Chapter 3

Preliminary Results

This chapter describes the elementary character of the data, which includes:

1. Histograms and numerical summaries of the data, enabling a crude comparison of economic indicators between Thailand and Malaysia.

2. Comparison the pattern of economic indicators.

3. Comparison the economic indicators between Thailand and Malaysia.

Histograms and Comparison based on Numerical Summaries

Figures 3.1 and 3.2 show histograms of the economic indicators for Thailand and Malaysia, based on monthly records over the 14 years 1983 to 1996 inclusive, i.e., for 168 months. The figures show the mean, standard deviation, minimum and maximum of each indicator. The following conclusions are evident:

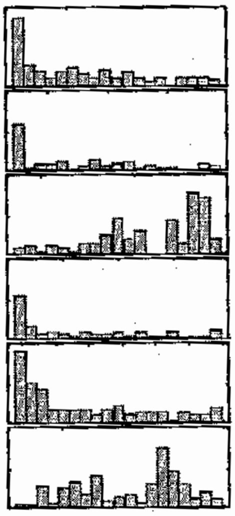
1. The minimum values for exports in Thailand and Malaysia were 1.38 to 2.27 billion US$ respectively. The corresponding maximum values were 15.35 and 20.40 billion US$, respectively. The averages (5.88 and 7.70 billion US$, respectively) indicated higher exports for Malaysia.

2. The minimum value of imports in Thailand as compared to Malaysia was 2.03 to 2.27 billion US$, respectively. The maximum values were 19.42 and 21.14 billion US$ for Thailand and Malaysia, respectively. So the average values of imports were 7.48 and 7.66 billion US$, respectively, indicating little difference between the two countries in the value of their imports.

3. After subtracting imports from exports, the minimum trade balance in Thailand as compared to Malaysia was –4.6 to –1.96 billion US$. The maximum values were –0.1 and 0.88 billion US$, respectively, and the averages were –1.6 and

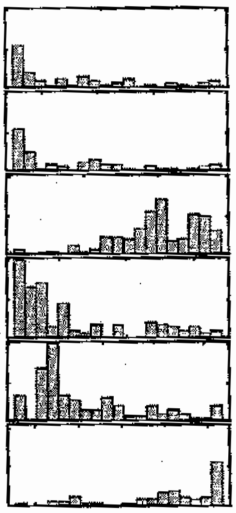
0.04 billion US$, respectively. Thus, Malaysia had a healthier trade balance than Thailand during the period.

Figure 3.1 Histograms & statistics, Thai economic indicators



col	variable	size	mean	st dev	min	max
1	Exports	168	5.883	4.138	1.38	15.35
2	Imports	168	7.483	5.227	2.03	19.42
3	Trade balance	168	-1.6	1.146	-4.6	-0.1
4	Int.reserves	168	12.986	11.745	1.31	38.49
5	Money supply	168	56.714	38.335	15.25	139.99
6	Econ.growth	168	7.14	1.598	3.5	10

Figure 3.2 Histogram & statistics, Malaysia economic indicators



col	variable	size	mean	st dev	min	max
1	Exports	168	7.699	5.373	2.27	20.4
2	Imports	168	7.664	5.617	2.27	21.14
3	Trade balance	168	0.036	0.548	-1.96	0.88
4	Int.reserves	168	11.52	8.885	3.16	34.24
5	Money supply	168	32.941	21.237	4.98	87.72
6	Econ.growth	168	6.304	2.409	-1	8.7

4. The maximum international reserves were 38.49 and 34.24 billion US$ for Thailand and Malaysia respectively. Also the minimum reserves were 1.31 and 3.16 billion US$. The average for Thailand (12.99 billion US$) was higher than that for

Malaysia (11.52 billion US$), but Thailand also had more variation in its reserves (11.74 compared to 8.88).

5. The minimum money supply in Thailand as compared to Malaysia was 15.25 to 4.98 billion US$, and the maximum was also higher (139.99 to 87.72 billion US$). The average minimum money supply for Thailand was 56.71 billion US$, compared to 32.94 billion US$ for Malaysia.

6. With respect to economic growth, in Thailand the minimum, maximum and average values were 3.50, 10.00 and 7.14%, respectively. In Malaysia, the equivalent statistics were –1.00, 8.70 and 6.30%, respectively. This comparison indicates that the economic growth rate was higher in Thailand than in Malaysia.

Comparison the Pattern of Economic Indicators

The character and pattern of economic indicators from Thailand and Malaysia over the 14 years from 1983 to 1996 are now described. The following graphs are presented in two formats. The first format shows monthly data for 1983 to 1996 inclusive. The second format shows the average value in each year. From observing these graphs to changes and differences in economic indicators between the two countries may be seen.

