Stock market integration between ASEAN-5 and developed nations: The roles of political and financial crises

BY

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DEDICATION

I would like to dedicate with my greatest appreciation to my beloved

parents and sisters

Ghanbar Ali Tajaddini

Mahin Mesbah

Maryam and Mina Tajaddini

ACKNOWLEDGEMENT

In the name of God, the most Gracious, the most Merciful

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ABSTRAK

Kajian ini menunjukkan tahap integrasi pasaran saham ASEAN-5 dan dua pasaran saham dari negara yang telah membangun, Jepun & Amerika Syarikat. Kajian ini juga berhasrat mencari kesan krisis ke atas integrasi akibat berlainan sebab, seperti politik dan kewangan. Lima indeks pasaran iaitu SES, KLCI, STE, PSE dan JSX dan 2 indeks stok NYSE dan NIKKEI 225 telah dipilih sebagai wakil pasaran saham ASEAN-5 dan pasaran saham Jepun dan Amerika Syarikat. Dua krisis kewangan, iaitu krisis kewangan Jepun 1990 dan krisis kewangan 1997, serta dua krisis politik iaitu insiden September 11, 2001 dan serangan Amerika Syarikat ke atas Iraq pada 2003 telah dipilih untuk ditanda aras sebagai krisis-krisis dalam kajian ini.

Data, yang telah diperolehi dari DataStream, yang meliputi tempoh 20 tahun, bermula dari 1987 hingga akhir 2007 untuk mengkaji kesan krisis ke atas pasaran saham, setiap siri dibahagi kepada dua tempoh pra-krisis dan selepas krisis dari ulasan sastera satu asas bagi teori kajian ini telah dikumpul dan tujuh hipotesis dikenalpasti. Kajian ini juga telah mencadangkan, dalam jangka masa panjang, tidak ada integrasi di antara pasaran saham ASEAN-5 samada pasaran saham Jepun atau Amerika Syarikat. Walaubagaimanapun, dalam jangka masa pendek, wujudnya intergrasi juga kesemua ASEAN-5 sensitif kepada kedua-dua krisis kewangan dan juga politik, di mana pasaran saham Thailand, Indonesia dan Filipina yang paling sensitif kepada krisis ekonomi. Di antara pasaran saham ASEAN-5, pasaraan saham Singapura didapati yang paling efisien. Hasil kajian juga menunjukkan bahawa di tahun-tahun kebelakangan ini, pasaran saham ASEAN-5 lebih

efisien mengatur hubungan dengam pasaran saham Jepun dan Amerika Syarikat. Ini memberi peluang yang baik untuk pelabur antarabangsa yang mencari diversifikasi portfolio di rantau ini.

ABSTRACT

This study examines the level of cointegration of ASEAN-5 stock markets and two developed stock markets of Japan and the U.S. It also seeks to find effects of crises of different natures, *i.e.* political and financial, on this cointegration. Five stock indices of SES, KLCI, STE, PSE, and JSX and two stock indices of NYSE and NIKKEI 225 were selected as the representatives of ASEAN-5 stock markets and the U.S. and Japan stock markets, respectively. Two financial crises, namely the 1990 Japanese financial crisis and the 1997 Asian financial crisis, and two political crises, namely September 11, 2001 and the 2003 U.S. invasion of Iraq were selected as the crises benchmarks of the study.

Data, which were obtained from DataStream, cover twenty years of sample period, from the beginning of 1987 to the end of 2007. In order to examine the effects of crises on stock markets, each series was divided into two periods of pre-crisis and post-crisis. From the literature review, a theoretical foundation for the study was compiled and seven hypotheses were established. Study results suggest that, in the long run, none of the ASEAN-5 stock markets are cointegrated with either the Japan or the U.S. stock market. However, in the short term, there are some cointegrations. Also, all ASEAN-5 are sensitive to both financial and political crises, where three stock markets namely Thailand, Indonesia, and the Philippines are more sensitive to financial crises. Among the ASEAN-5 stock markets, Singapore is the most efficient stock market. Results also suggest that in recent years all ASEAN-5 stock markets tend to be more efficient in their relationships with Japan and the U.S. stock markets. It can create good opportunities for international investors who seek portfolio diversification in this region.

Chapter 1

INTRODUCTION

1.1   Introduction

Increased globalization and economic integration among economies in different parts of the world have brought increased attention to the issue of relationships among capital markets for groups of investors as well as academic scholars (Bin Hoque, 2007). This relationship and integration shows the level of available opportunities for portfolio diversification in various stock markets in different countries. According to Click and Plummer (2004), from the perspective of a portfolio investor outside a region, stock market integration suggests that there is less benefit for portfolio diversification across countries when separate markets move together and have high correlations. Nevertheless, even though an integrated regional stock exchange is less appealing for inter-regional investors, it is highly appealing for investors from outside the region. Market integration creates this opportunity for those markets, which are bigger in size and are more well-known, to play the leaders' role in these markets.

