UNIVERSITI PUTRA MALAYSIA

EXCHANGE RATE VOLATILITY AND MACROECONOMIC FUNDAMENTALS IN FOUR ASEAN COUNTRIES

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FEP 2006 1

EXCHANGE RATE VOLATILITY AND MACROECONOMIC FUNDAMENTALS IN FOUR ASEAN COUNTRIES

By

CHONG LEE LEE

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirement for the Degree of Doctor of Philosophy

March 2006

UPM

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

EXCHANGE RATE VOLATILITY AND MACROECONOMIC FUNDAMENTALS IN FOUR ASEAN COUNTRIES

By

CHONG LEE LEE

March 2006

Chairman : Associate Professor Tan Hui Boon, PhD

Faculty : Faculty of Economics and Management

This study delineates the exchange rate volatilities of four ASEAN economies, namely Malaysia, Indonesia, Thailand and Singapore from four main aspects such as the movement of exchange rate and its macroeconomic factors, the regime-specific fundamental volatility and the impact of exchange rate volatility on economic fundamentals over the 1980-2004 period. This study aims to explore the exchange rate volatilities of these economies in providing a credible understanding of the behaviour of exchange rate volatilities and macroeconomic fundamentals.

Exchange rate volatility is the risk occurred due to an excessive movement of exchange rate and many measures have been employed in the literature in estimating it. In this study, the exchange rate volatility is computed based on the exponential-GARCH specification, an extension of the widely-used GARCH model. The empirical results indicate that the Indonesian rupiah exhibited the highest volatility while the Singapore dollar fluctuated with the least. In between these two currencies are the Thai baht and Malaysian ringgit which were the second most volatile and second least volatile respectively.

Exchange rate stability will benefit both policy makers and businesses. In view of the importance of exchange rate stability, this study examines the second aspect of exchange rate volatility to understand its macroeconomic factors. The results reveal that exchange rate volatility and relative macro variables are linked in both short- and long run although the short-run results seem to suggest that the influences of macroeconomic factors on the exchange rate volatility might differ given the different degrees of economic condition as well as financial and trade reforms. The result suggests that the significant common set factor is generated by stock market.

The other aspect is to examine the macroeconomic shocks across alternative exchange rate arrangements for Malaysia, Indonesia and Thailand - three countries that have experienced shifts in their exchange rate arrangements since the 1970s. Singapore has had a rather consistent system. The empirical findings suggest that a majority of the examined variables behave differently across alternative exchange rate arrangements. The F-statistic results of virtual, traditional and augmented traditional fundamentals are also significant with the exclusion of Thailand's traditional fundamental. Therefore, the exchange rate system is still a matter for the macroeconomic shocks for developing countries irrelevance of its trivial role in developed countries.

Finally, this study offers an analysis of the impact of exchange rate volatility on international trade, international capital movement and economic growth as regards the four economies. A long-run relationship is detected although no relationship is found in the short run with the exception of Indonesia. This might suggest that most of the derivative products are more applicable for effective use in the short run rather than over a longer period.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KETIDAKSTABILAN KADAR PERTUKARAN DAN ASAS MAKROEKONOMI BAGI EMPAT NEGARA ASEAN

Oleh

CHONG LEE LEE

Mac 2006

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Kajian ini menganalisis empat aspek utama ketidakstabilan kadar pertukaran dari segi pergerakan kadar pertukaran dan puncanya, ketidakstabilan asas ekonomi di bawah pelbagai rejim dan kesan ketidakstabilannya ke atas asas ekonomi bagi empat negara ASEAN iaitu Malaysia, Indonesia, Thailand dan Singapura dari 1980-2004. Kestabilan kadar pertukaran akan membawakan manfaat kepada pengkaji polisi dan peniaga. Oleh itu, kajian ini bertujuan untuk menganalisis ketidakstabilan kadar pertukaran bagi keempat-empat negara tersebut untuk mencungkilkan kefahaman ke atas kelakuan ketidakstabilan kadar pertukaran dan asas makroekonomi.

Ketidakstabilan kadar pertukaran adalah risiko yang muncul akibat pergerakan pertukaran mata wang yang tidak stabil dan ia telah diukur dengan pelbagai cara. Dalam kajian ini, ia diukur dengan spesifikasi E-GARCH di mana GARCH model telah digunakan secara meluas. Penemuan menunjukkan rupiah adalah paling tidak stabil dan dollar Singapura adalah paling stabil. Pada masa yang sama, baht bergerak lebih aktif daripada ringgit.

Memandangkan keutamaan kestabilan kadar pertukaran, salah satu kajian ini ialah menguji punca ketidakstabilan kadar pertukaran dari aspek makroekonomi. Penemuan menunjukkan bahawa ketidakstabilan kadar pertukaran dan makroekonomi adalah berkaitan dalam jangka masa pendek dan panjang. Penemuan jangka masa pendek menunjukkan bahawa punca makroekonomi yang berlainan akan mempengaruhi ketidakstabilan kadar pertukaran disebabkan perbezaan dalam darjah perkembangan ekonomi dan reformasi dalam bidang kewangan dan perdagangan. Keputusan menunjukkan bahawa satu punca yang sama adalah daripada pasaran saham.