Figures 3.3 and 3.4 show the values of exports and imports from Thailand and Malaysia during the period from 1983 to 1996. From Figure 3.4 it may clearly be seen that, both in Thailand and in Malaysia, the trends in both exports and imports were generally increasing. However, in each case, the increase did not begin until 1986 (in Thailand) or 1987 (in Malaysia).

Furthermore, the levels of imports were always higher than the level of exports in Thailand (particularly after 1990). In contrast, in Malaysia imports and exports were closely tied together.

Figure 3.3 shows that there was a dip in the export and import levels after 1996. However, this decrease is smoothed out by the yearly averages shown in Figure 3.4.

Figures 3.5 and 3.6 show the trade balance, that is, the difference between the values of exports and imports. If exports exceed imports, then the balance of trade is in a surplus position. When imports exceed exports, a deficit occurs in the balance of trade.

Figure 3.6 shows that the trade balance in Thailand was in deficit, and the trend was increasing. Thailand never reached a trade surplus. Its trade deficit reached 4 billion US$ in 1996. This deficit situation contrasted with Malaysia, which recorded a trade surplus for some years. The graph clearly shows that the trade balance line in Malaysia was above that of Thailand.

Figures 3.7 and 3.8 show that the international reserves for Thailand in the period from 1983 to 1988 were less than for Malaysia. Until 1990, the international reserves of Thailand were markedly higher than Malaysia's, with the gap widening. During this period, the international reserves of Thailand increased geometrically, whereas Malaysia stagnated. However, after 1994 the international reserves in Malaysia fluctuated dramatically, first decreasing, then rising rapidly above the level for Thailand's curve, and finally falling behind.

Figures 3.9 and 3.10 show the money supply in the two countries. These graphs demonstrate that in the first two years, the money supply in both countries was similar. In later years, the money supply in Thailand was clearly more than in Malaysia. However, the trend of money supply in two countries increased substantially during the period of study.

Figures 3.11 and 3.12 show the economic growth rate in Thailand and Malaysia. The economic growth rates in Malaysia were higher than Thailand in 1984. However, after 1985 the economic growth rate in Malaysia fluctuated dramatically, first increasing then dropping rapidly below the level for Thailand's curve. In 1995 the growth rate in Malaysia were constant, while in Thailand the rate was small growth in the same year.