As the most powerful economy in the world, the impact of the United States' economy on other economies is a general truth. The U.S. dollar has been the dominant global currency since the end of the First World War. Furthermore, the U.S.'s GDP and its international trade share are the highest in the world (Eun & Resnick, 2007). After the U.S., Japan is the world's second-largest economy as measured by real GDP, nominal GDP and market exchange rates. Its economy has had direct effects on the development of South East Asian economies and still retains its highly effective role in this region (The Ministry of Foreign Affairs of Japan, 2006). ASEAN (Association of Southeast Asian Nations) was

established with the aim of accelerating the economic growth of its members. With significant economic growth, ASEAN markets have been attracting many investors world-wide. Among them, American and Japanese investors make up a large portion of these investments. Thus, logically the interdependency between ASEAN markets and these two developed markets should be considered high. In these circumstances, linkages between markets create vulnerability for the future of investments in the case of any kinds of crises.

There are myriad forms of crises. Financial crises were equivalent to banking crises in the past, but today they also refer to currency crises and stock market crashes. When they occur, there is a sudden dramatic decline in the stock prices across a significant cross-section of a stock market. Financial crises can be caused by both economic and non-economic reasons. By increasing the integration of equity markets and world economies, any crisis has this potential to become a global crisis, specifically in the more important geographical regions. For example, on July 2, 1997, the Thai baht, which had been largely fixed to the U.S. dollar, was suddenly devalued. What at first appeared to be a local financial crisis in Thailand quickly changed into a global financial crisis, first spreading to other Asian countries such as Indonesia, Korea, Malaysia, and the Philippines, then more distantly to Russia and Latin America, especially Brazil (Eun & Resnick, 2007). Another example of a financial crisis was the 1990 Japan financial crisis, which occurred after the Japan stock bubble burst in the late 1980s. During this crisis the Nikkei average lost 50% of its value and Japan experienced a long economic recession for about half a decade. The costs of this crisis for Japanese taxpayers are estimated to

have exceeded ¥100 trillion, which would equal 20% of Japan's GDP (Hoshi & Kashyap, 2004).

In recent years, both developing and developed countries have been encouraged to liberalize their financial markets and allow free flow of capital across countries. This increased borrowing of foreign currencies has thus led to high dependency on outside financial supporters, which can convert any local crisis into a global catastrophe.

Another crisis form is that of political crises. They are those events that can cause instability in the political or social condition of a nation - such as wars, terrorist attacks and coups, etc. The large size of the U.S. economy makes it an important market for many countries. Sharp shifts in the health of the U.S. economy have important consequences for U.S. trading partners, which constitutes most of the world. On the morning of September 11, 2001 a small group of terrorists crashed four hijacked commercial airliners into the World Trade Center of New York City and the Pentagon. The attacks had significant economic repercussions for the United States and the world markets. The Dow Jones Industrial Average (DJIA) fell by 14.3% in the first week after it reopened. U.S. stocks lost $1.2 trillion in value in that week (Fernandez, 2005). But the nature of the 9/11 crisis was completely different from that of the 1997 Asian crisis. In the September 11 tragedy the government interfered in the markets and tried to maintain the stability of the financial markets. According to Makinen (2002), over the next three days after the attack, the Federal Reserve added some $100 billion per day in liquidity. In addition, other international financial markets such as the Bank of Japan and the European Central Bank supported the dollar in the markets. Furthermore, the U.S. central

bank cut the interest rate to support similar cuts made by the Federal Reserve. One of the consequences of this event was the U.S. war against terror that led to the Iraq invasion by the U.S. and its allies in 2003. A war which has had an estimated cost of over $3 trillion for the U.S. alone (Stiglitz & Bilmes, 2008).

In consideration of the discussion above, this study will try to explore to what extent ASEAN stock markets are correlated with other developed stock markets, in this case the United States and Japan. Also, the degree of each member's sensitivity to global crises with different nature will be examined. The inter-relationship of ASEAN-5 stock markets with each other and also main global stock markets will show the degree of diversification portfolio opportunities for investors on a global scale. This chapter introduces the research outline of the study, which illustrates the background, problem statement, research objectives, research questions, definition of key terms, and significance of the study.

1.2 Background of study

International market integration has been the subject of considerable empirical investigation (Johnson & Soenen, 2003). The expected returns and variances are required to construct optimal risk/return portfolios; as such, investors, portfolio managers, and financial market regulators can benefit from new insight into the co-movement of international equities. Karolyi and Stulz (1996) found evidence that correlations and co-variances of stock markets are high when markets move a lot. This evidence is more obvious when stock markets are faced with big shocks.

