the manufacturing sector. In the other sector the labor productivity remained stable until the 1970's and then decreased but was still more than two times as high as in the agricultural sector. Capital-labor ratio increased about five times from 7 in 1950 to 34 in 1986.

TABLE 8. CAPITAL STOCK AND LABOR FORCE

	1950	1955	1960	1965	1970	1975	1980	1985	1986
K/GDP	1.69	1.63	1.69	1.75	2.02	2.11	2.18	2.27	2.29
Labor Productivity (GDP/L)									
TOTAL	4.20	4.84	5.20	6.50	8.73	10.42	13.18	14.31	14.91
Agriculture	2.34	2.43	2.50	2.86	3.52	4.21	4.61	4.79	4.89
Manufacturing	13.75	16.66	17.70	24.40	32.81	35.59	42.28	39.75	38.77
Other	16.97	16.72	16.36	16.43	17.70	16.48	14.62	14.31	13.95
K/L	7.09	7.89	8.78	11.36	17.63	21.95	28.72	32.42	34.11

Source) GDP and Labor: NESDB
Capital stock: estimated by the auther. See text.

Based on data on GDP, Labor and capital inputs we can estimate the total factor productivity growth (TFPG), albeit a rough estimate without any adjustment of quality change of inputs. 3) The results are shown in Table 9. The percentage contribution of labor is about 20 percent except for the period of decelerating growth in 1953-57 and 1978-85. The percentage contributions of capital stock and TFPG show an indirect correlation.

While capital stock increases its contribution in the period of decelerating growth, TFPG increases its contribution in the period of accelerating growth. This phenomenon of TFPG is called " Verdoon's law" which indicates a positive relationship between rate of economic growth and FTPG.4)

In each business cycle phase, TFPG appears in a cycle. When this cyclical effect is eliminated, capital stock contribution is about 40 to 50 percent while TFPG is about 20 to 30 percent, as can be seen from the results of one cycle. The same results were noted by Ikemoto (1986). TFPG contributions were lower than those of Taiwan and Korea but showed a higher contribution of capital stock.

VI. INVESTMENT AND SAVING

In previous sections it is mentioned that the investment decreases in terms of relative share in GDP. Investment is an important factor in economic development in Thailand. This can be seen from the high percentage contribution of capital stock in GDP growth as illustrated in the previous section. This section provides further examination of investment and savings.

The share of GDCF in GDP at current prices is shown in Figure 17. In the 1950's the ratio was about 15 percent, increased to 25 percent in the 1970's and then fluctuated between the 21 to 26 percent. The figure also shows the ratio of current account deficit to GDP.

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3) The methodology is the same those discussed in Ikemoto, Y., "Technical Progress and Level of Technology in Asian Countries, 1970-80: A Translog Index Approach," Developing Economies, Vol.24, No.4, December 1986. In the present study the labor share in GDP is assumed 60 percent according to this study (1986).

