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Long-Run Trade Competitiveness and Exchange Rate Misalignments in ASEAN-5

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Abstract: After the Asian Financial crisis of 1997/98, ASEAN-5 (Indonesia, Malaysia, the Philippines, Singapore and Thailand) strongly promoted export-led policies to revive their economies. This paper attempts to compare the long-run trade (exports) competitiveness of the ASEAN-5 economies and to measure how much of the long-run trade competitiveness has been transferred into domestic growth. The study further evaluate the exchange rate policies of the ASEAN-5 countries by examining the exchange rate misalignments. Overall, these findings suggest that Singapore has the smallest amount of misalignment and is ranked as the most competitive country. This would imply that "prudent control" of the exchange rate is ideal for achieving a stable trading environment, allowing for transfer of wealth from trading (exporting) into domestic growth.

Keywords: ASEAN-5, long-run trade, exchange rate, trade competitiveness, growth promotion, misalignments.

1. Introduction

After the Asian Financial crisis of 1997/98, ASEAN-5 (Indonesia, Malaysia, the Philippines, Singapore and Thailand) strongly promoted export-led policies to revive their economies. However, a major concern of the ASEAN member countries is related to trade competitiveness, with the possible negative impact on member exports in third markets, due to fiercer intense competition from China (see Wilson & Robinson 2003). (China is the sixth largest trading partner of ASEAN while ASEAN is China's fifth biggest trading partner. ASEAN-China trade totaled USD41.6 billion in 2001).

This paper attempts to compare the long run trade (exports) competitiveness of the ASEAN-5 economies during the pre- and post-Asian Financial crisis so as to be able to rate some degree of competitiveness of each country. More importantly, this study would like to measure how much of trade (exports) competitiveness has been 'transferred' into domestic growth. The study further evaluated the relationship between growth and the exchange rate rule of each member country by estimating the amount of misalignment. The larger the misalignment or extreme shocks of the exchange rate rule, the larger will be the loss, transferred in terms of economic growth.

The rest of the paper is organised as follows. Section 2 evaluates the ASEAN-5 exports competitiveness. Section 3 gives the model of trade competitiveness and growth promotion. Section 4 examines the state of the economy, that is, how much of the trade competitiveness of each economy could have contributed to output growth, as measured by the real gross

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domestic product (RGDP). Section 5 tests for the amount of exchange rate misalignment, and Section 6 concludes the study.

2. Trade Competitiveness in ASEAN-5

The exchange rate or the price of a foreign currency has attracted many studies over the years. For example, assessing the real exchange rate dynamics is equivalent to exploring the competitiveness of a country. Other measures have not emerged to measure a country's competitiveness. Price deflated real exchange rates are also a standard measure of competitiveness (Edwards 1989). However, most countries have many trading partners. Thus, a better indicator is to calculate the real effective exchange rate (reer). *Reer* is the exchange rate of a country's currency measured by reference to a weighted average of the exchange rates of the currencies of the country's trading partners deflated by prices. The weights are chosen to correspond to the relative importance of each trading partner in the country's domestic markets as well as in the overseas markets.

The real effective exchange rate (reer) for Malaysia is calculated as

$$reer(M,t) = exp\{\ln P(M,t) - \ln E(M,t) - \Sigma\omega_i \ln P(i,t) + \Sigma\omega_i \ln E(i,t)\} \qquad (3.1)$$

where M stands for Malaysia, and the exchange rate terms are in units of RM or i currency per USD in index form (1990 = 100). P is the consumer price index of country M or i in index form. The weights ω_i are changing trade weights for the top ten trading partners. These major trading partner countries are chosen to correspond to the relative importance of trade weights of each ASEAN-5 countries as follows:

Countries	10 Top Trading Partners
Indonesia	US, Singapore, Japan, Hong Kong, Netherlands, Korea, Germany, China Mainland, Malaysia and Australia.
Malaysia	US, Singapore, Japan, Hong Kong, Netherlands, Thailand, United Kingdom, Korea, Germany, and China Mainland.
Singapore	US, Japan, Hong Kong, Netherlands Thailand, United Kingdom, Korea, Germany, China Mainland and Malaysia.
Thailand	US, Singapore, Japan, Hong Kong, Netherlands, United Kingdom, Germany, China Mainland, Malaysia and Australia.
Philippines	US, Singapore, Japan, Hong Kong, Netherlands, Thailand, United Kingdom, Korea, Germany, and Malaysia.

The nominal effective exchange rate (*neer*) weighted exports is also calculated as an index of the exported weighted effective exchange rate (1990 = 100). The period average exchange rates are in units of domestic currency per dollar. The calculation of the nominal effective exchange rate is represented by the number of units of domestic currency per unit of foreign currency and is given below.

$$neer = \frac{a_1 E_{1t} + ... + a_n E_{nt}}{a_1 E_{1o} + ... + a_n E_{no}} \quad \frac{\sum \frac{a_i}{E_{(i/US)t}} \frac{1}{E_{(RM/US)t}}}{\sum \frac{a_i}{E_{(i/US)O}} \frac{1}{E_{(RM/US)O}}} \times 100 \quad \frac{I_{E(RM/US)}}{\sum \omega_i I_{E(i/US)}} \times 100 \qquad (3.2)$$

where a represents weights or the fraction of Malaysian trade with country 1 is a_1, country 2 is a_2, etc. o is base year and t is current year. E_1 is the number of RM per unit of the currency of country 1 with E_2 being the number of RM per unit of the currency of country 2 etc.

Figure 1 plots the nominal effective exchange rates (*neer*) trade/exports weighted and the real effective exchange rates (*reer*) based on relative prices of ASEAN-5. These two calculated series, *neer* and *reer*, are based on equations (3.1) and (3.2), and are compared with the available series published in the International Financial Statistics (IFS, various issues) yearbook, namely *neeri* and reeri respectively. The trends of the nominal and real effective exchange rates are very similar. *Neer* and *reer* data for Indonesia and Thailand are not made available by the IFS.

This section reviews a short history of the exchange rate regimes in ASEAN-5, that is the Indonesian Rupiah, the Malaysian Ringgit, the Philippines Peso, the Singaporean Dollar, and the Thai Baht. The Bank Indonesia (BI) administers all foreign exchange and trade controls (see also Aghevli 1981). In August 1997, the managed floating exchange regime was replaced by a free-floating exchange rate arrangement, and this arrangement has been in force since then. The Bank Negara Malaysia (Central Bank of Malaysia) administers exchange controls with authority delegated to the authorised banks. Since the 1997/1998 Asian Financial Crisis, the exchange rate of the Ringgit per US Dollar is no longer determined by demand and supply in foreign exchange markets (managed floating), as Malaysia has returned to a fixed exchange rate system, with the USD pegged at a rate of RM3.80 per USD. The Central Bank of the Philippines, the Bangko Sentral Pilipinas (BSP) administers the foreign exchange controls with multiple pegs, and since the crisis, the Philippines has maintained a floating exchange rate regime. Singapore has always allowed its currency to float, monitored by the Monetary Authority of Singapore (MAS), which retains responsibility for exchange control matters in Singapore. The present exchange regime of Singapore may be classified as a Monitoring Band. The MAS monitors the Singapore dollar against an undisclosed basket of currencies of Singapore's major trading partners and competitors. The central parity is determined on the basis of countries that are the main sources of imported inflation and competition in export markets. There is an undisclosed target band around the computed central parity. Both the central parity and the bandwidth are periodically reviewed to ensure that they are always "consistent with economic fundamentals and market conditions". The Thailand exchange control is administered by the Bank of Thailand (BOT), which has adopted a managed floating exchange rate regime since 2 July 1997, with the value of the Baht being determined by market forces. Before the crisis, Thailand had a controlled floating rate arrangement. Below is a brief summary of the exchange rate regimes.

The real exchange rate (*rer*) is one of the key relative prices in that economy that partly determines its competitiveness. In a study by Bayoumi (1996), the real exchange rate and output elasticities for countries in the APEC region were estimated. Table 2 gives a summary of their findings.