Aspek lain yang dikaji ialah mengenai kelakuan makroekonomi di bawah pelbagai rejim kadar pertukaran bagi Malaysia, Indonesia dan Thailand sahaja. Negara-negara ini mengalami perubahan dalam polisi kadar pertukaran sejak 1970an kecuali Singapura. Penemuan mencadangkan kebanyakan pembolehubah makroekonomi berkelakuan berbeza di bawah pelbagai rejim kadar pertukaran. Ujian F-statistik juga mencadangkan keputusan yang berkesan bagi asas ekonomi sebenar, asas tradisional dan asas tradisional imbuhan kecuali asas tradisional bagi Thailand. Oleh itu, sistem kadar pertukaran adalah berkenaan bagi negara membangun walaupun ia dipandang tidak penting bagi negara maju.

Selain itu, kesan ketidakstabilan kadar pertukaran atas perdagangan antarabangsa, pelaburan asing dan pertumbuhan ekonomi telah juga dikaji. Hubungan ini telah dikesan pada jangak masa panjang tetapi ia tidak dapat dikesan pada jangka masa pendek kecuali bagi Indonesia. Justeru, penggunaan kebanyakan keluaran lindungan nilai yang terdapat di pasaran dapat mengurangkan risiko kadar pertukaran pada jangka masa pendek dengan berkesan tetapi bukan pada jangka masa panjang.

ACKNOWLEDGEMENTS

I would like to thanks all the people who have, in a way, assisted me along my doctorate study at Faculty of Economics and Management (FEP), University Putra Malaysia.

I am deeply grateful to my committees who have contributed lots of efforts in improving the quality of my work. My supervisor, Associate Professor Dr Tan Hui Boon, had always guided and given me ideas as well as comments in assisting me to complete my work. Her patience as well as constructive guidance is highly appreciated. My sincere gratitude is also going to the other two dissertation committees. Professor Dr Zubaidi Baharumshah, deputy dean of Research and Post-Graduate Study, had always given his comments and views that helped me to progress better of my work. Professor Dr Annuar Md. Nassir, deputy dean of development and finance, had also made a significant contribution to the completion of my research. My deepest appreciation and gratitude are given to all of them.

I also extend my thankful to the administrative staff of FEP, especially Puan Napsiah Yasin and Puan Khamsiah Kasdi whom I always ask for help. I also would like to express my thanks to my family and friends who always accompany and encourage me.

I certify that an Examination Committee has met on 13th March 2006 to conduct the final examination of Chong Lee Lee on her Doctor of Philosophy thesis entitled “Exchange Rate Volatility and Macroeconomic Fundamentals in Four ASEAN Countries" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller test
AIC	Akaike information criterion
ATF	Augmented traditional fundamental
ARCH	Autoregressive conditional heteroscedastic
ARDL	Autoregressive distributed lag
ECM	Error correction model
ECT	Error correction term
EGARCH	Exponential generalised autoregressive conditional heteroscedastic
EIU	Economist Intelligent Unit
ERV	Exchange rate volatility
FDI	Foreign direct investment
GARCH	Generalised Autoregressive conditional heteroscedastic
IMF	International Monetary Fund
KPSS	Kwiatkowski, Phillips and Schmidt test
RI	Relative income
RM	Relative money supply
RCPI	Relative consumer price index
RIP	Relative industrial production index
RTB	Relative trade balance
RCI	Relative composite index
TF	Traditional fundamental
VAR	Vector autoregressive
VECM	Vector error correction model
VF	Virtual fundamental
WCY	World Currency Yearbook

CHAPTER I

OVERVIEW OF THE STUDY

Introduction

The choice of exchange rate systems has been debated extensively but this issue remains controversial to date. In general, the structure of exchange rate arrangements has evolved over time from fixed exchange rate systems of Classical Gold Standard and Bretton Woods System to a more flexible exchange rate system and even a hybrid system in present. The perennial issue for an appropriate exchange rate arrangement, especially for small and open economies or even for developed countries, yields disputable answers. The macroeconomic 'trilemma' of the tradeoffs among exchange rate stability, monetary autonomy and capital mobility faced by policy makers in turn forces them to free themselves from achieving all three objectives simultaneously. In this case, when an economy implements fixed exchange rate with capital mobility, the problem encountered will be the rigidities of monetary policies. The Southeast Asia economies, to a larger extent, adopt semi-rigid exchange rate arrangements or 'soft-peg' system, which is said to be one of the factors contributing to the Asian crisis 1997-98.

The outbreak of the Asian financial crisis 1997-98, starting with the sharp devaluation of Thai baht, had brought about a severe depreciation of regional currencies over a short period of time. The catastrophic effects of the Asian crisis-1997 had since forced many economies to shy away from a pegged to a more flexible exchange rate arrangement. For instances, several South Asia and East Asian economies, among them South Korea, Thailand and Indonesia, had floated their currencies after ending a

peg to the U.S. dollar or a basket of currencies in 1997. The U.S. dollar has a prominent role in Asian economies as an anchor currency in their exchange rate arrangements considering the United States has been a major trading partner for most Asian economies. However, its dominant role has somewhat declined recently due to the sluggish U.S. economic growth and a reduced bilateral trades between Asian economies and the United States.

