

**EFFECT OF FINANCIAL FACTORS AND OPTIMUM
CURRENCY AREA ON REAL EXCHANGE RATE IN ASEAN-3
COUNTRIES**

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ON REAL EXCHANGE RATE IN ASEAN-3 COUNTRIES**

BY

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Othman Yeop Abdullah, Graduate School of Business

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ABSTRAK

Integrasi serantau telah menjadi subjek penting di kalangan ahli-ahli ekonomi dan di lihat mampu merangsang kerjasama kewangan serta aturan tukaran asing pada anggota negara ASEAN-3 seterusnya memperluaskan promosi koordinasi makro dengan sasaran utama untuk mengurangkan tahap pemeluapan makro ekonomi seperti pemeluapan kadar tukaran. Tujuan pembentukkan adalah untuk mengurangkan ketidaktentuan kadar tukaran dan mengelak ketidakselarasan kadar tukaran di kalangan anggota negara ASEAN. Kajian ini berhasrat untuk menyiasat tahap pengubah Kawasan Matawang Optima (OCA) dan Faktor Kewangan (FF) dalam konteks ASEAN-3 serantau dengan US Dollar digunakan sebagai matawang utama, juga kepentingannya sebagai rakan dagangan utama dengan negara ASEAN-3 serta menjadi matawang permintaan global. Secara amnya, kami mendapati beberapa pengubah faktor kewangan di dapati memberi sumbangan penting dalam menentukan perubahan kadar tukaran. Tambahan OCA memainkan peranan penting dalam menjelaskan kadar tukaran benar dagangan dua hala lagi.

ABSTRACT

Regional integration has become important subject among economists and is viewed capable of boosting monetary cooperation and foreign exchange arrangements among ASEAN-3 members thus promotes greater macro coordination, with the ultimate goal of reducing the extent of macroeconomics, such as real exchange rate. The purpose of the formation is to reduce exchange rate uncertainty and to avoid exchange rate misalignment among the ASEAN member countries. This research intends to investigate the extent of optimum currency area (OCA) variables and financial factors (FF) works within the context of ASEAN-3 countries with US Dollar used as anchor currencies, given their importance being major trading partners with the ASEAN countries and being the global demand currencies. In general, we found that several financial factors were found to have significant contribution on determining exchange rate variation. In addition, OCA variables have played an important role in explaining the bilateral real exchange rate.

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TABLE OF CONTENTS

	Page
PERMISSION TO USE	ii
ABSTRACT	iii
ABSTRAK	v
ACKNOWLEDGEMENTS	vii
APPROVAL	viii
DECLARATION	x
LIST OF TABLES	xiv
LIST OF FIGURES	xvi
LIST OF ABBREVIATIONS	xvii
CHAPTER	
1 OVERVIEW OF THE STUDY	
1.1 Introduction	1
1.2 ASEAN Exchange rate Regime	3
1.3 The Issues	5
1.4 Problem Statement	11
1.5 Objectives	13
1.6 Significance of Study	13
1.7 Scope of Study	14
1.8 Organization of Study	15
2 LITERATURE REVIEW	
2.0 Theoretical Literature	16
2.1 Theoretical Literature: Financial Factors	16
2.2 Theoretical Literature: Optimum Currency Areas Theory	19
2.3 Empirical Literature: Financial Factors	21
2.3.1 Domestic Financial Sector	21
2.3.2 Foreign Direct Investment (FDI)	22
2.3.3 Portfolio Investment (PI)	26
2.3.4 External Debt	29
2.3.5 Exchange Control	33
2.4 Empirical Literature: Optimum Currency Areas	35
2.4.1 Trade (Openness)	35
2.4.2 Growth Domestic Product (GDP)	37
2.4.3 Reserves	37
3 METHODOLOGY AND DATA	
3.1 Empirical Model	40
3.2 Estimation Procedure	44
3.2.1 Unit Root test	44
3.2.2 Phillips-Perron (PP) unit root test	45
3.2.3 Cointegration	45
3.2.4 Johansen and Juselius (JJ) maximum likelihood test	46
3.3 Data	48

4	RESULTS AND DISCUSSIONS	
4.1	Unit root tests	49
4.2	Cointegration test	52
4.3	Long-run Equation	55
4.4	Conclusion	58
5	CONCLUSIONS	
5.1	Summary	60
5.2	Conclusion	63
5.3	Policy Implication	64
5.4	Limitations of the Study	66
5.5	Suggestion for Further Studies	67
		68
	REFERENCES	

LIST OF TABLES

Table		Page
1.1	ASEAN-3 Economic Growth (GDP at constant prices; % change)	2
1.2	ASEAN-3 currency arrangements 1990, 1997, and 2001	4
4.1	Unit root test – Philips-Perron (1988) test for FF variables	50
4.2	Unit root test – Philips-Perron (1988) test for OCA variables	51
4.3	Cointegration tests – RER vs FF for ASEAN-3	54
4.4	Cointegration tests – RER vs OCA for ASEAN-3	54
4.5	Long run equation – RER vs FF	55
4.6	Long run equation – RER vs OCA	57
5.1	Summary of impacts on RER	62

LIST OF FIGURES

Figure		Page
1.1	Rupiah /USD Exchange rate	5
1.2	RM /USD Exchange rate	6
1.3	Rupiah /USD Exchange rate	6
1.4	Indonesia Rupiah Returns	7
1.5	Malaysia Ringgit Returns	7
1.6	Thailand Baht Returns	

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Introduction

The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967 in The Bangkok Declaration by the five original member countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined on 8 January 1984, Vietnam on 28 July 1995, Laos and Myanmar on 23 July 1997, and Cambodia on 30 April 1999. The ASEAN region has a population of about 542 million, a total area of 4.5 millions square kilometers; its total gross domestic product (GDP) in 2003 was US\$ 737 billion and a total trade of more than US\$ 790 billion.

Prior to the currency and economic crisis in 1997, ASEAN countries had recorded historically strong and impressive real economic growth for the past ten years since the late 1980s. On average, the real GDP growth rates for the ASEAN countries excluding Brunei in 1994 and 1995 were 7.6% and 7.9% respectively. Among the ASEAN member countries, the highest economic growth rate (in 1995) was recorded in Malaysia (9.5%), followed by Thailand and Singapore (8.7%), Indonesia (8.2%) and The Philippines (4.8%). From 1990 to 1997 ASEAN countries achieved higher economic growth than any others. They were viewed as model for advances in technology and economic improvement. Strong domestic consumption and investment plus large exports

due to widespread economic expansion in the industrial countries had been the major impetus for the ASEAN region's strong growth.

Table 1.1: ASEAN-3 Economic Growth (GDP at constant prices; % change)

Country/Year	2004	2005	2005	2006	2007	2008	2009	2010
Indonesia	5	5	6	6	6	6	5	6
Malaysia	6	7	5	6	6	5	-2	7
Thailand	7	6	5	5	5	2	-2	8

Note: *ASEAN - 3 relates to Indonesia, Malaysia, and Thailand
Source: ASEAN Statistical Yearbook 2011, ASEAN Secretariat

One of the important factors, being cited in the literature that believed as having large impact on this achievement is the role of openness. In other words, greater reliance on external sectors (i.e. imports and exports) has provided an impetus to the development process via industrialization

On the other hand, prior to July 1997 financial crisis, the exchange rates for most of the convertible ASEAN currencies were loosely tied to the US dollar. The Thai baht, although tied to a basket of currency, was effectively pegged to the US dollar at an exchange rate ranging around 25 baht. The Indonesian rupiah was subject to managed, gradual devaluation against the US dollar, in effect a moving peg, which drifted towards the 2,500 mark through the first part of 1997. The Malaysian ringgit was allowed to fluctuate more than the other three currencies, but still maintained a rough band of around 2.5 ringgit to the dollar. The currencies of the newer ASEAN members (with the exception of Myanmar) remain non-convertible.

Exchange rate stability is very important in order to enable macroeconomic stabilization goals. Economic theory suggests that real exchange rate misalignment, or departure from

its long run equilibrium rate, will negatively affect economic growth. It creates relative price uncertainty, adjustment costs and decreases the efficiency of resource allocation in domestic markets (Kemme and Tend, 2000). Hence, effort in stabilizing exchange rate will provide a conducive environment for business, by which the economic growth can be boost further. In contrast, exchange rate volatility is a cause of concern due to its ability to disrupt economic activities. In the international trade, the price of a country's currency plays a major role in determining the cost of its imports and exports. Since, some South-East Asian countries rely heavily on external sectors i.e. exports and imports, currency fluctuations may have a significant impact on commercial trade flows.

1.2 ASEAN Exchange Rate Regime

While ASEAN was growing in membership, the entire East Asian region, including the ASEAN countries was experiencing miraculous economic growth. From the 1960s to 1996 East Asia's growth averaged about 8% a year, which was higher than the growth experienced by most industrial, well developed countries during that period. This dynamic economic progress, often termed the "East Asian miracle," collapsed however with the 1997 East Asian financial crisis. This crisis exposed the fragile nature of the financial and banking systems of East Asia. Through the "contagion effect" the currency crisis spread from Thailand to Indonesia, to Malaysia and to the Philippines. Other ASEAN countries were also affected negatively. In order to combat these effects of the crisis, economic integration became a necessity in the ASEAN region. Before 1997 most East Asian countries had pegged their currencies to the dollar or Yen, but during the crisis they were forced to float their currencies. Since then, many economists have

debated about the perfect exchange rate regime for the East Asian countries. Floating the currency, pegging the currency to the dollar, yen or euro, forming an internal basket peg, and even forming an ASEAN monetary union are the many options that economists and policymakers are considering.

Table 1.2 summarizes ASEAN-3 currency arrangements in 1990, 1997, 2001, and their monetary policy positions in 2001, as recorded at the IMF.

Table 1.2: ASEAN-3 currency arrangements 1990, 1997, and 2001

	Fixed to a single currency	Fixed to a composite	Managed float	Convertibility	Monetary policy 2001
Indonesia			1990,1997, 2001	Partial	Fund supported/other
Malaysia	2001	1990	1997, 2005	Partial	Exch. rate anchor
Thailand		1990,1997	2001	Partial	Inflation target/fund supported/ other

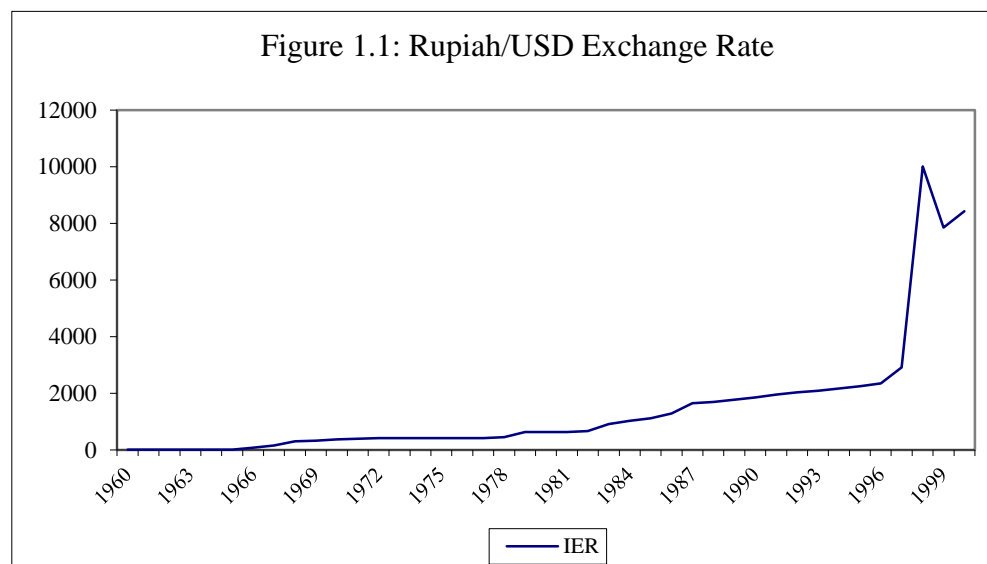
Source: *International Monetary Fund, International Financial Statistics*, various years.