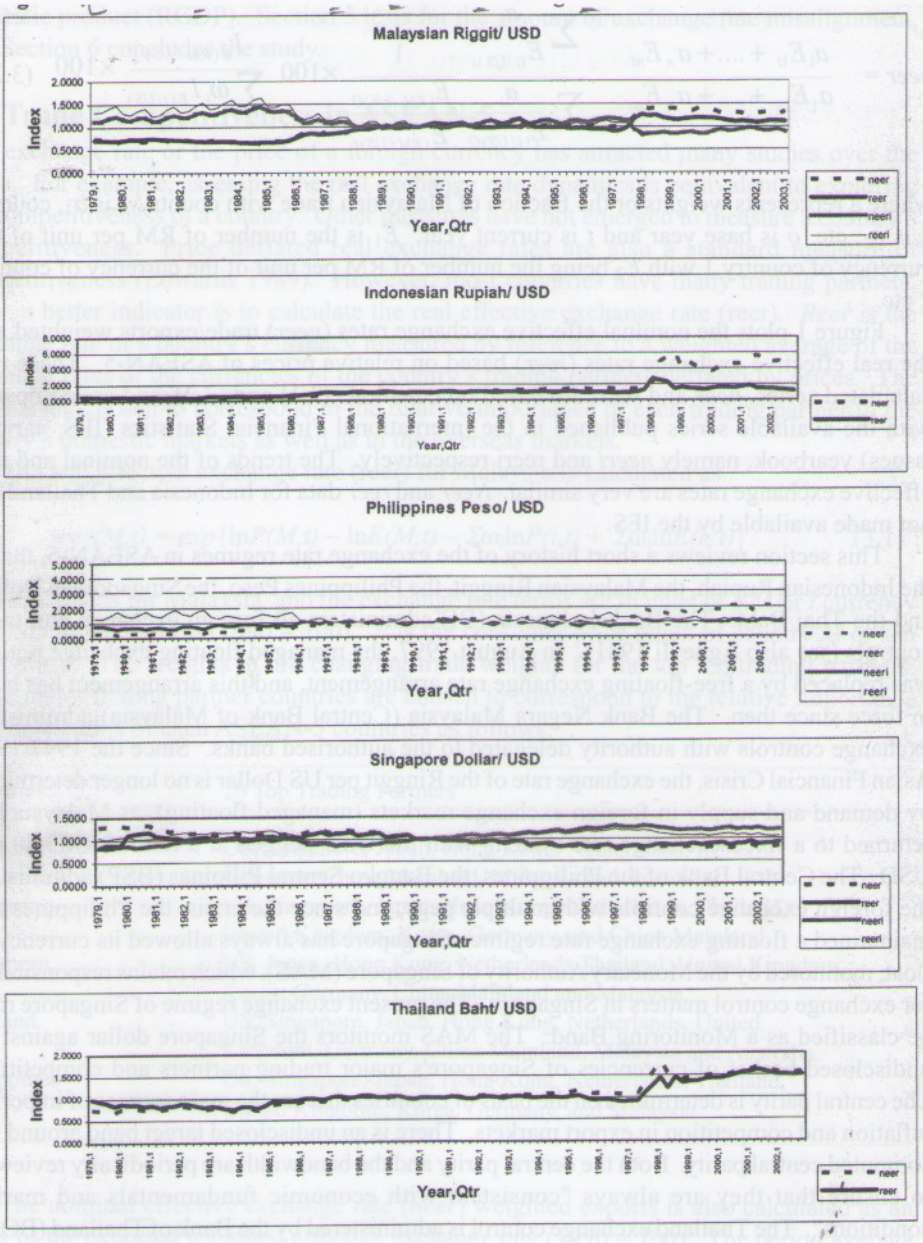


Figure 1. Nominal effective and real effective exchange rates of ASEAN-5

Table 1. Summary of the exchange rate regimes in ASEAN-5

	1979 - 1997/98	Post 1997/98
Indonesia	Managed floating	Free-floating
Malaysia	Managed floating	Pegging to USD
Philippines	Multiple guided rate	Floating rate
Singapore	Monitoring band	Monitoring band
Thailand	Controlled floating rate	Managed-float (pegged to a weighted basket of currencies)

Table 2. Impact of output and real exchange rate on exports

	Long-run elasticities		Short-run elasticities	
	Output	*rer*	Output	*rer*
Indonesia	1.27	0.32	1.03	0.16
Malaysia	1.86**	0.53	2.14	0.06
Philippines	1.34**	–0.10	2.15	–0.06
Singapore	1.77**	0.21	3.52**	–0.52
Thailand	2.73**	0.99	3.28*	0.09

Notes: * Singnificant at 5 per cent
** Significant at 1 per cent
Source: Bayoumi (1996)

The data used were quarterly from 1992 – 2001. The long-run elasticity model is defined as

$$\ln X_t = \alpha + \beta_1 \ln(rer)_t + \beta_2 \ln y^f_t + \varepsilon_t,$$

where X is real exports, *rer* is real exchange rate and y^f is partner-country GDP. The coefficients of β_1 and β_2 represent initial estimates of the long-run elasticities with respect to the real exchange rate and output.

The short-run response model is

$$\Delta \ln X_t = \alpha + \delta_1 \Delta \ln(rer)_t + \delta_2 \Delta \ln y^f_t + \delta_3 \varepsilon_{t-1} + \varepsilon_t$$

The coefficients of δ_1, and δ_2, are the short-run responses with respect to the real exchange rate and economic activity, and δ_3 is the error-correction term which specifies the speed at which the system tends to the long-run equilibrium.

The long-run coefficients with respect to output were significant for all member countries except for Indonesia. But the short-run responses are only significant for Singapore and Thailand. However, the regressions with respect to the real exchange rate effect both for short-run and long-run were not significant. These results seem to show that real exchange rates effects do not have impact on export volumes.

Based on the long-run elasticities of exports with respect to output, a relative ranking was formed with the most response to the least response. Thailand ranked the highest. This implies that Thailand has effectively transferred production to exports and/or probably vice-versa. Indonesia fared the worst. Malaysia is ranked second, followed by Singapore and the Philippines.

Response of Output to Exports (1992:Q1-2001:Q4)

Thailand Malaysia Singapore Philippines Indonesia

(Note: → (From most response to least)

3. The Model

Figure 2 gives a simple policy space for the state of the economy. The state can be divided into four quadrants to compare the degree of competitiveness viz-a-viz an expansionary/ contractionary monetary policy. The *x*-axis denotes the plane for competitiveness and is measured by the real effective exchange rate (*reer*). The *y*-axis is the plane measuring an expansionary monetary policy and is the interest rate difference (the nominal interbank rates (i) are used).

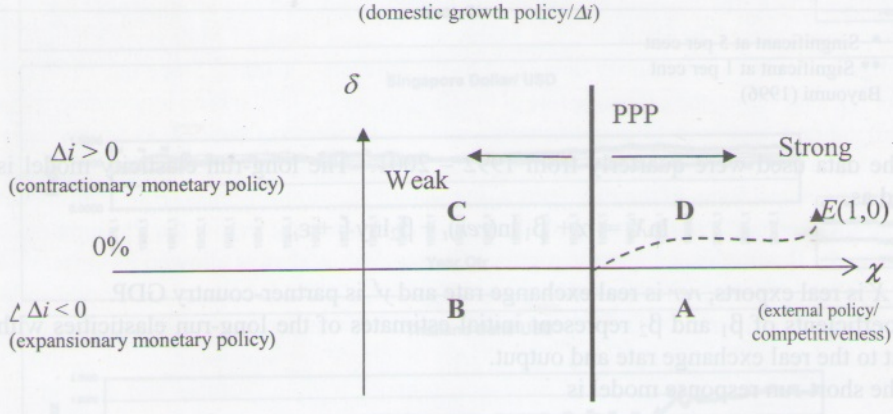


Figure 2. Policy space for the state of an economy

x-axis

The PPP line or parity line (purchasing power parity) is assumed to be the best equilibrium line for a long-run theory of exchange rate determination. In order to enhance competitiveness gain, the exchange rate is to be depreciated. As the exchange rate experiences appreciation, it is transferred into a loss of competitiveness.

y-axis

The first difference in the interbank rate is assumed to reflect the stance of the central bank in monetary policy. An expansionary policy for promoting growth corresponds to $\Delta i < 0$, and $\Delta i > 0$ reflects a contractionary monetary policy.

