الجامعة الاسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

STOCK MARKET INTEGRATION IN EMERGING ECONOMIES: THE CASE OF ASEAN VIS-À-VIS USA AND JAPAN

BY

M. SHABRI, SE

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

MAY 2005

STOCK MARKET INTEGRATION IN EMERGING ECONOMIES: THE CASE OF ASEAN VIS-À-VIS USA AND JAPAN

BY
M. SHABRI, SE

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ECONOMICS

KULLIYYAH OF ECONOMICS
AND MANAGEMENT SCIENCES
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

MAY 2005

ABSTRACT

This study empirically explores market integration among five selected ASEAN emerging markets (Malaysia, Thailand, Indonesia, the Philippines and Singapore) *vis-à-vis* USA and Japan based on a two-step estimation, cointegration analysis and Generalized Method of Moments (GMM). To obtain more detailed insights into short- and long run relationships among the stock markets under study, apart from grouping stock markets into 120 portfolio combinations, the study utilizes a longer and more recent sample of data, starting from July 1, 1987 to June 30, 2002. Closing daily stock indices for five selected ASEAN markets and for the two largest markets in the world, USA and Japan are used.

The study reveals that the ASEAN stock markets are going towards a greater integration either among themselves or with the two largest stock markets in the world, USA and Japan, particularly during the post-1997 financial crisis. Though the stock markets in the ASEAN region are found cointegrated during pre- and post-1997 financial crisis, but no evidence of cointegration among the ASEAN markets was documented during the period of the 1997 financial crisis (January 1, 1997 to 31 December, 1998). This implies that investors who diversify their investments across the ASEAN markets could gain benefits during the 1997 financial period, but not before and after the crisis.

As for the long run causal relations between ASEAN stock markets with USA and Japan, the study discovers that Indonesia was relatively independent of both USA and Japan; Malaysia was more dependent on Japan rather than USA; Thailand was relatively independent of USA, but to some extent dependent on Japan; The Philippines is more affected by USA than Japan; and USA and Japan have bidirectional Granger causalities with Singapore. The study also finds Japan to Granger cause USA before the 1997 financial crisis, but they Granger cause each other afterward. Finally, as measured by the error correction terms (ECTs), any deviations from the equilibrium cointegrating relationships in these markets are mainly caused by changes in all stock markets under study, except for the US stock market.

ملخص البحث

تعني هذه الدراسة بإختبار ما إذا كان هنالك أي تكامل بين عينة من بورصات مجموعة "آسيان" وهي (ماليزيا، تايلاند، إندونيسيا، الفليبين، سنغافورة) بالمقارنة مع بورصتي الولايات المتحدة واليابان. تم استخدام ثلاثة طرق لتحليل البيانات وهي: طريقة التثمين ذات الخطوتين، طريقة تحليل التكامل، وطريقة الاستقراء اللحظي. للمزيد من التبصُّر حول العلاقات قصيرة وبعيدة المدى بين البورصات المذكورة أعلاه، فبالإضافة إلى تقسيم هذه البورصات إلى عدد 120 مجموعة فإن الدراسة تستخدم عينة حديثة ولفترة أطول بدءاً من 1987/7/1 حتى 2002/6/30. سعر الإقفال اليومي لعدد خمس بورصات تم اختيارها من مجموعة "آسيان" بالإضافة إلى إثنين من أكبر الأسواق في العالم وهما الولايات المتحدة الأمريكية واليابان.

توضح الدراسة أن البورصات بمنطقة "آسيان" تتحه نحو مزيد من التكامل فيما بينها من ناحية والتكامل بينها وبين السوق الأمريكية واليابانية من ناحية أخرى. ويظهر هذا النمط بوضوح في الفترة التي تلت الإنهيار المالي بجنوب شرق آسيا في عام 1997 ، هذا وعلى الرغم من أن البورصات بمنطقة "أسيان" قد أظهرت تكاملاً فيما بينها للفترتين ما قبل وما بعد عام 1997، إلا أنه وخلال الفترة من 1997/1/1 وحتى 1998/12/31 لم تظهر الدراسة أي تكامل بين البورصات آنفة الذكر. وهذا يعني أنه كان بإمكان المستثمرين الذين يقومون بتوزيع استثماراتهم في أسواق منطقة "آسيان" أن يحققوا أرباحاً خلال الأزمة الاقتصادية لعام 1997 ولكن ليس قبلها ولا بعدها.

