Managing foreign exchange risk: the Malaysian experience in the 1997 financial crisis

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This paper gives an overview of some important factors that cause exchange-rate volatility and the key economic indicators that influence the probability of a crisis and its depth. It examines the Malaysian currency peg that has been in place since September 1998, using selected key economic indicators to examine whether the currency peg is a sustainable solution for managing foreign exchange risk. It also reviews the benefits and challenges of common currency and evaluates whether the implementation of a common currency could effectively reduce foreign exchange risk for Malaysia and ASEAN countries. There are three major findings presented. First, the volatility of the ringgit value against currencies of its major trading partners and competitors in the postcrisis period was significantly higher than that of the precrisis period, except against the Thai baht. Second, the currency peg is not a long-term solution for managing foreign exchange risk. Third and last, forming a synthetic common currency using data for the period 1996 to 2001, significant diversifiable risk—around 90 percent—is found in all individual currencies.

1. Introduction

Foreign exchange risk is defined as the effect of unanticipated change in foreign exchange values on wealth, corporate profitability, or a country's

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international reserves. Although we now know more of the causes of exchange rate fluctuations and their impact on the economy, numerous financial crises in relation to these fluctuations have been observed. Countries that experienced such crises include some countries in Europe, Latin America, East Asia, and Russia. Although different financial crises depend on specific conditions, affected countries all experience a plunge in the value of their currencies and instability in the exchange rate. The sudden currency crash triggers a full-fledged financial and economic crisis.

The countries affected by the 1997 financial crisis all took various steps to mitigate the foreign exchange risk in an effort to recover. Still, these countries have not displayed a satisfactory recovery trend near precrisis levels. Some are still in the process of strengthening their existing solutions or even looking for better ones.

2. Objectives of the study

Generally, Malaysia's foreign exchange risk exposure is high because of its active international trade.[1] The sum of both annual import and export activities ranged from 1.55 to 2.01 times of annual gross domestic product (GDP) for 1995-2000. This means that the value of the ringgit is relative to the value of the currency of its major trade partners (i.e., United States, Japan, Europe, and East Asian countries), which is crucial to ensuring the stability and sustainability of Malaysia's economic growth.

This paper has three objectives. First, it will examine the factors affecting the volatility of exchange rates in the East Asian crisis and identify the key economic indicators of an impending crisis. Second, it will examine the effects of the currency peg in managing foreign exchange risk. Third and most important, it will inquire into the viability of a regional common currency vis-à-vis foreign exchange risk management in Malaysia.

3. Review of literature

3.1. Determinants of exchange rate volatility and currency crises

Exchange rates are generally volatile due to the volatility of the underlying economic fundamentals. Shapiro [1999] asserts that under the floating exchange

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[1] Trade openness refers to the percentage of external trades against the GDP of a nation. See "Pocket world in figures", *The Economist*, various editions.

rate system, exchange rates respond to the forces of demand and supply, which in turn are dependent on relative inflation rates, interest rates, and GDP growth rates. For example, if the central bank expands the money supply at a faster rate than the growth in money demand, the money's purchasing power declines both at home (inflation) and abroad (currency depreciation). The volatility of the exchange rates depends on future currency changes, which in turn depend on future economic and political conditions.

Over the last decade, a series of currency turmoil has revived a long-standing debate on exchange rate systems, particularly between floating and fixed exchange rate regimes. Theoretically, the preference for a specific exchange rate regime can be linked to macroeconomic objectives and policies, particularly the preference for full employment or price stability.[2]

Recent theoretical contributions to the choice of an exchange rate regime can be grouped into two broad categories: (a) fear of floating approach and (b) political economy approach [Poirson 2001]. Under the fear of floating approach, countries that are either involved heavily in international trade or with high levels of unhedged external debt will prefer (either through direct intervention or open market operations) to peg their currencies on the foreign currency in which they have significant risk exposure. On the other hand, under the political economy approach, the choice of an exchange rate regime is determined by the stability of the political environment and the level of people's confidence in the government.

A significant number of empirical studies on the East Asian crisis indicate that the fear of floating and the intention of policymakers to maintain an unrealistic US dollar-pegged regime were the main reasons that led to the crisis. For instance, Kawai and Akiyama [2000] have indicated that before the crisis, the East Asian currencies saddled with the US dollar in their currency baskets became overvalued in a real[3] sense, eventually triggering speculative pressure that caused the currency crisis in 1997. One reason cited by Beng [2000] for the fear of floating is that any erosion in policy credibility would quickly translate to a sharp depreciation in the currency and high interest-rate volatility. However, after examining the daily currency volatility of seven countries (i.e., Thailand, Malaysia, Indonesia, Singapore, Philippines, Korea, and Taiwan), Beng [2000]

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[2] See "Exchange rate regimes and capital control", *Challenge*, November-December 2000:77.

[3] This was because of the higher domestic inflation relative to the United States and the dollar's appreciation since mid-1995 against major industrialized currencies such as the Japanese yen and the Deutsche mark.

further pointed out that the East Asian experience offers an example of how to resolve the issue of credibility versus flexibility. The study explained that the crisis-hit countries (except Malaysia), which had begun to move from the unrealistic peg to greater exchange rate flexibility, have experienced a narrowing of the differential between the domestic and the US interest rates and the improvement in macroeconomic fundamentals.

While the debate rages as to which exchange rate regime is most suitable under various economic conditions, a significant number of countries have instead settled for one of the numerous intermediate regimes.[4] Williamson [2000] says an appropriate intermediate regime would provide enough stability to capture most of the growth benefits that stability at a competitive rate offers, while incorporating enough flexibility to avoid hard crashes and the squandering of credibility.[5] Although there are arguments that this exchange rate mechanism is relatively more vulnerable to currency attacks, Vernengo and Rochon [2000] assert that the exchange rate regimes are of secondary importance because it is possible to pursue either full-employment or price stability regardless of the exchange rate regime in place. As such, it is more important to look into the basic models that explain the currency crisis and to identify important factors that trigger a crisis. This may help countries to take appropriate actions to deal with the crisis and install preventive measures to reduce vulnerability to currency crashes.

3.2. Currency crisis models

Traditionally, there are two models to explain the causes of currency crisis. The first suggests that crises are unavoidable outcomes of unsustainable policies or fundamental imbalances. The second says that the interaction between market expectations and actual policy outcomes can generate self-fulfilling crises. These two models are far from being mutually exclusive; they actually complement one another.

According to Pesenti and Tille [2000], the fundamental imbalances stressed by the first model make a country vulnerable to shifts in investor sentiments, and once a crisis occurs the second model explains its self-reinforcing features.

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[4] As of 1999, about 44 percent of the member countries of the International Monetary Fund (IMF) were classified as limited flexibility and managed float while 11 percent and 45 percent had been classified as fixed exchange rate regime and flexible exchange rate regime, respectively.

[5] Williamson [2000:8-10] suggests some viable intermediate regimes such as reference rates, soft bands, and monitoring band.