For example, an economy that has a tendency to position itself at point A is said to be strongly competitive, and is also not growth-oriented in its domestic policy. However, an economy at point B is inferred as weakly competitive, but has a domestic growth-oriented policy.

4. Measuring the State of the Economy

The success of an economy is generally attributed to sound economic management. Policy management of the economy is directly related to how demand-side management policies, like the response of monetary policy responds to external disturbances, or prevents undervaluation/overvaluation of the real exchange rates. Table 3 gives a contingency table, defining the relationships between competitiveness and output growth for the ASEAN-5. It shows the extent of the adjustment in competitiveness in order to accommodate external shocks during the pre-crisis and post-crisis periods. The four spaces are determined by the PPP line and the stance of monetary of policy. The period of study is divided into three windows of time-frame: 1979:Q1-2002:Q4, 1979:Q1-1996:Q4 and 1997Q1-2002:Q4. It is assumed that the null hypothesis, that is, the probabilities for each outcome are independent of the treatment.

In the overall sample, the competitive stance of the ASEAN countries in the 'less than the PPP line', was as follows: 53 per cent for Indonesia, 67 per cent for Malaysia, 75 per cent for the Philippines, 58 per cent for Singapore, and 48 per cent for Thailand were in the weaker region of competitiveness. The findings show that 52 per cent of Thailand's external policy seems on average to reflect a stronger competitive stance.

In the pre-crisis period, the competitive stance of the four ASEAN countries except Singapore, remained weakly-oriented. Singapore was the only country in the strongly competitive region. Malaysia had the highest percent of being least competitive or rather 'over-appreciated on average (87%) in its *reer.*

In the post-crisis period, the competitive stance of the five ASEAN members changed. Singapore, the most competitive nation in the pre-crisis, became the least competitive (100%). Singapore seems to have priced itself out of the trading game. Thailand and Indonesia came in as being equally competitive at 92 per cent on average, with Malaysia being competitive at 88 per cent on average. The Philippines' competitive stance remained unchanged, i.e. residing in the weak competitive quadrant, with 63 per cent on average.

In terms of output growth in the full sample period, only Indonesia and Malaysia did not adopt an output growth oriented policy. The Philippines, Singapore and Thailand promoted output growth policies, at an average 52 per cent of the time. In the pre-crisis period, Singapore and Thailand had an output growth policy orientation, at an average 52 per cent of the time. Post-crisis period saw all the ASEAN members except the Philippines, placing output growth orientation on an equal importance (50% on average) with the competitiveness policy.

Table 3. Relationship between competitiveness and output growth

	Sample period : 1979:1 2002:4				Sample period: 1979:1 1996:4				Sample period: 1997:1 2002:4			
	Diff of interest rate	*reer*		Total	*Diff of interest rate*	*reer*		Total	*Diff of interest rate*	*reer*		Total
		<PPP	>PPP			<PPP	>PPP			<PPP	>PPP	
Indonesia		20	22	42		19	11	30		1	11	12
	< 0 %	21.05%	23.16%	44.21%	< 0 %	26.76%	15.49%	42.25%	< 0 %	4.17%	45.83%	50.00%
		30	23	53		29	12	41		1	11	12
	> 0 %	31.58%	24.21%	55.79%	> 0 %	40.85%	16.90%	57.75%	> 0 %	4.17%	45.83%	50.00%
	Total	**50**	**45**	**95**	Total	**48**	**23**	**71**	Total	**2**	**22**	**24**
		52.63%	**47.37%**	**100%**		**67.61%**	**32.39%**	**100%**		**8.33%**	**91.67%**	**100%**
		<PPP	>PPP			<PPP	>PPP			<PPP	>PPP	
Malaysia		27	13	40		27	1	28		0	12	12
	< 0 %	29.35%	14.13%	43.48%	< 0 %	39.71%	1.47%	41.18%	< 0 %	0.00%	50.00%	50.00%
		35	17	52		32	8	40		3	9	12
	> 0 %	38.04%	18.48%	56.52%	> 0 %	47.06%	11.76%	58.82%	> 0 %	12.50%	37.50%	50.00%
	Total	**62**	**30**	**92**	Total	**59**	**9**	**68**	Total	**3**	**21**	**24**
		67.39%	**32.61%**	**100%**		**86.76%**	**13.24%**	**100%**		**12.50%**	**87.50%**	**100%**
		<PPP	>PPP			<PPP	>PPP			<PPP	>PPP	
Philippines		33	15	48		25	7	32		8	8	16
	< 0 %	35.87%	16.30%	52.17%	< 0 %	36.76%	10.29%	47.06%	< 0 %	33.33%	33.33%	66.66%
		36	8	44		29	7	36		7	1	8
	> 0 %	39.13%	8.70%	47.83%	> 0 %	42.65%	10.29%	52.94%	> 0 %	29.17%	4.17%	33.33%
	Total	**69**	**23**	**92**	Total	**54**	**14**	**68**	Total	**15**	**9**	**24**
		75.00%	**25.00%**	**100.00%**		**79.41%**	**20.59%**	**100.00%**		**63%**	**37.50%**	**100.00%**
		<PPP	>PPP			<PPP	>PPP			<PPP	>PPP	
Singapore		30	18	48		18	18	36		12	0	12
	< 0 %	32.61%	19.57%	52.17%	< 0 %	26.47%	26.47%	52.94%	< 0 %	50.00%	0.00%	50.00%
		24	20	44		12	20	32		12	0	12
	> 0 %	26.09%	21.74%	47.83%	> 0 %	17.65%	29.41%	47.06%	> 0 %	50.00%	0.00%	50.00%
	Total	**54**	**38**	**92**	Total	**30**	**38**	**68**	Total	**24**	**0**	**24**
		58.70%	**41.30%**	**100.00%**		**44.12%**	**55.88%**	**100.00%**		**100.00%**	**0.00%**	**100.00%**
		<PPP	>PPP			<PPP	>PPP			<PPP	>PPP	
Thailand		24	24	48		24	12	36		0	12	12
	< 0 %	26.09%	26.09%	52.17%	< 0 %	35.29%	17.65%	52.94%	< 0 %	0.00%	50.00%	50.00%
		20	24	44		18	14	32		2	10	12
	> 0 %	21.74%	26.09%	47.83%	> 0 %	26.47%	20.59%	47.06%	> 0 %	8.33%	41.67%	50.00%
	Total	**44**	**48**	**92**	Total	**42**	**26**	**68**	Total	**2**	**22**	**24**
		47.83%	**52.17%**	**100.00%**		**61.76%**	**38.24%**	**100.00%**		**8.33%**	**91.67%**	**100.00%**

Figure 3 summarises the results in Table 4, and gives the scatter plots of the policy space for ASEAN-5 from 1979-2002. These plots give a broad picture of the concentration of the policy stance of these countries.