Compared to Europe in the mid-1970s when the first steps in exchange rate cooperation were being put in place after the breakdown of the Bretton Woods system of fixed exchange rates, one is struck by the variety of Asian foreign exchange regimes and monetary policies. In 1990 and 1997 Indonesia is officially managed floating and the Indonesian rupiah seems to be managed in terms of a crawling basket peg to allow the currency to depreciate steadily over time to offset a domestic inflation rate which persistently exceeds that of its competitors. Thailand, on the other hand, officially operated a multi-currency basket peg prior to the crisis but in practice pegged quite

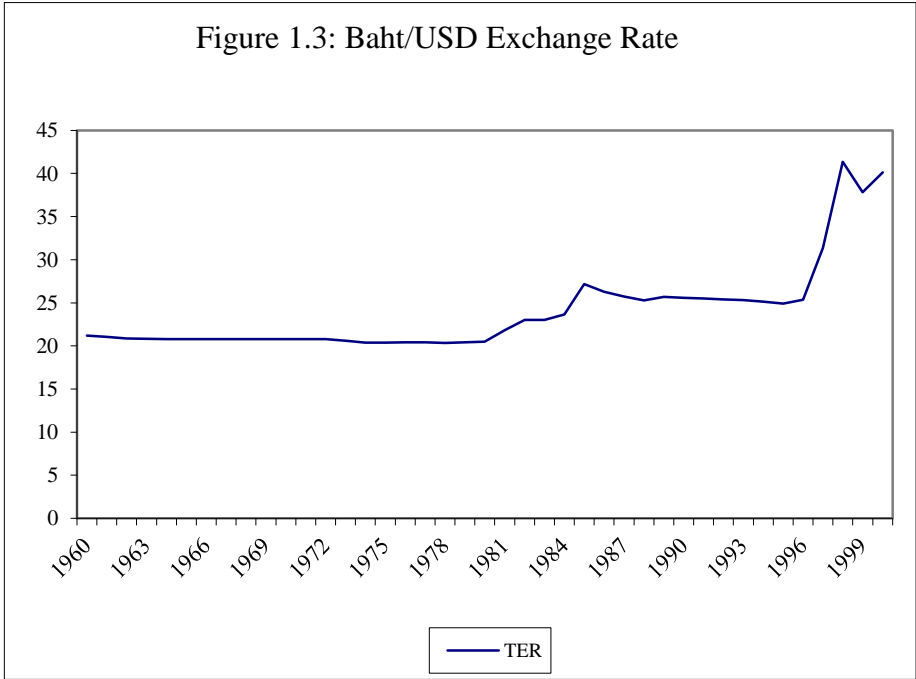
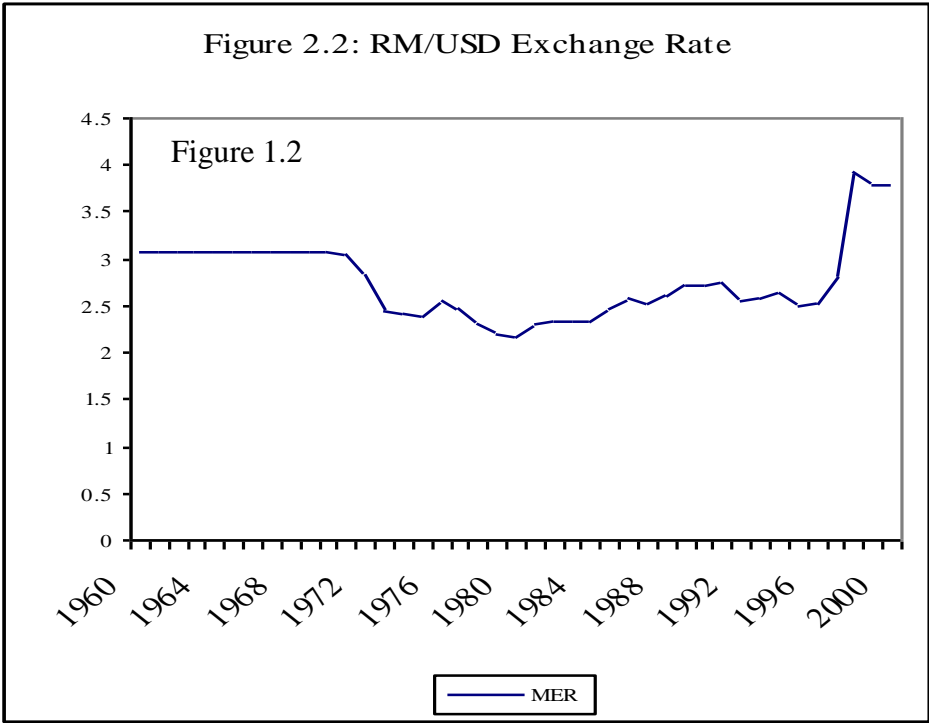
closely to the dollar, ostensibly to maintain export competitiveness. Moreover, during the Asian crisis it there was substantial exchange rate volatility in ASEAN. Malaysia had devalued by about 50 per cent. Of the crisis countries, Indonesia displayed the highest volatility against the dollar and had devalued massively.

1.3 The Issues

ASEAN economies generally prefer to follow more flexible exchange rate regime after the collapsed of Bretton Wood system. However, in spite of the adoption of a crawling peg exchange rate regime¹ in the period after the breakdown of the Bretton Woods system, the ASEAN-3 nations still experienced substantial exchange rate volatility as evidenced in the following Figure 1.1 – 1.6.



¹ Crawling peg regime is the regime in which currency is pegged, but not necessarily cannot be changed.



Between 1974 and 1999, the Indonesian rupiah was the most volatile, while the Singapore dollar was the least variable (Hurley and Santos, 2001, Jason and McPhee, 2001). This phenomenon can be seen from the plots of the change of foreign exchange rates for Indonesia, Malaysia, and Thailand, which are given in Figure 1.4 – Figure 1.6.

Figure 1.4 – Figure 1.6: Change of each ASEAN exchange rates

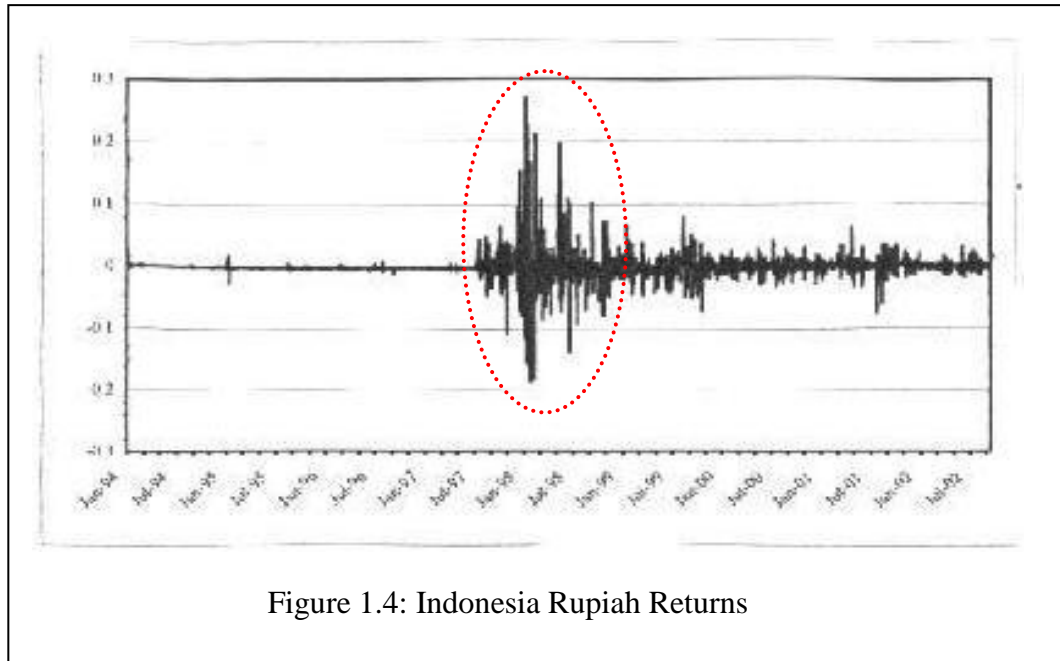


Figure 1.4: Indonesia Rupiah Returns

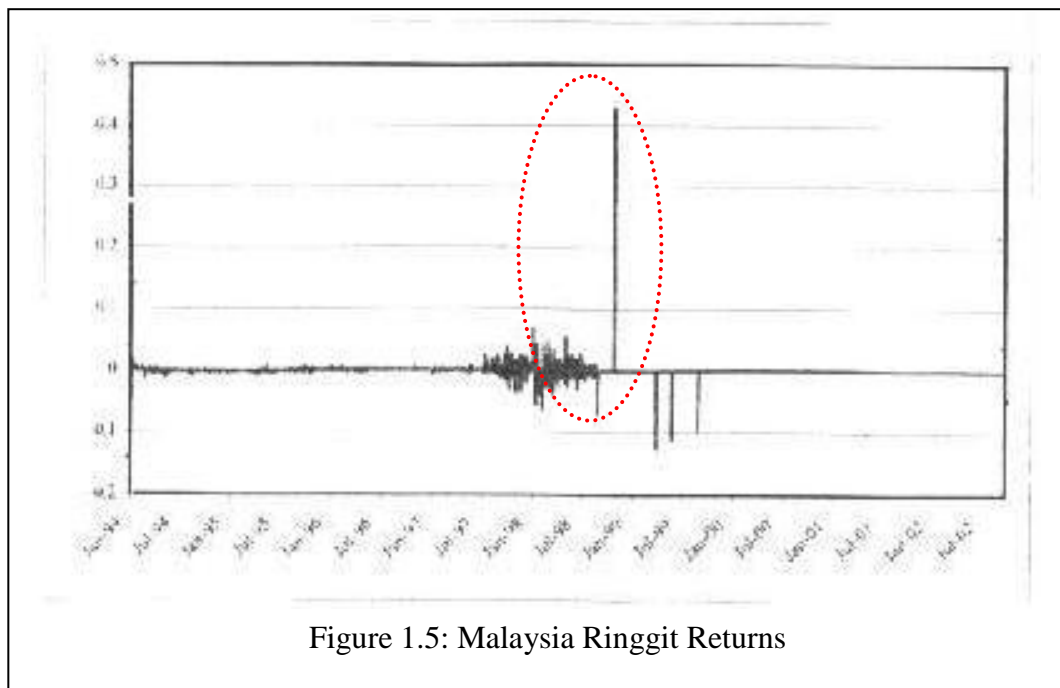


Figure 1.5: Malaysia Ringgit Returns

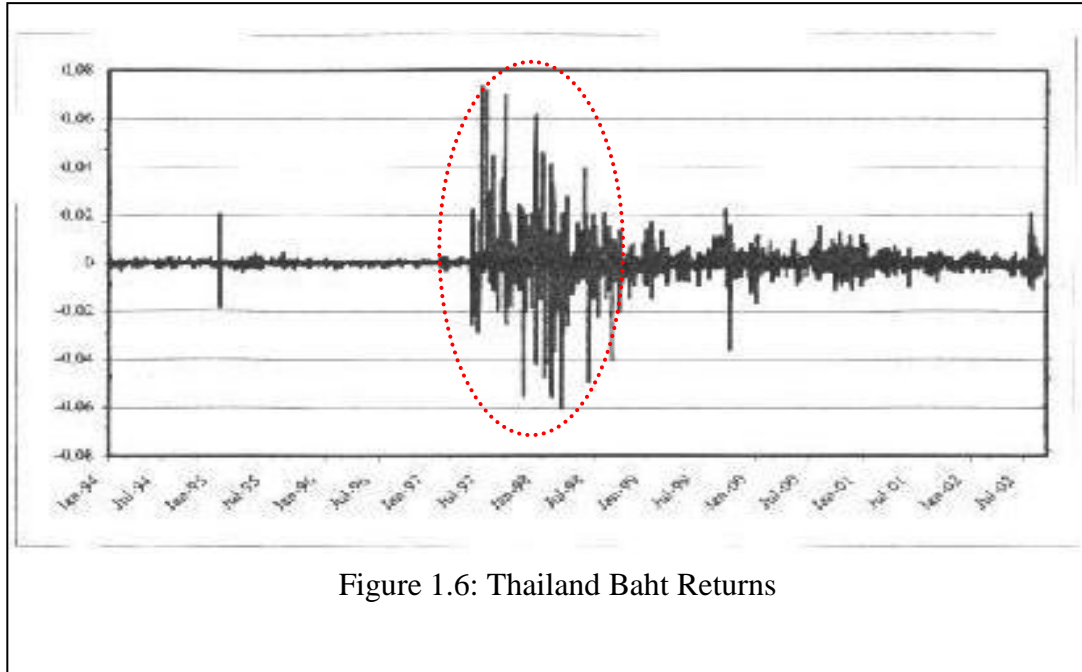


Figure 1.6: Thailand Baht Returns

Source: Nam and McAleer (2002).

Changes in the value of foreign exchange rates are given as:

$$\Delta ERV = \frac{ER_t - ER_{t-1}}{ER_{t-1}}$$

where ER_t denotes the foreign exchange rate denominated in US dollars, expressed in levels at time t . Devaluation (revaluation) is represented by an increase (decrease) in ΔERV .

The Indonesia Rupiah seems to be the most volatile currency in ASEAN-3, especially after the Asian crisis, which reflects the economic and political upheavals plaguing the country. From the figure, the largest devaluation of the Indonesia rupiah was by 27 percent at observation 1049, which corresponds to the share market crash of 18.5 percent in mid-afternoon trading. Post-Asian crisis, the Malaysia ringgit was pegged to the US dollar. Outliers observed after the crisis indicate pegging adjustments made by Bank

Negara, Malaysia's central bank. The largest adjustment to the US Dollar peg is at observation 1258, which is a 42.9 percent downward revision of the ringgit (Chee and McAleer 2002).

The Thailand baht appears to have the largest number of outliers, which is evident during the crisis period. Thailand has been labeled as the first ASEAN-3 country to experience the crisis when speculators attacked the baht on 14 and 15 May 1997, after the government failed to make payments on foreign debt. Comparing the pre-crisis and post-crisis foreign exchange rate volatility, the Indonesia rupiah, the Philippines peso and the Thailand baht reflect higher ex post volatility.

Greater exchange rate volatility increases uncertainty over the return to the investment and profit expectation. Potential investors will invest in a foreign location only as long as the expected returns are high enough to cover for the currency risk. Thus, foreign direct investment will be lower under higher exchange rate volatility. Heavy fluctuation in the bilateral real exchange rates of the major currencies will have an immediate impact on the real wealth of the ASEAN countries.

The 1997 Asian financial crisis had led to the deterioration of the relative price competitiveness of ASEAN countries, thus contributing to a deterioration of their external accounts, and may have eventually led to the currency crises. The exchange rate arrangement that emerged after the collapsed of Bretton-Woods has always been criticized on the grounds that it does not have a mechanism to reduce or regulate

excessive exchange rate fluctuations among the world currencies. A substantial amount of research has been carried out on the effects of volatility of a country's own real exchange on certain macroeconomic variables. McKinnon and Ohno (1997) argue that excessive exchange rate volatility and persistent misalignments can depress trade flows, distort investment decisions, and misallocate the outsourcing locations chosen by multinational firms. For instance, exchange rate volatility can reduce the volume of international trade by creating uncertainty about the profits made from international transactions and also restrict the international flow of capital by reducing both direct investment in foreign operating facilities and financial portfolio investment. Increased exchange rate volatility may also lead to higher prices for internationally traded goods by causing traders to add a risk premium to cover unanticipated exchange rate fluctuations.