They also cited two other factors that help explain the severity of currency crises—the inadequate supervision of the banking and financial sector and the domino effect a crisis has on nearby countries.

The "Tom Yam" currency crash of Thailand provides a comprehensive explanation on the above models. When the Thai baht was under severe attack in February 1997, the Bank of Thailand decided to defend the unrealistic peg through deep intervention by issuing US$ 23 billion foreign exchange contracts. At the time, Thailand's foreign exchange reserves stood at only around US$ 25 billion; as a result investors became extremely pessimistic. The economic condition worsened as the financial institutions, whose loan portfolios had been deteriorating because of the bursting real-estate bubble, came under pressure; meanwhile, the government continued to pump large sums to support them. This led to huge capital outflows and a further decline in foreign exchange reserves. After facing heavy selling pressure and massive interventions in the forward market, Thailand was forced to announce capital controls in mid-May 1997. On 2 July 1997, the government yielded to market forces and abandoned the unrealistic peg. Finally, the fall in exchange rate and the stock market spread quickly from Thailand to neighboring countries, i.e., Malaysia, Singapore, Indonesia, Philippines, South Korea, Hong Kong, and Taiwan.

Kawai and Akiyama [2000] found that the developments in Thailand prompted investors to look more closely at the vulnerabilities they had previously ignored elsewhere, especially with regard to problems of the financial system and the magnitude of short-term external debt.[6] According to them, market instabilities were compounded by the lack of transparency in the financial and corporate sectors, particularly the magnitude of nonperforming loans in the banking sector. Once investors lost confidence that the foreign reserves could cover short-term external debt,[7] both domestic and foreign investors scrambled to get out. The lack of a mechanism for an orderly working of private external debt undoubtedly contributed to a full-scale financial panic that swept through the neighboring countries.

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[6] During the precrisis period, the current account deficits of East Asian economies grew to critical levels. While these deficits were largely financed by private capital inflows, a growing portion began to be financed by short-term capital flows, which are very volatile in nature.

[7] Before the crisis, the foreign exchange reserves coverage on short-term external debt in South Korea, Thailand, and Indonesia were below parity while the Philippines and Malaysia maintained a range of 1 to 2 times.

According to the emerging markets committee of the US International Organization of Securities Commissions [1998],[8] the capital-flow surges since early 1990s, which were channeled to the developing countries (i.e., East Asian countries including Malaysia), had indeed provided a lot of opportunities to boost their consumption and investment patterns and also brought along the benefits of "knowledge spillover" and improvements in resources allocation. However, the committee alleged that weak fundamental conditions[9] in the East Asian countries sustained the credit boom, leading to an "overheating" expansion of the monetary aggregates. This in turn increased the inflationary pressure and the channeling of capital inflows into nonproductive and speculative sectors such as the real estate and equity markets. The combination of credit boom, misallocated funds, lax monetary policies, and an asset-price bubble rendered the macroeconomy highly vulnerable. The vicious cycle is self-sustaining, until some "trigger event," or an exogenous shock like a currency crash, eventually brings about huge reversals in capital flows.

In addition, several studies have also cited moral problems as having contributed to the currency crises. In the crisis-hit countries, implicit government guarantees and the central bank's function as lender of last resort had allowed banks to give easy credits, which in turn allowed corporations to assume higher risks in investment decisions. Similarly, the expectation on the IMF to provide last-resort financial assistance to member countries also caused foreign creditors to accept greater tolerance in financing high-gearing countries.

According to Aschinger [2001], as various factors play major roles in different stages of a currency crisis, several measures can be taken to prevent currency crises at those stages. First, capital controls such as those introduced in Malaysia and Russia, could help protect a country from huge capital outflows during a currency crisis. Second, the local markets should not be liberalized too quickly without flanking good measures (such as a good bank-supervising system, requirements for capital ratios, risk management, and bookkeeping

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[8] See "Causes, effects and regulatory implications of financial and economic turbulence in emerging markets," International Organisation of Securities Commissions, September 1998: 11-13.

[9] The weak initial conditions cited include poor corporate governance, financial deregulation without adequate supervision on banking and financial institutions, inappropriate policies such as lax fiscal policies, and nonsterilized inflows. Meera [2002], nonetheless, asserts that the fundamental reason behind the crisis is the structure of the international fiat monetary system. It is ironic that with the same "weak" conditions the Asian countries were earlier termed "Asian Tigers" for their tremendous economic growth.

devices) while imposing necessary controls on the level of foreign indebtedness as well as domestic credit expansion. Third, if no peg were to exist, currency crises would be moderate, but different forms of pegs (e.g., crawling pegs, currency boards, or dollarization) may reduce the likelihood of currency attacks. Finally, greater transparency in industries and government could enhance investors' confidence. Similarly, the crisis' contagion could be reduced if more information about the differences and similarities between countries were made available.

3.3. Key economic indicators

As there are various factors affecting the volatility of exchange rates, the most important concern for managing exchange rate risk is to identify highly correlated variables that can help predict the likelihood of a currency crisis and provide early warning signals. Osband and Rijckeghem [2000] found that a country that can easily service its external debt out of export proceeds or reserves can also protect its currency. As such, difficulties in servicing external debt will exert pressure on its currency value. The useful indicators may include reserves against short-term external debt, debt service against exports, as well as official debt against total external debt. Besides the debt-related fundamentals, Osband and Rijckeghem [2000] also indicate that current account surpluses, fiscal surpluses, real GDP growth, and foreign direct investment (FDI) can effectively mitigate the risks of a currency attack. For example, their findings show that current account balance against GDP, degree of diversification of export portfolio, and FDI against GDP are crucial in measuring safety from a currency crash.

However, there is also growing evidence showing that during currency crises the behavior of market participants differs from those during normal circumstances. Accordingly, Vlaar [2000] introduces a method that separates the variables that influence the probability of a crisis from those that impact on the depth of a crisis. Variables significantly affecting the probability of a currency crash include the growth of the short-term debt/reserves ratio, growth in reserves, the reserves/M2 ratio, the import/export ratio, and the real exchange rate and the inflation rate. On the other hand, variables that influence the depth of a crisis through further depreciation and volatility are local depreciations and the short-term debt/reserves ratio. The study also finds that the recent crises (from 1997 to 1999) were probably more liquidity driven than the previous ones (from 1987 to 1996). The study indicates that the reason for this could be the relative importance of the short-term debt/reserves ratio compared to the import/export ratio.

3.4. Common currency

In discussing possible solutions to the Asian crisis, some economists argued that the excessive reform measures[10] imposed by the IMF had made its funding assistance unpopular in the region. As a result, a number of the Asian governments that felt the IMF was incapable of providing effective solutions to their problems, had proposed various alternative solutions. In 1997, at the height of the currency crisis, Japan proposed to form an Asian Monetary Fund (AMF)[11] with an initial capitalization of US$ 100 billion to help troubled East Asian economies and contain the regional financial crisis. But the Japanese government had since withdrawn the proposal because of strong opposition from the G-7 countries (especially the United States). Although the AMF proposal was withdrawn, the issue had initiated greater discussion toward improving regional cooperation among the Asian and the ASEAN countries.