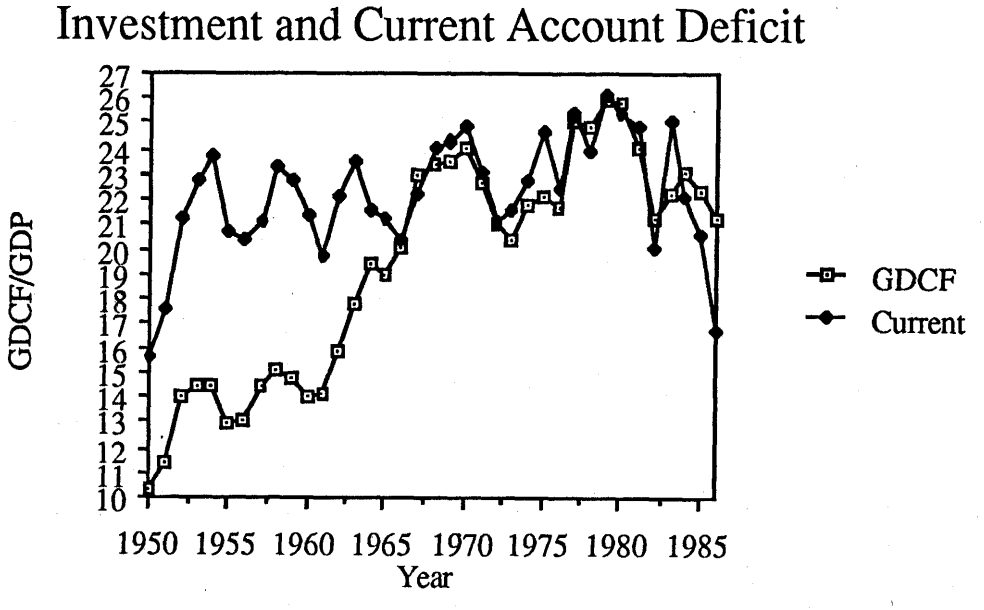
4) See Ikemoto (1986).

TABLE 9. TOTAL FACTOR PRODUCTIVITY GROWTH

	50-53	53-57	57-66	66-71	71-78	78-85	50-57	53-66	57-71	66-78	71-85
Growth Rate (%)											
GDP	6.8	2.8	7.6	7.1	7.5	5.3	4.5	6.1	7.4	7.3	6.4
Labor	2.5	2.9	2.8	2.4	2.6	3.1	2.7	2.8	2.7	2.5	2.8
Capital Stock	4.6	5.2	7.5	11.4	7.4	6.6	4.9	6.8	8.9	9.0	7.0
Contribution (%)											
GDP	6.8	2.8	7.6	7.1	7.5	5.3	4.5	6.1	7.4	7.3	6.4
Labor	1.5	1.8	1.7	1.5	1.6	1.9	1.7	1.7	1.6	1.5	1.7
Capital Stock	1.9	2.0	3.0	4.5	2.9	2.6	2.0	2.7	3.5	3.6	2.8
TFPG	3.4	-1.1	2.9	1.1	3.0	0.8	0.9	1.7	2.3	2.2	1.9
Percentage Contribution (%)											
GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Labor	22.1	63.9	22.7	20.6	21.2	35.7	36.9	28.5	22.0	21.0	27.2
Capital Stock	27.4	74.5	39.4	63.3	39.1	49.6	44.1	44.3	47.5	48.8	43.5
TFPG	50.5	-38.4	37.9	16.0	39.7	14.6	19.0	27.1	30.5	30.2	29.3

Source) See Table 8 and text.

Figure 17



Ingram (1971) mentioned that Thailand underwent a shift from an export-dominated economy to an investment-dominated economy.5) This means that the trade balance was attained automatically by export in the export-dominated economy. As Thailand moved to an investment-dominated economy this automatic mechanism does not apply.

Figure 17, however, shows that GDCF moves in the same direction as the current account deficit, even in the 1950s when export was still dominated. During the post war period the current account deficit changed in the same direction and in almost the same magnitude as GDCF. What is worthy to mention is that in the 1960's Thailand succeeded in increasing investment ratio, without aggravating the current account deficit caused by the increase in export.

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5) J. Ingram, Economic Change in Thailand, 1850-1970, Stanford University Press. Stanford 1971.