Caballero and Corbo (1989) showed that higher volatility of the real exchange rate hurts exports in a large group of developing countries. Recent and stronger evidence of a negative impact of exchange rate volatility on trade flows can be found in Arize et al. (2000) and Dell'Ariccia (1999). Larrain and Vergara (1993) showed that real exchange rate volatility hurts the rate of private investment in emerging Asia, while Darby et al. (1999) found that exchange rate uncertainty will depress investment under certain condition and if this condition does not hold, it may not depress investment in developed countries.

1.4 Problem Statement

Coordinating macroeconomic is very important policy especially in the context of regional integration such as the Association of Southeast Asian Nations (ASEAN) Free Trade Area (AFTA). The purpose of regional integration itself is actually to boost monetary cooperation and foreign exchange arrangements among ASEAN members in order to promote greater macro coordination, and with the ultimate goal of reducing the extent of macroeconomics volatility, such as exchange rate volatility (Frankel and Wei, 1993). The purpose of the formation is aimed to reduce uncertainty, i.e. exchange rates, among ASEAN members and consequently, intra-trade and intra-investment among its members can be promoted.

Given its important in promoting regional prosperity, the issue of how we could reduce the extent of exchange rate volatility should be put in the first place. The recent regional financial crisis has renewed calls for greater monetary integration and regional exchange rate stability in South-East Asia (SEA). One of the proposals raised during the 1998 by the former Philippines' President Estrada at the ASEAN Ministerial Meeting in Hanoi was the idea of having a common currency and exchange rate system in the region. The successful launch of the Euro in early 1999 makes a common currency particularly interesting option for both ASEAN and East Asia (Zhang et al., 2004). In the November 1999 meeting of the ASEAN, further emphasis had been given on this issue and urged the 10 ASEAN members to work harder to achieve their target of having a common

market, single currency and one community (Asia Now, 1999, Hurley and Santos, 2001). Over the long run, as South-East Asia move towards realization of a monetary union, the resulting stability in exchange rate environment could pave the way for better growth prospects and prosperity in South-East Asia.

In short, exchange rate volatility is currently a critical challenge to the ASEAN economies especially Indonesia, Malaysia and Thailand. High exchange rate volatility will be an unfavorable phenomenon to the ASEAN countries because it can aggravate the problem of external debt, reduce the domestic investment resources and ultimately distort the country's economic growth and development. In the light of the above discussion on the serious implications of high exchange rate volatility amongst ASEAN countries and the recent currency and economic crisis, it is important to conduct a study on exchange rate volatility focusing on the factors affecting the choice of exchange rate regimes in selected ASEAN countries hence policy measures can be derived in order to reduce or control the problem.

Considering the United States is the major trading partners with the ASEAN countries and being the global demand currencies, we therefore focus on the bilateral exchange rate between the developed nations (i.e. United States) and other ASEAN economies, namely; Indonesia, Malaysia and Thailand.

Therefore, this study attempts to answer several questions such as 'what factor(s) can contribute towards having more stable exchange rate (if not fix)', and 'given difficulty in forming the currency area, what type of effort can we proceed with to gain from the

variability in the exchange rate’ as well as ‘which economic activities are being affected by real exchange rate’.

1.5 Objectives

The general objective of this study is to examine the factors affecting the choice of Real Exchange Rate among the selected ASEAN-3 countries.

The specific objectives of this study are:

1. to justify the existence of Financial Factors’ role on the choice of real exchange rate.
2. to investigate the impact of OCA criteria on the choice of real exchange rate.

1.6 Significance of Study

In spite of the abundant literature on the effects of exchange rate variability macroeconomic variables, therefore very few studies that had attempted to examine the effect of factors affecting the choice of real exchange rate among the selected ASEAN countries in relation to the bilateral exchange rate with US. By conducting this study, shed light to us may able to get the answer and suggest the possible choice of exchange rate regime that suit to each ASEAN economies.

On the other hand, given the difficulty in having stable exchange rate regime, we attempt to suggest the area in which we have to focus on to ensure that our economy can

still benefit the most. This will be very useful for policymakers to chart out future actions in tackling the exchange rate volatility issue effectively.

Finally, the impact of exchange rate volatility on several macroeconomic variables, such as trade, investment and debt are taken separately. In this study, we attempt to examine the effect of exchange rate volatility within a dynamic framework.

1.7 Scope of Study

For the purpose of this study, (3) three of the ASEAN countries are selected, namely Indonesia, Malaysia and Thailand. The choice is based on the relevance of the possibility of establishing an exchange rate arrangement among its members and the fact that these countries are the developing economies. The geographical layout of ASEAN countries showing that they are neighbors in reality makes the member countries very effective in implementing any regional policy particularly on financial matters.

1.8 Organization of Study

The organization of study is as follows. The following chapter provides historical economic background of the selected economies and highlights all key economic indicators' trend in the past. Chapter Two will review the theoretical framework and empirical studies regarding the choice of exchange rate regime and the variability factors. Chapter Three provides detail information about (empirical) model specification, while it will then followed by the estimation techniques and data collection procedure. Chapter Four presents the empirical results of the analysis and interpretation of the results. Finally, Chapter Five provides the summary of this study and policy implications and recommendations.

CHAPTER 2

LITERATURE REVIEW

This chapter will focus on the theoretical and empirical review on financial factors and Optimum Currency Areas which provides different framework for analyzing the various links between financial factors and Optimum Currency Areas and real exchange rate.

2.1 Theoretical Literature: Financial Factors

Bulíř and Šmídková (2005) provided a theoretical framework regarding the adoption of the euro in the new European Union (EU) accession countries into three views. First, the euro skeptics argue for opting out. However, all the new accession countries had accepted the obligation of eventual euro adoption. Second, the euro optimists argue that the Exchange Rate Mechanism and the subsequent peg vis-à-vis the euro can be accomplished easily with little or no economic cost. Sustainable real exchange rates are estimated using economic fundamentals. They used net external debt, net foreign direct investment (FDI), and domestic and external demand variables. In such a model, real exchange rate appreciation/depreciation manifests itself primarily in larger/smaller accumulation of external liabilities. Just like any model of equilibrium real exchange rates, this approach provides model-specific results that differ from those based on alternative approaches. Model uncertainty remains high in their approach, as the existing literature does not offer a consensual model of equilibrium exchange rate determination.

Branson and Healy (2004) developed the basis for monetary and exchange rate coordination in Asia as part of a package of monetary integration that could support growth and poverty reduction. This could be achieved directly through coordinated exchange rate stabilization, and indirectly through the implications of this for reserve pooling and investment in an Asian development fund and through development of the Asian bond market. The paper constructs currency baskets and real effective exchange rates (REERs) for the countries in the region. Since their trade patterns are quite similar and their policies are already implicitly coordinated, their REERs tend to move together. This means that ASEAN and China are already moving toward integration in practical effect.

Chang and Velasco (1998) studied financial fragility, exchange rate crises and monetary policy in an open economy model in which banks are maturity transformers as in Diamond-Dybvig. The banking system, the exchange rate regime and central bank credit policy are seen as parts of a mechanism intended to maximize social welfare. If the mechanism fails, banking crises and speculative attacks become possible. They compare currency boards, fixed rate and flexible rates, with and without a lender of last resort. A currency board cannot implement a socially optimal allocation and in addition, under a currency board bank runs are possible. A fixed exchange rate system may implement the social optimum but is more prone to bank runs and exchange rate crises than a currency board. Larger capital inflows enhance welfare if the no-run equilibrium occurs, but may also render the economy more vulnerable to self-fulfilling runs. A flexible rate system

implements the social optimum and eliminates runs, provided the exchange rate and central bank lending policies of the central bank are appropriately designed.

Hoti (2002) discussed the flows of international capital to developing countries that have fluctuated substantially over the last three decades. Empirical evidence concerning the main causes of international capital flows is, in general, mixed. There is strong support for the ‘push’ view that external factors have been important in driving capital inflows to emerging markets. However, the apparent importance of ‘push’ factors does not preclude the relevance of ‘pull’ phenomena. ‘Pull’ factors may be necessary to explain the geographic distribution of capital flows over time. During 1970–1990, international capital flows were mainly in the form of bank lending directed to governments and/or to the private sector. In the 1990s, capital flows took the form of foreign direct investment (FDI) and portfolio investment (PI), including bond and equity flows. The purpose of the paper is to examine the nature of foreign direct investment and portfolio investment, both of which help to finance investment and stimulate economic growth in the developing world.

Caves (1982) and Agarwal (1980) provided comprehensive reviews on FDI theory focusing on structure variables, such as market sizes and differences in capital return. Most of these studies conclude that devaluation in the value of the recipient country’s currency stimulates the inflows of FDI and conversely an appreciation leads to a reduction. Fundamentally, there are two channels through which exchange rates impact FDI: the wealth effect and relative production costs. Devaluation in the currency of a country receiving FDI induces a reduction in local production costs in term of foreign

currency, raising the profits of export-oriented foreign investors accordingly. Higher returns naturally attract more FDI inflows.

Benassy-Quere (2001) examined the trade-off between exchange rate depreciation and its volatility in terms of their effects on FDI, and argued that the negative impact on FDI of excessive volatility could erode the apparent attractiveness resulting from currency depreciation.

2.2 Theoretical Literature: Optimum Currency Areas Theory

McKinnon (1963) argued that highly open economies also qualify for OCA since a common currency is very important for their stability and prosperity. The benefits of monetary unification in terms of reducing the uncertainty related to exchange rate variations are more significant for areas that trade extensively with foreign regions. On the other hand, a greater volume of trade implies that a larger share of foreign goods is brought on the domestic market. Thus, in two economically integrated regions, each possessing its own currency, the variation of the exchange rate is strongly correlated with the dynamics of domestic prices. In the extreme situation in which all goods are inter-regionally tradable, prices in one region are heavily influenced by the level of prices in the second region. Therefore, expansionary monetary policy in one region cannot be used as a tool for influencing the terms of trade between the two regions. In a word, the gains of having an independent fiat currency in terms of “tuning” the economy are small (Glavan, 2004). Monetary unification allows international businessmen to save the currency conversion costs. It also reduces the uncertainty over currency exchange

rates and supposedly enhances worldwide trade. Hence, the higher level of intra-trade between two countries, or the higher the trade intensity within certain region, the higher possibility or validity of forming OCA.

The OCA literature has stressed that if participating countries of a monetary union face similar shocks, the costs of forgoing the exchange rate as a shock absorbing mechanism are likely to be reduced. On the other hand, the retention of the exchange rate as an independent policy instrument is crucial if a country faces mainly asymmetric shocks (Ling, 2001). In Mundell's paradigm, policymakers balance the saving in transactions costs from the creation of single money against the consequences of diminished policy autonomy. The diminution of autonomy follows from the loss of the exchange rate and of an independent monetary policy as instruments of adjustment. That loss will be more costly when macroeconomic shocks are more "asymmetric" (for present purposes, more region- or country- specific), when monetary policy is a more powerful instrument for offsetting them, and when other adjustment mechanisms like relative wages and labor mobility are less effective (Eichengreen, 1997).

The existing theory of OCA, primarily relate to the choice of exchange rate regime, also tend to focus on variables that do not change very much over time which is termed as country specific variable. Size is intended to proxy for the microeconomic benefits of exchange rate stability in which smaller countries should be more reluctant to tolerate fluctuations in the nominal exchange rate. Benigno (2004) investigates how monetary policy should be conducted in a two-region general equilibrium model with monopolistic competition and price stickiness. This framework delivers a simple welfare

criterion based on the utility of the consumers that can be used to evaluate monetary policy in a currency area. If the two regions share the same degree of nominal rigidity, the terms of trade are completely insulated from monetary policy and the optimal outcome is obtained by targeting a weighted average of the regional inflation rates. These weights coincide with the economic sizes of the region. If the degrees of rigidity are different, the optimal plan implies a high degree of inertia in the inflation rate. But an inflation targeting policy in which higher weight is given to the inflation in the region with higher degree of nominal rigidity is nearly optimal.

2.3 Empirical Literature: Financial Factors

2.3.1 Domestic Financial Sector

Julian (2005) asked what key roles do macroeconomic and financial variables play in the foreign direct investment (FDI) decision of firms? This question is addressed in this paper using a large panel data set of cross-border Merger & Acquisition (M&A) deals for the period 1990–1999. Various econometric specifications are built around the simple “gravity model” commonly used in the trade literature. Interestingly, financial variables and other institutional factors seem to play a significant role in M&A flows. In particular, the size of financial markets, as measured by the stock market capitalization to GDP ratio, has a strong positive association with domestic firms investing abroad. This result points to the importance of domestic financial conditions in stimulating international investment during the boom years of 1990s, and accorded with the significant drop in cross-border M&As in recent years.

Anders (2005) argued that during Sweden's nineteenth-century modernization, Enskilda bank contributed to economic expansion and integration by providing generally accepted means of payment beyond what would have been possible for the central bank, the Riksbank. The Riksbank was constrained by specie convertibility requirements for Sweden's currency. Contrary to previous arguments, however, the Enskilda banks did not operate according to free banking theory. The Enskilda banks held Riksbank notes instead of specie as base-money reserves. This arrangement led to a higher supply of formal liquidity than what would have been the case with either a free banking system or a pure deposit based commercial banking system. The consequence for Sweden was a rapid rate of monetization and financial deepening.