In 1998, Japan announced the US$ 30 billion Miyazawa Initiative (fully funded by Japan), which included bilateral swap lines with selected Asian countries. In May 2000, the Chiang Mai Initiative was a significant step to expand the ASEAN Swap Arrangement (ASA) to all ten ASEAN members and to reach a consensus in providing a network of bilateral swap and repurchase arrangement facilities among ASEAN, China, Japan, and Korea (known as ASEAN + 3). Dieter [2001] says that the creation of a network of currency swaps in East Asia effectively represents the beginning of a new era of regionalism. He highlights four important emerging elements that are helping facilitate the supranational cooperation. First, monetary regionalism is aimed at enhancing the region's ability to weather financial crises. Thus, the first step is to create a regional liquidity fund as a serious lender of last resort for participating central banks. Second, the creation of a regional liquidity fund will also provide the functional basis for further cooperation. Participating countries will have to create institutions that constantly monitor economic developments in the region, and the promising intraregional policy networks that have been developed over the last decade will be consolidated. Third, by introducing the ability to mobilize liquidity in the region rather than having to

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[10] The reform measures that include budget cuts, closure of troubled financial institutions, writing off bad debts, and liberalizing markets to foreign competition had caused the condition of some countries (e.g., Indonesia) to worsen.

[11] The AMF was envisioned as a multipurpose fund that would provide funds speedily without the burdensome requirements of the IMF to assist the Asian economies in defending their currencies against speculators, provide emergency balance of payments financing, and make available long-term funding for economic adjustment purposes.

go to the IMF, East Asia will have secured the main aim of monetary regionalism. In the event of a financial crisis, neighbors help each other.

While there is a strong trend to cultivate more dynamic and proactive strategies and mechanisms to prevent the recurrence of currency crises, the swap arrangement is only a starting point toward monetary cooperation at much deeper levels. In fact, Asian nations are inclined to expand the Chiang Mai Initiative from a reserve swap arrangement into a formal exchange rate mechanism of the kind similar to, or even predates, the existing European Monetary System. One of the possible outcomes of a formal exchange rate mechanism would be an Asian Monetary System and, of course, a common currency. In fact, it was at the height of the Asian financial crisis when a common currency for ASEAN was proposed. Subsequently, ASEAN member countries also agreed in principle at a Manila summit in 1999 that a common market and a common currency were "distinct possibilities". According to Khaw [2000], overdependence on the US dollar has created significant downside risks, as the Asian financial crisis has shown. He highlights that the crisis had triggered much thought on possible ways to avert a similar problem in the future, in which among the several proposals, the common currency has been identified as one of the meaningful solutions toward minimizing the exchange rate risks within the region and enhancing regional economic and financial stability.

4. Methodology and data

The study uses a two-tier empirical framework given the following problem statements:

1. Is the currency peg a long-term solution for foreign exchange risk management for Malaysia?
2. Would the adoption of a common currency effectively eliminate the volatility of exchange rates?

The two-tier empirical framework is as follows:

1. Using selected key economic indicators to examine the sustainability of Malaysian economic recovery for the period 1996-2001.
2. Developing a synthetic common currency and determining the extent of diversifiable risk in the ASEAN currencies.

Table 1. List of key economic indicators

A	Foreign reserves coverage on total external debt (FR/ED)	H	Annual GDP growth (% ΔGDP)
B	Foreign reserves coverage on total short-term debt (FR/SD)	I	Foreign direct investment against GDP (FDI/GDP)
C	Debt services against export (DS/X)	J	Quarterly volatility of foreign reserves (%ΔFR)
D	Current account balance against GDP (CA/GDP)	K	Fiscal balance against GDP (FB/GDP)
E	Inflation rate (INF)	L	Foreign reserves coverage on M2 (FR/M2)
F	Import/export ratio (I/X)	M	Volatility of ringgit value against currencies of major trade partners and competitors (σ_{RM})
G	Foreign reserves coverage on import (FR/I)		

Note: All indicators use quarterly data, except items E, G, and H (which are annual data) and item M (which uses daily data).

This study includes five major ASEAN member countries—Malaysia, Thailand, Indonesia, Singapore, and the Philippines (ASEAN 5)—and involved three analytical steps as follows:

a. To conduct a correlation analysis on the currencies of ASEAN 5 to determine whether the formation of synthetic common currency among them will generate diversifiable effect.

b. To conduct a simple diversification analysis by grouping ASEAN 5 currencies into an equally weighted portfolio as a synthetic common currency. This is to justify the existence of diversifiable effect on the foreign exchange risk by comparing the average standard deviation of the ASEAN 5 currencies and the standard deviation of the equally weighted portfolio.

c. To identify and quantify the level of diversifiable risk in the ASEAN 5 currencies. Here we employ the single-index model developed by William Sharpe to estimate the betas (b_i) of each individual currency. The single-index model for our purpose can be expressed in the following equation:

$$R_i = \alpha_i + \beta_i R_m + e_i \qquad (1)$$

where

R_i – the daily returns on currency i

R_m – the daily returns on the market portfolio (MP)

α_i – the portion of currency i's return that is independent from the market portfolio

β_i – a constant measure of the expected change in the dependent variable, R_i given a change in the independent variable, R_m

e_i – the random residual error

We use the daily returns of each individual currency for the period 1996-2001 as R_i while the R_m represents the average daily returns on composite indices of ASEAN 5's stock exchanges in the same period, namely Kuala Lumpur Stock Exchange (KLSE), Thailand Stock Exchange (TSE), Jakarta Stock Exchange (JSE), Singapore Stock Exchange (SGX), and the Philippines Stock Exchange (PSE). We use the stock market indices as a proxy for the market since the stock market is a leading performance indicator of the real economy. Of course, we also conduct a correlation analysis on the composite indices of these stock exchanges.

After estimating the betas, we proceed to identify the diversifiable risk in each currency. According to the general principle of portfolio management, the total risk (TR) of an individual asset can generally be separated into two major components: systematic risk and unsystematic risk. The systematic risk represents marketwide risk (MR), which is nondiversifiable in nature, while the unsystematic risk represents risks unique to the country, hence diversifiable (DR) as shown in equation (2). The market risk is represented by $\beta_i^2 \sigma_m^2$ while diversifiable risk is represented by σ_{ie}^2. As a result, we can determine the diversifiable risk of each currency by subtracting the market risk ($\beta_i^2 \sigma_m^2$) from the total risk (σ_i^2) as shown in equation (4). Finally, equation (5) quantifies the level of diversifiable risk (LDR).