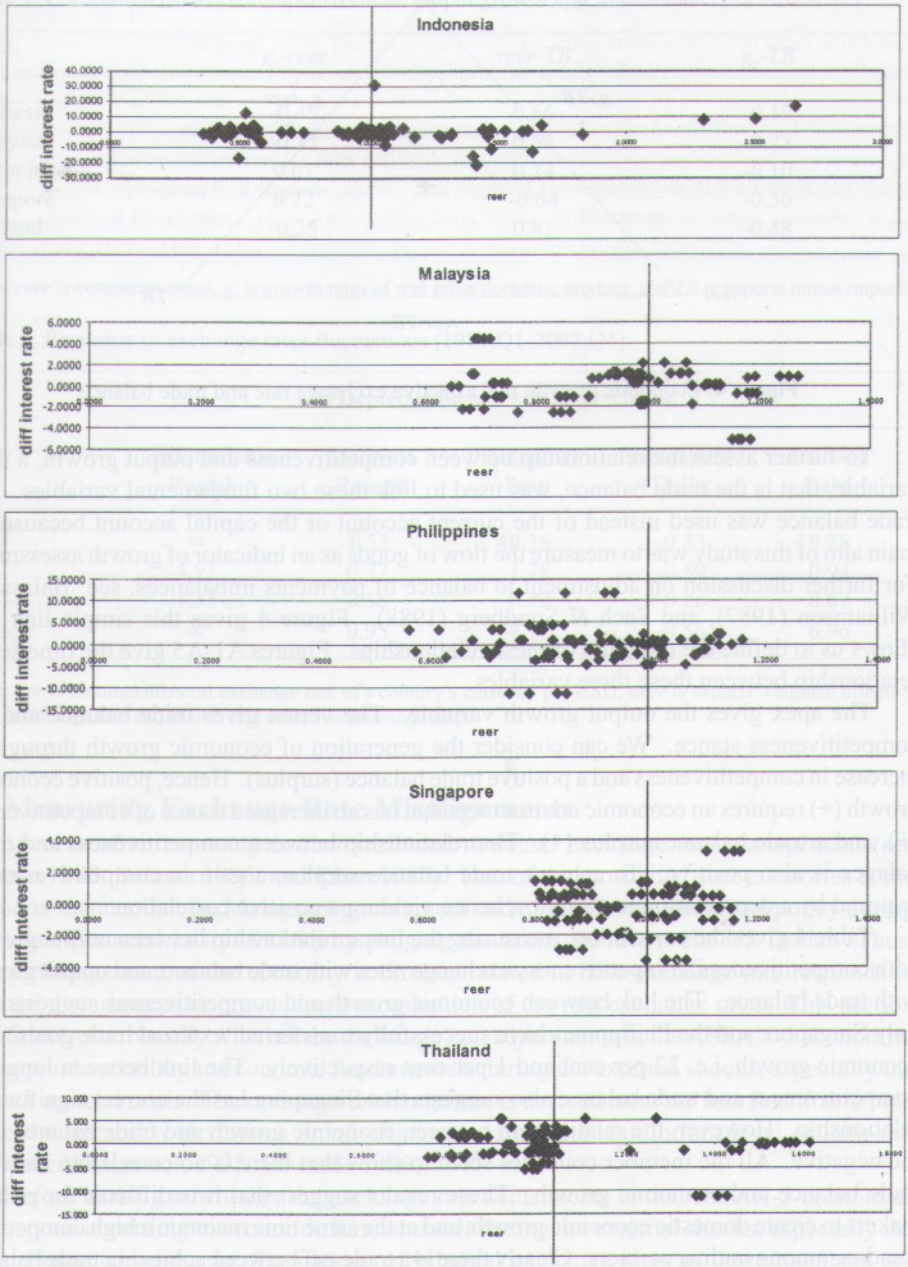


Figure 3. Scatter plots of the policy-space for ASEAN-5

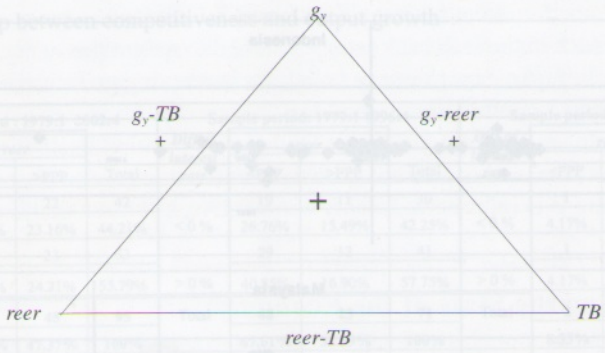


Figure 4: Economic growth, real effective exchange rate and trade balance

To further assess the relationship between competitiveness and output growth, a third variable, that is the trade balance, was used to link these two fundamental variables. The trade balance was used instead of the current account or the capital account because the main aim of this study was to measure the flow of goods as an indicator of growth assessment. For further discussion on adjustment to balance of payments imbalances, see Balassa & Williamson (1987), and Sach & Sundberg (1988). Figure 4 gives this simple link that allows us to define the direction of these relationships. Figures A1-A5 give the time series relationship between these three variables.

The apex gives the output growth variable. The vertex gives trade balance and the competitiveness stance. We can consider the generation of economic growth through an increase in competitiveness and a positive trade balance (surplus). Hence, positive economic growth (+) requires an economic environment that has an increased stance of competitiveness (+), and a trade balance surplus (+). The relationship between competitiveness and trade balance is also positive. To achieve trade balance surplus, a gain in competitiveness is required by a depreciation in currency, hence yielding a positive correlation.

Table 4 gives the correlation, measuring the linear relationship between output growth with competitiveness, competitiveness/exchange rates with trade balance, and output growth with trade balance. The link between economic growth and competitiveness suggests that only Singapore and the Philippines have successfully transferred 'external trade goals' into economic growth, i.e. 22 per cent and 1 per cent respectively. The link between long-run competitiveness and trade balance also suggests that Singapore has the correct sign for this relationship. However, the relationship between economic growth and trade balance is in the negative. All the member countries seem to show that there is no correlation between trade balance and economic growth. These results suggest that it is difficult for policy-makers to create domestic economic growth, and at the same time maintain a high competitive standing among trading partners. Clearly there is a trade-off between achieving trade balance surplus and high output growth. A major weakness from the correlation analysis is that it does not show the direction of the causation, as it is only a simple measure of linear relationship.

Table 4. Correlation between competitiveness, output growth and trade balance for ASEAN-5

	g_y-*reer*	*reer*-*TB*	g_y-*TB*
Indonesia	-0.46	0.66	-0.19
Malaysia	-0.15	0.64	-0.28
Philippines	0.01	0.24	-0.10
Singapore	0.22	-0.64	-0.50
Thailand	-0.25	0.81	-0.48

Notes: *reer* is competitiveness, g_y is growth rates of real gross domestic product, and *TB* is exports minus imports.

Table 5. Response to exchange rates fluctuations (1979:Q1-2002:Q4)

	+/% Depreciation and –/% Appreciation				
	Indonesian Rupiah	Malaysia Ringgit	Philippines Peso	Singapore Dollar	Thailand Baht
ner	∞	1.52	40.36	–0.83	19.28
neer	4.91	0.77	1.78	–0.59	0.94
reer	1.33	0.56	0.22	–0.26	0.67
Average	∞	0.95	14.12	–0.56	6.96

Notes: *ner* is nominal bilateral exchange rate of a country's currency per USD; *neer* is exports weighted effective exchange rate and *reer* is real effective exchange rate.

5. Measuring Exchange Rate Misalignments

The success of an economy is also attributed to sound exchange rate management (see Moreno 1990; Balassa 1986; and Khan 1986). One of the most cited success stories is the orthodox manner that the Malaysian government undertook the exchange rate policy during the Asian Financial crisis 1997/98 by pegging the exchange rate to the US Dollar. Thus, policy management of the economy is directly related to how exchange rate responds to external disturbances or preventing overvaluation of the real exchange rates. This section tries to examine broadly whether the exchange rate adjustments in the ASEAN-5 economies did respond according to economic fundamentals during the external shocks, especially the Asian Financial crisis. The optimum exchange rate is derived from the loss function to help relate the instability/deviations or misalignments from the equilibrium level or long-run level (see Williamson 1995; Edwards 1988).

Before looking at whether the exchange rate adjustments in the ASEAN-5 economies did respond according to economic fundamentals during the external shocks, especially the Asian Financial crisis, the fluctuations of bilateral exchange rates of these members are examined. The Asian Financial crisis during 1997-1998 generally had adverse effects on the ASEAN-5 economies. The extent of response in percentage are estimated based on a linear trend line from 1979:Q1 - 2002:Q4. The results are given in Table 5.