أما بالنسبة للعلاقات بعيدة المدى بين بورصات "آسيان" ونظيرتيهما بالولايات المتحدة واليابان، فقد كشفت الدراسة أن بورصة إندونيسيا تبدو مستقلة عن بورصتي الولايات المتحدة واليابان. أما بورصة ماليزيا، فتعتمد بقدر أكبر على بورصة اليابان مقارنةً بالولايات المتحدة الأمريكية. أما تايلاند فتعتمد على اليابان بدرجة كبيرة ولكنها مستقلة نسبياً عن الولايات المتحدة الأمريكية. على عكس الحالة المنسوبة لماليزيا وتايلاند فإن الفليبين تتأثر بالولايات المتحدة بدرجة كبيرة. أما سنغافورة فتتأثر بكل من أمريكا واليابان بنسب متقاربة. أفصحت الدراسة أيضاً أن اليابان كانت تؤثر على أمريكا قبل عام 1997 ولكن بعد ذلك العام أصبح التأثير متكافئ بين البورصتين. أخيراً وباستثناء بورصة الولايات المتحدة الأمريكية، فإن أي انحراف عن التوازن في العلاقات بهذه الأسواق يكون سببه تغيرات بكل الأسواق موضع الدراسة.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPROVAL PAGE

The dissertation of M. Shabri, SE has been examined and is approved by the following:

Ahamed Kameel Mydin Meera (Supervisor)

Mohd. Azmi Omar

Hassanuddeen Abdul Azis

Shamsher Mohamed (External Examiner)

Mansor Hj. Ibrahim (Internal Examiner)

Ibrahim M. Zein (Chairman)

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references and a bibliography is appended.

Name: M.Shabri, SE

Signature: ……………………...   Date: …………………….

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

STOCK MARKET INTEGRATION IN EMERGING ECONOMIES:

THE CASE OF ASEAN VIS-À-VIS USA AND JAPAN

Affirmed by **M. Shabri, SE**

------------------------------ ----------------------------
Signature Date

To my beloved parents, H. Abdul Majid Saman and Hj. Radhiah Ali;
my beloved wife and daughter, Farhati H.M. Tatar and Hayyin;
my brothers and sister, Ulul Azmi, Khairani, Irsyadi,
Tirmizi, Fakhrurrazi, and Baihaqi.

Without their prayers and support,
I could not have completed this thesis.
May Allah bless them all.

ACKNOWLEDGEMENTS

I would like to express my utmost thanks and gratitude to Allah, the Most Beneficent, the Most Merciful who granted me the ability and will to start and complete this work. I pray to His greatness to inspire me to the right path to His content and to enable me to continue the work started in this thesis to the benefits of the *ummah*.

The work carried out in this thesis has the support, assistance and advice of many people to whom I am grateful: My main supervisor, Assoc. Prof. Dr. Ahamed Kameel Mydin Meera who gave me a lot of his time, invaluable guidance and advice, constructive comments, support and encouragement throughout the time it took me to complete this work. I would also like to express my sincere thanks to Assoc. Prof. Dr. Mohd. Azmi Omar, who acted as my first co-supervisor. His support and advice during the entire period of my study and critical comments and suggestions on the thesis have enabled me to improve and finish my work. I would also like to express my gratitude to Assoc. Prof. Dr. Hassanuddeen Abdul Aziz, who acted as my second co-supervisor. His valuable suggestions and constructive comments have improved my work immeasurably.

My heartfelt gratitude also goes to Prof. Dr. Mansor Hj. Ibrahim, Asst. Prof. Dr. Rosylin Mohd. Yusof and Assoc. Prof. Dr. Naziruddin Abdullah: I could not have graduated my study without their encouragement, priceless assistance, valuable advice, moral support and kind understanding during the exhaustive period of my study. My colleagues and friends, Brother Izeldin Eldoma Abdalla, Muhammad Abubakar, Zulkarnen Mora, Fahmi M. Nasir, Muhammad Zaki, Mukhtaruddin, Haris J. Muchtar: thank you for your support, kind understanding and assistance during the entire period of my study. I would like to sincerely thank all the people who have supported me and were involved in one way or another in the preparation of this thesis.