Total Risk	$=$	*Market Risk*	$+$	*Diversifiable Risk*	
TR	$=$	MR	$+$	DR	(2)
σ_i^2	$=$	$\beta_i^2 \sigma_m^2$	$+$	σ_{ei}^2	(3)
DR	$=$	σ_i^2	$-$	$\beta_i^2 \sigma_m^2$	(4)
LDR	$=$	$[(DR) / \sigma_i^2]$	$\times$	*100%*	(5)

where

σ_i – stand-alone standard deviation of individual currency

β_i – Beta of an individual currency

σ_m – standard deviation of market portfolio

5. Results and implications

5.1. Is currency peg a long-term solution?

Analysis of the key economic indicators shows that Malaysia has been on the recovery track since the imposition of a currency peg while others show some uncertainties or adverse indications. Table 2 shows the performance of selected key economic indicators. For the purpose of this analysis, we classify January 1996 to June 1997 as the crisis period, July 1997 to August 1998 as the mid-crisis period, and September 1998 to December 2001 as the postcrisis period.

Table 2. Performance of key economic indicators

	Indicator	Performance	Impact
A	FR/ED	The foreign reserves coverage on the total external debt FR/ED ratio was consistently below parity. This implies that Malaysia relied significantly on external debt (see Exhibit 1).	Uncertain
B	FR/SD	The short-term external debt of Malaysia was well covered by foreign reserves with a favorable increasing trend (see Exhibit 1).	Positive
C	DS/X	The debt service ratio was also consistently maintained below the 6 percent level since the second quarter of 1999 except for the fourth quarter of 1999 (see Exhibit 1).	Positive
D	CA/GDP	The current account over gross domestic product ratio, CA/GDP, had recovered significantly from –4.00 percent in 1997 to 15.24 percent in 1999. The ratio had been maintained at 9.38 percent and 6.18 percent in 2000 and 2001, respectively, which are comfortable levels (see Exhibit 2).	Positive
E	INF	Malaysia had successfully controlled inflation within a range of 1.4 percent to 1.6 percent in the postcrisis period (2000-2001).	Positive
F	I/X	The import-export ratio, I/X, shows noticeable improvement compared to the precrisis period (January 1996 to June 1997), which was consistently maintained at above-parity level in the range of 0.74 to 0.86 in the postcrisis period (see Exhibit 3).	Positive
G	FR/I	The foreign reserves over import ratio, FR/I, which dropped below parity during the mid-crisis period, had improved to the level well above 1.40 since the third quarter of 1998 (see Exhibit 3).	Positive

Table 2 (continued)

Indicator		Performance	Impact
H	%ΔGDP	Malaysia had registered a positive GDP growth of 5.4 percent and 7.5 percent for 1999 and 2000, respectively. However, the GDP growth deteriorated sharply to 0.4 percent in 2001 due to the global economy slowdown arising from the September 11 incident.	Uncertain
I	FDI/GDP	The foreign direct investment over GDP ratio, FDI/GDP, declined significantly to a level below 4.0 percent since 1998. Although efforts had been taken to attract and retain the FDIs, the ratio, however, further deteriorated to 0.64 percent in 2001 from 4.22 percent in 2000.	Negative
J	%ΔFR	This indicator had shown high volatility. The standard deviation of the quarterly changes for foreign reserve had increased significantly from 0.0203 in precrisis period to 0.2059 in crisis period. Although the standard deviation had decreased to 0.0930 during the postcrisis period, it still demonstrates a significantly higher volatility than during the precrisis period (see Exhibit 4).	Negative
K	FB/GDP	Malaysia has adopted fiscal deficits since 1998 aimed at boosting the domestic economy as it is relatively lacking in foreign investment compared to the boom period before the crisis. As a result, the fiscal balance against GDP of Malaysia changed from −1.77 percent in 1998 to high levels of −5.79 percent and −5.54 percent in 2000 and 2001, respectively (see Exhibit 5).	Uncertain
L	FR/M2	Although the foreign reserves / M2 ratio had reached the 0.34-0.38 level in the period between the fourth quarter of 1998 and the third quarter of 2000, which was significantly higher than the precrisis level (a range between 0.27 and 0.31), it had returned to the level of 0.28 to 0.32 since the fourth quarter of 2000 (Exhibit 6). This development indicates that it is entering a volatile regime that may trigger the recurrence of currency crash.	Negative
M	σ_{RM}	Exhibit 7 shows the bilateral exchange rate of the ringgit against the euro[12] and selected Asian currencies. The volatility during the postcrisis period was significantly higher than during the precrisis period except that against the Thai baht. Among the bilateral exchange rates with high volatility, the daily return of nominal ringgit value against both rupiah and peso had demonstrated the highest jump in volatility (521 percent and 453 percent, respectively) while against other currencies it ranged from 47 percent to 88 percent.	Negative

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[12] The figure before January 1999 is basically a synthetic euro based on trade-weighted averages of the exchange rates of the eleven euro-area countries. Beginning January 1999, figures reflect observed Euro-RM exchange rates.

Several observations arise from the performance of key economic indicators:

1. The stability and certainty accorded by the currency peg and exchange control provide adequate room for prudent debt management, thereby improving the external liquidity position and reducing Malaysia's vulnerability to external shocks.

2. The introduction of the currency peg also further strengthened the sustainability of external trade surplus. Moreover, Malaysia maintained a marginal annual GDP growth despite the September 11 incident in the United States, which had forced Malaysia's growth to be negative both in the third and fourth quarters of 2001. However, the peg also implied heavy reliance on the US dollar's movement, which proved to be an unpleasant association at some point in time, depending on the stability of the dollar.

3. The Malaysian economy's recovery depended heavily on the expansionary policies adopted by the government with relative low inflation. However, lack of FDI inflows and continuous fiscal deficits may jeopardize the sustainability of the recovery.

4. Although the foreign reserves generally showed an increasing trend, the volatility of foreign reserves in the postcrisis period was significantly higher than that during the precrisis period.

5. A commitment to peg the exchange rate would reduce the flexibility of domestic monetary policy. For instance, the currency peg forces the ringgit to track the movement of the US dollar against other currencies in an exact style, a variable not determined by domestic fundamentals.[13]

6. The peg is also a reflection of weakening monetary independence. Malaysia is actually exposed to greater uncertainties as the conduct of the Malaysian monetary policy is now tied to the policies adopted by the US monetary authority.

7. Finally, the ringgit may become over- or undervalued against other currencies as the target currency moves.[14] This is because the ringgit

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[13] If the underlying economic fundamentals are significantly different, the pegged rate can become vulnerable to various modes of speculative attack.

[14] For the ringgit, the appreciation or depreciation of the dollar against other currencies (like the yen) may directly affect the ringgit value as well as the competitiveness of Malaysia's external trade.

peg stabilizes only the nominal value of ringgit against the dollar while it remains floating against other currencies. As other countries are both major trading partners and competitors of Malaysia, it is important to consider the stability of the ringgit against the currencies so as to profile Malaysia at a better competitive stance in international trades, attracting foreign investment as well as rationalizing the cost of foreign funds.[15]

The findings suggest that the currency peg of Malaysia lacks flexibility to be a long-term solution. Therefore, Malaysia needs to seek alternative long-term solutions to effectively manage its foreign exchange risk.