The estimated response from the trend line shows that only the Singapore currency appreciated by as much as 0.83 per cent from its nominal bilateral exchange rate. On

average, the Singapore Dollar appreciated 0.56 per cent. Interestingly, it was the smallest response in magnitude. This clearly shows that the Singapore Central Bank (MAS) had been monitoring its exchange rate well, as confessed in a 'quiet band'. The bilateral exchange rate for the Malaysian Ringgit responded at 1.52 per cent but on average experienced a depreciation of 0.95 per cent. Clearly, this also suggests that BNM had been 'controlling' its exchange rate in a 'pegged' form over the last 20 years. The Philippines had a response of 40.36 per cent in depreciation, but on average experienced a depreciation of 14.12 per cent. This shows that the Peso is used as an instrument to smoothen the exchange rate cycles more often, compared to the Singaporean or the Malaysian exchange rates regimes. The bilateral Thai Baht experienced a 19.28 per cent depreciation, but on average experienced a depreciation of 6.96 per cent. These numbers do not actually reflect the misalignment from the fundamental equilibrium exchange rates but they do show that Singapore and Malaysia have been using their exchange rates as a target variable for price stability, as the amount of deviations or misalignments are not excessively large. Indonesia has experienced excessive depreciation, that is 2,789.75 per cent. These results do suggest that the Bank of Indonesia has been using the exchange rate variable as an instrument to smoothen out external shocks.

Based on the long-run response to exchange rate disturbances, a scale in relative ranking is formed with the most response to the least response. Indonesia is ranked the highest with the most disturbances or noise, and Singapore is ranked as the most 'stable' exchange rate regime. Malaysia seems to have a pretty stable policy, followed by Thailand and the Philippines.

Response of Exchange Rate (1979:Q1-2002:Q4) →

Indonesia Philippines Thailand Malaysia Singapore

(*Note*: → From most response to least.)

This section that follows considers a simple loss function for measuring the amount of exchange rate misalignment. The aim is to estimate this amount of misalignment based on a theoretical equilibrium exchange rate. Expressing the extent of misalignment by estimating the distribution functions of the nominal effective exchange rates, allows one to compare the frequency of departure from equilibrium. Then a comparison is made by decomposing the misalignment due to normal shocks and extreme shocks. A country's exchange rate that is greatly misaligned will have higher extreme value shocks. This is because misalignments are always caused by extreme shocks.

Let us denote the nominal effective exchange rate variable of *neer* as e, and assume that the future nominal effective exchange rate is determined by the current state of the economy, x, a current policy instrument, i, and an exogenous future stochastic shock, z, according to:

$$e_t = \gamma + \alpha x_t + \beta i_t + z_t \tag{3.3}$$

where α and β are coefficients. Assume that the future shock is the sum of two independently distributed random variables, ε and η,

$$z_t = \varepsilon_t + \eta_t \tag{3.4}$$

Assume that ε has a zero mean and a continuous distribution. It will be interpreted as a future normal-size shock with a relatively modest variance. Let $f(\varepsilon)$ denote the density function of the normal-size shock.

Let η have a discrete distribution such that it can take two values, 0 and a, with probability $1 - \gamma > 0$ and $\gamma > 0$, respectively. Let a > 0 be a given large number, and let γ be a small probability. The high-probability outcome, $\eta = 0$, and the resulting shock, $z = \varepsilon$, will be identified with a future normal outcome. The low-probability outcome, $\eta = a$, and the resulting shock, $z = \alpha + \varepsilon$, will be identified with a future extreme outcome.

Let $h(z)$ be the density function of the future shock z. Given the assumptions above, it will be given by

$$h(z) \equiv (1-\gamma) f(z) + \gamma f(z-a) \tag{3.5}$$

Let med(z) denote the median of z. It is defined (for a continuous distribution) by

$$\Pr[z \leq \text{med}(z)] = 1/2$$

Let us also denote $\bar{e}$ as the expected future equilibrium exchange rate conditional on the future normal outcome. Then the normal mean (future) equilibrium exchange rate is

$$\bar{e}_t \equiv E[e;\ \eta = 0]$$

The normal mean of equilibrium exchange rate is also related to the current state of the economy and the current instrument by

$$\bar{e}_t \equiv \alpha x_t + \beta i_t \tag{3.6}$$

and that the relation between realised future rate and normal mean is

$$e_t \equiv \bar{e}_t + z_t \tag{3.7}$$

For a given normal mean equilibrium, the density function of expected exchange rate is given by $h(e_t - \bar{e}_t)$.

Assume that the normal shock, ε, has a bounded symmetric support, $\varepsilon \in [-b, b]$ (where $b > 0$ is a constant). Further assume that

$$a > 2b \tag{3.8}$$

This implies that the support of the extreme shock, $z = a + \varepsilon \in [-b, +b]$, falls outside the support of the normal shock. Furthermore, in order to conveniently compute the median of the total future shock, z, assume that ε is uniformly distributed.

$$f(\varepsilon) = \begin{cases} \dfrac{1}{2b} & \text{for } |\varepsilon| \le b, \\ 0 & \text{for } |\varepsilon| > b. \end{cases} \tag{3.9}$$

Figure 5. Shows the estimated distribution functions of the exchange rate shocks.

The results for the estimated bounds of normal and extreme shocks are computed in Table 6 for the five ASEAN member countries.

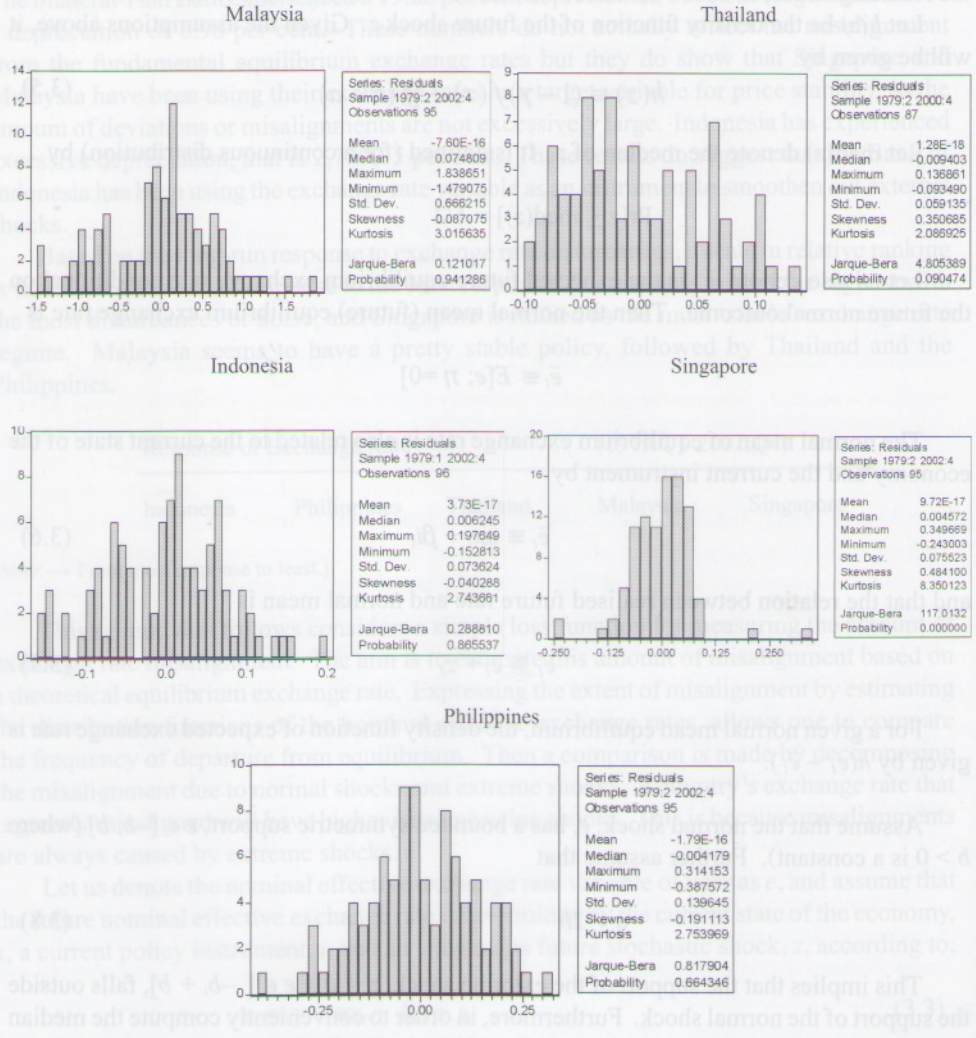


Figure 5. Distribution functions of the exchange rate misalignment

Table 6. Estimated exchange rate misalignments for ASEAN-5

	Indonesia	Malaysia	Philippines	Singapore	Thailand
b	0.140	0.015	0.030	0.013	0.015
a	0.300	0.035	0.065	0.030	0.035

Notes: *b* is the bound of the normal future shock, *a* is the bound of the extreme shock

The largest exchange rate misalignment is estimated for Indonesia, with the largest bounds of 0.14 for normal future shock and 0.30 for extreme shock. This clearly would indicate that there is very little exchange rate control in the Rupiah exchange rate, as the amount of deviation or misalignment was very large when a disturbance hit the foreign currency market. Not surprising, the Singapore Dollar had the smallest amount of misalignment, that is the estimated bounds of 0.013 for normal future shock and in extreme shock, it was only 0.013. Thailand and Malaysia's exchange rates would have very similar bounds when faced with normal future or extreme shocks, that is 0.015 and 0.035. The Philippines ranked second last, with a slightly smaller amount of misalignment compared to Indonesia, with a bound of 0.03 for normal future shock and 0.065 for extreme shock.