Figure 3.3 The value of exports and imports for each month

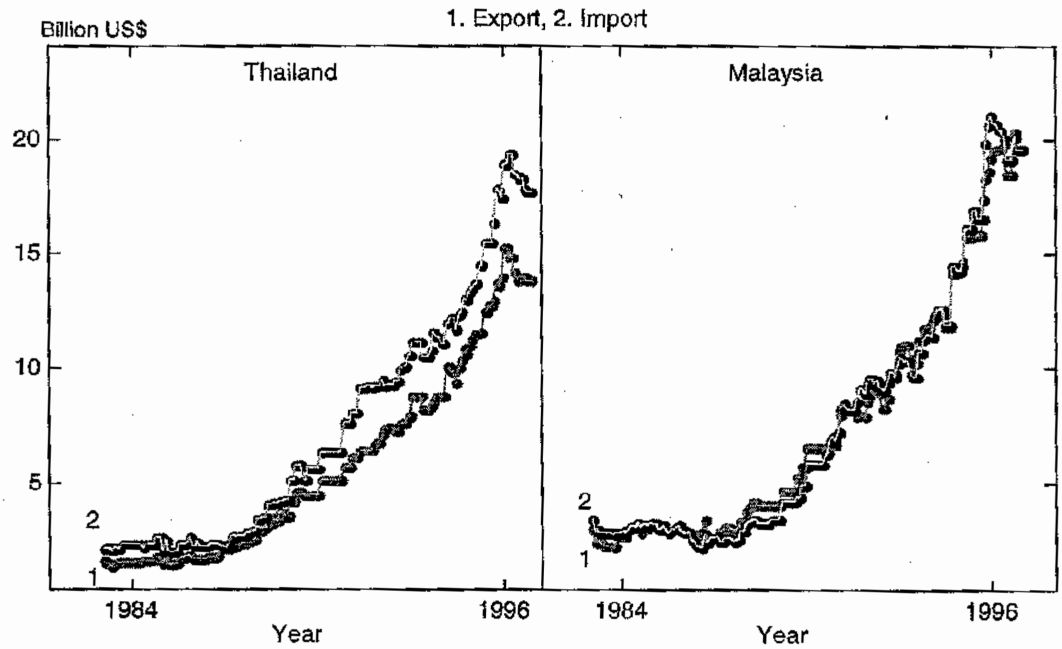


Figure 3.4 The average values of exports and imports for each year

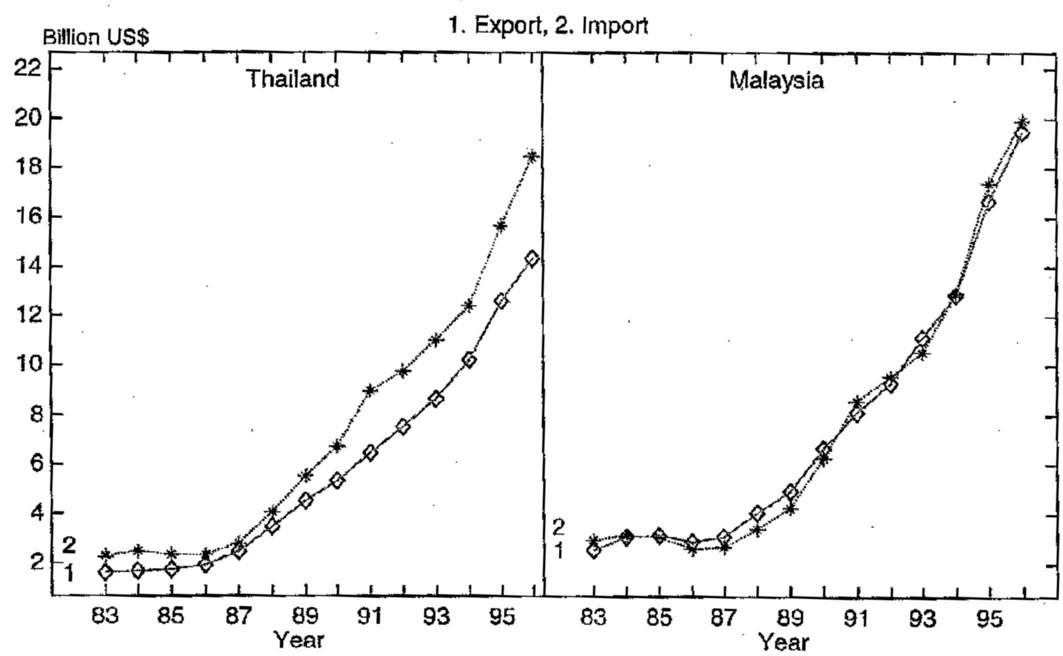