5.2. Would the adoption of a common currency effectively eliminate the volatility in exchange rates?

5.2.1. Correlation analysis and diversification benefits

Table 3 shows that the correlation coefficients between the daily returns of the ASEAN 5 currencies range from +0.3008 to +0.6551. As the correlations are all under +1.0, this implies that the combination of these five currencies into a portfolio to form a common currency would generate some degree of diversification effects, thereby reducing exchange rate risk as well.

Table 3. Pearson correlation coefficient among ASEAN 5 currencies

	RM	THB	IDR	SGD	PHP
RM	1				
THB	0.5582	1			
IDR	0.4908	0.4354	1		
SGD	0.6551	0.5640	0.4441	1	
PHP	0.3984	0.3774	0.3008	0.3771	1

[15] In fact, the recent episode of yen depreciation provides a good example in explaining this finding. This is because the continuous depreciation of yen has boosted a significant number of speculations on the revaluation of the ringgit, and most economists seem to agree that the ringgit-dollar peg will have to depreciate to RM 4.00 and above if the dollar-yen rate moves to ¥140 and above. In other words, a small percent appreciation of the ringgit against the yen would be sufficient to create significant pressure on the ringgit value and Malaysia's export competitiveness.

Table 4 shows that the volatilities (measured by the standard deviation) of RM, THB, IDR, SGD, and PHP are 0.9323, 1.1461, 3.006, 0.5004, and 0.9103, respectively, while the average stand-alone standard deviation of the five currencies is 1.2991. The standard deviation for the equally weighted portfolio is 1.0058, which is approximately 23 percent lower than the average stand-alone standard deviation. This result provides evidence on the existence of significant diversifiable risk that can be eliminated through formation of a simple basket of currencies. Hence, it also proves that the establishment of a common currency will effectively reduce the foreign exchange risk among the ASEAN 5 countries.

Table 4. Stand-alone standard deviation of individual currency and standard deviation for an equal weighted portfolio (1996 to 2001)

	RM	THB	IDR	SGD	PHP	Average of Stand-alone Standard Deviation	Standard Deviation of Equal Weighted Portfolio
Standard Deviation (σ)	0.9323	1.1416	3.0063	0.5004	0.9103	1.2991	1.0058

5.2.2. Diversifiable risk in each currency

We determine the beta of each individual currency by using the single-index model. The correlation analysis among the daily returns of the composite indices of ASEAN 5's stock exchanges shows that the correlation between the composite indices range from 0.313 to 0.493 (see Table 5). This means that these composite indices were moderately correlated for our observation period. We take the average daily return of these composite indices to represent the common market index, i.e., the R_m variable of the single-index model. Subsequently, we conduct regression analyses on the daily returns on each currency (R_i) against the R_m variable.

Table 5. Correlation coefficient among the daily returns of the composite indices of the ASEAN 5's stock exchanges

	KLSE	SET	JSE	SGX	PSE
KLSE	1				
SET	0.401	1			
JSE	0.376	0.399	1		
SGX	0.470	0.493	0.449	1	
PSE	0.313	0.397	0.359	0.440	1

Using the estimated betas (Table 6) and the standard deviations of the ASEAN 5 currencies (Table 4), we compute the diversifiable risk for each currency using equation (4). Using the stand-alone standard deviation as proxy for the total risk for each individual currency, which comprises both market risk and diversifiable risk, the computations show that all individual ASEAN currencies are expected to enjoy significant diversifiable risk against their original total stand-alone risk. The level of diversifiable risk is quantified using equation (5). The results are shown in Table 7.

Table 6. Betas for each ASEAN currency (1996 to 2001)

Currency	RM	Baht	IDR	SGD	PHP
Beta (β)	0.1981	0.2153	0.5961	0.0840	0.1881
σ_m^*			1.5879		

* Standard deviation of the average daily returns of the stock exchanges.

Table 7. Diversifiable risk of ASEAN currencies (January 1996 – December 2001)

	RM	THB	IDR	SGD	PHP
Market Risk	0.09895	0.11688	0.89595	0.01779	0.08921
Diversifiable Risk	0.77023	1.18637	8.14189	0.23261	0.73944
Total Risk	0.9323^2	1.1416^2	3.0063^2	0.5004^2	0.9103^2
Level of Diversifiable Risk	88.62%	91.03%	90.09%	92.89%	89.23%

As the data for daily returns of RM include the period after the currency peg, the results above may be different if we had considered the period before the currency peg. Therefore, we undertake a similar analysis for the period January 1996 to August 1998. Table 8 reports the beta and standard deviation for each individual currency for the period January 1996 to August 1998. Table 9 summarizes the results.

Table 8. Betas and standard deviation for each ASEAN currency
(January 1996 – August 1998)

Currency	RM	THB	IDR	SGD	PHP
Beta (β)	0.3827	0.3386	0.8755	0.1429	0.2496
Std Dev (σ^2)*	1.2933	1.5714	3.8101	0.6206	0.9956
σ_m**			1.6912		

* Standard deviation of the daily returns of each individual currency.
** Standard deviation of average daily returns of the stock exchanges.

Table 9. Diversifiable risk of ASEAN currencies
(January 1996 – August 1998)

	RM	THB	IDR	SGD	PHP
Diversifiable Risk	1.2537	2.1414	12.3246	0.3267	0.8148
Level of Diversifiable Risk	74.96%	86.72%	84.90%	84.84%	82.05%

By excluding the period after the imposition of the currency peg in Malaysia (September 1998 onward), the results show that the level of diversifiable risk is lower for all the individual currencies compared to the previous analysis that considered the whole 1996-2001 period. This is because the proportion of market risk was generally higher during the period between January 1996 and August 1998 as these countries had been facing currency crises since mid-1997. However, these levels of diversifiable risk (ranging from 74.96 percent to 86.72 percent) are still considered sufficient to provide evidence on the existence of significant diversifiable risk within the individual currencies.

In summary, the analysis provided evidence on the existence of diversification effects arising from the formation of an equally weighted common currency portfolio, comprising the five major ASEAN currencies. More important, the analysis demonstrates the existence of significant diversifiable risk in each currency, ranging from 88.62 percent to 92.89 percent of their stand-alone risk for the period 1996-2001 and from 74.96 percent to 86.72 percent of their stand-alone risk for the precrisis period (January 1996 to August 1998). Consequently, one can conclude that "participating" countries will be able to take advantage by reducing their exchange risk significantly through the introduction of a common currency.