Political and economic crises both have the potential to become a financial crisis. For example, September 11 was a terrible event that disrupted trade and investment interaction between the U.S. and other countries. It might have had significant effects on the interactions between the U.S. equity market and other global equity markets, especially those that have welcomed high portions of American investments in their countries, such as in the ASEAN region. Fernandez (2006) examined the effects of the 9/11 terrorist attack, and discovered that the level of sensitivity to political or terrorist crises is higher within more developed stock markets than in less developed ones. Hatemi, Roca, and Buncic (2006) also investigated the causal relationship between the U.S. equity market and the stock markets of the developed nations of the U.K., Japan, Germany, France, Canada and Australia during the periods before and after September 11. Their results indicated that after the crisis the markets of the other developed countries responded more efficiently to information transmitted from the U.S. market than before 9/11.

This event also later caused the U.S. invasion of Iraq as part of the war against terrorism. This war, as well, had direct effects on the volatility of stock markets throughout the world. In another study by Fernandez (2008), the effects of this event on global stock markets were examined. She found sharp increases in the levels of volatility in global stock markets during the war period. This war was accompanied by rapid rises in oil prices, which have affected many countries' economies worldwide.

Most stock markets worldwide are correlated with the U.S. stock market. The high influence of the U.S. economy on other economies is well known; it is even thought that the U.S. market drives other markets worldwide (Hatemi *et al,* 2006). The U.S. has a strong and historical relationship with members of ASEAN-5. For instance, despite the Asian financial turmoil, the U.S. investment in these five countries at the end of 1998 stood at more than US$41 billion, 9.2% higher than the 1997 figure, showing that the U.S. investors still have strong confidence in the future economic development of this region (Chan & Liu, 2002). In 2006, ASEAN attracted $52 billion in foreign direct investment. The United States is the largest foreign investor in South East Asia. From 1995 to 2005, the United States invested $83 billion in ASEAN countries (USAID, 2007). The cumulative value of U.S. private investment in just one of the ASEAN-5 members, Malaysia, exceeds $10 billion (U.S. State Department, 2008). Conversely, the U.S. is considered one of the main export destinations of ASEAN countries. In 2007 alone, U.S. imports from Malaysia exceeded $32.8 billion, making up 20.1% of total Malaysia exports (Malaysia manufacturing directory, 2007). This is a reason why any turmoil that causes economic recession in the U.S. or any reduction in the level of U.S. imports will have direct effects on the economies of ASEAN-5.

Moreover, most of these countries are considered political and strategic allies of the United States. Singapore, for example, is a steadfast supporter of the U.S., strongly supporting the war against terrorism led by the superpowers, as it views itself a prime target of the Jamaah Islamiyah (JI), a group blamed for attacks and plots throughout Southeast Asia (Zubir, 2006). All the statements above prove how much these economies

can be vulnerable to political instability in any part of their own regions as well as those of their main economic partners.

Japan's formal relationship with ASEAN dates back to 1977. Japan and ASEAN have forged a robust partnership that has contributed significantly to the region's economic, social, and political development. Japan has played a particularly important role in the region's economic dynamism and continues to be a pillar of support for ASEAN's newest members. A new milestone in their economic relationships was the recently signed trade agreements that will eliminate tariffs up to 90 percent in both partners' countries. Thus far, Japan has also been one of the main export markets of ASEAN. In 2001, 15% of total Malaysian exports were sent to Japan (Malaysia manufacturing directory, 2007). Many Japanese car manufacturers have shifted their plants to Thailand; manufacturers include Toyota Motor Corp., Isuzu Motors Ltd, and Mazda Motors Ltd. All these examples explain the importance of Japan's economic health for ASEAN countries, and also vice versa.

The 1997 Asian financial crisis highlighted the interdependence of the region's economies and led to the establishment of the ASEAN+3 (Japan, Korea, and China) framework two years later. To assist ASEAN recovery from the crisis, Japan created the Japan-ASEAN Solidarity Fund in 1999 and the Japan-ASEAN General Exchange Fund (JAGEF) in 2000. Japan acceded to the Treaty of Amity and Cooperation in Southeast Asia (TAC) in 2004, marking a milestone in Japan-ASEAN security relations. In the same year, Japan and ASEAN adopted the ASEAN-Japan Joint Declaration for

Cooperation to Combat International Terrorism (The Ministry of Foreign Affairs of Japan, 2006). These show the advanced level of political and economic relationships between Japan and ASEAN members.

ASEAN was established in 1967 to accelerate the economic growth and social progress of South East Asian countries, making the integration of economies in this region to become even greater than before. Malaysia, Singapore, Thailand, Indonesia, and the Philippines were the pioneers of this association; they have very high levels of investment and trade between their countries. Thus, the importance of any financial disorder in this region has very clear effects on any of these countries' economies. In 1997, the Asian financial crisis was thought to have started with the devaluation of the Thai baht. But the crisis was started earlier in June when the stock prices in Thailand began to sharply decline (Jang & Sul, 2002). During this period, Indonesia's Rupiah rapidly lost its value and fell to over R10000/$. Its composite index collapsed from 738.01 to 261.31 (a 64.6% reduction) within the next 15 months (Chan & Liu, 2002). By the end of 1997, the Kuala Lumpur stock exchange market and the Ringgit both lost more than 50% of their values. It has also had long term effects on Malaysia's economy as it fell into its first recession for many years (Cheong, 2008).