TABLE 10. INVESTMENT RATIO

	GFCF	CONSTRUCTION			EQUIPMENT		
		Total	Public	Private	Total	Public	Private
1950	8.9	6.1	2.0	4.1	2.8	0.8	2.0
1955	13.7	8.6	3.7	4.9	5.1	0.7	4.3
1960	15.4	8.7	2.6	6.1	6.6	1.3	5.3
1965	21.7	10.3	4.0	6.3	11.4	2.7	8.7
1970	26.6	11.7	5.3	6.4	14.9	2.8	12.2
1975	20.8	8.3	3.1	5.2	12.5	1.6	11.0
1980	24.4	10.8	5.5	5.3	13.5	2.6	11.0
1981	23.3	10.2	5.5	4.7	13.1	2.4	10.6
1982	20.0	9.6	5.2	4.4	10.4	1.7	8.7
1983	20.9	9.8	4.9	4.9	11.1	2.0	9.1
1984	21.2	10.4	5.2	5.2	10.8	2.0	8.8
1985	19.8	10.1	5.3	4.8	9.7	2.3	7.4
1986	18.5	9.7	4.9	4.8	8.8	2.0	6.8

Source) Appendix Table 1
Note) Percentage shore in GDP.

Table 10 itemizes investment by percentage of GDP at 1972 constant prices. The investment ratio decreased from 25 percent in 1980 to 19.5 percent in 1986 by 5.5 percentage points. This decrease was mostly due to the decrease in private equipment investment which decreased from 11.3 percent to 7.2 percent by 4.1 percentage points in the same period. Though we cannot establish any clear relationship in this brief study, we should mention that during this period household savings decreased from 13.7 percent of GDP in 1980 to 8.8 percent in 1986. In addition, this period also saw a decrease of current account deficits which resulted in a surplus in 1986.

VII. CONCLUSION

This study presented an overview of the economic growth since 1950. This period was divided into six phases according the business cycle called Kuznets cycle. The periods are 1950-1953, 1953-1957, 1957- 1966, 1966-1971, 1971-1978 and 1978-1985. This cycle corresponds to the cycle of the non-agricultural sector and eliminates the effect of agricultural fluctuation. In Thailand the short cycle of two to three years is better explained by the agricultural sector rather than by inventory investment, as has been observed in developed countries. This non-agricultural cycle was caused by the investment, especially by equipment investment though the cycle of equipment investment is shorter than the Kuznets cycle. From the industrial side it is shown that this cycle is caused by the secondary sector. Since construction is an important sector, this partly corresponds to the findings of the expenditure side.

The analysis of total factor productivity growth (TFPG) shows that the contribution of capital stock and TFPG change in opposite directions according to business cycle phases. In the period of accelerating growth TFPG is larger and the contribution of capital stock is smaller than in the other period.

The investment and current account deficit in terms of share in GDP changes in the same direction and same magnitude to each other. However in the latter half of 1960s the investment ratio was increased without worsening the current account deficits. This is due to the increase in exports.

Though the investment ratio increased in the 1960s, it decreased significantly in the 1980s. This decrease is due to the decrease in private equipment investment. With regard to savings, this corresponds to the decrease in household savings and current account deficits or foreign savings. In this period the main objective of the government policy was to decrease the current account deficit which may be the cause of the decrease in investment ratio.

Appendix Table 1

GROSS DOMESTIC PRODUCT AT 1972 CONSTANT PRICES, (series 2) (millions of baht)