Figure 3.5 Trade balance, monthly data

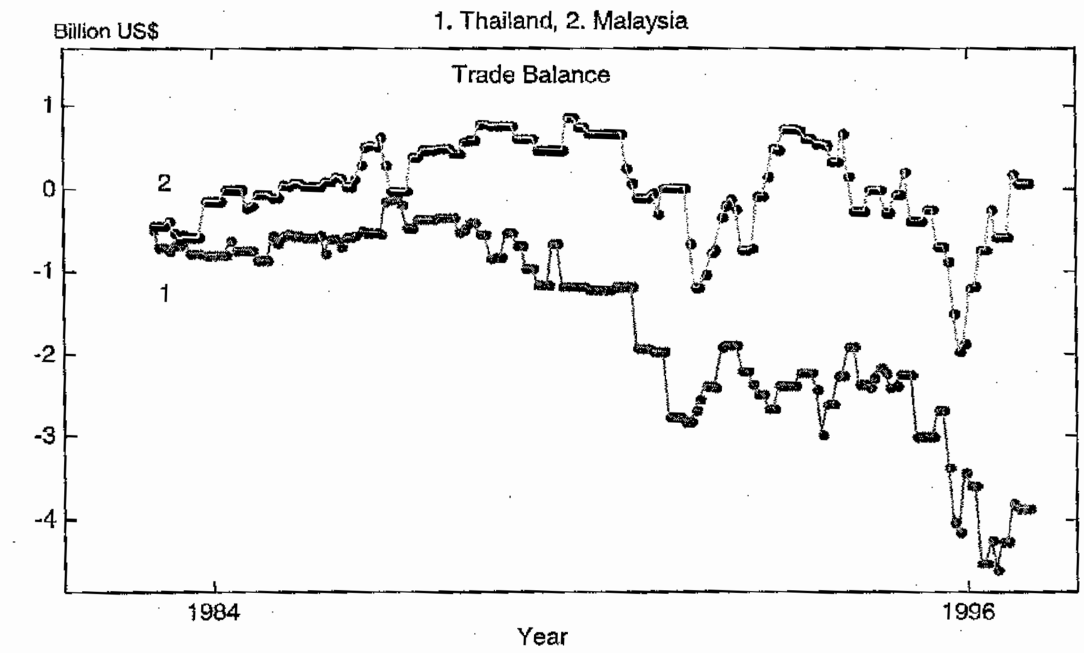


Figure 3.6 Trade balance, yearly averages

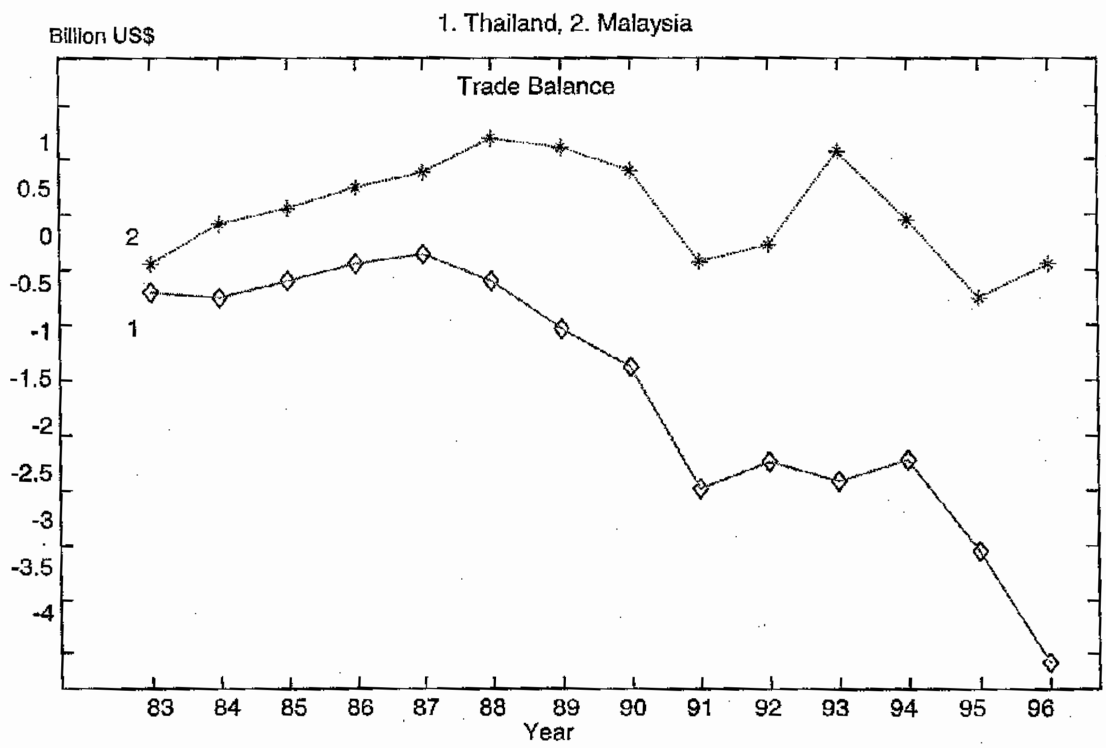


Figure 3.7 International reserves, monthly data