Many Asian countries underwent difficult time throughout the Asian crisis-1997 period and they had employed substantial efforts to restore their economies' stability. Some countries, such as South Korea, Thailand and Indonesia, had received external financial assistance from the International Monetary Fund (IMF) while Malaysia had shied away from the offer. Now, as the affected countries have slowly recovered from the painful experience, they are reviewing the appropriateness of their exchange rate arrangements periodically in order to meet the challenges from both internal and external economic turbulence.

In the international economy, exchange rate is playing a vital role and its function in economic performance is an important issue for regulators as well as market players. Throughout the years, the global economy has been transformed from a simplified financial architecture to a complex intertwined set of financial systems. From the Bretton Woods system to the advent of flexible exchange rate systems in 1973 until the present days, the environment of international markets has experienced substantial changes in terms of the excessive variability in exchange rates. In line with liberalisation and globalisation, international financial markets are increasingly integrated and capital mobility becomes greater. All these have led to drastic changes

in the world economy, punctuated by a series of financial crises worldwide in recent years, including the Mexican crisis of 1994-1995, the Asian crisis of 1997-1998, the Russian crisis of 1998 and the Brazilian crisis of 1999. All these crises have in turn caused a state of macroeconomic turbulence and devastating effects to the economies concerned.

Inevitably and perhaps consequentially, the global financial market has experienced great instability in recent years. This was evident in the occurrence of several crises involving various currencies. Due to globalisation and the more integrated nature of global financial markets, the stability of currency appears to be a matter of growing importance. Sustainability of exchange rate regimes becomes the centre of debate, particularly whether the exchange rate itself is the issue or macroeconomic fundamentals are the matter. The relevance of exchange rate regimes to macroeconomic performance remains a key issue in international macroeconomics as well as in this study.

Movements of exchange rate are always the concern for various parties. Researches have been conducted on developed countries especially the Organisation of Economic Cooperation and Development (OECD) countries. Since the breakdown of Bretton Woods System in 1971, the movement of real exchange rate has been characterised by high volatility and the causes attributed to the variability of exchange rate are of interest to various parties including market participants and policy makers. The studies of exchange rate volatility provide crucial information for currency- related derivative pricing and policy formation. This is understandable because the movement of exchange rate also influences economic performance. The volatility of exchange

rate is, therefore, the primary focus of this study especially from the perspective of its macroeconomic factors of variability, its regime-specific fundamental volatility and its impact to macroeconomic fundamentals.

In international currency markets, exchange rate plays a significant role and the variability of exchange rate tends to give a certain impact on the economy. The study of the volatility of exchange rate, hence, has attracted much attention, especially its role as the so-called “determinants”. Broadly speaking, two approaches have been pursued to better understand this subject. One is the fundamental or macroeconomic approach, which tries to explain the movement of exchange rate in terms of macroeconomic variables. This approach has become the basic tool for analysing the movement in exchange rate in the past two decades. Another approach is the technical analysis, which intends to track how the movement of historical data has affected exchange rate. The macroeconomic approach is indeed the backbone of this study.

Most of the previous studies of exchange rate have been focused on the developed countries, while our study emphasises on exchange rate volatility for four neighbouring countries in the ASEAN region - Malaysia, Indonesia, Thailand and Singapore. The behaviour of exchange rate volatility is truly a concern and its regime-specific fundamental volatility across alternative exchange rate arrangements is further emphasised in order to highlight important currency-related issues for the countries concerned. Nevertheless, the impact of exchange rate volatility on economic performance is also investigated to uncover the spill-over effect of exchange rate volatility to external sector, international capital movement and economic growth.

In a nutshell, this study will explore the behaviour of exchange rate volatility in a comprehensive manner pertaining to the four selected countries and will further examine its influence to the economy. The factors of exchange rate volatility will also be explored from the macroeconomic perspective in which the selection of macro factors is referred to the monetary model approach of exchange rate since there is no consensus on which fundamental factors might cause changes to exchange rate or its variability. In this study, the macroeconomic factors of exchange rate volatility and its impact on the economy will be ascertained for the four individual countries.

Since the starting of the adoption of flexible exchange rate system in 1973, exchange rate movements have been excessive and most of the studies on exchange rate movements are based on the experience of developed countries. Little attention has been given to developing countries' pegging system to a major currency or to a basket of currencies that have induced lesser volatility and stabilised their exchange rate movements. However, the nominal currencies of the developing nations might not produce fixed and predictable real exchange rates and its parity level might be deviated, bringing to the speculation attack. This explains why a currency crisis frequently takes place in developing countries. In short, the currencies of these economies most likely will also vary despite of its pegging system (Warner and Kreinin, 1983 and Alba and Papell, 1998). This may due to the implicit weight of the currency that one country pegs might fluctuate substantially.

As a result, there is a need to explore the volatility of exchange rate in spite of the restricted exchange rate system implemented by various developing countries. The study of Hurley and Santos (2001) had further looked into the volatility of exchange