2.3.2 Foreign Direct Investment (FDI)

Jordaan (2005) presented new statistical evidence on foreign direct investment (FDI) induced externalities in Mexican manufacturing industries for 1993. The new empirical results are important in three respects. First, the size of technological differences between FDI and Mexican firms is positively related to positive externalities, indicating the importance of sufficient scope of potential externalities, incentives to make externality-facilitating investments and the absence of negative competition effects. Second, geographical concentration is identified as a structural determinant of positive FDI externalities. Finally, the effect from FDI cleared from the influence of technological differences and agglomeration is the creation of positive externalities, especially when endogeneity of the foreign participation variable is controlled for.

Bartys et al. (2005) provided the description and presentation of the actuator benchmark used in fault diagnosis studies within the DAMADICS European Research Training Network presented in the papers of this special issue. The benchmark system is openly available and where it is FDI method-independent and based on an in-depth study of the phenomena that can lead to likely faults in valve actuator systems. The study used a detailed consideration of the physical and electro-mechanical properties of an intelligent industrial actuator and includes typical engineering requirements of an actuator valve operating under challenging process conditions, e.g. provision of a set of performance indices for evaluating the results. The industrial application is focused on the sugar factory Cukrownia Lublin SA, Poland.

Pak and Park (2005) investigated the key determinants that distinguish the investment behavior of Japanese manufacturing companies in two general regions (East and West) and two specific countries (China and the United States) in order to identify the underlying global strategic motives of Japanese investment. The West was preferred by Japanese firms that belonged to competitive domestic industries and that also had aggressive foreign ownership strategies. When China and the US were compared, additional variables, such as initial entry time and an industry's resource-intensiveness were found to influence the geographic choices of Japanese firms. A marginal effect of Japanese firms' R&D activities on the selection of location was also observed. Overall, an examination of different investment behaviors has allowed us to identify the global strategic approaches of Japanese firms in the two regions. Internalization theory, a knowledge-based view, and the OLI paradigm complemented each other in explaining the geographic preferences of Japanese firms.

Hosseini (2005) argued that the explanation of foreign investment decision (FDI) need not lie outside the realm of economics, for it can be explained using the attributes of behavioral economics. Behavioral economics, which tries to improve the assumptive realism of economic theory, and objects to the neoclassical acceptance of the simplistic economic model of rational agents exhibiting optimizing behavior, is certainly capable of explaining the decision of multinational enterprises making investment decisions when they face the complex and uncertain international environment. It is in this spirit that he had tried to model the FDI decision using the attributes of behavioral economics. However, before presenting this behavioral economics model of FDI decisions, he discussed the problems that neoclassical economics faced in explaining the new reality of FDI/international production after World War II, when neoclassical economists utilized the unrelated arbitrage theory of portfolio flows to explain it. He also did Stephen Hymer's critique of that attempt, and his attempt to explain FDI decision, which helped it move outside of the realm of economics. He reviewed and discussed the various FDI theories that emerged, after the 1960 dissertation of Hymer, in the works of Dunning, Buckley, Casson, Markusen, and others presented as transaction cost, internalization and the eclectic theories of foreign direct investment. While praising the contributions of these theories, he argued that they are inferior to the behavioral economics based model he developed in this model.

Wei (2005) explored the determinants of inward FDI in China and India and the causes for their huge difference. He first used random-effect models to analyze separately the determinants of FDI from OECD countries in China and India, and then applied the

Oaxaca-Blinder decomposition to examine the causes of the differences. It was found that China's much higher FDI from OECD countries was mainly due to its larger domestic market and higher international trade ties with OECD countries. India, however, had advantage in its cheaper labor cost, lower country risk, geographic closeness to OECD countries and cultural similarity.

Zhang (2005) argued that while the European Union, the US and Japan (the Triad) supply 90% of global foreign direct investment (FDI) and China is the second largest FDI recipient in the world, most FDI into China did not come from the Triad but from Hong Kong and Taiwan (HKT). Evidence presented in the paper revealed that the unusually large amount of Hong Kong-Taiwan direct investment (HKTDI) cannot be fully appreciated without understanding China's location characteristics and differences between HKTDI and the Triad FDI. Four determinants of the dominant HKTDI in China are identified: China's export-promotion FDI strategy, its large pool of cheap labor, HKT's specific advantages in export-oriented FDI, and their unique links with China (the Chinese connections). Empirical results suggest that HKTDI was primarily motivated by low labor costs while FDI from the Triad was market-oriented. As China's domestic markets become more open to foreign investors, the share of HKTDI may shrink and the importance of FDI from the Triad may rise.

Yussof and Ismail, 2002 found that the impact of foreign direct investment within the ASEAN 4 countries goes well beyond a simple listing of directly associated investment, employment output and export statistics. By any standard, it has been a decisive source of knowledge transfer in technology, management know-how, an enhanced ability to

exploit international market trends and participate in global investment trends and financial expertise. Such competitiveness provides not only a fundamental source of comparative advantage for countries but a central rationale for international investors in the modern global economy. FDI has thus been a major force in the transformation of the ASEAN 4 economies and has positioned the countries as significant players in the global business environment.

2.3.3 Portfolio Investment (PI)

Liljeblom and L'oflund (2005) investigated the determinants of foreign portfolio investment flows into a market on which restrictions for foreign investments were removed in 1993, the Finnish stock market. During their research period, the relative share of the Finnish stock market owned by foreign investors had grown rapidly and was in December 1998, 53% of the total market value of the listed shares. Using company-specific data on the degree of foreign ownership, we report that foreign investment flows are above all significantly related to variables related to (i) investment barriers, as proxied by the variables; Dividend yield, Liquidity, and firm size, and (ii) profitability or risk related variables. Additional analysis of subsequent portfolio performance did not provide robust evidence of apparent informational differences, which would result in either group (foreign or domestic investors) systematically outperforming the other.

Goldstein and Pauzner (2004) looked at two countries that have independent fundamentals, but share the same group of investors. Each country might face a self-fulfilling crisis: Agents withdrawing their investments fearing that others will. A crisis in

one country reduces agents' wealth. This makes them more averse to the strategic risk associated with the unknown behavior of other agents in the second country, increasing their incentive to withdraw their investments. Consequently, the probability of a crisis there increases. This generates a positive correlation between the returns in the two countries. Since diversification affects returns in their model, its welfare implications are non-trivial.

Phengpis and Swanson (2004) extended the study of international portfolio diversification benefits in two dimensions. First, it is based on shares, assets actually available for investment, rather than on national indices, and second, it incorporates long-term measures into the decision-making process. Basic findings include the following: (1) evaluating diversification gains based on indices overstates actual attainable benefits, (2) including consideration of long-term relationships can improve diversification gains, and (3) investing in emerging and developing markets does not provide benefits of the magnitude found in earlier studies covering earlier time periods.

Durham (2004) examined the effects of foreign direct investment (FDI) and equity foreign portfolio investment (EFPI) on economic growth using data on 80 countries from 1979 through 1998. The results largely suggest that lagged FDI and EFPI do not have direct, unmitigated positive effects on growth, but some data are consistent with the view that the effects of FDI and EFPI are contingent on the 'absorptive capacity' of host countries, with particular respect to financial or institutional development. Moreover, extreme bound analysis (EBA) significant results indicates that the estimates are robust compared to other empirical studies on growth.

Levy and Lim (1994) examined the gains to the US investor from international diversification of investment portfolios through portfolio strategies that hedge and strategies that do not hedge exchange rate risk via the inter-bank forward market. Using the Sharpe Performance Index and stochastic dominance as performance measures, almost all the unhedged strategies outperformed the hedged strategies for 1985-93; the opposite held for 1981-84. The results are explained by the biasedness of forward rates in predicting future spot rates.

Bailey et al. (1992) applied a formula for the optimal hedge in a mean-variance framework to an investment in the Nikkei 225. It is shown that through hedging U.S. investors can construct a portfolio long in the Nikkei whose dollar excess return has the same volatility as the yen excess return of the Nikkei. There seems to be little gain from improving estimates of the exposure of the Nikkei to the dollar- yen exchange rate; in contrast, the performance of portfolios can be enhanced substantially by obtaining better forecasts of exchange rate changes.

Dooley and Isard (1991) argued that trade balances and exchange rates may be quite responsive to changes in the relative attractiveness of locating production facilities or storing other 'taxable' forms of wealth in different countries. This suggested that there are at least three important channels through which fiscal policy changes may be transmitted to exchange rates. It is argued that a country-oriented analysis of asset choice, as distinct from the traditional currency-oriented portfolio balance framework, may be important for understanding the behavior of exchange rates.

Stockman and Dellas (1989) argued that incomplete international portfolio diversification is implied by an equilibrium models of exchange rates with non-traded goods. The model can also explain the greater correlation between consumption and income within a country than between consumption across countries. Non-traded goods make more stringent the elasticity conditions required to explain exchange rate variability resulting from current productivity disturbances though not from disturbances to fiscal policies or the prospective return to investment. The model is also consistent with international real interest rate differentials, changes over time in the current account and relative wealth across nations, and observed time-series properties of exchange rates.

2.3.4 External Debt

Torras (2003), who applied Martinez-Alier's (1993) "ecological debt" concept to the problem of debt relief, exploring the possibility of compensatory transfers from rich to poor countries based on existing ecological balances. He employed recent estimates on ecological footprints and ecosystem values to estimate the ecological debt to be distributed among eligible transfer recipients—all less-developed countries (LDCs). The results provide a policy criterion for transfers in the event that future circumstances make large-scale international debt relief compulsory. The study probably underestimates the appropriate transfer amounts because of conservative assumptions regarding the environmental values and the size of the north's ecological debt in physical terms.

Senhadji (2003) this paper analyzed the borrowing behavior of a small open economy of a less developed countries (LDCs) that relies heavily on imports for its capital formation and faces an upward sloping supply function of foreign loans, in an environment where decision makers face uncertainty about the longevity of external shocks. First, a dynamic general equilibrium model is developed which replicates fairly well the business cycle properties of the LDC data. Second, it is shown that uncertainty concerning the longevity of shocks (a relevant type of uncertainty, especially for LDCs) generated forecast errors that are auto-correlated in a way that is similar to Bayesian learning in the “peso problem.” This auto-correlated forecast errors can generate substantial debt accumulation. Third, it is shown that the assumption of an upward sloping supply function of foreign loans, which is a more realistic assumption for LDCs than the usual perfectly elastic one, offers an alternative to the Uzawa type utility function for the analysis of asset accumulation in the small open economy framework.

Hishow (2001) raised a question as to whether Russia would default on her sovereign domestic debt in the aftermath of the August 1998 crisis, for its huge external liabilities. Creditors worry about the possibility that Moscow will try to confront them either with a unilateral moratorium or will try to achieve an “infinite” debt restructuring. The latter would eventually mean the same since the original claims would not be serviced, but kept on the books whereas written off claims get erased. Given the economic resources of that country such a solution cannot be recommended despite some voices that Russia needs even more aid. To relieve the debt service burden the West should, however, agree to reschedule the payments.

Forslid (1998) analyzed the effect of external government borrowing in a small open economy version of the Diamond model with endogenous growth. Contrary to earlier results from the closed economy version of this model, Ponzi-games are growth and welfare-enhancing. Intuitively, the growth rate of the economy works as the planner's time discount factor. If a country can borrow at a rate less than this, it will increase welfare for all generations except the initially old generation whose welfare is unchanged.

Ellis (1996) examined the effect of fiscal adjustments on the steady-state rate of inflation when the government is externally indebted. It is shown that the effect of such adjustments depends on the real exchange rate movements associated with each method used to reduce the budget deficit, since real exchange rate movement deduced the feedback to the government budget.

Cohen (1995) analyzed the optimal rescheduling strategy of lenders whose claims on a country show a discount on the secondary markets. The paper showed that lenders should proceed as follows. They should split the debt into two components: a performing and a nonperforming part. They should act 'as if' the debt amounted to the performing part and scale down how much money the borrower should service on that part only. As a result it is shown that the (efficient) servicing of the debt crowds-in investment. The paper relates this result to the 'debt overhang' argument according to which too large a nominal claim may reduce investment and the market value of the debt.

Nishimura and Ohyama (1995) analyzed the optimal borrowing or lending plan of a small open economy with some market power in the world capital market. The country's external debt in the long-run stationary equilibrium is shown to be an increasing function of her rate of time preference. The optimal borrowing or lending path may become monotonic or oscillatory depending on the nature of the interest cost schedule the country faces. The dynamic response of the economy to various exogenous disturbances is also examined.

Raheem (1994) addressed some of the major issues in external debt management from the point of view of a borrowing country. It has been found that frequent occurrence of debt and debt-servicing problems among less developed countries (LDCs) can be traced to poor debt management. Despite the awareness of the need to develop an effective debt management capability and formulate specific debt management policies, formal debt models have yet to enjoy wide application in many African countries. Whereas there are many debt management systems which debtor countries can adopt, most African countries are not using them because of several constraints. An analytical framework which can be used to formulate sound debt management policies is proposed and applied using Nigeria as a case study.

Boyce (1992) studied the private citizens of a number of Third World countries accumulated substantial external assets in recent decades via capital flight. At the same time their governments incurred large external debts. This paper proposes a classification of hypothetical linkages between capital flight and external debt

disbursements, and examined the strength of these linkages in the Philippines during 1962-86. Econometric analysis and anecdotal evidence indicate that large sums of capital flowed into and out of the Philippines through a financial revolving door. On this basis, he concluded that there is scope for political and legal challenges to the legitimacy of a substantial fraction of the country's external debt.