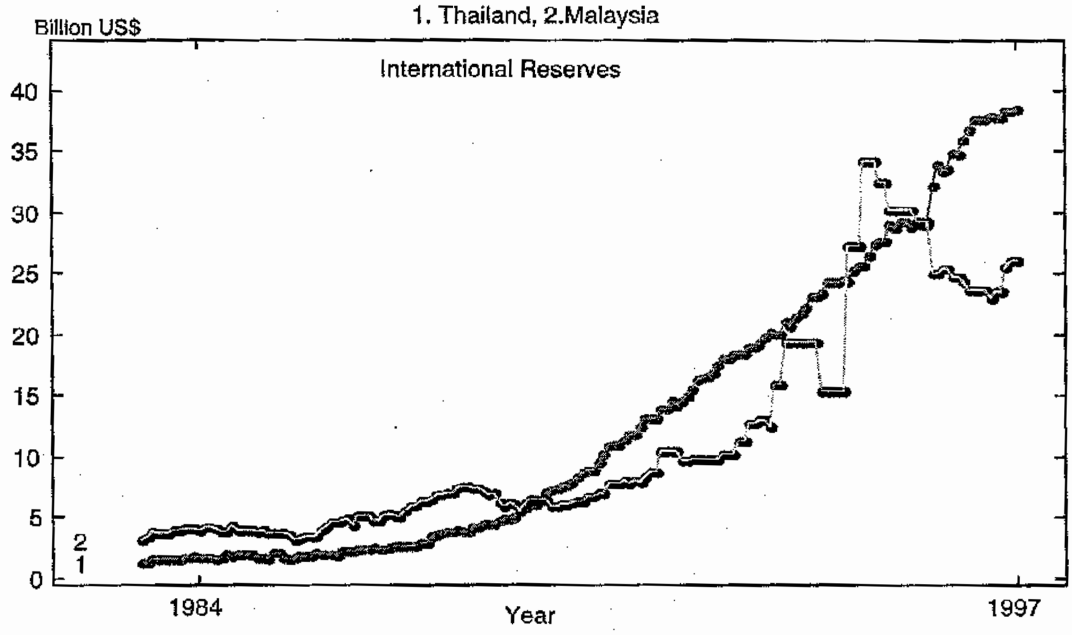


Figure 3.8 International reserves, yearly averages

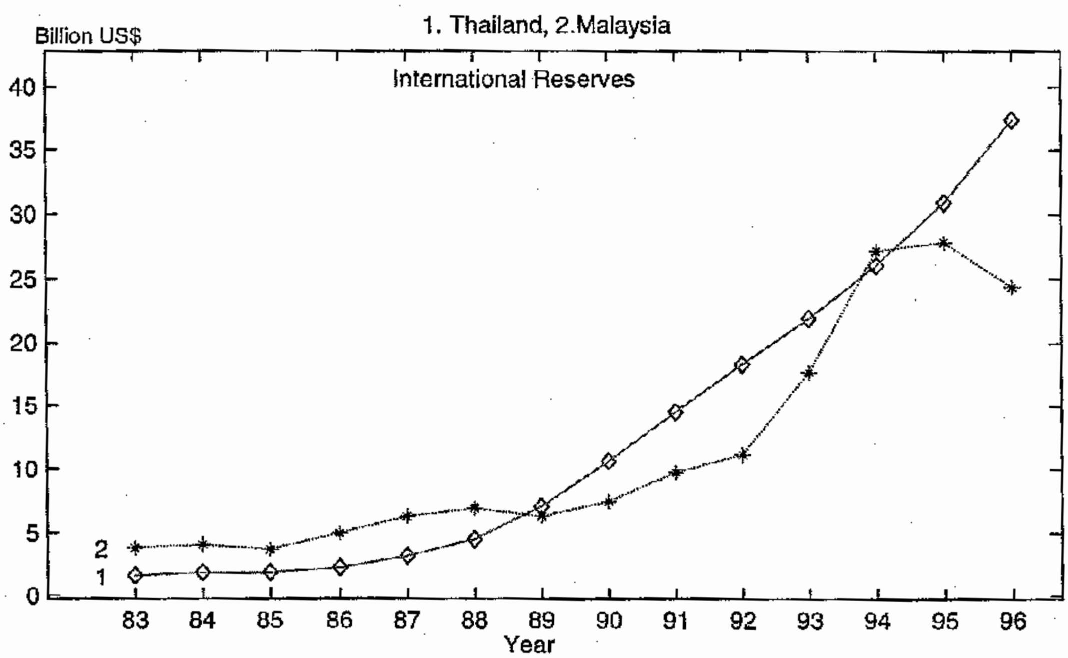


Figure 3.9 Money supply, monthly data

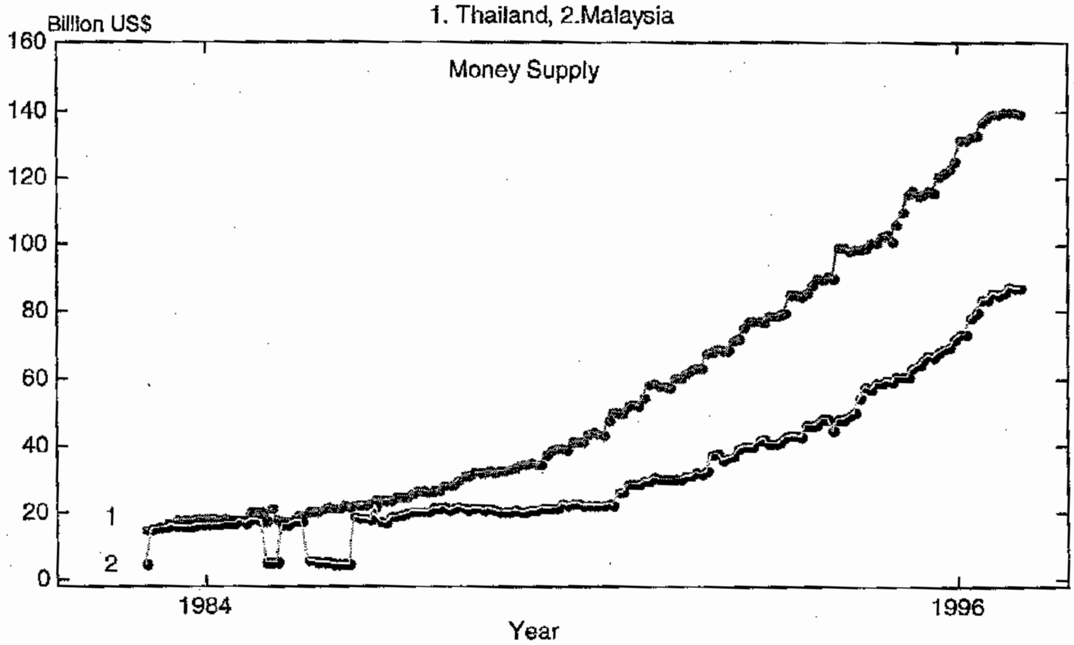