I would also like to offer my deepest thanks to the International Islamic University Malaysia (IIUM) for providing me a financial loan during my study here and making my dream come true.

Finally, I would like to express my special thanks to my beloved parents, H. Abdul Majid Saman and Hj. Radhiah Ali, my beloved wife and daughter, Farhati H.M. Tatar and Hayyin, my brothers and sister, Ulul Azmi, Khairani, Irsyadi, Tirmizi, Fakhrurrazi, and Baihaqi; and my respected parent-in-laws, H.M. Tatar Usman and Hj. Mardhiah Badruddin. Their prayers, support, advice, and love have incalculably assisted me to finish my study. May Allah bless them all.

CHAPTER 1

INTRODUCTION

1.1 Overview of the Issues

Nowadays, the world capital markets have been increasingly integrated and co-movements among the leading world financial markets have been rising.[1] In their survey on available empirical evidences on market integration across national capital markets, Goldstein and Michael (1993) found that the international links have been increasing over the past decade, especially for the stocks traded actively in the major financial centres. They also found that the emerging markets[2] are becoming more closely integrated with markets in the rest of the world, although their integration progress has been far less than the industrial countries. This phenomenon is not isolated from efforts taken by developed economies to realise an efficient integrated world economy through globalization and liberalization. The developments in Information and Communication Technology (ICT) and financial

---

[1] In their study, Blackman et al. (1994) found an increasing degree of market integration among 17 countries in 1980s than 1970s. Masih and Masih (1997) discovered market integration between each pair of the four developed markets—Germany, UK, Japan, and US and the group of four Little Dragons, i.e., Taiwan, South Korea, Hong Kong and Singapore. Ghosh et al. (1999) also found that Hong Kong, India, South Korea, and Malaysia shared a long run equilibrium relationship with the US stock market, while Indonesia, the Philippines and Singapore were linked to the Japanese market for the period 26th March 1997 to 31st December 1997. However, they did not find any evidence for Taiwan and Thailand to have effects from the US, nor from Japanese markets. In short, these findings provide evidence that supports international market integration. Many economists also claimed that the contagion effect in the global stock market during the October 1987 stock market crash and the 1997 East Asia financial and currency crises is one indication of market integration among the world stock markets.

[2] The emerging stock markets are referred to the stock markets of emerging economies. The term "emerging markets" implies stock markets that are in transition, increasing in size, activity or level of sophistication. In short, these markets typically have higher expected returns than established markets but also have higher risks. In general, International Finance Corporation (IFC) classifies a stock market as "emerging" if it meets at least one of two general criteria: (i) it is located in a low-or middle-income economy as defined by the World Bank, and (ii) its investable market capitalization is low relative to its most recent Gross Domestic Product figures (For more detail, see *Emerging Stock Markets Factbook*, 1998).

deregulation as a part of globalization and liberalization agenda are not only facilitating the free flow of information among the developed countries, but they are also permeating into emerging markets. These developments gradually lead emerging markets towards greater integration.[3]

Although Hung and Cheung (1995) failed to find integration among five Asian emerging stock markets, namely Hong Kong, Korea, Malaysia, Singapore and Taiwan for the period 1981 to 1991 when the indices were denominated in their national currencies, they still found that there were at least three cointegrating vectors when all indices were denominated in US dollars. Corhay et al. (1995) also found that at least one cointegrating vector existed among five Pacific-Basin markets during the period 1972 to 1992. These empirical evidences showed that these financial markets have been heading towards a greater degree of integration and an increasing co-movement with world financial markets from year to year.