6. Benefits and challenges of a common currency

While the European integration process is not necessarily a blueprint for other regions of the world, the introduction of and the relatively smooth transition to the euro shows the main ingredients for a successful regionalism. Hence the euro is an important reference for ASEAN in developing a common currency. In analyzing the impacts of the European Monetary Union, Rajan [1999] highlights that the benefits of common currency can be broadly divided into those that are microeconomic and those that are macroeconomic in nature. Microeconomic efficiency benefits include the elimination of exchange rate uncertainties, reduction in transaction costs, benefits of transparency, and enhanced competition and fortification of the regional product markets. Macroeconomic gains include those arising from increased price stability, greater macroeconomic discipline, and the economic advantages of a strong single currency. In addition, the stringent economic requirements[16] to join the euro area also discipline the nations, encourage structural changes, and liberalize the labor and capital markets of the participating countries.

While the most important issue of foreign exchange management is the volatility of the exchange rates, the adoption of a common currency may serve as a vehicle currency for all the participating countries, thereby effectively eliminating the volatility in the bilateral exchange rates. In fact, our results in the previous section provided evidence that the formation of a common currency can effectively reduce the foreign exchange risk among the ASEAN

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[16] The European Union has set out a number of requirements to qualify for membership in the euro area. The requirements include price stability, sustainable government finances, exchange rate stability, and long-term interest rate convergence.

countries. In addition, the introduction of a common currency is expected to encourage a deeper regional cooperation, which in turn will boost greater commitment among ASEAN countries to ensure the credibility of economic fundamentals. Accordingly, this can minimize the negative impacts arising from the volatility of third-party major currencies, such as the US dollar and the Japanese yen, and the ASEAN countries can have greater independence to manage their economies, as well as a stronger sustainability, i.e., through having a larger pool of foreign exchange reserves to battle various kinds of speculative attacks. As such, the usage of a common currency for trading purposes can eventually be expanded to safeguard regional financial stability and enhance the ability of the ASEAN countries to face the greater challenges of liberalization, globalization, and an integrating world economy.

Besides that, the most obvious and immediate benefit from the adoption of a common currency is the elimination of transaction costs between participating countries arising from the conversions between the national currencies.

In addition, a common currency will bring the participating countries to direct price comparisons. As a result, greater price transparency will prevail, thereby enhancing competition among business entities. This would foster competitive pricing practices that improve the competitive advantages and global appearance of the participating countries. In fact, this can help a developing country grow into a developed nation with various kinds of competitive qualification.

If the ASEAN countries are able to enjoy the efficiency benefits, it would gradually increase price stability, foster greater macroeconomic discipline and market integration within the region, and bring about various other economic advantages arising from the establishment of a strong single currency. But how certain is it that the ASEAN countries would enjoy the efficiency benefits or microeconomic benefits of a common currency? This will be partly answered by the trade openness among the regional member countries and their relative trade pattern. As shown in Exhibit 8, the average figures (1996-2001) show that around 25 percent of Malaysia's exports was directed to ASEAN countries while 21 percent of Malaysia's imports was channeled from ASEAN countries. Obviously, the adoption of a common currency among ASEAN countries will benefit Malaysia since intraregional trade is approximately a quarter of Malaysia's total external trade. In addition, although the trade pattern may not be exactly the same, Exhibit 9 shows that a significant portion of the external trade for Singapore, Thailand, Indonesia, and the Philippines is intraregional. Therefore,

the introduction of a common currency will surely benefit these countries as well.

Although a single currency has the potential to bring many economic benefits, there are also costs, which would be political and macroeconomic in nature. It may also involve social and technical costs that are relatively short term in nature, such as expenses incurred for the various transition stages of moving from multiple currencies to a single currency. One of the most important concerns from the perspective of potential participating countries is that a single currency will force a country to forgo an independent monetary policy and the supranational central bank will become the sole monetary policymaker. Limitations of the fiscal tools to influence domestic economy comprise the other major concern. The effects of this inflexibility will be more adverse if some participating countries were at the peak of a boom with others in recession.

Nevertheless, the successful launch of the euro has motivated other regions to put greater commitment toward realizing common currencies. For example, unlike ASEAN countries that have yet to formalize commitment and specify a tentative schedule for the introduction of a common currency, West African states have already pledged their commitment to the formation of a monetary union by 2004. This reflects the increasing global consensus on the claim that benefits of having a common currency exceed the costs while the monetary integration in the form of a common currency can coexist with political plurality. From another point of view, if the supranational central bank that oversees the currency union is not controlled by a single government, it will be easier for this central bank to focus on its primary objective, i.e., to control prices and fight inflation with prudent decision making and implementation of policies without unnecessary manipulation by politicians. Similarly, the participating countries can no longer use devaluations as part of their economic policy to gain advantage over other participating countries. Therefore, the adverse effects of intraregional competitive depreciation can be eliminated, and the participating countries are likely to have a stronger global appearance by focusing on improving their effectiveness and efficiency in delivering the best products and services to the rest of the world.

Although our analysis shows evidence that the common currency will effectively reduce the foreign exchange risk of the participating countries, the common currency itself is still exposed to the volatility of major currencies outside the ASEAN region such as the dollar, euro, and yen. Furthermore, the development toward a monetary union and the introduction of a common

currency may take a considerable period of time to materialize;[17] therefore, it is necessary to take some practical steps aimed at facilitating the foreign exchange risk management in the immediate future. As a result, it is necessary for the ASEAN region in general and the participating countries in particular to develop a proactive and dynamic mechanism as well as a market environment for the participants such as large corporations, small- and medium-business entities, financial institutions, private and public investors, and policymakers to manage foreign exchange risks in their respective levels. Developing effective and efficient derivatives markets would be among the important items on the agenda to achieve this objective.

Although the Malaysian financial derivatives market has experienced progressive development since the mid-1990s, the variety of derivatives products offered by MDEX remains very limited. Only five derivatives have been offered: Crude Palm Oil (CPO) Futures, Kuala Lumpur Stock Exchange Composite Index (KLSE CI) Futures, Kuala Lumpur Stock Exchange Composite Index (KLSE CI) Options, Three-Month Kuala Lumpur Interbank Offer Rate (KLIBOR) Interest Rate Futures, and Five-Year Malaysian Government Securities (MGS) Futures. None of the derivatives products is principally designed for the purpose of hedging foreign exchange risk. As a result, most of the corporations in Malaysia manage their foreign exchange exposure through other alternative channels such as currency forwards or swaps with banking institutions or through "homemade" methods such as balance-sheet hedges.[18]

As part of Malaysia's Capital Market Master Plan, which had been announced since early 2001, the Securities Commission highlights several objectives to ensure the continued relevance and long-term competitiveness

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[17] Bayoumi, Eichengreen, and Mauro [2000] find that on the economic front, ASEAN is generally less suitable for a regional monetary arrangement than the euro area was before the Maastricht Treaty, but the differences are not large. However, they comment that if the commitment to deeper monetary integration develops in Asia, it will then be necessary to put in place a mechanism to manage the transition. The key aspects of that mechanism would include introducing greater central bank independence, further enhancing wage and price flexibility, strengthening the financial sector, harmonizing monetary policy over the transition, and creating barriers to exit from the arrangement as well.