Aizenman (1991) analyzed the welfare effects of a conditional debt relief in the presence of partial defaults. Even for an economy in a state of partial default, external finance for investment in highly trade-dependent sectors may be warranted. A marginal relief of the present debt service, conditional on an equivalent increase in investment in the trade-dependent sectors, will benefit the debtor and will increase the future repayment. Investment targeted towards highly productive trade-dependent sectors will benefit both creditors and debtors. The investment can be implemented by a marginal relief of the present debt service, or through direct investment.

2.3.5 Exchange Control

Exchange control can be explained as a system whereby a country tries to control money within its borders. From simple to complex policy changes, it can be characterized as a government initiated system to control currency fluctuations through interest rates, bonds, laws, money printing, and many more. According to Root (1984), exchange controls can be motivated by different reasons: (a) the suppression of balance of payments disequilibria; (b) the facilitation of national planning; (c) the protection of

national industries; (d) and the creation of government revenues. The main concern of exchange controls has always been the balance of payments and the scarcity of foreign exchange. Exchange controls were also used as an instrument of development policy in the context of national planning. The most visible example of such strategy is the import substitution industrialization. The use of exchange controls as a source of government revenues was particularly important to finance government expenditures.

One argument against invoking outflow exchange controls in crisis as against inflow exchange controls in booms period, is that the former are notoriously difficult to enforce (Edwards, 1999a). IMF (2000) describes Malaysia's controls as effective, with little evidence of the development of traditional channels for evasion: trade mis-invoicing, illegal forex market or non-deliverable forward market. Morgan Stanley (1999) suggest this largely was due to the Ringgit's undervaluation relative to regional currencies, which made circumvention less attractive. Even in the initial months after September-1998, however, when the Ringgit's undervaluation was not obvious, illegal financial transactions were found limited due to the unavailability of willing onshore counterparties (IMF, 2000).

2.4 Empirical Literature: Optimum Currency Areas

Bayoumi and Eichengreen (1998) show that variables pointed to by the theory of optimum currency areas (OCAs) help to explain patterns of exchange rate variability and intervention across countries. But OCA considerations affect exchange market pressures and intervention in different ways. Exchange market pressures mainly reflect asymmetric shocks, while intervention largely reflects the variables that OCA theory suggests cause countries to value stable exchange rates (small size and the extent of trade links). Intervention and exchange market pressure also vary with the structure of the international monetary system.

2.4.1 Trade (Openness)

There are several studies investigated the determinants of exchange rate volatility also not necessarily on ASEAN case. Hviding et al. (2004) provides various possible explanatory variables based on previous studies. They classified them into four categories. The first category is macroeconomic variables such as growth, inflation, and fiscal balance to GDP ratio. These variables capture confidence factors that may affect market sentiment and were used in the Canales-Kriljenko and Habermeier (1999) and Christofides et al. (2003) studies, among others. The second category is volatility of fundamentals, such as terms of trade and money supply. The first variable was employed in the Canales-Kriljenko and Habermeier (1999) study. The monetary volatility variable captures any influence from frequent changes in monetary stance, which according to

the monetary theory of the exchange rate could be an important factor influencing the volatility in the nominal exchange rate (Deveraux and Lane, 2003). The third category is variables related to the choice of exchange rate regime which is fall into several types. First, a dummy was used for the choice of exchange rate regime, based on a de facto classification of Reinhart and Rogoff (2002). Second, variables that are presumed to be related to the choice of exchange rate regime were introduced such as trade openness, domestic financial deepness, and economic size, which are based on Devereux and Lane (2003). Finally, proxy of foreign exchange market intervention. The measure for market intervention was constructed by calculating the annual volatility of monthly changes in reserves, constructed in a similar way as exchange rate and monetary volatility (Hviding et al., 2004).

In contrast, Bauwens et al. (2005) who sheds new light on the mixture of distribution hypothesis by means of a study of the weekly exchange rate volatility of the Norwegian krone, find that the impact of information arrival on exchange rate volatility is positive and statistically significant, and that the hypothesis that an increase in the number of traders reduces exchange rate volatility is not supported. The novelties of their study consist in documenting that the positive impact of information arrival on volatility is relatively stable across three different exchange rate regimes, and in that the impact is relatively similar for both weekly volatility and weekly realized volatility. It is not given that the former should be the case since exchange rate stabilization was actively pursued by the central bank in parts of the study period. They also report a case in which undesirable residual properties attained within traditional frameworks are easily removed by applying the log-transformation on volatilities.

2.4.2 Growth Domestic Product (GDP)

Devereux and Lane (2003) present a theoretical model where the choice of exchange rate flexibility is based on optimal currency area considerations with credit constraints. The theoretical results are then tested against a large cross-section of industrial and developing countries, using averages of monthly data from January 1995 to September 2000. Besides financial variables, they also include OCA variables such as trade, cycle and country size. They find that all of these variables play a significant role in determining the bilateral volatility of the exchange rate. Country size is proxied by GDP.

2.4.3 Reserves

Kim et al. (2005) investigated the effects of the Reserve Bank of Australia's foreign exchange interventions on the USD/AUD market and 90-day and 10-year interest rate futures markets for the period July 1986–December 2003. Using recently released revised and updated intervention data, they investigated contemporaneous and disaggregated intervention influences and find significant evidence for (i) intervention effectiveness in moderating the contemporaneous exchange rate movements especially if interventions were cumulative and large, (ii) exchange rate volatility reducing effect with a day's lag, (iii) undesirable interest rate movements following interventions in some periods compromising monetary policy effectiveness, and (iv) a volatility reducing effect of cumulative interventions in the 90-day rate, and a volatility increasing effect of large interventions in both the 90-day and 10-year rate futures. These findings are

unique and significant contribution to the prevailing literature as they demonstrate that the RBA's interventions matter not only for the foreign exchange market but also for the debt markets.

Miller (2005) argued that recently the central bank of China lent part of its enormous reserve of foreign exchange to two of its largest banks in difficulty. This seemed to be a very clever policy response since the capital infusion did not affect the money supply nor sacrifice the currency peg as has traditionally been the case. This paper considered the viability of this policy and asks why other Southeast Asian countries with large reserves of foreign exchange did not adopt a similar approach to combat their bank problems in the 1990s.

Fujiki (2003) and Freeman (1996) showed that an elastic money supply enhances the efficiency of monetary equilibrium by clearing default-free debts at par value in the domestic credit market. This research added a foreign exchange market to Freeman's model and extends his analysis into a two-country model, in which the arrival rates of agents are not equal between the two countries. In this model, an elastic money supply in the foreign exchange market to clear the exchange of monies at gold standard parity, accompanied by an elastic money supply in the domestic credit market, could improve the efficiency of monetary equilibrium.

Cristopher (2003), based on the recent currency crises have focused attention on models of currency crises. Although many models exist, few focus on intermediate exchange rate systems, and fewer describe the interplay between regime choice and vulnerability

to crisis. This paper embedded a target zone model (typifying many intermediate regimes) into a first-generation currency crisis model. This paper showed that an inverted S-curve (where a targeted exchange rate is more volatile than its underlying fundamentals) is generally inconsistent with a viable target zone because such a regime would collapse upon speculative attack. This paper described conditions where a policymaker could ensure a target zone would weakly stabilize exchange rates and thereby maintain short-run viability.

Robert et al. (1998) argued that many Latin American countries appear locked into cycles of reserve loss, devaluation and temporary reserve gains. This paper showed how a dual exchange rate system with leakages may generate cycles in reserves and the premium between official and parallel exchange rates. They studied the dynamics of these cycles and their asymptotic behavior both analytically and numerically.

CHAPTER 3

METHODOLOGY AND DATA

In this chapter provide detail information about the empirical model, while it will then followed by the estimation techniques and data collection procedure.

3.1 Empirical Model

Theoretically, other macroeconomic determinants which have influence on the rear exchange rate regime can be discussed as follows:

- i. External debt: most of transition countries have no opportunity to borrow on the domestic markets, and thus external debt is growing, the phenomena of ‘fear of floating’ arises: countries are afraid to float and possibly devalue their currencies as it will increase their foreign debt in the local currency; thus the greater external debt has a negative effect on the flexibility of the regime;
- ii. growth rate: higher growth in transition countries is basically driven by the international demand; as a result higher growth rate leads to more flexible arrangements needed to offset the possible negative shocks of external demand; higher growth rate has a positive impact on the flexibility of the regime;
- iii. foreign direct investment inflows: large foreign direct investment creates a pressure for the government to maintain the fixed arrangement not to devalue profits of international investors and not to make them leave the country; the significance of

this effect greatly depends on the government's wish to hold the attracted investors; the foreign investment inflows provide the international currency inflows and liberalizing the flexible arrangements with transparent economic fundamentals can justify to retain foreign investment. Therefore foreign direct investment inflows have a positive effect on the flexibility of the arrangement.

- iv. Financial development: other determinant having influence on real exchange rate regime (RER) can be measured by the economic development indicator, that is financial development measure (proxied by the broad money M3): higher degree of financial development provides more instruments and more motivation for speculative attacks on the peg, for that reason financial development is expected to have positive influence on the flexibility of the regime. On the other hand, the economy regulation (deregulation) measure is another point worth to ponder. It does not have any direct effect on the regime choice, but it affects the propensity to use exchange rate policy as a supportive to the fiscal policy; we expect the fiscal effect to increase and credibility effect to diminish with the increase in regulation of the economy.

The existing theory of optimum currency area (*OCA*) relate to the choice of exchange rate regime and also tend to focus on variables that do not change very much over time which is termed as country specific variable. Devereux and Lane (2001) proposed size which is calculated from the interaction between two countries' GDP. Size is the log of the product of the GDPs of i and j . Size is intended to proxy for the microeconomic benefits of exchange rate stability in which smaller countries should be more reluctant to tolerate fluctuations in the nominal exchange rate.

The determinants of exchange rate regime are the *OCA* factors and can be explained as follows:

- i. openness of the country (defined as the trade or imports): this measure shows the exposure of the country to the nominal shocks from the outside, hence greater openness leads to the need of nominal protection, increasing the probability of choosing the fixed arrangement; so it has a negative impact on flexibility
- ii. economic flexibility and factor mobility (proxied by GDP), the greater economic mobility provides faster and less painful adjustment to the real shocks but require regulatory framework towards real shock protection by flexible exchange rate regimes; as a result economic flexibility will have positive effect on the exchange rate flexibility.

Our model specification with the most basic equation in which RER is explained as follows:

$$RER_t = \beta_0 + \beta_1 FF_t + \varepsilon_t \quad (3.1)$$

where *FF* is a financial factors. After decomposing *FF* into their respective components or proxies, we got the following augmented empirical model:

$$ERR_t = \beta_0 + \beta_1 \ln DF_t + \beta_2 \ln FDI_t + \beta_3 \ln ED_t + \beta_4 \ln PI_t + \varepsilon_t \quad (3.2)$$

where domestic financial ($\ln DF$), foreign direct investment ($\ln FDI$), external debt ($\ln ED$) and portfolio investment ($\ln PI$) are the financial factors entered in the log form. Among the developing countries that domestic financial development helps to stabilize the exchange rate, for instance by facilitating intertemporal smoothing by households and firms or adding liquidity to financial markets including the foreign exchange market (Deveraux and Lane, 2003). The anticipated impact of DF on RER is positive since developing country with high level of financial development also subject to variation in the level of exchange rate. Domestic financial sector is proxied by liquid liability ($M3$).

The impact of external financial sector on RER is dependent on the type of capital flows. If the inflow is FDI , the expected impact is positive given the fact that liberalizing flexible arrangement can encourage retain foreign investment. Similarly, the role of external debt is also expected to have a negative impact on RER (Devereux and Lane, 2003). However, the impact cannot be interpreted directly, but rather in the word of Fear of Floating (Calvo and Reinhart, 2002). In other words, the higher the external debt, the more fear would be on the large swing of exchange rate.

Accordingly, the developing countries would try to reduce the level of RER . In contrast to FDI , the flow of portfolio investment may exert a positive impact on RER since its fluctuating will also lead to fluctuation in demand for foreign exchange. In addition to financial sector, we also attempt to investigate the role of exchange control as well as the restriction of currency trading outside the country on RER .

Therefore, our second empirical model specification will become:

$$RER_t = \phi_0 + \phi_1 OCA_t + \varepsilon_t \quad (3.3)$$

where *OCA* is a optimum currency area. After decomposing *OCA* into their respective components or proxies, we got the following augmented empirical model:

$$RER_t = \phi_0 + \phi_1 \Delta trade_t + \phi_2 \Delta GDP_t + \varepsilon_t \quad (3.4)$$

where $\Delta trade$ is a openness of the country (defined as the trade) and ΔGDP is a economic flexibility and factor mobility (proxied by GDP). Both of that independent variables are *OCA* factors.

3.2 Estimation Procedure

3.2.1 Unit root tests

The first requirement in estimating time series model is that the variables must be stationary. There are two classical unit root tests, namely the Augmented Dickey-Fuller or ADF test (Dickey and Fuller, 1981; Said and Dickey, 1984) and the Philip-Perron or PP test (Phillip and Perron, 1988) that provides convenient procedures to determine the univariate time series properties of time series data. Both of these tests are based on the null hypothesis that a unit root exists in the time series. The ADF procedure requires homoscedastic and uncorrelated errors in the underlying structure. On the other hand, PP

test is a nonparametric test that generalizes the ADF procedure and allow for less restrictive assumption. Hence, it will be eliminating any nuisance parameters.

3.2.2 Phillips-Perron (PP) unit root test

This test was introduced by Phillips and Perron (1988) by making some modifications of the Dickey-Fuller t-statistic. The PP test account for possible relationship in the first-differences of the series using the non-parametric correction as an alternative to the inclusion of lag variables. In short, the PP test introduced a procedure to solve the problem of large size equations by undertaking non-parametric correction to test statistic to account for auto-correlation. The test also allow for the presence of a non-zero mean and a deterministic linear time trend.