6. Conclusions

With China's accession to WTO in December 2001, many believe that world trade and regional trade will significantly expand. ASEAN country members are also under pressure to fulfill AFTA in 2005. It is thus very obvious then that member countries that do not position themselves competitively, will not be able to integrate successfully into this new trading trading system.

Indonesia has the largest response to exchange rate disturbances, and the largest amount of exchange rate misalignment. Indonesia also has the largest negative relationship between long-run competitiveness and economic growth. This information seems to suggest that Indonesian policy makers have been using the exchange rate as an instrument to maintain the country's competitiveness in achieving a huge surplus in its trade balance. However, its success in maintaining this surplus is also at the cost of achieving positive output growth. Indonesia has experienced 11 years of negative growth since 1979.

Before the crisis of 1997/98, Malaysia had the weakest competitive stance among the ASEAN-5 member countries. This comes as no surprise, as Malaysia has had a continued trade balance deficit since 1979. This loss in competitiveness during the pre-crisis period is a trade-off to achieving high domestic growth rates. During the last ten years before the crisis, Malaysia maintained an average growth rate of 8-10 per cent. Malaysia has experienced four years of negative growth since 1979. The Philippines has not shifted their long-run competitiveness stance since after the crisis of 1997/98. Their trade balance has always been in deficit except for 1999 and 2000. Since 1979, the output growth of the Philippines has been in the negative region for almost 13 years.

Before the crisis, Singapore was ranked the most competitive country. The results further show that Singapore had comparatively achieved, on average, the highest growth among ASEAN-5. The results on policy-space seem to suggest also that Singapore is not

spurring its competitiveness to greater heights. Before the crisis, Singapore was the only country that had a competitive stance, i.e. 55 per cent with a tendency towards competitive. However, after the crisis, its high value in exchange rate has weakened its competitiveness stance. Moreover, Singapore is the only ASEAN country that was not badly hit by the crisis of 1997/98. Singapore still maintained a positive growth rate of 2 per cent whereas Indonesia, Malaysia, the Philippines and Thailand had negative growth rates of −18 per cent to −140 per cent. This suggests that the competitiveness factor has served as a buffer in difficult times, like a recession. Singapore has experienced barely two years of negative growth since 1979.

Thailand had been maintaining a weaker competitive stance during the pre-crisis period. Like Malaysia, Thailand is poised to become more competitive after the crisis. The strength of the Baht has kept the trade balance in the large deficit region for many years before the crisis period. Thailand has also had the largest positive correlation coefficient between real effective exchange rate and trade balance, which reflects the action of policy-makers in controlling the Baht. Thailand has experienced four years of negative growth since 1979. Thailand is ranked, on average, as the most competitive among the ASEAN countries and there is scope for the Thai government to further spur growth rates and augment competitiveness and economic efficiency.

Clearly, the results also suggest that there is a trade-off between achieving trade balance surplus and high output growth among the ASEAN-5 countries. It looks like the price to pay for strong competitiveness/domestic growth is to forego domestic growth/ competitiveness. However, Singapore showcases a classic story of being in a dual region, that is either in a strongly or weakly competitive stance with the main domestic objective of achieving high growth rates never deterred. Except for the two years, i.e. the 1985 global recession and 2001 where the dot.com bust, Singapore successfully carved a city with a high standard of living, comparable to any developed nation. Could the 'quiet band' be the answer to controlling a good exchange rate regime?

References

Aghevli, B.B. 1981. Experience of Asian countries with various exchange rate policies. In *Exchange Rate Rules: The Theory, Performance and Prospects of the Crawling Peg*, ed. John Williamson. pp. 298-318. London: Macmillan.

Balassa, B. 1986. Policy response to exogenous shocks in developing countries. *American Economic Review* 76: 75-78.

Balassa, B. and J. Williamson. 1987. *Adjusting to Success: Balance of Payments in the Far East Asian* NICs. Washington DC: Institute for International Economics.

Bank Negara Malaysia. *The Monthly Statistical Bulletin*. Various issues.

Bayoumi, T., 1996. International Trade and Real Exchange Rates. In *Exchange Rate Movements and Their Impact on Trade and Investment in the APEC Region* ed. by T. Ito, P. Isard, S. Symansky and T. Bayoumi. Washington DC: IMF.

Edwards, S. 1989. Real exchange rates in the developing countries: concepts and measurement. *NBER Working Paper* (2950).

Edwards, S. 1988. *Exchange Rate Misalignment in Developing Countries*. Occasional Paper Number 2. Baltimore: John Hopkins.

Khan, M.S. 1986. Developing country exchange rate policy responses to exogenous shocks. *American Economic Review* 76 (2):85-87.

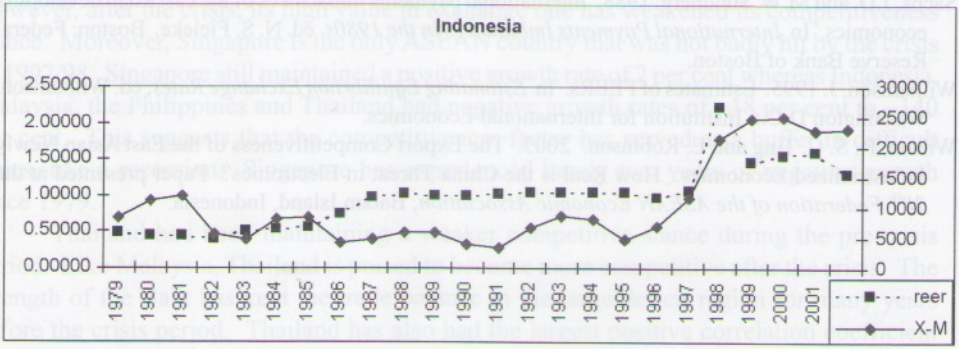
Moreno, R. 1990. External shocks and adjustment in four asian economies 1978-1987. *Economic Review* 1: 27-41.

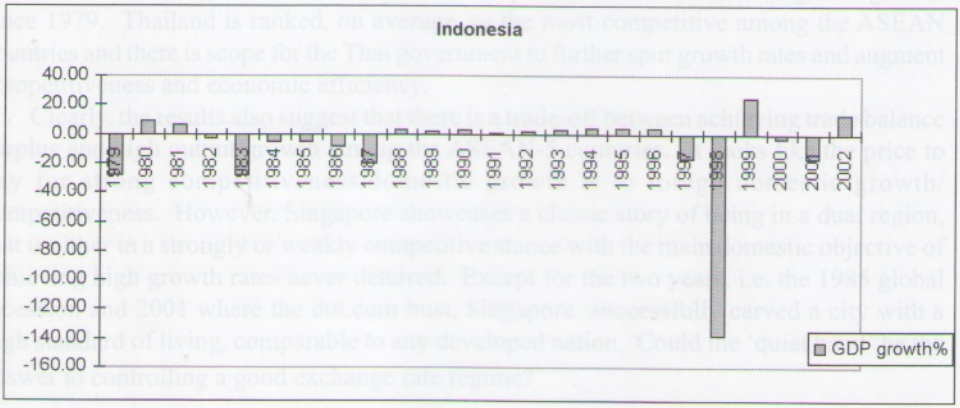
Sachs, J.D. and M.W. Sundberg. 1988. International payments imbalances of the east asian developing economics. In *International Payments Imbalances in the 1980s,* ed. N. S. Fieleke. Boston: Federal Reserve Bank of Boston.