Figure 3.10 Money supply, yearly averages

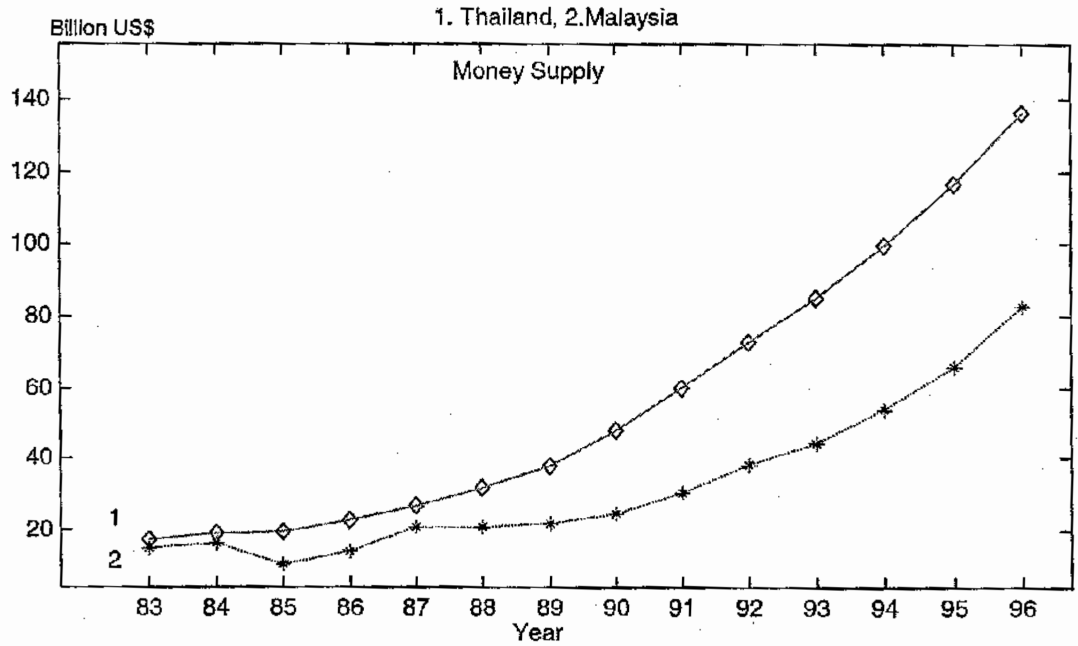


Figure 3.11 Economic growth, monthly data

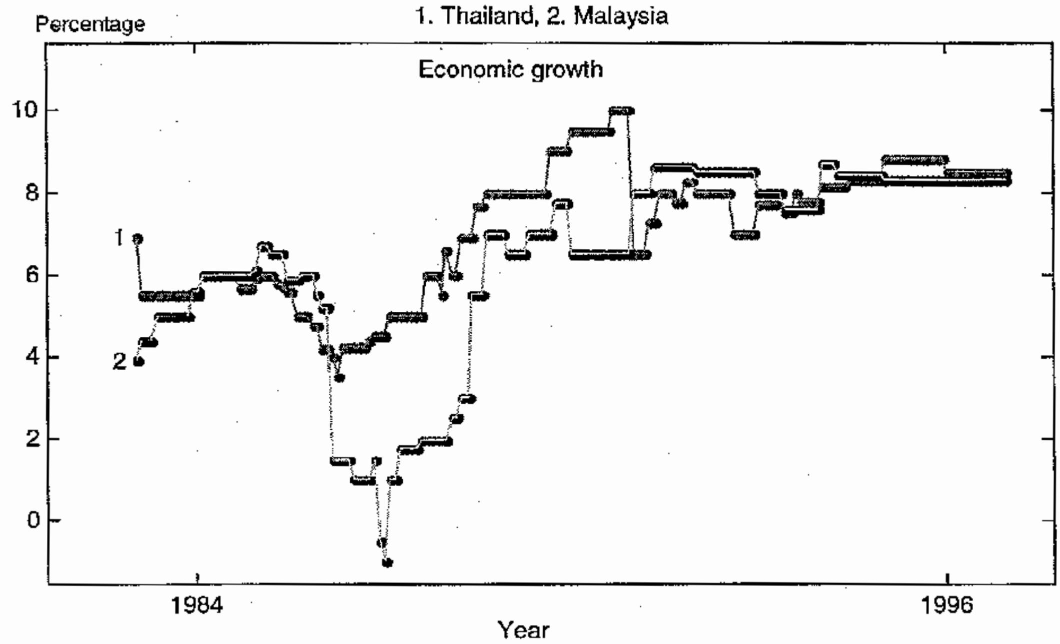
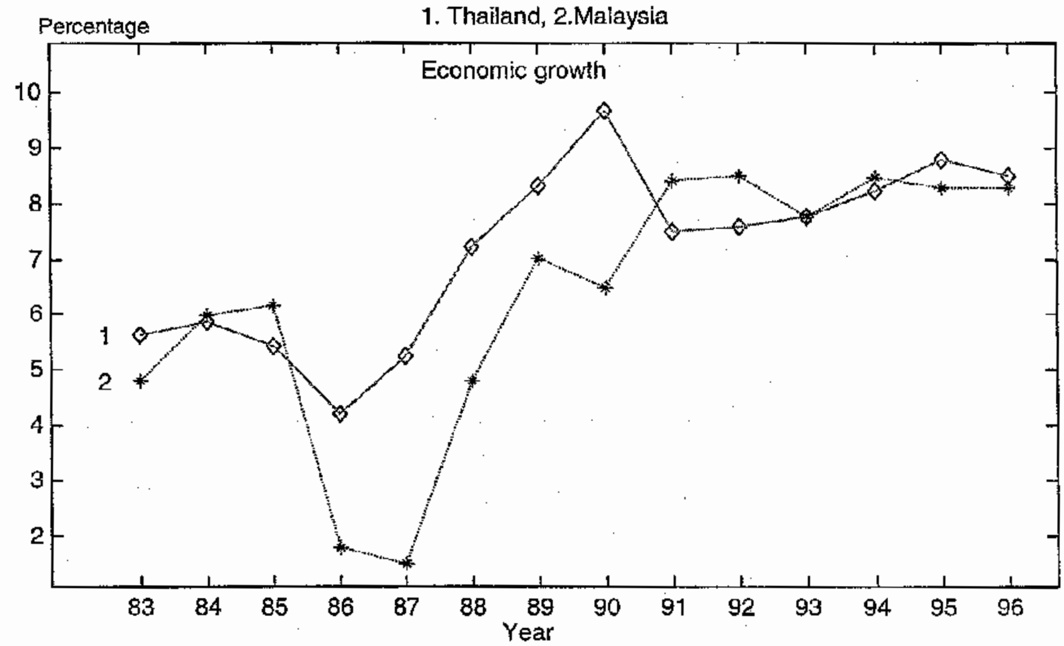