Unlike enormous researches that have dealt with the developed countries in this area of study, the documentation of stock market integration among the ASEAN emerging markets still seems inadequate compared to the vast literature that have focused on the same area in the developed markets. For example, Roll (1995) affirmed that although Indonesia has had an active equity market for a number of years, no empirical studies on this market have appeared in western scholarly journals.[4]

---

[3] The long history of sustained economic interdependence among East Asian countries, for example, is reflected in the consistently high level of intra-regional trade. By 1913, intra-trade already accounted for 42% of the region's total trade compared to 46% in 1938 and 47% in 1993 (see, Yip, 2001).

[4] Unlike in the past, the Jakarta Stock Exchange (JSX) is now becoming large, volatile and fascinating. Along with markets from other developing countries, it offers fertile ground for further empirical study. Jakarta's data virtually untouched and in the sense provide opportunity for more reliable inferences about market behaviors (Roll, 1995).

In addition, the validity of some results for most of the earlier tests conducted on market integration that were based on certain asset pricing models, such as the Sharpe's (1964) and Lintner's (1965) Capital Asset Pricing Model (CAPM),[5] Ross's (1976) Arbitrage Pricing Model (APT), consumption-based asset pricing, volatility interaction[6] and coherence[7] models has been questioned. These studies relied upon the argument that if markets are integrated, securities with similar risk characteristics should be priced the same regardless of where the securities are traded. This particular argument implicitly assumes away the types of risk that are usually not considered in the asset pricing models, such as liquidity and country risks (Cheng, 2000). In addition, the CAPM requires some restrictive and unrealistic assumptions such as market equilibrium condition and certain types of utility function for investors. Even though APT model necessitates less restrictive assumptions than CAPM, it still suffers the misspecification problem, thus the validity of model has been cast as doubtful by numerous studies. One of the major limitations of this model is that it might overlook some risk factors that affect asset returns. For example, Ingersol (1987) found that the error variance in the asset pricing models might be due to full-unidentified risk factors. Furthermore, the type of test used in the asset pricing models is a joint test of a specification, which means a rejection of a test could be a failure of either the models or the rejection of market integration hypothesis.

In order to cope with the above shortcomings, recent studies have adopted different approaches to investigate the market integration issues, such as Vector Autoregressive (VAR), Generalized Autoregressive Conditional Heteroskedasticity (GARCH), Granger

[5] This model, for example, has been adopted by Solnik (1974), Stehle (1977), Joiron and Schwart (1986), Wheatley (1988), Campbell and Hamao (1992), to name a few.
[6] See Darbar and Deb (1997).
[7] This model, for example, has been adopted by Sewell et al. (1996).

causality and cointegration analysis. Among these econometric techniques, cointegration analysis is the most commonly used in exploring market integration. However, to the best of our knowledge, there has not been any empirical study on market integration that adopts a two-step estimation, cointegration analysis and Generalized Method of Moments (GMM), which does not impose stringent assumptions. This study, therefore, is among the first to use two-step estimation to investigate market integration among ASEAN[8] emerging markets. The superiority of these adopted estimations could mitigate the shortcomings of the previous studies on this subject, as believed.

As reported in Table 1.1, according to the Market Potential Indicators for Emerging Markets,[9] despite its limited size in the world market capitalization and value traded as compared to other emerging markets, Singapore—among the ASEAN stock markets—records a maximum overall market potential index of 100[10] for the year 2000. These facts prove that the ASEAN emerging markets are among the potential markets in the world for international investors to diversify their investments. However, the extent to which the benefits of investment diversification can be gained by international investors depends on the degree of market integration.

---

[8] Out of ten members of ASEAN (Association of South East Asian Nations), only the five founding members of ASEAN—Malaysia, Indonesia, Thailand, the Philippines and Singapore—are investigated in this paper. The rest of the five ASEAN members, namely: Vietnam, Brunei Darussalam, Myanmar, Cambodia and Laos are excluded from this study in view of the unavailability of data for the study period. Though Singapore is the most developed country in the region, it is still categorized under emerging market (Yang and Siregar, 2001). Masih and Masih (1997) called Singapore as "emerging Newly Industrialized Country (NIC) market".

[9] This report is provided by the Center for International Business Education and Research at Michigan State University (MSU-CIBER). MSU-CIBER was designated in 1990 as one of the pioneer National Resource Centers in international business by the U.S. Department of Education, aiming at providing world-class education, research, and assistance to businesses on issues of importance to international trade and global competitiveness.