Williamson, J. 1995. Estimates of FEERs. In *Estimating Equilibrium Exchange Rates*, ed. Williamson. Washington D.C.: Institution for International Economics.

Wilson, P., S. C. Ting and E. Robinson. 2003. The Export Competitiveness of the East Asian Newly Industrialized Economics: How Real is the China Threat in Electronics? Paper presented at the *28th Federation of the ASEAN Economic Association*, Batam Island, Indonesia.

Appendix 1





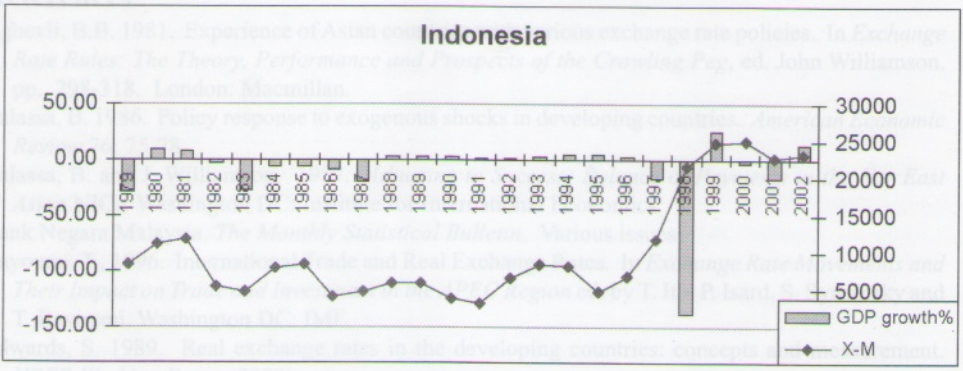


Figure A1. Competitiveness, trade balance and economic growth in Indonesia (1979-2002)

Appendix 2

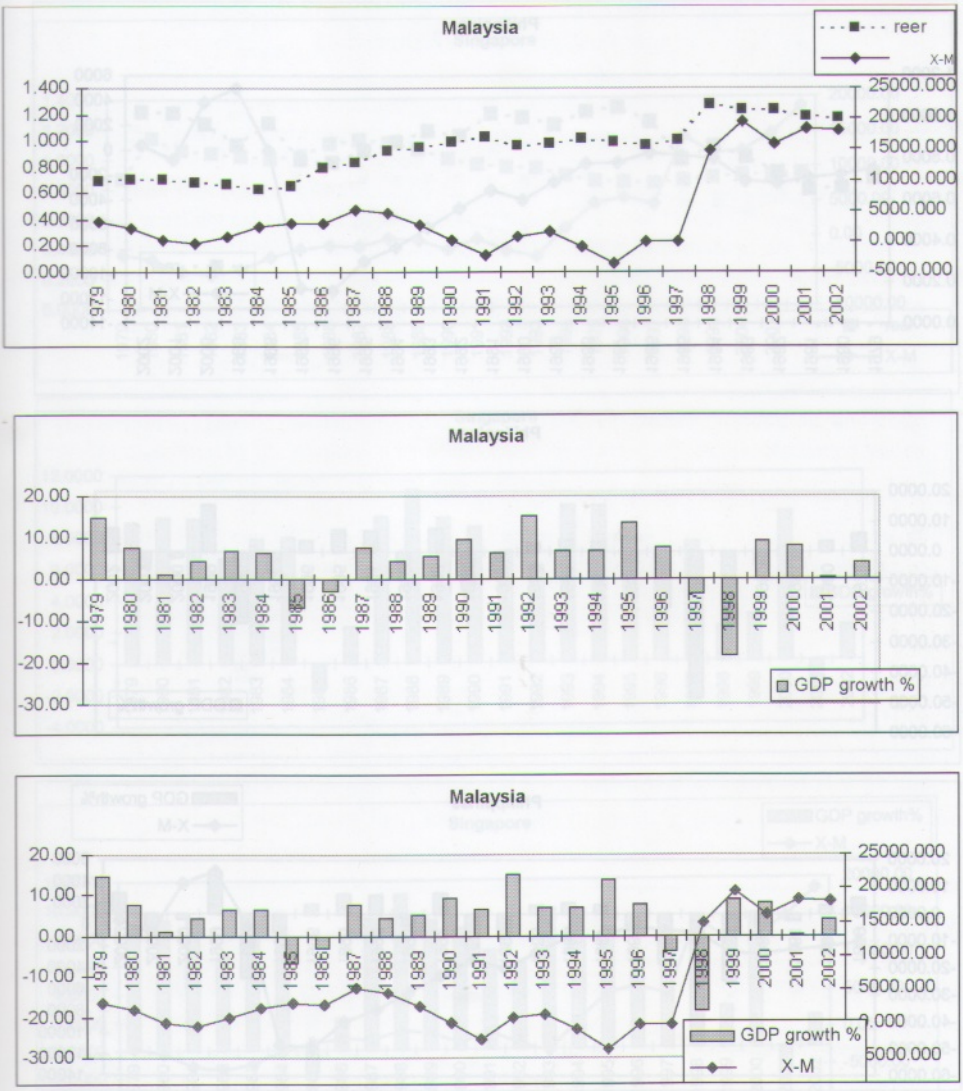


Figure A2. Competitiveness, trade balance and economic growth in Malaysia (1979-2002)