The other financial crisis of this study is the Japanese financial crisis in the late 1980s. The Japanese market, which accounts for approximately 60 percent of the goods and services produced in Asia, was faced with a long recession after its stock bubble burst in the beginning of 1990. Since Japan is considered as one of the main export markets of

ASEAN-5, the importance of its economic health is more apparent. The graphs below

show the effects of different crises on the Nikkei 225 and NYSE stock indices during the

last 20 years.
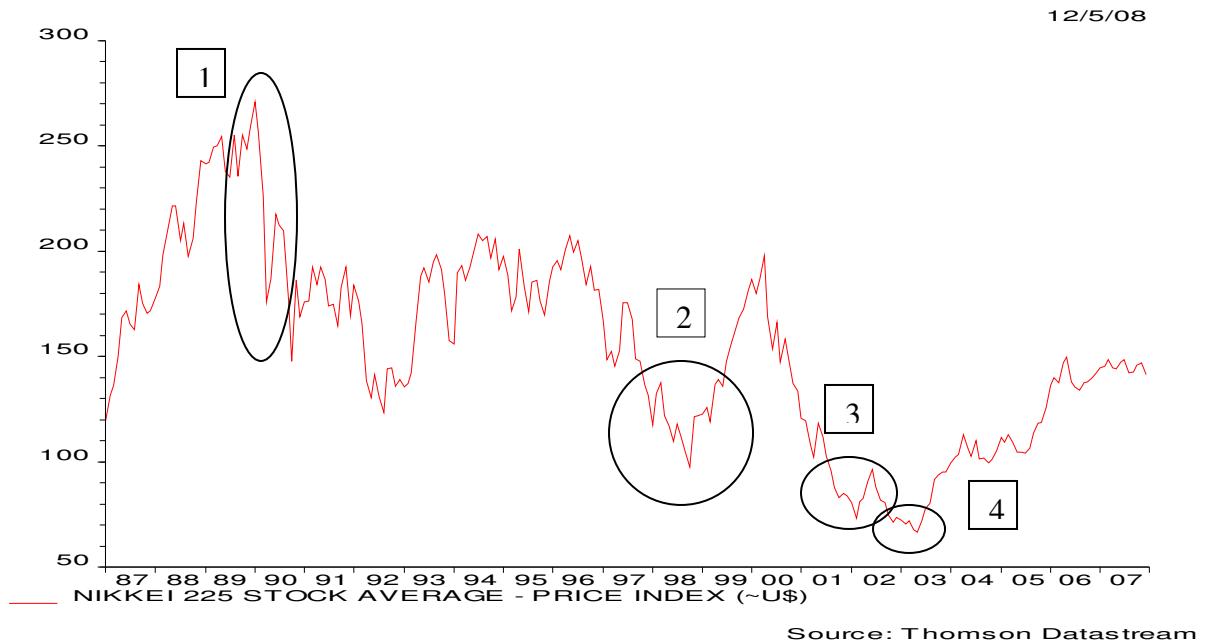
Figure 1.1: *Changes in the Nikkei 225 index price from 1987-2007 (DataStream, 2008)*
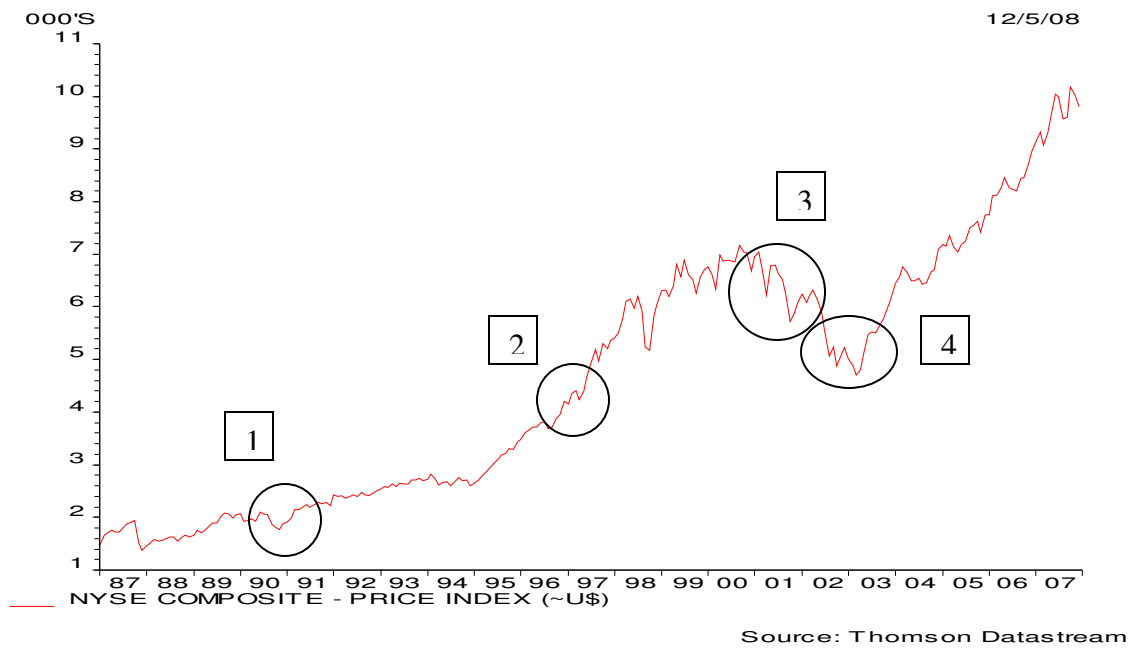
Figure 1.2: *Changes in the NYSE index price during the 1987-2007 (DataStream, 2008)*