The null hypothesis of this test is the series is non-stationary which contain unit root against the alternative that the series is stationary.

3.2.3 Cointegration

Econometric analysis of long-run relationship has been the focus of much theoretical and empirical research in economics. Therefore, over the past decades, considerable attention has been paid in empirical economics to test for the existence of long-run relationship using mainly cointegration techniques.

The desire to evaluate models which combine both short-run and long run properties and which at the same time maintain stationarity in all of the variables, has prompted a reconsideration of the problem of regression using variables measured in their levels. The focus of attention has recently been concentrated on economic data series which, although nonstationary, can be combined together (through linear combination) into a single series which itself stationary. Series which exhibit such a property are called cointegrated series.

3.2.4 Johansen and Juselius (JJ) maximum likelihood test

Johansen and Juselius (1992) procedure possesses several advantages over EG method in testing for cointegration:

- i. No prior assumption regarding the number of cointegrating vector;
- ii. Assumes all variables as endogenous;
- iii. Provides a unified framework for estimating and testing cointegration relations within the vector error correction model (VECM) formulation; and
- iv. Unlike EG cointegration test, which use bivariate framework, ARDL bounds test allows a multivariate framework that enable us to include other relevant variables to avoid simultaneity and specification problems.

The procedure develops by Johansen which involves the identification of rank of the m by m matrix Π in the specification as given below:

$$\Delta Y_t = \delta + \Pi Y_{t-k} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-k} + \nu_t \quad (3.5)$$

where X_t is a column vector of the m variables, Π and Γ are coefficient matrices, Δ is difference operator, k denotes the lag length, and δ is a constant. There are two tests provided, namely trace and maximal eigenvalue tests. One important regarding these two tests is that both tests have no standard distributions under the null hypothesis, although approximate critical values are tabulated by Osterwald-Lenum (1992). Nevertheless, Johansen and Juselius (1990) suggest that the maximal eigenvalue test is more powerful than the trace test.

Trace test:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \quad (3.6)$$

Maximal eigenvalue test:

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (3.7)$$

where r is the number of cointegrating vector, $\hat{\lambda}$ is the estimate values of the characteristics roots obtain from the estimated Π matrix, T is the number of usable observations.

However, there are at least two major problems in using this approach. First of all, the small sample properties of this approach are remained unknown and secondly, it only applicable in the situation in which all variables are integrated at order of 1 or $I(1)$.

3.3 Data

Annual data are to be utilized over the 1980-2010 period for domestic financial (M3), FDI, external debt, portfolio investment, exchange rate, GDP per capita and growth rate where the data can be collected from International Financial Statistics. Also, the data for bilateral trade between United States and its selected ASEAN-3 trading partners are to be covered for the period of 1980 to 2010. The data are intended to be collected from Direction of International Trade (IMF).

The other sources are Key Economic Indicator (Asian Development Bank), World Development Indicator (World Bank), International Financial Statistics (International Monetary Fund), and Penn-World Table version 7.0.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter provides empirical estimation based on the modeling strategy presented in the Chapter Three. Section 4.1 offers some preliminary analysis on the order of integration for each series. In the following section of 4.2, cointegration test will be carried out accordingly provided that all series are integrated at order one. Section 4.3 shall illustrate our main focal point, namely the long run equation. Section 4.4 presents the summary of the findings.

4.1 Unit root tests

In this sub-section, main issues in time series will be determined, namely the existence of unit root problem. For unit root test, results based on Phillips – Perron (PP) test are presented. As outlined in the previous chapter, unit root test is conducted in order to discriminate the conclusion of stationarity and non-stationarity for all series under investigation. For PP test, we allow for Newey-West bandwidth to choose the optimal lag length automatically.

Table 4.1: Unit root test – Philips-Perron (1988) test for FF variables

	Level		1 st Difference	
	Constant	Constant & Trend	Constant	Constant & Trend
Indonesia				
lnDF	-1.2368	-0.2769	-4.3804*	-4.7867*
lnFDI	-0.4891	-0.5443	-4.7893*	-4.6562*
lnPI	-1.3878	-1.4557	-6.5674*	-5.9324*
lnED	-0.6047	-1.7834	-5.7215*	-7.5673*
Malaysia				
lnDF	-1.4363	-0.3980	-4.5658*	-4.9832*
lnFDI	-0.5612	-0.3736	-4.8915*	-4.8711*
lnPI	-1.4369	-0.6874	-4.4514*	-4.7761*
lnED	-1.2454	-1.5433	-4.2367*	-4.6537*
Thailand				
lnDF	-1.8950	-1.5621	-7.4846*	-7.0415*
lnFDI	-0.9972	-0.5983	-4.1475*	-5.1336*
lnPI	-1.4595	-1.7349	-4.0686*	-4.5173*
lnED	-1.4464	-1.8356	-5.4425*	-5.2058*

Note: Asterisk * denotes significance at least (Mackinnon) 90% critical values for rejection of hypothesis of a unit root respectively.

Table 4.1 contains the results of the PP test for all Financial Factors (FF) series, namely Domestic Finance (lnDF), Foreign Direct Investment (lnFDI), Portfolio Investment (lnPI) and External Debt (lnED). The PP test results failed to reject the hypotheses of having unit root in all series at level form. However, at first difference the null hypotheses of unit root are rejected for all series. Hence, based on PP test we conclude that all series are integrated of the same order, namely order one or $I(1)$.

Table 4.2: Unit root test – Philips-Perron (1988) test for OCA variables

	Level		1 st Difference	
	Constant	Constant & Trend	Constant	Constant & Trend
INDONESIA				
RER	-2.2201	-1.3544	-4.4504*	-4.8841*
lnIT	-2.1890	-2.2110	-6.0192*	-5.8086*
AS	-2.6785	-3.6193	-6.8230*	-11.6139*
lnSIZE	-1.5216	-1.9474	-4.3497*	-4.2466*
MALAYSIA				
RER	-1.4696	-1.4231	-3.4182*	-4.6721*
lnIT	-2.3267	-0.2397	-3.6719*	-4.4405*
AS	-2.1266	-3.0741	-7.4499*	-21.5606*
lnSIZE	-1.3051	-2.6545	-10.2857*	-13.2482*
THAILAND				
RER	-1.5016	-1.2395	-4.6256*	-4.8838*
lnIT	-0.8956	-2.4333	-4.6766*	-4.4256*
AS	-2.6246	-2.0597	-6.8995*	-7.3306*
lnSIZE	-1.1097	-1.8240	-8.2303*	-6.5667*

Note: Asterisk * denotes significance at least (Mackinnon) 90% critical values for rejection of hypothesis of a unit root respectively.

Table 4.2 summarizes the outcome of the PP test performed on real exchange rate (RER) and all OCA variables (lnIT, AS and lnSIZE) in ASEAN-3 economies for the period of 1980 to 2004. It is evident from Table 4.2 that the calculated PP statistics have exceeded the significance level of at least 90 percent critical values after taking first difference and thus, suggesting that all series generally have the same integration order $I(1)$.

Henceforth, based on the results of PP tests, we can conclude that all series are integrated with the same order one $I(1)$. As such, the Johansen-Juselius (JJ) procedure will follow in search of the existence of the long-run and short-run relationship in the model.

4.2 Cointegration test

The maximum likelihood estimation procedure proposed by Johansen (1988, 1995) was used in estimating long-run equilibrium relationships. In contrast to single-equation methods, the procedure efficiently includes the short-run dynamics in the estimation of the long-run model structure. The main advantage of the Johansen's vector autoregressive estimation procedure is, however, in the testing and estimation of the multiple long-run equilibrium relationships. Also, the testing of various economic hypotheses via linear restrictions in cointegration space is possible when using Johansen's estimation method (Johansen and Juselius 1990, 1994). Problems in identifying (multiple) cointegration vectors with theoretical economic relationships are also possible when using the Johansen method.

Understanding the above principles, we then proceed to examine the cointegration properties of integrated series where we employ the maximum likelihood approach of Johansen (1988) and Johansen and Juselius (1990). The Johansen-Juselius (JJ) test treats all variables as potentially endogenous and, thus, it avoids the problem of normalizing the cointegrating vector on one of the variable as in the case of the traditional two-step Engle and Granger (1987) test. Moreover, beside the power advantage over the Engle-

Granger procedure, it also has the advantage of identifying the presence of multiple cointegrating vectors.

Having the order of integration of the variables determined, the Johansen-Juselius (1988) technique can be applied to investigate cointegration among the variables. The Johansen-Juselius (JJ) procedure applies the maximum likelihood to determine the presence of cointegrating vectors in non-stationary time series. The trace test and eigenvalue test determine the number of cointegrating vectors. This will accordingly implies a stationary long-run equilibrium relationship among the variables. The maximum lag length of the VAR model used in the JJ procedure is determined by the Likelihood Ratio (LR) statistics. Tables 4.3 to 4.4 summarized the outcome of the cointegration analyses.

The trace test statistic strongly rejects the null hypothesis of no cointegration ($r = 0$) at the 1 % level. Further, the null hypothesis that there is at most one cointegrating vector cannot be rejected at the 1 % level. Conversely, the alternative hypothesis that there is more than one cointegrating vectors are rejected at 1 % level. Thus, the results seem to support the hypothesis that there is a long-run relationship between RER and FF variables (see Table 4.3) as well as RER and OCA variables (see Table 4.4). Both tests suggested the number of cointegrating vector as one in all relationships. Similarly, the maximum-eigenvalue test also indicated that there is one cointegrating vector for both equations in all three ASEAN economies, which exhibits cointegration between the variables under analysis. Thus, given the above results, RER and FF variables as well as RER and OCA variables appeared to have long run relationships.

Table 4.3: Cointegration tests – RER vs FF for ASEAN-3

H₀	Trace test				Maximum eigenvalue test			
	IS	MS	TS	1%	IS	MS	TS	1%
$r = 0$	90.80*	101.22*	86.14*	77.81	44.94*	42.05*	39.49*	39.37
$r \leq 1$	35.86	58.30	28.64	58.68	18.60	27.11	14.76	32.71
$r \leq 2$	17.25	37.77	13.87	38.45	13.68	15.71	8.09	25.86
$r \leq 3$	11.56	22.68	9.78	19.91	6.56	9.99	5.78	18.52

Note: IS = [RUPIAH/USD] volatility, MS = [RM/USD] volatility and TS = [BAHT/USD] volatility.
 Asterisk * denotes significance at least 1 % critical values.

Table 4.4: Cointegration tests – RER vs OCA for ASEAN-3

H₀	Trace test				Maximum eigenvalue test			
	IS	MS	TS	1% CV	IS	MS	TS	1% CV
$r = 0$	90.67*	79.36*	96.65*	70.05	42.00*	37.08*	52.74*	36.65
$r \leq 1$	48.07	42.29	43.90	48.45	28.32	19.18	29.59	30.34
$r \leq 2$	20.34	23.08	12.31	30.45	20.18	13.06	8.60	23.65
$r \leq 3$	0.15	10.02	3.70	16.26	0.15	10.02	3.70	16.26

Note: MS = [RM/USD] volatility, TS = [BAHT/USD] volatility, IS = [RUPIAH/USD] volatility, and PS = [PESO/USD] volatility.
 Asterisk * denotes significance at least 1 % critical values.

4.3 Long-run Equation

The previous section already confirmed that all variables in both equations are cointegrated. In other words, there are long run equilibrium exist among the variables. This section discusses the estimated long-run equation. First, we look at the results of RER versus FF variables, namely domestic financial development, FDI, External Debt and Portfolio Investment. Second, we look at the results of RER versus OCA variables, namely trade, asymmetric shock and country's size as shown in Table 4.5 (RER vs FF) and Table 4.6 (RER vs OCA).

Table 4.5: Long run equation – RER vs FF

ASEAN-3				
1. RUPIAH/USD:	RER =	2.4874lnDF	+ 2.3677lnFDI	- 2.5671lnED + 5.5039lnPI
		(1.9457)	(1.2437)	(22.1345)* (12.5367)*
2. RM/USD:	RER =	0.2325lnDF	+ 0.0125lnFDI	- 0.0718lnED + 0.1457lnPI
		(19.3352)*	(2.6058)*	(7.8900)* (22.5243)*
3. BAHT/USD:	RER =	0.5276lnDF	+ 0.1571lnFDI	- 0.0239lnED + 0.2041lnPI
		(6.7704)*	(8.4810)*	(0.7600) (2.9510)*

Note: Figure in () denotes t-value. Asterisk * denotes significance at least at 10 % critical value.

Developing countries such as ASEAN economies have to resort to foreign capital in order to further develop their economies due to lack of capital and managerial skill or technology. Hence, we attempt to investigate the role of financial factor (FF) variables – Domestic FF as well as Foreign FF – in explaining the behavior of exchange rates in ASEAN economies, particularly because ASEAN economies are highly open economies

and getting more integrated into the global financial system where the flow of capital is much less restricted than before.

A country that has a strong domestic financial development should proceed with floating exchange rate regime to ensure that they get full benefit (Chang and Velasco, 1999). That means, the impact of domestic financial development on RER must be positive. As illustrated in Table 4.5, domestic financial development (DF) has a (+) positive and significant impact on RER, with an exception in the case of RUPIAH/USD and this is consistent with the view of Chang and Velasco (1999).

The role of FDI in the choice of exchange rate regime, we found that FDI has a (+) positive sign and significant impact on RER (exceptional to RUPIAH/USD). FDI is considered as the most loyal foreign capital to host country compared to other source of foreign capital such as Portfolio Investment. Therefore, the larger the inflow of FDI into the country, the more the country is ready to have a floating their exchange rate.