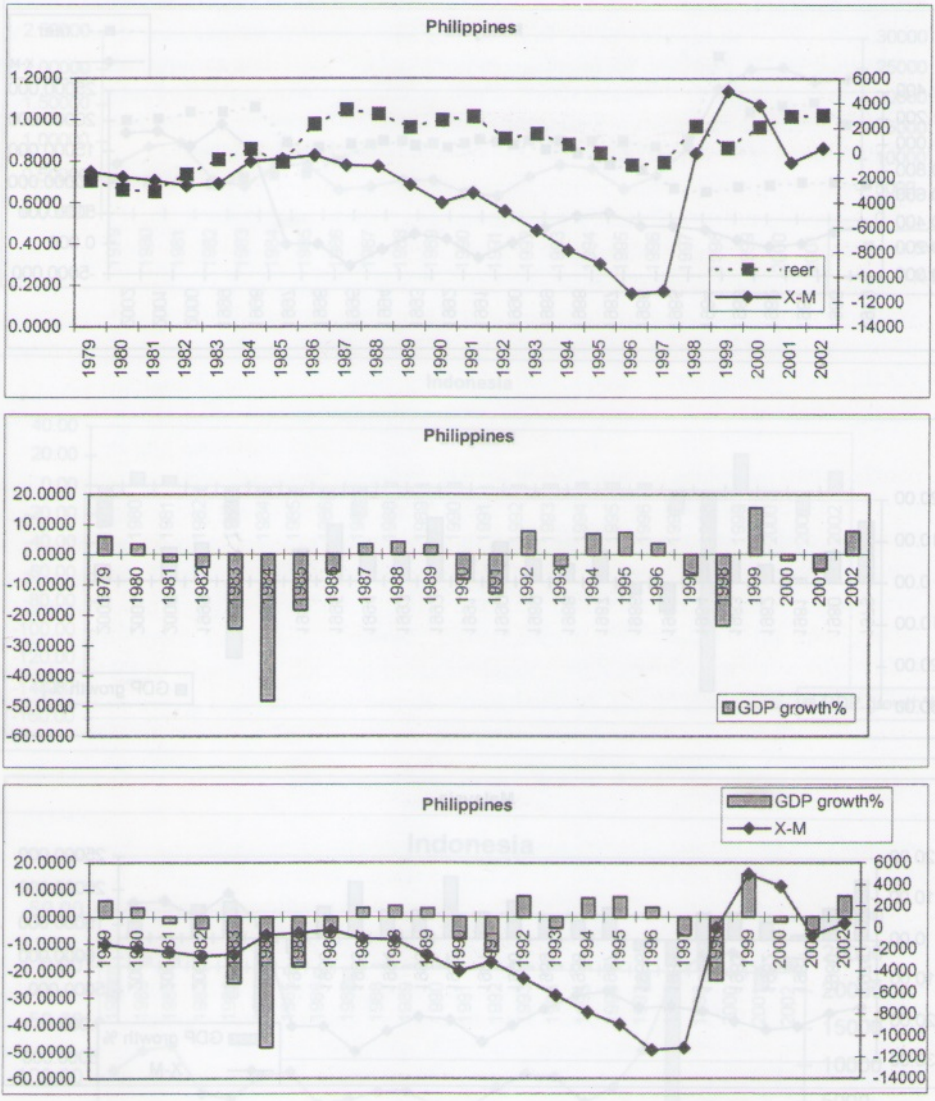
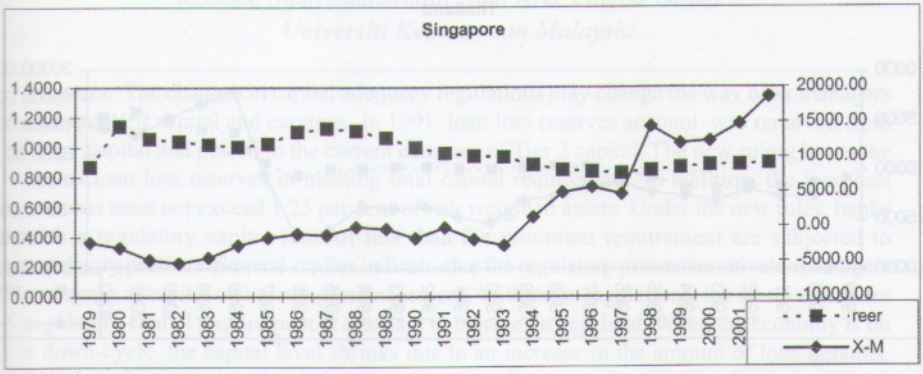
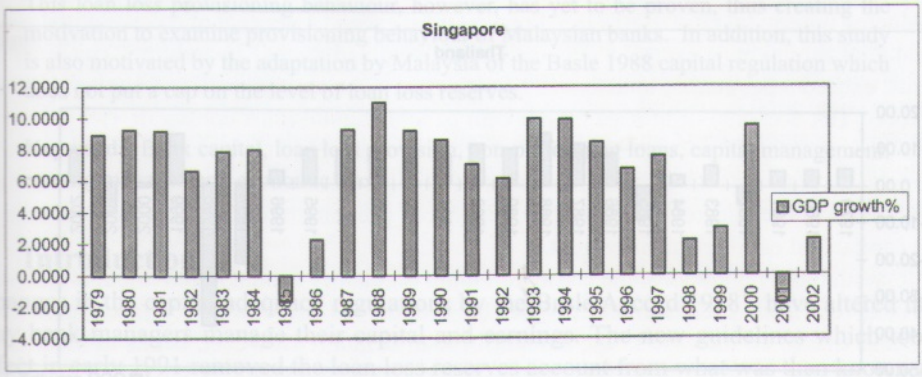


Figure A3. Competitiveness, trade balance and economic growth in the Philippines (1979-2002)

Appendix 4





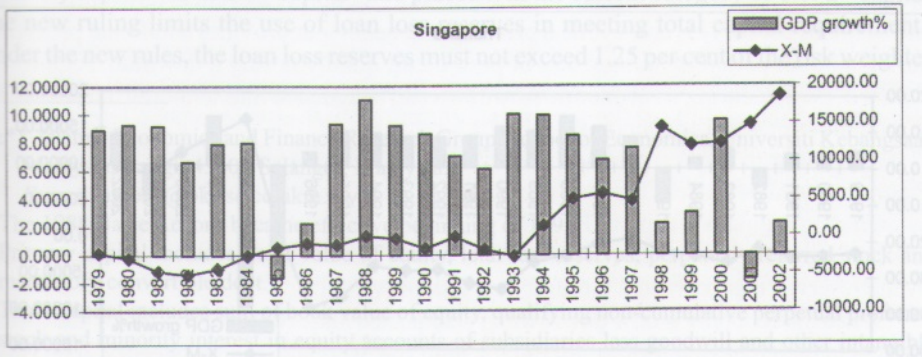
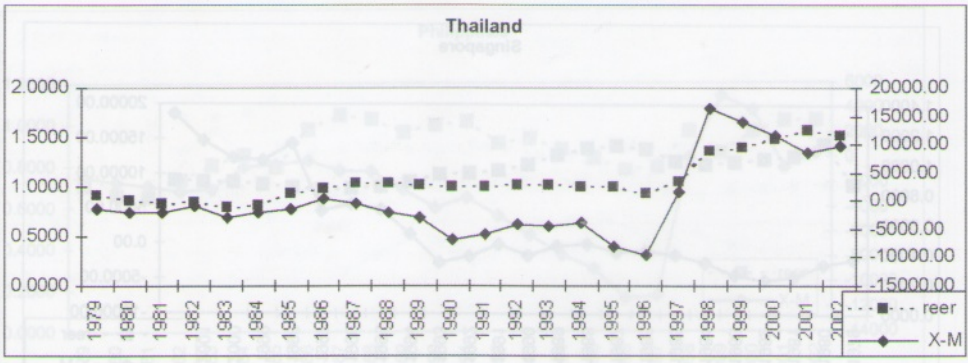
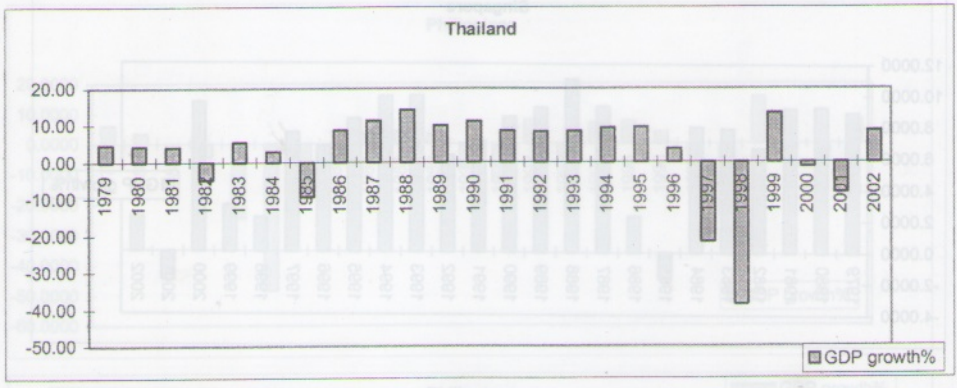


Figure A4. Competitiveness, trade balance and economic growth in Singapore (1979-2002)

Appendix 5





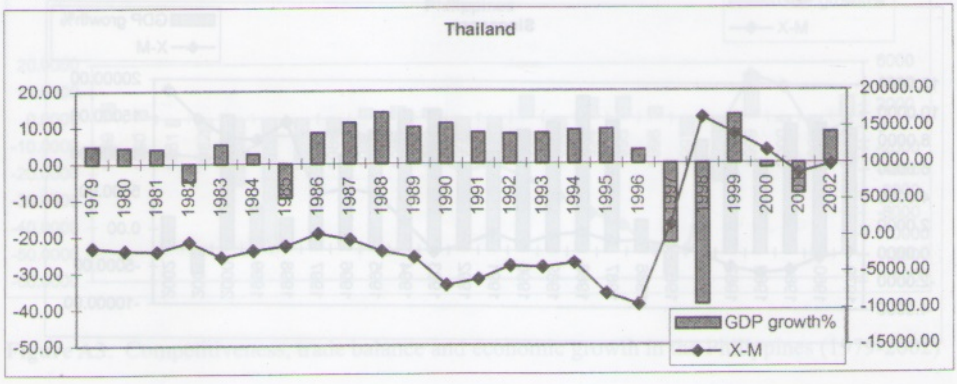


Figure A5. Competitivenes, trade balance and economic growth in Thailand (1979-2002)