The numbers 1, 2, 3, and 4 represent the Japanese late 1980s crisis, the 1997 Asian financial crisis, the 9/11 terrorist attack, and the U.S. invasion of Iraq, respectively.

1.3 Problem statement

An issue which has theoretical, practical and programmatic importance is the cointegration between various international financial markets. By increasing the co-movement of stock markets, the opportunities for international portfolio diversification declines.

Although there have been lots of studies on the cointegration of ASEAN stock markets and the effects of financial crises on them, there is a gap in the literature about comparisons between crises of different natures, political and financial, on cointegration of these stock markets. Also, the degree of ASEAN-5 stock markets' sensitivity to different crises of political and financial is an uninvestigated area.

By understanding the level of correlation and co-integration of ASEAN's economies with the leading economies of the world, the U.S. and Japan, and then understanding the effects of different crises of different natures on ASEAN-5 economies, this study will help investors from different countries to observe which ASEAN-5 stock markets have the greatest potential for portfolio diversification expansion and also help ASEAN investors to venture into other regional and global stock markets.

Therefore, the central problems for this study can be defined as: to what extent are ASEAN-5 stock markets correlated and co-integrated with the U.S. stock market, and with the Japanese stock market; and what is the level of sensitivity of each of the AESAN-5 stock markets to different kinds of financial and political crises? It has implications in different areas such as portfolio diversification, open macroeconomics, market efficiency, and international financial contagion risk. It also can be very useful for long term stock market policy makers, governments, economists, investors, brokers and whoever is connected to these stock markets in any way.

1.4 Research Objectives

Based on discussion in previous segments, the main objectives of study can be stated as:

1. To examine the extent of the correlation of ASEAN-5 stock markets with the U.S. and Japan stock markets.

2. To analyze the existence of cointegration between stock markets of the U.S and Japan with ASEAN-5 stock markets.

3. To explore the extent to which political and financial crises affect cointegration between ASEAN-5 stock markets and stock markets of the U.S. and Japan, specifically the 9/11 terrorist attack and the U.S. invasion of Iraq in 2003 as the political benchmarks, and the Japanese 1990 financial crisis and the 1997 Asian financial crisis as the financial benchmarks.

1.5   Research questions

The objectives of the present study lead to the following research questions:

1. What is the correlation between the U.S., Japanese, and ASEAN-5 stock markets?

2. What is the level of cointegration between ASEAN-5 stock markets and stock markets of the U.S. and Japan?

3. To what extent do global political and economic crises affect cointegration between ASEAN-5 stock markets and the stock markets of the U.S. and Japan? Which of these stock markets are more sensitive to which kinds of political or financial crises?

1.6   Significance of the Study

There is a vast body of literature addressing the issue of stock market integration around the world. Many of them concentrate on regional stock markets: Patev, Kanaryan and Lyroudi (2006) investigated the Central and Eastern European (CEE) equity market; Knif (2007) analyzed the small Nordic markets; Liow, Ooi and Gong (2005) looked at four Asian and four European property markets; Click and Plummer (2004) studied the correlations between ASEAN-5 stock markets; and Jang and Sul (2002) investigated the co-movement of stock markets of South East Asian countries. Some literature pays more attention to the interrelation of main global stock indices and the effects of their changes on other regional stock markets: Bin Hoque (2007), Hui (2002), Izquierdo and Lafuente (2004), Fernandez (2006), Hatemi and Roca (2006). Researchers have also attempted to find the consequences of global crises on this relation and the extent to which regional crises affect stock markets in different parts of the world. Since the stock market is a good indicator of the real economy, it can be useful to study the responses of ASEAN-5

stock markets to internal and external interventions. Although much research has been done in the area of financial crises, very few have directly referred to the effects of crises of political nature on the ASEAN-5 stock markets. Specifically, no study has compared the effects of political and financial crises on a regional stock market. Thus, there is a major research gap in observing the consequences of political crises on stock markets; this gap is more noticeable for ASEAN-5 stock markets. Furthermore, this study will provide a better understanding of the opportunities available to international investors for portfolio diversification in ASEAN-5 stock markets, and may also be useful for fund managers and stock market policy makers. Moreover, it can help to supplement the existing literature in this area of study.