	PCE	GCE	GFCF	CON	CONPUB	CONPRI	EQUIP	EQPUB	EQPRI	#STOCK	TOTAL	EXPORT	IMPORT	GDE	S DIS.	GDP
1950	31034	3583	3791	2595	865	1730	1196	328	868	979	39987	3817	2322	40082	1617	42499
1951	12900	3526	4774	3007	1127	1880	1766	236	1530	1350	42550	4427	3164	43021	1603	45424
1952	35066	3840	6592	3881	1420	2453	2711	365	2346	342	45040	6510	7359	44991	1050	46041
1953	36897	4204	7279	4218	1024	2393	3062	342	2720	2304	50752	6440	7572	49620	2105	51813
1954	38600	4432	7534	4527	1722	2805	3007	467	2540	-129	50438	5950	7734	48654	2709	51363
1955	40391	4581	7604	4708	2047	2741	2815	414	2401	674	53250	7468	8094	52624	2931	55555
1956	42409	4771	8097	5024	1749	3275	3072	1270	1803	2010	57294	8527	8306	57515	1398	58913
1957	43974	4890	9338	5375	1913	3461	3963	621	3342	-2035	56166	9393	9194	56365	1391	57756
1958	45810	5219	10157	5744	2068	3676	4413	375	4038	-132	61054	7522	8902	59674	105	59779
1959	48606	5627	10425	6247	1866	4381	4179	720	3458	-500	64158	8102	9904	62356	1427	63783
1960	50583	6716	10772	6113	1845	4268	4659	833	3726	899	68970	9117	10494	67593	2546	70139
1961	53250	6985	11472	6553	1973	4580	4919	1193	3726	654	72369	10999	11001	72267	1569	73836
1962	56612	7642	13640	7406	2467	4939	6234	1637	4597	2015	79909	10944	13157	77696	2142	79838
1963	60439	8360	16245	8413	3190	5223	7832	1705	6047	3496	88540	11459	14787	85212	1332	86544
1964	64411	8862	19016	9412	3470	5933	10504	2209	8295	476	93665	14297	16545	91417	839	92256
1965	68924	9792	21648	10274	3996	6278	11375	2684	8691	1231	101596	15472	17050	99210	334	99544
1966	74988	10565	26455	11953	4677	7276	14502	3142	11360	3770	115770	18002	21020	112840	1152	111688
1967	80936	11380	32500	13910	6117	7793	18598	3220	15378	579	125403	20805	26594	119694	695	120389
1968	86307	13788	35405	14785	6101	8684	20620	4216	16404	1503	137003	21067	30002	127268	3330	130598
1969	91374	14986	39809	17032	7375	9657	22777	4463	18314	4366	150535	21258	33709	138084	2057	140941
1970	97978	16426	39951	17524	7955	9569	22427	4138	18289	3170	157525	22703	32573	147735	2357	150092
1971	103681	17542	39335	17222	8003	9139	22113	3738	18375	2636	163104	26196	31399	157901	-902	157089
1972	110254	17885	34607	16638	7093	8735	17969	3537	14432	-928	161018	31866	33040	159844	4727	164571
1973	119569	19653	37904	15603	6443	9240	22221	2540	19681	5313	182430	27000	39476	170042	10004	180046
1974	126207	19818	42140	14717	420	10419	27423	2570	24853	5616	193781	20632	37591	184822	5127	189949
1975	134447	21908	42141	16875	6283	10592	25536	3205	22331	7731	206497	20536	36815	190218	5308	203526
1976	146241	25032	45119	20171	9451	10720	24948	4092	20856	4407	220709	36647	39145	218301	2974	221275
1977	158455	27274	59032	24515	11330	13185	35317	5335	29982	4026	249500	41309	47399	243579	-6354	237225
1978	166856	31016	64104	28063	12461	15602	36121	6073	25248	794	268650	47068	50986	264732	-3634	261098
1979	177204	36864	69225	27067	11311	15556	41358	8409	32869	6784	290077	51412	60995	280494	-3588	276906
1980	185641	37352	71438	31761	16166	15595	40677	7543	32134	2858	297209	55337	60602	292024	870	292894
1981	191573	40595	72556	31007	17271	14616	40669	7579	33090	1870	306594	63992	59407	311009	188	311277
1982	196354	14850	64732	30965	16750	14207	33767	5579	28188	-265	306271	77336	52107	327900	-3867	324033
1983	212645	42767	71649	33602	16918	16764	37967	6894	31073	2274	329335	73316	65671	336980	6109	343169
1984	223241	44830	76937	37727	18067	18060	39210	7351	31859	2888	347096	82990	67426	363460	-1282	362178
1985	229757	46963	73990	37601	19662	18019	36309	8485	27824	3000	354510	90449	65002	379957	-6888	373069
1986e	235619	47688	71615	37064	19084	18580	33951	7588	26363	642	355564	100716	69205	386995	-200	386795