[18] If the company can take a position that offsets a foreign-denominated asset or liability on its financial statements, then it is possible that foreign exchange risk can at least be partially hedged. For example, a company with a foreign subsidiary that does business in a foreign currency could use some of the subsidiary's foreign-denominated revenues to pay some of its foreign-denominated expenses or debt repayment if any, thus minimizing the amount of currency exchange needed.

of the derivatives market. One of the objectives is to foster a market-driven approach toward the development of new products to encourage product innovation and facilitate proactive solutions to the investors' risk-management needs. Under recommendation 53 of the master plan, both KLOFFE and COMMEX (now called MDEX) are encouraged to actively pursue the introduction of more derivatives products aimed at fulfilling a variety of risk-management needs.[19] Therefore, the introduction of currency futures and options will be an appropriate and immediate step as there is a significant demand from the market participants to manage their foreign exchange risk arising from currency volatility.

7. Conclusion

This paper examined issues in managing foreign exchange risk in Malaysia. The currency peg imposed in Malaysia has significantly strengthened several important fundamentals arising from the stability of nominal ringgit value against the US dollar. However, the combination of currency peg and exchange control is not a comprehensive and long-term solution to effectively managing foreign exchange risk. This is because at least two major problems have remained unsolved. First, the currency peg forces the ringgit to track the movement of the dollar against other currencies in an exact style regardless of the domestic fundamentals. Second, the ringgit may become over- or undervalued against the currencies of the major trade partners and competitors as the dollar moves.

A central point for managing Malaysia's foreign exchange risk is to develop a long-term, comprehensive, and sustainable mechanism that reflects its actual risk profile and fundamentals. However, it is relatively insufficient if Malaysia moves toward one direction while neighboring countries move in another. This is because the contagion effect is still a major factor in triggering financial crises. As a result, it is relatively more effective and efficient if the foreign exchange management mechanism is developed through regional cooperation. Accordingly, an ASEAN common currency has been considered one of the directions for greater regional cooperation since the middle of the East Asian crisis. This suggestion is likely to become more popular as the European common currency has demonstrated a number of successful developments since 1999.

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[19] See "Capital market master plan 2001", Securities Commission of Malaysia, February 2001, 162, 164-165.

Although some empirical studies show that ASEAN countries have yet to qualify for a common currency from several viewpoints, this study showed that the ASEAN currencies are able to obtain diversification benefits by examining an equally weighted basket of currencies that reflects a synthetic common currency. Besides that, some qualitative aspects also support the creation of a common currency. Benefits include a significant volume of intraregional trades, larger pool of foreign exchange reserves to battle various kinds of speculative attacks, support from a number of ASEAN countries, and the increasing need to strengthen the global appearance of ASEAN countries for greater competitive advantage in facing the challenges of globalization and liberalization.

Finally, a complete and dynamic risk management environment is also crucial for various levels of the market participants such as large corporations, small and medium businesses, financial institutions, and institutional and individual investors to manage their foreign exchange risk. As a result, Malaysia should hasten moves to create awareness, develop the infrastructure of derivatives market, and more important, launch a greater variety of derivatives instruments that can help manage the foreign exchange risk in a proactive and timely basis.

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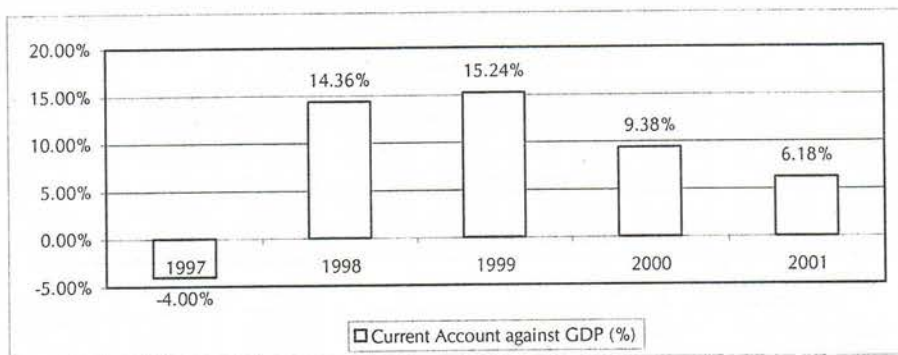
Appendices

Exhibit 1. Foreign reserves coverage on external debt (FR/ED), short-term external debt (FR/SD), and debt services ratio (DS/X)
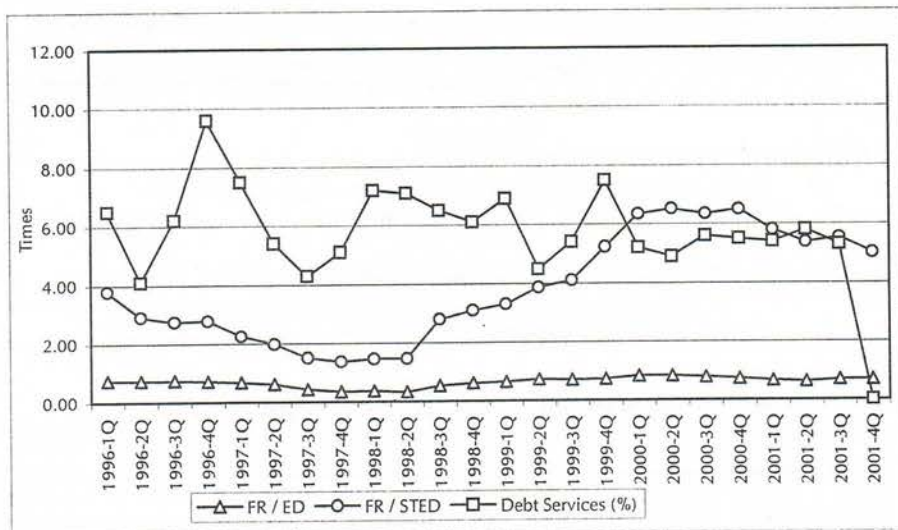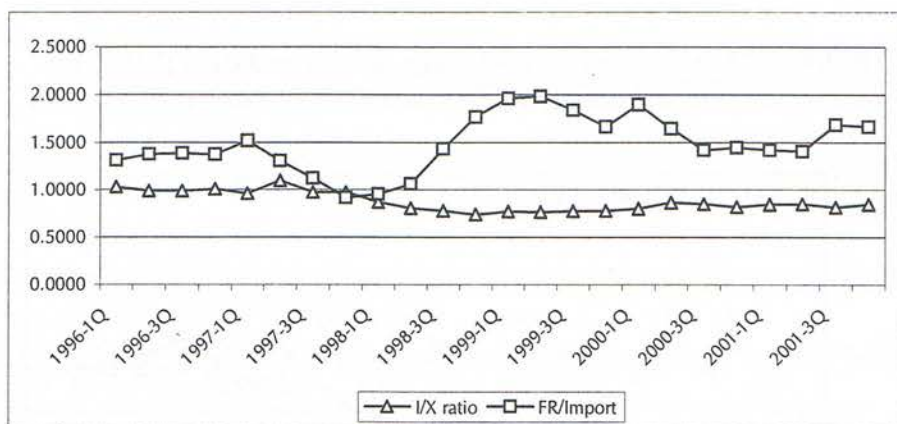