Figure 3.12 Economic growth, yearly averages

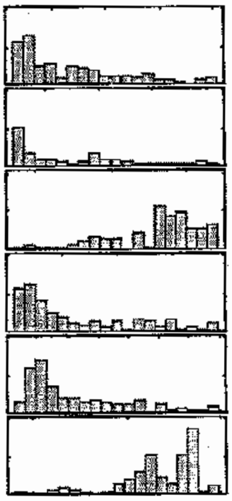


From the preliminary data, we can see the character and trend in economic indicators from both countries had similar patterns. Some differences were noted. The differences will be discussed in Chapter 4.

Comparison the Economic Indicators between Thailand and Malaysia

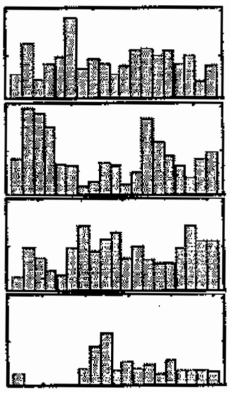
The following figure shows summaries of the raw data. The data are skewed, so there is an advantage in transforming these data to remove or reduce skewness. Histograms show that the raw data have a skewed distribution, the economic growth and trade balance are skewed to the left while the international reserves, money supply, exports, and imports are skewed to the right.

Figure 3.13 Histograms & statistics of economic indicators from Thailand and Malaysia



col	variable	size	mean	st dev	min	max
1	Export	336	6.791	4.874	1.38	20.4
2	Import	336	7.573	5.418	2.03	21.14
3	Trade balance	336	-0.782	1.214	-4.6	0.88
4	Int.reserves	336	12.253	10.424	1.31	38.49
5	Money supply	336	44.827	33.153	4.98	139.99
6	Econ.growth	336	6.722	2.084	-1	10

Figure 3.14 Histograms & statistics of transformed data using logarithms



1	log2(exports)	336	2.384	1.073	0.465	4.35
2	log2(imports)	336	2.545	1.053	1.021	4.402
3	log2(int.res)	336	3.035	1.358	0.39	5.266
4	log2(mon.spy)	336	5.111	1.065	2.316	7.129

Figure 3.14 shows the results after transforming the data. For the international reserves, money supply, exports, and imports, taking logarithms effectively removes the skewness. Afterwards, the two-sample t-test was used to analyse to test the hypothesis that the means are the same in each case.