Appendix Table 1 (Cont)

GROSS DOMESTIC PRODUCT AT 1972 CONSTANT PRICES. (series 2) (millons of baht)

	GDP	AGR	MINING	MANU	CONST	ELE	TRANS	W SALE	BANK	DWELL	PUB AD	SERVICR
1950	42499	20031	645	5251	1073	35	1624	5553	259	1581	2351	4099
1951	45424	21246	636	5805	1274	48	1929	6399	271	1623	2226	3967
1952	46841	20508	662	6146	1607	50	2299	7364	325	1667	2169	4044
1953	51813	23407	714	6587	1757	59	2504	7866	420	1712	2233	4553
1954	51363	21137	751	6928	1895	85	2619	8280	529	1758	2389	4994
1955	55555	23486	817	6932	2024	115	3005	8881	786	1806	2508	5196
1956	58913	25383	865	7504	2145	128	3172	9215	801	1854	2594	5251
1957	57756	22344	925	7724	2333	129	3361	10194	871	1905	2652	5320
1958	59779	24318	723	7661	2549	153	3354	9809	924	1956	2748	5582
1959	63783	24846	838	8348	2770	186	3877	10527	1134	2009	2914	6332
1960	70139	28227	860	8389	3343	210	4827	11123	1306	2063	3168	6623
1961	73856	29135	930	9197	3514	284	4861	11926	1533	2121	3327	7028
1962	79838	31330	1068	10341	4018	330	5305	12478	1781	2185	3494	7508
1963	86544	34110	1142	11269	4439	337	5489	13722	1941	2243	3828	8024
1964	92256	34610	1332	12258	5109	417	6130	15270	2242	2314	3942	8632
1965	99544	35931	1692	14249	5688	532	6444	16220	2580	2391	4258	9559
1966	111688	40873	2009	15911	6908	707	6906	17868	3164	2483	4358	10501
1967	120389	39834	2235	17895	8212	921	7643	21166	3687	2587	4776	11433
1968	130598	43706	2465	19209	8591	1263	7859	22489	4249	2699	5445	12623
1969	140941	47018	2577	21805	8724	1365	8408	23817	4977	2842	5893	13515
1970	150092	48332	2555	23320	8705	1638	9195	26524	5806	3000	6476	14541
1971	157089	50537	2856	25203	7689	1879	9373	27189	6559	3106	6993	15705
1972	164571	49919	2886	27809	7168	2251	10514	29881	6922	3199	7178	16844
1973	180046	56237	2683	31423	7221	2626	11320	31396	7616	3313	7692	18519
1974	189949	56962	2918	34402	7459	2786	12109	34249	8944	3453	7866	18801
1975	203526	62081	2455	36829	8514	3181	13445	35774	9629	3555	8359	19704
1976	221275	65898	2906	42579	10022	3642	13366	38821	10208	3664	8893	21276
1977	237225	65537	3526	48123	11996	4144	14474	41213	11574	3833	9555	23260
1978	261098	72513	4104	52522	13583	4500	16205	43658	13443	4052	10166	26352
1979	276906	71408	4531	57840	14547	5178	17663	45497	15582	4289	11594	28777
1980	292894	72784	4780	60639	16576	5560	18811	48227	17419	4502	12423	31173
1981	311277	77701	4623	64489	15500	6330	20209	51103	19205	4723	13192	34202
1982	324033	78502	4431	67318	15097	6755	21715	52789	21396	4936	13833	37261
1983	343169	81449	4414	72252	15927	7348	23290	55076	24461	5178	14498	39276
1984	362178	84144	5415	76811	17680	8088	24605	57430	26994	5369	14106	41536
1985	373869	86839	6001	77425	17786	8910	25829	59120	27780	5597	14897	43685
1986e	386795	86215	6086	82612	17911	9527	27180	61406	28063	5814	15250	46731