The third type of foreign capital is External Debt. ASEAN are not free from borrowing from abroad in order to enable them to develop their economies. The main issue related to the exchange rate is that the debt issued is normally denominated in US dollar. Heavy fluctuation in real exchange rate will definitely raised uncertainty about the risk that the borrowing country has to bear and might caught the country into debt trap (Calvo and Reinhart, 2001; Devereux and Lane, 2003). Hence, small developing country that has bulk of external debt might prefer to have a stable (or fixed) exchange rate so as to ensure that they are able to cope with the repayment of the debt. As expected, from

Table 4.5, ED has a (+) positive sign and significant (except for BAHT/USD) impact on RER.

In the presence of large private capital flows such as portfolio investment, each of developing countries like ASEAN economies, have to proceed towards free floating exchange rate. In other words, the impact of Portfolio Investment on exchange rate fluctuation must be (+) positive. It means that high inflow of portfolio investment should lead to the desire to have more flexible exchange rate regime. The empirical results indicate that portfolio investment has a (+) positive and significant impact on exchange rate fluctuation in all economies, which confirmed the hypothesis that the higher the inflow of portfolio investment, the more the desire to have floating exchange rate.

Table 4.6: Long run equation – RER vs OCA

		ASEAN-3		
3. RUPIAH/USD:	RER =	-7.5384lnIT (-3.4907)*	+ 1.0053AS (-3.2067)*	+ 4.4273lnSIZE (1.0135)*
1. RM/USD:	RER =	-1.4248lnIT (-4.2543)*	+ 0.1327AS (-2.3554)*	+ 0.4123lnSIZE (5.5638)*
2. BAHT/USD:	RER =	-0.7342lnIT (-5.5035)*	+ 0.1872AS (-3.5113)*	+ 2.3457lnSIZE (6.3612)*

Note: Figure in () denotes t-value. Asterisk * denotes significance at least 10 % critical values.

These estimated equations shows that all the OCA variables satisfy their expected sign i.e. negative for IT and positive for AS and SIZE for US Dollar. All variables are significant, bilateral trade between US with ASEAN-3 economies can be considered to be the most significant determinant for RER. The (-) negative sign implies the extent of

the variation in the exchange rate, ASEAN economies should make an effort to increase the level of bilateral trade. The association between bilateral trade and real exchange rate suggests that the higher the level of bilateral trade, the greater the desire for a relatively stable, if not fixed, exchange rate. In other words, large bilateral trade acts as an incentive for the maintenance of a stable or fixed exchange rate.

For AS, it appears that its contribution to volatility is relatively low, partly because of Malaysia's and Thailand's spectacular economic performance, at least in terms of GDP per capita growth. The contribution of AS to exchange rate volatility is relatively low for RM and BAHT but much higher RUPIAH in types of exchange rates, USD.

The role of SIZE in determining the choice of exchange rate regime, we found that SIZE plays pivotal role in explaining the regime. With a special reference to ASEAN-3 economies, which are considered as small relative to the rest of the world, ASEAN-3 economies will have more desire towards having fix or stable exchange rate (Devereux and Lane, 2003).

4.4 Conclusion

This chapter devotes in analyzing the empirical model as discussed in the Chapter Four to find out the possible answers for three objectives of this study. Section 4.1 examines the nature of each variable in each country as well as equation. In general, we could say that the integration order of the series are consistently $I(1)$. For this reason, JJ approach is applicable.

Section 4.2 provides the cointegration test based on Johansen's maximum eigenvalue and trace tests. Generally, we found that all the variables are cointegrated in all the three currencies.

CHAPTER 5

CONCLUSION

This chapter provides summary, conclusion, implications related to the findings (as already discussed in Chapter Four), limitation of the study as well as suggestions for future study.

5.1 Summary

ASEAN-3 countries namely Indonesia, Malaysia dan Thailand have followed different paths of real exchange rate over the past two decades. Prior to the crisis in 1997, Indonesia, Malaysia, and Thailand followed the less flexible crawling-band or managed-floating arrangements. Indonesia followed a crawling-band exchange rate arrangement; Thailand pegged its currency to a currency basket and Malaysia followed a managed float exchange rate. As a response to the currency crisis in 1997, the governments of the core Southeast Asian countries introduced various economic policy instruments, particularly to the policy on exchange rate. Following the currency crisis, Indonesia and Thailand have adopted a more flexible exchange rate, where the governments in these countries let their exchange rates be determined by supply and demand in foreign exchange markets with occasional unannounced intervention. By contrast, since September 1998 the Malaysian government has formally pegged its currency to the US dollar.

In addition to changing its exchange rate, the Malaysian government has also undertaken an important change in its policy regarding capital flows. In order to reduce the pressure on its currency and to regain monetary independence, in September 1998 the Malaysian government introduced a package of capital controls. The controls included a requirement for non-residents to hold the proceeds from sale of Malaysian securities for one year, and a prohibition of some off-shore Ringgit trading. The control on capital outflow was removed in May 2001. Whether or not this effort has become a source of stabilization for Malaysian Ringgit, it has yet to be tested. Therefore, with a special reference to Malaysian Ringgit, we also want to investigate the role of exchange control on the fluctuation of RM exchange rates.

We started the analysis the role of several kinds of financial factors (i.e. domestic financial development, foreign direct investment, portfolio investment and external debt) on the exchange rate. Then, followed by the idea of Mundell (1961), which is known as optimum currency area (OCA). We look at the possibility that ASEAN could form a currency area so as to create currency stability within ASEAN as part of the effort towards boosting regional (bilateral) trade as well as regional investment and inflow of foreign capital, particularly foreign direct investment. In addition, as argued by Calvo and Reinhart (1999) and Devereaux and Lane (2003) that OCA by itself is insufficient to explain fully the variation in exchange rates.

By utilizing three ASEAN currencies, namely Ringgit (RM), Baht, and Rupiah, against their major trading partners' currency, i.e. US Dollar, we investigate our above

mentioned objectives. The data cover the period from 1985 to 2002 and therefore, time series procedure is followed and Johansen and Juselius (1990), is utilized in order to find out the long run equations.

As for general findings, we found that financial factors (FF), namely domestic financial development (DF), foreign direct investment (FDI), portfolio investment (PI) and external debt (ED), have also contributed in explaining the variation in exchange rates. Similarly, we also found that OCA has a significant impact on RER through its three main components, namely bilateral trade (IT), asymmetric shock (AS) and country's specific characteristics (SIZE).

We can summarize and tabulate the results, in terms of sign of the impact on RER as per the Table 5.1.

Table 5.1: Summary of impacts on RER

Financial Factors				
	DF	FDI	PI	ED
Rupiah	+	+	+	-
RM	+	+	+	-
Baht	+	+	+	-
OCA Criteria				
	lnIT	AS	lnSIZE	
Rupiah	-	+	+	
RM	-	+	+	
Baht	-	+	+	

5.2 Conclusion

Several important conclusions can be drawn from the study. Firstly, this study provide another supporting finding on the argument made by Devereaux and Lane (2003) that OCA alone is insufficient to explain the real exchange rates in emerging markets. Several financial factors are found to have significant contribution on determining exchange rate variation.

Secondly, the possibility of forming common currencies is justified in this study. Hence, more attention should be given on strengthening each OCA criteria, i.e. by promoting more bilateral trade and lowering asymmetric shocks.

Following Naya and Plummer (2005), the economic variables tested in their analysis are found to achieve the expected sign and statistically significant in relation to bilateral trade with United States. Also there are interesting findings which noted that the largest effects are derived for the existence of a common currency and extreme currency stability obviously has a very strong effect on bilateral trade. They found that ASEAN-3 as a regional grouping does indeed matter and ASEAN-3 Countries do tend to trade more with each other. In our analysis, we found that Financial Factors namely; Domestic Finance (+), Foreign Direct Investment (+), External Debt (-) and Portfolio Investment (+) also behave similarly as expected as per the signage in the parentheses. Most of all OCA factors of Asean-3 countries also achieved the desired signage which are negative (-) for bilateral trade and positive (+) for growth and GDP for USD currency. These findings gives us idea and leads us to a similar proposition that having a common

currency among ASEAN countries would be beneficial with particular advantage of reducing transaction costs.

5.3 Policy implications

From this study, we can derive several policy implications. Besides having high external-ASEAN trade, ASEAN is also dependent heavily on foreign capital to develop its economy, either due to lacking in capital or expertise. High flow of capital, in and out of the region will affect the demand for currency as well. Therefore, this is another evidence to suggest that ASEAN has to form a free trade area that goes beyond ASEAN members particularly by inviting major investors such as, again US, Japan or South Korea. Although this approach can be considered as conservative and out-dated, by prohibiting trading of country' currency, it is proven that the country will gain more ability to control the fluctuation in exchange rates.

The United States has been far more aggressive with their new policy in pursuing FTAs. Recent effort is the negotiation with Thailand over a bilateral FTA. In order to stay competitive, ASEAN member countries need to concentrate on lowering the costs of doing business, improving productivity, and facilitating market-consistent structural change.

A common currency for the entire ASEAN region is recommended as a long-term goal, which may take many decades to materialize. A common currency will be a great boon to intra-regional movements of goods and services and factors of production. This

proposition would make sense, only if ASEAN economies are successfully integrated and the thorny national sovereignty issue can boldly be sidestepped. A currency union for Asian and ASEAN countries for that matter will represent the highest form of regional integration. It is recommended that this goal is not lost sight of, although it is extremely difficult to draw a timeline for it.

While the common currency idea is kept in the backburner, it will be in the interest of ASEAN economies, in the interim, to cooperate and coordinate with one another in their exchange rate management. It is recommended that a coordinated basket peg be put in place so that there can be flexible but stable exchange rates in the region. This will facilitate increased intra-regional economic transactions and render the region financially resilient. The currency basket need not necessarily be identical in the sense weights assigned may vary depending on the trade pattern of individual countries. However, it is absolutely necessary to have close consultations and coordination on macroeconomic matters so that the exchange rate alignment is not out of sync with macroeconomic realities.

Realizing that the medium-term coordinated basket peg proposition will take a while to be debated and adopted, it will be prudent for ASEAN countries to begin the process by immediately initiating a networking process. As the global exchange rate system is in a state of flux, it is important for ASEAN countries to work towards some kind of convergence with respect to exchange rate policies in the immediate term. There has to be a clear understanding among the foreign exchange authorities on the kind of interventions that will have to be made in the near term.

A well-coordinated and concerted action by ASEAN countries will be far more effective than if these countries were to go it alone. The situation warrants more than an informal arrangement. A consultative council of Asian and ASEAN central banks will provide an avenue for meaningful consultations on exchange rate management in the region.

5.4 Limitation of Study

There are few limitations on this study. Firstly, the apparent financial factors have contributed in explaining the variation in exchange rates. However, the robustness of this contribution cannot be tested. Due to small number of observation we are unable to combine OCA and FF together in one equation. Therefore, the limitations can be seen and explained.

Secondly, although we found that OCA has a significant contribution on RER, and thus validating the proposal of common currency, this study is unable to provide a clear and definitive answer on the type of currency to be utilized. In other words, the choice of currency remains an open question and ASEAN can choose either to fix their nominal currency to any world vehicle currency such as USD to find out a new currency a Euro with a new currency name.

5.5 Future Research Suggestions

Although common currency seem to be feasible in the case of ASEAN, but this study only focus on three members. Therefore, the feasibility of common currency for the whole ASEAN can be further justified by the inclusion of more members in the analysis.

In future, study should focus on pooling the FF and OCA together so that we can check the robustness of the impact. For this reason, the next study should be carried out in panel.

REFERENCES

- Abbas, S. M. A. (2004). Evaluating the Success of Malaysia's Exchange Controls (1998-1999). *QEH Working Paper Series – QEHWPS113, January 2004*.
- Ahmad, M.H. and Ahmed, Q.M. (2003). Foreign Capital Inflows and Domestic Saving In Pakistan: Cointegration Techniques and Error Correction Modeling.
- Appell, D. (1999). Malaysia Simplifies Tax for Foreign Share Investors. *Asian Wall Street Journal*, New York, September 22
- Ariccia, D. G. (1999). Exchange rate fluctuations and trade flows: Evidence from the European Union. *IMF Staff Papers* 46, 315-334.
- Ariyoshi., A., K. Habermeier, B. Laurens, I. Otker-Robe, J.I. Canales-Kriljenko and A.Kirilenko (2000). Capital Controls: Country Experiences with Their Use and Liberalizations. *IMF Occasional Paper* 190, Washington, D.C.
- Balassa, B. (1964). The Purchasing Power Parity Doctrine: A Reappraisal. *Journal of Political Economy* 72: 584-596.
- Banerjee, A., Dolado, J. J. and Mestre, R. (1998). Error-Correction Mechanism Tests for Cointegration in a Single-Equation Framework. *Journal of Time Series Analysis*, Vol. 19, pp. 267-283.
- Bayoumi, T. and Eichengreen, B. (1998). Exchange rate volatility and intervention: Implications of the theory of optimum currency areas. *Journal of International Economics*, 45, 191-209.
- Bera, A.K. and C.M. Jarque (1981). An Efficient Large sample Test for Normality of Observations and Regression Residuals. *Australian National University Working Papers in Econometrics* 40, ANU, Canberra.
- Berg, Andrew and Catherine Patillo (1999). Are Currency Crises Predictable? A Test. *International Monetary Fund Staff Papers* 46 (June), pp.249-73.
- Bollerslev, T. (1986). Generalised Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics*, Vol. 31, pp. 307-327.
- Brailsford, T. J. (1996). The empirical relationship between trading volume, returns and volatility. *Accounting and Finance*, Vol. 523-543, pp.89-106.
- Ch, Muhammad and Ali (1993). Pakistan's foreign dependence, its capacity for debt repayment and future prospects. *Pakistan Economic and Social Review*, Vol. 31. No. 1.