Figure 3.15 Box plots and 95% confidence intervals of economic indicators

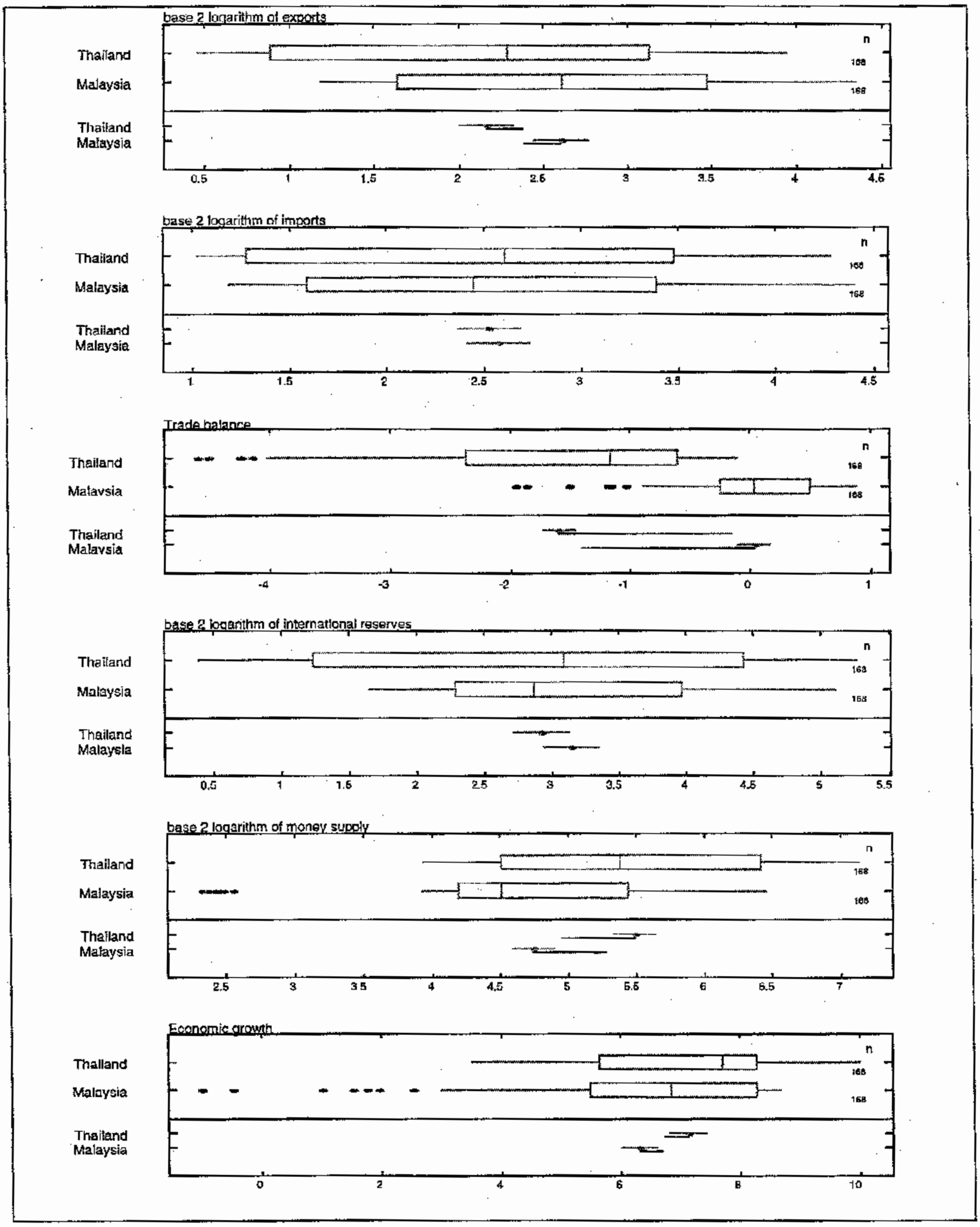


Figure 3.15 shows box plots of the data, together with 95% confidence intervals for means. The figure shows that the means of international reserves in Thailand were slightly higher than in Malaysia, and the same was true for imports. The means of both money supply and economic growth in Thailand were markedly higher than in Malaysia. However, the exports in Thailand were less than Malaysia, so the trade balance in Thailand was clearly in trade deficit more than Malaysia, because the means of the imports in Thailand were more than the mean exports. The 95% confidence intervals shown when the confidence intervals overlap means that there are no statistically significant differences in population means. In Figure 3.17 shows the imports and international reserves were not different in Thailand and Malaysia, because the confidence intervals overlap. But there were differences in exports, trade balance, money supply and economic growth in Thailand and Malaysia, because the confidence intervals did not overlap.

The results were confirmed by p-values, from the two-sample t-statistic for testing the null hypothesis that the population means are equal. Table 3.1 shows p-values. There are statistically significant differences in exports, trade balances, money supply, and economic growth between Thailand and Malaysia. However, there are no statistically significant differences in imports and international reserves in the two countries. The p-values support the result given by the 95% confidence intervals.

Table 3.1 Two-sample t-statistics and p-values for the economic indicators

Economic indicators	Two-sample t-statistic	P-value
log2(Exports)	3.8463	0.00014
log2(Imports)	0.4102	0.68
Trade Balance	16.68	0
log2(International Reserves)	1.5	0.13
log2(Money Supply)	6.903	0
Economic Growth	3.75	0.00021