1.7 Organization of the study

Following the first chapter, the rest of the thesis is structured as follow: The second chapter's aim is to review the theoretical foundation upon which the research is based by reviewing the relevant literature. In Chapter Three, analytical framework and research procedures will be explained. This chapter describes the methodology which was used to collect the data in order to address the research question. Chapter Four will discuss findings and interpretations of the study's results; this chapter presents tables of all obtained data. And the last chapter, Chapter Five will be the study conclusion. In the final chapter, the aim of the research will be summarized; the study's contribution to the discipline will be stated; and recommendations for future research will be made.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

The existence of linkages across different national stock markets has important implications for investors who are seeking diversification opportunities in foreign markets. Such links among different stock markets reduces the possibilities for portfolio diversification (Goh, Wong, & Kok, 2005). The extent to which the recent financial and political crises have changed the inter-relations of the ASEAN stock markets is an important point in many recent studies. It is important for investors to understand the reactions of these economies to massive external and internal shocks. The present literature review attempts to more deeply explore existing research related to stock market co-integration and the role of different crises on them.

2.2 Co-movement and Co-integration of Stock Markets

Co-integration is an econometric property of time series variables. Since the financial shocks and the contagion process in the crises incidents are attributable to a variety of factors beyond economic linkages, many researchers have focused on financial contagion through providing evidence of significant increases in cross-country correlations of stock returns and volatility in a region (Sachs *et al*., 1996). The development of technologies lead to increasing integration of international stock markets, quick information transactions in financial markets, and less restrictive control of asset market transactions among countries (Izquierdo & Lafuente, 2004). An examination of the dynamic linkage among national stock markets of different geographical areas of Europe, Asia, and

America during the period of 1997-2001 was conducted by Izquierdo and Lafuente (2004). Argentina, Chile, Mexico and the United States from the Americas; Germany, Italy, Spain and the United Kingdom from Europe; and Hong Kong, Japan, Singapore and South Korea were selected from Asia. It was initially thought that crises have just short time effects, but later by revealing the negative shocks in the real economy the long term effects also appeared, such as negative GDP growth rates that were experienced by Korea, Indonesia and Thailand during the period of 1997-1998, which was then transferred to most Latin American economies. Izquierdo and Lafuente (2004) showed that shock in volatility does not vanish quickly, and furthermore, all market regions have significant influences associated with news that are specific to their own geographical region. The results revealed that asymmetry is caused by cross-market interactions and is a reason why domestic volatility is increased by bad news or negative shocks. Their findings support that noisy transmission of news is the key factor in explaining the link between volatilities during the Asian crisis.

In another study, Kallberg and Pasquariello (2007) investigated the co-movement of security prices by focusing on the degree to which observed correlations cannot be explained by fundamental factors. The sample size was 82 industry indices for the U.S. equity market over the period of January 5, 1976 to December 31, 2001. Their analysis showed that aggregate excess square correlation is both economically and statistically significant, averaging 0.07 over the entire sample. Excess co-movement was also consistently significant across all industries over the entire time interval and fluctuated between 14% and 23% of all return residual correlations during the time period. In

addition, their results found that non-fundamental co-movement has been playing an increasingly important role in affecting the covariance among stock indices. These results are remarkably uniform across most industries. In addition, most estimated indicators of excess co-movement are symmetric. Their evidence supports the theoretical literature attributing financial contagion to the portfolio rebalancing decisions of investors, the extent of their accessibility to information, or to product market shocks. But the evidence also suggests that excess co-movement in the U.S. stock market does not prevent liquidity shocks.

Since the degree of dependency between U.S. stock market and the stock markets of other countries is always considered high, it has been assumed that other markets tend to be strongly influenced by U.S stock market behavior. Aggarwal and Rivoli (1989) examined this relationship and investigated the linkage between equity returns in the United State and four Asian equity markets - Hong Kong, Singapore, Malaysia, and the Philippines. Furthermore, they tried to understand if the day of the week effect pattern observed in the U.S also occurred in these Asian markets. Their observation period was from 1976 to 1988. They also examined the dependency of these Asian stock markets on the New York stock market by computing correlation coefficient of indices. Their study results confirmed that the four observed Asian stock markets have a tendency to follow the New York index on a day-to-day basis. In addition, they found a strong relationship between the U.S. and Asian markets for cases of Monday/Tuesday and Friday/Monday. Particularly for Asian markets, the Tuesday effect is more significant, as it follows the well-known Monday effect in the United States. Among the Asian markets, the strongest

effects occurred in Malaysia. The existence of the weekend effect, which claims that Monday returns are significantly lower than Friday returns, was also proven by these results.