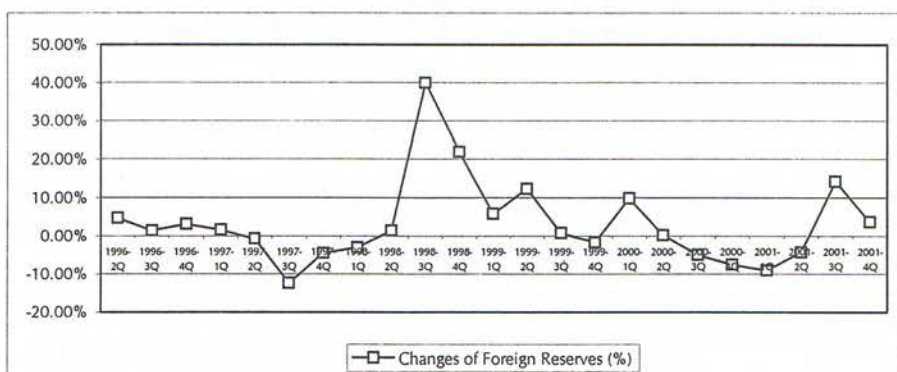Source: Bank Negara Malaysia official website, www.bnm.gov.my.

### Exhibit 2. Current account balance against GDP

Source: Bank Negara Malaysia official website, www.bnm.gov.my.

## Exhibit 3. Import-export ratio and foreign reserves coverage on import

Source: Bank Negara Malaysia official website, www.bnm.gov.my.

Exhibit 4. Quarterly changes of foreign reserves

Source: Bank Negara Malaysia official website, www.bnm.gov.my.

Exhibit 5. Fiscal balance against GDP
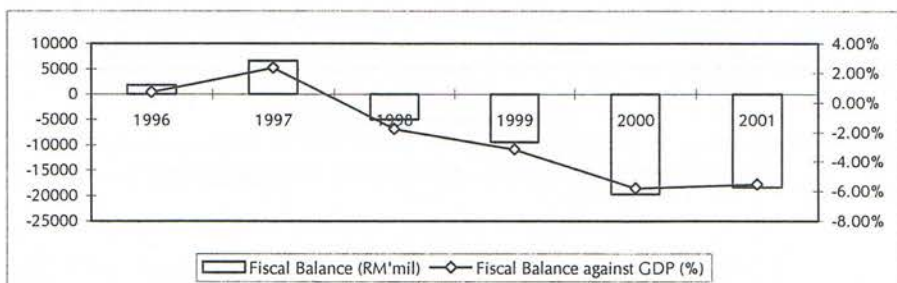
Source: Bank Negara Malaysia official website, www.bnm.gov.my.

Exhibit 6. Foreign reserves coverage on M2
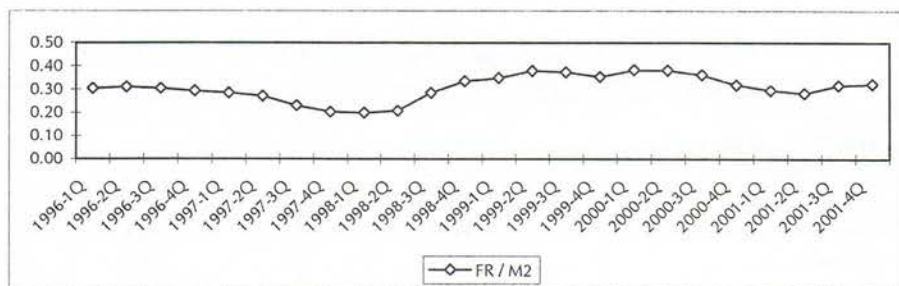
Source: Bank Negara Malaysia official website, www.bnm.gov.my.

Exhibit 7. Volatility of ringgit value against currencies of major trade partners and competitors

	JPY Yen	Euro	CNY Yuan	Korean Won	SGD Sing dollar	THB Baht	IDR Rupiah	PHP Peso
Precrisis	0.0058	0.0042	0.0019	0.0033	0.0023	0.0079	0.0037	0.0018
Mid-crisis	0.0165	0.0175	0.0170	0.0335	0.0124	0.0170	0.0457	0.0160
Postcrisis	0.0085	0.0075	0.0035	0.0062	0.0041	0.0053	0.0193	0.0082

Source: Historical data of daily exchange rates in 1996-2001, Pacific Exchange Rate Services, http://pacific.commerce.ubc.ca/xr/.

Exhibit 8. Direction of external trade of Malaysia

	1996	1997	1998	1999	2000	2001	Avrg	%
Export to:								
ASEAN	55,066	60,717	68,578	75,467	97,872	83,107	73,468	25.42
USA	35,822	41,124	62,130	70,391	76,579	67,672	58,953	20.40
Japan	26,378	27,484	30236	37,289	48,770	44,503	35,777	12.38
EU	26,998	31,944	46,432	50,522	51,019	45,502	42,070	14.56
Others	52,762	59,622	79,380	87,891	99,030	93,636	78,720	27.24
Total	197,026	220,891	286,756	321,560	373,270	334,420	288,987	100.00
Import from:								
ASEAN	39,201	44,958	30,237	58,072	74,612	63,168	51,708	20.86
USA	30,496	37,103	44,762	43,318	51,744	44,841	42,044	16.96
Japan	48,398	48,498	44855	51,803	65,513	54,002	52,178	21.05
EU	28,419	31,252	27,072	28,974	33,527	36,074	30,886	12.46
Others	50,766	59,125	81,383	66,310	86,063	82,606	71,042	28.66
Total	197,280	220,936	228,309	248,477	311,459	280,691	247,859	100.00

Source: Bank Negara Malaysia official website, www.bnm.gov.my.

Exhibit 9. Direction of external trade of ASEAN 4 countries

	Average Annual Figure (1996-2000) USD' Million	%
Export to:		
ASEAN 5 and Brunei	56,951	22.4
United States	42,147	16.6
Japan	33,155	13.0
European Union	39,238	15.5
Others	82,476	32.5
World	253,967	100.0
Import from:		
ASEAN 5 and Brunei	45,943	19.1
United States	36,855	15.3
Japan	46,715	19.4
European Union	33,242	13.8
Others	77,926	32.4
World	240,681	100.0

Source: ASEAN official website, www.aseansec.org.
Note: Year 2000 data of Thailand cover only January-September 2000.