[10] This report only focuses on 23 emerging countries identified as "emerging market" by the economist. The ranking of these emerging economies, that comprise more than half of world's population and account for a large share of world output and have very high growth rates, is based on eight dimensions, representing the market potential over a scale 1 to 100.

Insert Table 1.1 here

Whether the markets are integrated or not, it is not isolated from, *inter alia,* the country's regulation towards creating a conducive investment environment, the degree of economic openness and the level of the government intervention in the economy (Cheng, 2000). This implies that the different economic policies among the countries determine the degree of market integration or segmentation. This explains why in empirical studies, researchers have documented mixed results where both integrated and segmented markets were found.

What are the implications of market integration? If the markets are integrated, the benefits from diversifying investments across the world markets are limited because the integration of markets would improve market efficiency as a result of fewer investment barriers to defer information transmission across borders (Cheng, 2000). On the other hand, if markets are not integrated, it provides ample room for investors to gain risk reduction through diversifying. This implies that the knowledge on market integration is important for investors to base their investment decisions on international diversification. Therefore, the study on market integration in these potential emerging markets, which have been almost ignored by researchers, is a crying need for investors, fund management houses and other institutional investors both at national and international levels, who are seeking to diversify their investments into the ASEAN emerging markets. This study tries to provide a more up-to-date integration evidence on ASEAN emerging markets, relying on longer and more recent sample of data and superior model of estimation.

1.2 Statement of the Problem

Despite voluminous studies on market integration among developed countries, the study on emerging markets in the ASEAN region is inadequate considering the vast-growing economic activities and the increasing investment opportunities there, with the international scene becoming dominant. In developed economies such as America, Japan and Germany, both market integration and segmentation are documented. For the emerging economies, especially for the ASEAN stock markets, as far as we know, there have been very few empirical analyses done in this area. However, in recent years, the vast-growing economic activities and the increasing investment opportunities in some emerging markets have attracted investors' and researchers' attention. This was shown in some studies. For example, Chan et al. (1992) investigated market integration on Major Asian markets *vis-à-vis* US economy, whereas Chowdhury (1994) studied the integration among four Asian NICs.[11] Blackman et al. (1995) explored the relationships among seventeen stock markets, including developed and emerging markets, while Ghosh et al. (1999) and Durand et al. (2001) investigated the issue on "who moves the Asia-Pacific stock markets—US or Japan"?[12] In spite of this increasing interest in researching the emerging markets, again, the documentation on the ASEAN emerging markets is still inadequate.

Do the ASEAN stock markets integrate among themselves and also with US and Japan? Who moves the ASEAN stock markets—US or Japan? Do the results of our study on the ASEAN stock markets coincide with those findings of the developed countries? If not, to

---

[11] NICs (Newly Industrialized Countries) are also known as the Asian Four Little Dragon countries, i.e., Taiwan, South Korea, Hong Kong and Singapore.

[12] Actually, their studies are similar in aim and title, but their data and methodology are different. To explore market integration, Ghosh et al. (1999) used ten-month daily stock indices of nine Asia-Pacific markets (Hong Kong, India, South Korea, Malaysia, the Philippines, Indonesia, Taiwan, Thailand, Singapore) plus Japan and USA from the period 26th March 1997 to 31st December 1997 with the Engle and Granger's cointegration test, while Durand, et al. (2001) utilized daily stock indices, interest and exchanges rates of seven Pacific-Rim (Australia, Hong Kong, South Korea, Malaysia, Singapore, Taiwan and Thailand) markets during the 2nd December 1985 to 31st December 1996 period by the Granger causality test based on ARCH(1) (Autoregressive Conditional Heteroskedasticity).

what extent may the results differ from those studies on developed economies? A detailed investigation on the ASEAN stock markets is of interest because of the increased economic cooperation in accordance with the ASEAN agreement and the distinguished structure of emerging stock markets. Thus, this study attempts to partially fill this gap in the literature and to provide recent empirical evidence on market integration among the ASEAN countries and their interrelationships with the two largest stock markets in the world, i.e., the US and Japan. The findings of this study may have implications for investors and companies in the international community who internationally diversify their investments and make capital budgeting decisions in this region.