Liow, Ooi and Gong (2005) further investigated the long-run and short-run relationship among the four Asian property stock markets of Japan, Hong Kong, Singapore and Malaysia; and four European property markets of the U.K., France, Germany and Italy. Furthermore, they examined the relationship between equally-weighted Asian and European regional property stock indices. They not only examined the effects of mean and volatility on different national stock markets, but also paid special attention to listed real estate markets. They compared and contrasted the differences in the nature and degree of interdependence and transmission of return and volatility among the property stock markets in Asia and Europe, respectively. Thus, they would be able to derive any regional property stock portfolio implications. Liow *et al* (2005) study revealed that there is no integration between the equally weighted Asian and European property stock indices. Their findings indicated over longer horizons that there are some diversification opportunities among property stock markets of Asia and Europe for those investors who diversify a property stock portfolio that contains both Asian and European listed real estate.

On the other hand, Liow *et al* (2005) study showed that a significant cross-market return dynamic exists between Singapore and Malaysia. This relation is especially obvious during global crises; for instance, the results confirm that the Asian financial crises had

an awful impact on Asian property stock returns; in particular, its impacts on the markets of Singapore and Malaysia were highly significant. In addition, the 9/11 event recorded a highly negative impact on the Japanese property stock returns. In general, their analysis proved that although the magnitude of mean transmission is relatively small among the Asian and European property stock markets, there is some evidence of significantly positive cross-mean two-way effects between Europe and Asia of regional property stock markets. As a result, diversification opportunities exist among Asian and European property stock markets.

Other example of correlation between different stock markets was provided by Knif (2007). Based on his study high volatility tends to increase correlations between the markets. Knif analyzed the small Nordic markets and showed that local volatilities may play a role in the change of the correlation level. However, world-wide volatilities play the most important role in driving correlation changes. This means that market correlations tend to be dependent on general world-wide volatility rather than on local volatilities of a particular market. He extended the analysis of correlation changes from the normal methods such as comparing correlations across various sub-periods or examining conditional correlations, to a new method of investigating the direct dependence of the correlations on the involved volatilities as well as external volatilities.

In another study, role of crisis in co-movement of stock market was presented by Patev, Kanaryan and Lyroudi (2006). They investigated the Central and Eastern European (CEE) equity market co-movements in three periods related to international crises: pre-

crises, crises, and post-crises periods, respectively. They attempted to find the impact caused by crises on the international portfolio diversification gains in the CEE. They proved CEE markets are not integrated. However, they found some evidence for significant increases in co-integration between the CEE markets themselves and between the CEE markets and the U.S. market during the post-crises period. These results support the conclusion that dollar-based investors can benefit from diversification in CEE markets. Both long-term and short-term investors can benefit since these markets are not co-integrated.

Hatemi and Roca (2006) investigated the international portfolio diversification, focusing on the US, Japan, and the UK – which they alleged were the three largest financial markets in the world from the American investor's point of view from 1970 to 2000. To prove the stability of the markets' correlation, the market casual integration must be known because the existence of a long-term relationship between two markets can cause a great diminishment of international diversification benefits. The authors used a bootstrapping method and asymptotic assessment to check result validity. Furthermore, since most studies refer to just the existence and direction of causality, they chose to address the degree of causality to show the magnitude of international diversification benefits. Finally, their results, which were based on a portfolio approach, revealed that international diversification between the U.S., the U.K., and Japan can increase risk-adjusted returns.

The role of the main international financial markets of Japan and the U.S. were also considered by other academics who focused their attentions on developing stock markets. Bin Hoque (2007) explored the relationship between the stock price movement of Bangladesh with the USA, Japan and India. Bangladesh was used as a case study of an emerging market as its stock market is still in its infantile stages. He examined the interdependence among stock prices in evaluating the stock prices in evaluating the transmission of stock prices shocks across these four countries. Bin Hoque also examined the role of international crises in this co-integration. He found that there are long-term and short-term dynamic relationships between stock prices of these countries. The results proved that stock prices in these countries share a common stochastic trend. As was expected, impulse response analysis showed that shocks to the U.S. market had a direct impact on the Bangladesh market. On the other hand, responses of the Bangladesh market to the Indian and Japanese markets were weaker.

2.3 Financial crises

"The term financial crisis is applied broadly to many types of situations in which many financial institutions or assets suddenly lose a large part of their value" (Thefreedictionary, 2008). In this segment, two financial crises will be examined by this study.

2.3.1 Asian Financial Crisis

In the last few years there have been considerable studies on the causes of the 1997 Asian financial crisis. The East Asian Financial Crisis was a period that gripped much of Asia;

it began in July 1997 and raised fears of a worldwide economic meltdown. A study by Lim, Brooks and Kim (2007) investigated the effects of the 1997 financial crises on eight Asian stock markets, on a country-by-country basis. Hong Kong was the hardest hit followed by the Philippines, Malaysia, Singapore, Thailand and Korea. The study contains three sub-periods: pre-crisis, crisis, and post-crisis. To mark the beginning of the first period they considered the devaluation of the Thai baht when the Bank of Thailand announced a managed float currency on July 2, 1997. In this time period, the currency crisis of Thailand quickly spread to other Asian countries with massive depreciations of local currencies and the collapse of stock markets. The end of the crisis is defined as December 1998 when most of the Asian economies had recovered to pre-crisis levels of GDP and currency exchange value, regaining stability and almost ending the short-lived depreciation.