- Chia, S. Y. (1998). The Asian Financial Crisis: Singapore's experience and response. *ASEAN Economic Bulletin*, 15 (3), 297-308.
- Demarmels, R and Fischer A.M. (2003). Understanding Reserve Volatility in Emerging Markets: A Look at the Long-Run. *Stiftung Der Schweizerischen NationalBank, Working Paper No. 03.03*.
- Devereux, M. B. and Lane, P. L. (2003). Understanding bilateral exchange rate volatility. *Journal of International Economics*, 60, 109-132.
- Dickey, D.A. and W.A. Fuller (1979). Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association* 74:427-431.
- Dickey, D.A. and W.A. Fuller (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit root. *Econometrica* 49:1057-1072.
- Edison, Hali J. and Carmen M. Reinhart (2000). Capital Controls During Financial Crises: The Cases of Malaysia and Thailand. In R.Glick, R.Moreno, and M.Spiegel, eds., *Financial Crises in Emerging Markets*, Cambridge University Press Cambridge, UK), Forthcoming.
- Edwards, Sebastian (1999b). How Effective Are Capital Controls? *NBER Working Paper* No. 7413 (November).
- Eichengreen, B. (1997). *European Monetary Unification: Theory, Practice, and Analysis*, The MIT Press, Cambridge Mass.
- Engle, R.F. and Granger, C.W.J. (1987). Cointegration and error correction: Representation, estimation and testing. *Econometrica*, 55, 251-276.
- Esquivel, G. and Larrain, F.B. (2001). The Impact Of G-3 Exchange Rate Volatility On Developing Countries.
- Esquivel, Gerardo and Felipe Larrain (1998). *Explaining Currency Crises*. Mimeo, Harvard Institute for International Development (June).
- Frankel, J. and Wei, S-. J. (1993). Trade blocs and currency blocs. *NBER Working Paper* 435.
- Frankel, Jeffrey and Andrew Rose (1996). Currency Crashes in Emerging Markets. An Empirical Treatment. *Journal of International Economics* 41 (November), pp. 352-366.
- Frenkel, J. and Mussa, M. (1980). The Efficiency of the Foreign Exchange Market and Measures of Turbulence. *American Economic Review*, 70(2), 374-81.

- Frenkel, M., Nickel, C., Schmidt, G. and Stadtmann, G. (2001). The Effects of Capital Controls on Exchange Rate Volatility and Output. *International Monetary Fund, IMF Working Paper, WP/01/187*.
- Furman, Jason and Joseph Stiglitz (1998). Economic Crises: Evidence and Insights from East Asia. *Brookings Papers on Economic Activity*, No. 2, pp. 1-119.
- Glick, R. and Hutchison, M. (2000). Stopping “Hot Money” or Signaling Bad Policy? Capital Controls and the Onset of Currency Crises.
- Goldstein, M. (1995), *Coping with Too Much of a Good Thing: Policy Responses for Large Capital Inflows to Developing Countries*, Institute for International Economics, Washington D.C.
- Granger, C. W. J. (1988). Some recent developments in a concept of causality. *Journal of Econometrics*, 39, pp. 199-211.
- Granger, C.W.J. and T. Terasvirta (1993) *Modeling Non-Linear Economic Relationships*, Oxford: Oxford University Press.
- Gregorio, Jose, Sebastian Edwards and Rodrigo Valdes (2000). Controls on Capital Inflows: Do They Work? *NBER Working Paper No. 7645* (April).
- Grilli, Vittorio and G.-M. Milesi-Ferretti (1995). Economic Effects and Structural Determinants of Capital Controls. *IMF Staff Papers* 42, pp. 517-51.
- Hanaki, N. (2000). Effects of policies and institutions on economic volatility and growth: A literature review. *Columbia University, September 1, 2000*.
- Harris, R.I.D. (1995), *Cointegration Analysis in Econometric Modeling*, London, Prentice Hall.
- Hausman, J.A. 1978. Specification Tests in Econometrics. *Econometrica*, 46, 1251-1272.
- Henry, C. and Longmore, R. (2003). Current Account Dynamics and The Real Effective Exchange Rate: The Jamaican Experience. *Bank Of Jamaica, March 2003*.
- Henry, P.B. (2005). Discussion of “Malaysian Capital Controls: An Assessment”. *Stanford University and NBER, February 2005*.
- Hull, J. (2000). Estimating Volatilities and Correlations. Chapter 15 in *Options, Futures and Other Derivatives*, (4th Edition)
- Hurley, D. T. and Santos, R. A. (2001). Exchange rate volatility and the role of regional currency linkages: the ASEAN case. *Applied Economics*, 33, 1991-1999.

- Hviding, K., Nowak, M. and Ricci, L. A. (2003). Can Higher Reserves Help Reduce Exchange Rate Volatility? An Empirical Investigation. *IMF Staff Papers*.
- IMF (1998). World Economic Outlook, May. Chapter 4: "Financial Crises: Characteristics and Indicators of Vulnerability."
- Inder, B. (1993). Estimating Long-run Relationships in Economics: A Comparison of Different Approaches. *Journal of Econometrics*, pp. 53-68.
- Ito, Takatoshi (1999). Capital Flows in Asia. *NBER Working Paper* No. 7134.
- Ito, Takatoshi and Richard Portes (1998). Dealing with the Asian Financial Crises. European Economic Perspectives, CEPR.
- Jason, C.W.N. and McAleer, M. (2002). Monetary Integration and Contagion. *Dept. of Economics, University of Western Australia*.
- Johansen (1988). statistical Analysis of cointegrating vectors. *Journal of Economic Dynamic and control*, Vol. 12, pp 231-254.
- Johansen and Juselius (1990). Maximum Likelihood Estimation and inference on Cointegration with applications the demand for money. *Oxford Bulletin of Economics and statistics*, Vol 52, No 2, pp 169-210.
- Johansen, S. (1988). Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control* 12:231-254.
- Johansen, S. and Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52, 169-211.
- Johnston, B.R. and N. T. Tamirisa (1998). Why Do Countries Use Capital Controls? *IMF Working Paper* 98/181, Washington D.C.
- Jones, C.M., Kaul, G. and Lipson, M. L. (1994). Transactions, Volume and Volatility. *Review of Financial Studies*, Vol. 7, pp. 631-651.
- Juhn, G. and Mauro, P. (2003). Long-Run Determinants of Exchange Rate Regimes: A Simple Sensitivity Analysis.
- Kaminsky, Graciela, Saul Lizondo, and Carmen Reinhart (1998). Leading Indicators of Currency Crises. *IMF Staff Papers* 45 (March), pp. 1-48.
- Kaplan, E., and D. Rodrik (February 2001), "Did the Malaysian Capital Controls Work?" *NBER Working Paper* 8142.

- Kemme, D. M. and Teng, W. Y. (2000). Determinants of the Real Exchange rate, misalignment and implications for growth in Poland, *Economic Systems*, 24 (2), 171-205.
- Kikuchi, T. (2004). The Impact of Exchange Rate Volatility on Bilateral Exports in East Asian Countries. *Graduate School of Systems and Information Engineering, University of Tsukuba*.
- Kumar, Manmohan, Uma Moorthy, and William Peraudin (1998). Determinants of Emerging Market Currency Crises and Contagion Effects. Paper presented at CEPR/World Bank conference "Financial Crises: Contagion and Market Volatility," London, May 8-9.
- Lee, J. S. (1998). Exchange Controls: The Path To Economic Recovery In Asia? *Asian Development Bank, EDRC Briefing Notes, Number 4, October 1998*.
- Li, G. and Wickramanayake, J. (2004). Chinese Closed-End Fund Market (1998-2003): An Empirical Investigation.
- Ling, H. Y. P. (2001). Optimum currency areas in East Asia: A structural VAR approach. *ASEAN Economic Bulletin*, 18 (2), 206-217.
- Liu, O. (2000). Malaysia fashions own path to recovery, looks to strengthen growth. in *IMF Survey*, Vol. 29(17); pp. 282-284, International Monetary Fund.
- Ljung, G. M. and Box, G. E. P. (1978). On a Measure of Lack of Fit in Time Series Models. *Biometrika*, Vol. 65, pp/ 297-303.
- Madhur, S. (2002). Costs and benefits of a common currency for ASEAN. *ERD Working Paper No. 12*.
- Mehra, Y. (1991). An Error Correction Model of U.S. M2 Demand, *Economic Review, Federal Reserve Bank of Richmond*, 77, 3-12.
- Miller, S.M. (1991). Monetary Dynamics: An Application of Cointegration and Error-Correction Modeling, *Journal of Money, Credit, and Banking*, 23, 139-154.
- Neely, C. J. (1999). An Introduction to Capital Controls. *Federal Reserve Bank of St. Louis Review*, Vol. 81(6), pp. 13-30.
- Nell, K. S. (2001). Explaining Long-Run Growth In South Africa and OECD Countries: Implications For The Rest Of SADC Countries. *NIEP, September 2001*.
- Nelson, D. B. (1991). Conditional Heteroskedasticity in Asset Returns: A New Approach. *Econometrica*, Vol. 59, pp. 347-370.
- OECD (1999). Evaluating Malaysia's capital control 1998. *OECD*, Japan.

- Park and Song (1999). Managing Foreign Capital Flows: The Experiences of the Republic of Korea, Thailand, Malaysia and Indonesia. In G. Helleiner (ed) *Capital Account Regimes and the Developing Countries*, 1999, UNCTAD
- Pattichis, C. and Kanaan, M. (2004). The Balassa-Samuelson Hypothesis and Oil Price Shocks In A Small Open Economy: Evidence From Cyprus. *Open Economies Review* 15: 45-56, 2004.
- Perron, P. (1990). Testing for a Unit Root in a Time Series with a Changing Mean. *Journal of Business and Economic Statistics*, 8, 153-162.
- Pesaran, M.H. (1997). The Role of Economic Theory in Modeling the Long-run. *The Economic Journal*, 107, 178-191.
- Pesaran, M.H. (1999). An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis. *Econometrics and Economic Theory in the 20th Century*.
- Pesaran, M.H. and Shin, Y. (1999). An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis, in S. Strom (ed.). *Econometrics and Economic Theory in the 20th Century. The Ragnar Frisch Centennial Symposium*, 1998, Cambridge University press, Cambridge, (forthcoming).
- Pesaran, M.H., Shin, Y. and Smith, R.J. (1996). Testing for the Existence of a Long-run Relationship. *DAE Working Papers Amalgamated Series*, no. 9622, University of Cambridge.
- Phillips, P.C.B. and Loretan, M. (1991). Estimating Long-Run Economic Equilibria. *Review of Economic Studies*, Vol. 53, pp. 407-436.
- Phillips, P.C.B. and Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*, 75, pp. 335-346.
- Radelet and Sachs (1998). The East Asian Financial Crisis: Diagnosis, Remedies, Prospects. *Brookings Papers on Economic Activity*, 1998:1
- Ramirez, M.D. and Khan, S. (1999). A Cointegration Analysis of Purchasing Power Parity: 1973 – 1996. *International Advances in Economic Research. Volume 5, Number 3, August 1999*.
- Ramsey, J.B. (1969). Tests for Specification Errors in Classical Linear Least Squares Regression Analysis. *Journal of the Royal Statistical Society* B31:350-371.
- Sachs, Jeffrey, Aaron Tornell, and Andres Velasco (1996). Financial Crises in Emerging Markets. The Lessons from 1995. *Brookings Papers on Economic Activity*, No. 1, pp. 147-215.

- Shabbir, T and Muhammad, A (1992). The effect of foreign private investment on economic growth in Pakistan. *The Pakistan Development Review*, Vol. 4, No. 31, pp. 831-841.
- Sun, Y (2000). Economic Development: An Analysis of Malaysia. *Social Science* 410, November, 2000.
- Supaat, S., Angela Jiun, P.S., Tiong, N.H. and Robinson, E. (2003). Investigating The Relationship Between Exchange Rate Volatility And Macroeconomic Volatility in Singapore. *Economic Policy Department, Monetary Authority of Singapore*.
- Terasvirta, T. (1994). Specification, Estimation, and Evaluation of Smooth Transition Autoregressive Models. *Journal of the American Statistical Association* 89:208-218.
- Vergil, H (2001). Exchange Rate Volatility in Turkey and Its Effect on Trade Flows. *Journal of Economic and Social Research* 4(1), 83-99.
- Weisskopf, T.E. (1972). The impact of foreign capital inflow on saving in under developing countries. *Journals of International Economics*, Vol. 1. No. 5.
- White, H. (1980). A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica* 48:817-838.
- Wolff, C.C.P (1987). Time-Varying Parameters and the Out-of-Sample Forecasting Performance of Structural Exchange Rate Models. *Journal of Business and Economic Statistics* 5:87-97.
- _____(2003). Towards An Exchange Rate Arrangement For East Asia: The Malaysian Perspective, *Final Report, MIER*.
- _____(1999a). Malaysia: Selected Issues. *IMF Staff Country Reports 99/86*, IMF, Washington, August,
- _____(1999b). Financial Sector Crisis and Restructuring: Lessons from Asia. *IMF Occasional paper* 188, Prepared by: Kochhar, Roger, Tzanninis, Johnston, Moore and Otker-Robe, International Monetary Fund, Washington, D.C.
- _____(1999). Capital Control Freaks: How Malaysia Got Away With Economic Heresy. *Slate*, www.slate.com, October