To explore market integration, most previous studies have adopted asset pricing based models such as Capital Asset Pricing Model (CAPM), Arbitrage Pricing Model (APT) and consumption-based asset pricing models. As identified earlier, these models have been questioned by numerous studies (Ingersol, 1987 and Cheng, 2000) because they still suffer from misspecification problems. Other econometric techniques that have been adopted to cope with the abovementioned model misspecifications are VAR (Jeon and Von Furstenberg, 1990), GARCH and cointegration analysis (Allen and MacDonald, 1995; Kanas, 1998; Ghosh et al. 1999; Cheng, 2000; Huang et al. 2000 and Kleimeier and Herald, 2000, to name a few). As such, a more relaxed assumption of the two step-estimation models, namely cointegration analysis and Generalized Method of Moments (GMM), which will be explained later in detail in the methodology section, are adopted in this study with the intention to resolve the abovementioned problems. In addition, this study also differs from earlier studies in the sense that it relies on a longer period and more recent data sample[13] and analyses market integration both at bivariate and multivariate[14] levels.

1.3 Objectives of the Study

The main objectives of this study are as follows:

1. To empirically test the market integration in terms of a long run equilibrium relationship among the five founding members of the ASEAN emerging markets, namely Malaysia, Indonesia, Thailand, Singapore and the Philippines and their integration with the two largest stock markets in the world, i.e., the US and Japan.
2. To empirically explore the dynamic causal linkages among the ASEAN emerging stock markets and their linkages with the US and Japanese stock markets.
3. To empirically examine the influence of the two largest developed markets in the world, US and Japan on the ASEAN emerging stock markets pertaining to the issue of market integration.

The results of the present study would indicate whether stock markets in this region are segmented or integrated. If stock markets share a long run equilibrium relationship, which implies that they have a tendency to move together in the same direction in the long run, then these markets are integrated and provide no diversification benefits for those who are investing in this region. On the other hand, if the stock markets have no tendency to move

[13] In exploring integration among the Asia-Pacific markets (Hong Kong, India, South Korea, Malaysia, the Philippines, Indonesia, Taiwan, Thailand, Singapore, Japan and USA), Ghosh, et al. (1999) used only ten-month daily data covering from 26th March 1997 to 31st December 1997. Meanwhile, Cheng's (2000) study on the Great China Economic Area markets utilized only six-year weekly data starting from 1993 to 1999. Their studies adopted similar method of analyses that is cointegration technique.

[14] Focusing only on bivariate or multivariate cointegration analysis might miss some important information. The markets are possible to be segmented using bivariate analysis, but they are become integrated using multivariate analysis, or vice versa. This was a fatal deficiency of Palac-McMiken's (1997) and Jang and Sul's (2002) studies, to mention a few, on market integration among the five founding of the ASEAN and selected Asian stock markets, respectively.

together in the long run, then the markets are segmented and provide ample room for international investment diversification. In a nutshell, only investors who seek to allocate their investments in the segmented markets can gain the diversification benefits.

1.4 Contributions of the Study

An accurate analysis of market integration is one of the key determinants of success for a profitable investment for investors, fund management houses and other institutional investors both at national and international levels who are seeking to diversify their investments into the ASEAN emerging markets. The market integration would improve the market efficiency as a result of fewer investment barriers to defer information transmission across borders. This study will then contribute to the existing empirical literature on economics and finance on the topic of stock market integration in ASEAN emerging markets. At least, four contributions of the study can be listed in detail as follows:

1. The study provides a systematic analysis on five founding members of the ASEAN stock markets that play significant roles on the regional and international economic stages. There have been relatively very few studies that explore the issues on stock market integration in the ASEAN region.
2. The empirical study on stock market integration in the ASEAN emerging stock markets and their interrelationships with USA and Japan using the two-step estimation—cointegration analysis and GMM—to the best of our knowledge, is among the early attempts to investigate market integration. It is not only in this region, but also all over the world. Since the cointegration analysis can detect whether or not economic variables have a tendency to move together in the long run and GMM has no stringent assumptions compared to other estimations adopted in