Furthermore, in this study Lim *et al* (2007) investigated the efficiency of these markets in different stages of a crisis. The efficient markets hypothesis (EMH), which was presented with Eugene Fama in 1970, states that financial asset prices fully reflect all available information. Lim *et al* (2007) tried to find out if the 1997 financial crisis was responsible for inefficiencies in Asian stock markets. They found considerable decreases in inefficiency during this instability period for all markets. Among different markets, Hong Kong appears to have been the most efficient, followed by Korea and Taiwan, while Malaysia is at the tail end of the ranking list. The impact of the crisis on the inefficiency of these markets is also varying, where there is evidence to show great inefficiencies in the markets of Malaysia, Taiwan and Philippines; but the Indonesian stock market

showed greater efficiency as it displayed small reactions to the crisis. During the pre-period crisis, most markets showed positive trends in market efficiencies, but during the crisis these trends were adversely affected. Most stock markets were able to overcome this situation during the post-crisis period, except for Thailand which was not able to come out of the negative zone.

During a crisis there are always overreactions in markets to not only local news, but also to news that originates in other markets (Lim *et al*, 2007). In such cases, policy makers play a significant role in calming the market. A successful example is Malaysia, where policies attempted to rebuild investor confidence by restricting capital outflow, thereby causing the market to stabilize the market.

Another study by Jang and Sul (2002) also investigated the co-movement of Southeast Asian stock markets during four periods: pre-crisis, crisis, and two post-crisis periods. Each period consists of 8 months, thus the total sample period of the study is 2 years from October 1, 1996 to September 30, 1998, plus another 8-month period in 2000. This study not only included those countries directly hit by the Asian crisis, such as Thailand, Indonesia, and Korea; but also neighboring countries of Japan, Taiwan, Hong Kong and Singapore. The authors used both the co-integration and the Granger causality tests. They found that the correlation coefficients for the pre-crisis period were quite low on both tests. For example, Korea showed a very low correlation coefficient of -0.01. On the other hand, this trend completely changed during and after the crisis. For Korea, the correlation coefficient level between Korea and the other six countries increased rapidly

and peaked at 0.12 during the crisis period and increased to 0.29 in the post-crisis period. The stock markets of Hong Kong and Singapore were considered not as directly hit by the crisis; they showed high correlation with stock markets of neighboring countries. This level of correlation maintained itself strongly even in the post crisis period.

Additionally, Yusof and Majid (2006) examined the long term co-movement of the Malaysian stock market and its two main economic partners, the U.S. and Japan, during the Asian crisis. They used different methods in their study, such as time-series analysis, co-integration, variance decompositions, and impulse response functions. To achieve higher confidence, they analyzed market integration at both bivariate and multivariate levels. Their study focus periods were before, during, and after the 1997 Asian financial crisis. They also sought to find out which of these two markets more strongly leads the Malaysian stock market. Their findings showed that the Malaysian stock market is volatile since it showed higher standard deviation. KLCI, as the representative of the Malaysian stock market, had high statistical correlations with its American partner NYSE in the periods before and during the crisis. However, as Malaysia's western partner had been lost its correlation, the eastern partner Japan showed more correlation during the periods of the financial crisis and recovery. The long-run equilibrium was examined among the three stock markets. Both bivariate and multivariate analyses were done. These tests also confirmed the above results. These results may have been caused by increases in bilateral trade between Malaysia and Japan during the recovery period, meanwhile proportional trade between Malaysia and the U.S. declined. Another factor that could have played an important role is geographical distance. Thus, based on this

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study, the opportunities of gaining profits through trans-national investment diversification during the post-crisis period diminished between the Malaysian and Japanese stock markets.

2.3.2 ASEAN-5 and the Asian Financial Crisis of 1997

Increases in financial system liberalization of the ASEAN-5 countries make examining financial integration of these markets more interesting for scholars. Janor and Ali (2007) investigated the regional and global financial market integration of ASEAN-5 countries, specifically focusing consideration on the effects of the Asian financial crisis. For global indicators they used the U.S. and Japan and the World market index as the proxies. They applied bivariate and multivariate co-integration techniques. They found that the correlations between most ASEAN-5 markets and Japan are the lowest in comparison to correlations between ASEAN-5 countries and the other global markets. Moreover, the co-integration test showed the relationship between these markets differs during the pre- and post-crisis periods. For instance, during the pre-crisis period, the Philippines was co-integrated with all of the countries except for Thailand and Malaysia was co-integrated with Thailand. However, lesser co-integration relationship was discovered during the post-crisis period. Moreover, multivariate co-integration results also confirmed that the co-integration relationship between the markets increased during the post-crisis period.

In contrast to the correlation results, multivariate tests showed that during the post-crisis period Japan was more co-integrated with ASEAN-5 countries than the U.S. was. This