THE COMOVEMENT OF THE SELECTIVE ASEAN STOCK MARKETS: IS THERE ANY IMPACT ON MALAYSIAN STOCK MARKET?

BY

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UNIVERSITI UTARA MALAYSIA

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ABSTRACT

This paper investigates the cointegration relationship in the monthly returns among five stock market indices of ASEAN countries namely FTSE Bursa Malaysia KLCI, Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index and Philippines Stock Exchange. The period of study is between January 2001 and December 2015. The Johansen-Juselius cointegration test and Vector Error Correction Model (VECM) are applied to examine the cointegration between Malaysian stock market index with the other four selected stock market indices. Findings indicate that there is cointegration relationship among the five selected ASEAN stock market indices. The VECM long run results show that the Bangkok Stock Exchange of Thailand has the highest influence on the FTSE Bursa Malaysia KLCI

Keywords: Stock market, Cointegration, VECM

ABSTRAK

Kajian in mengkaji hubungan kointegrasi antara lima indeks saham di negara ASEAN iaitu FTSE Bursa Malaysia KLCI, Bursa Malaysia Bangkok, Thailand, Bursa Saham Ho Chi Minh, Jakarta Indek Komposit dan Bursa Saham Filipina dengan menggunakan pulangan bulanan. Tempoh masa ujian antara Januari 2001 dan Disember 2015. Ujian kointegrasi dan ujian Vector Error Correction Model (VECM) digunakan untuk memeriksa kointegrasi antara indek saham Malaysia dengan empat indeks saham yang terpilih. Keputusan kajian menunjukkan ada hubungan kointegrasi antara lima indeks saham ASEAN yang terpilih. Keputusan ujian jangka panjang VECM menunjukkan Bursa Saham Bangkok, Thailand memberi pengaruh yang paling tinggi terhadap FTSE Bursa Malaysia KLCI.

Katakunci: Pasaran saham, kointegrasi, VECM

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LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
FTSE	Financial Times Stock Exchange
KLSE	Kuala Lumpur Stock Exchange
KLCI	Kuala Lumpur Composite Index
IDX	Indonesia Stock Exchange
JCI	Jakarta Composite Index
SEC	Securities and Exchange Commission
FBMKLCI	FTSE Bursa Malaysia KLCI
BNGKSET	Stock Exchange of Thailand
HCMNVNE	Ho Chi Minh Stock Exchange
JAKCOMP	Jakarta Composite Index
PSECOMP	Philippine Stock Exchange
CAPM	Capital Asset Pricing Model
EMH	Efficiency Market Hypothesis
MPT	Modern Portfolio Theory
ADF	Augmented Dickey-Fuller
PP	Phillip-Perrons
VECM	Vector Error Correction Model
CUSUM	Cumulative Sum of Recursive Residuals Test
AIC	Akaike Information Criterion
SBIC	Schwarz' Bayesian Information Criterion

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Financial market is an important part in finance. Financial market consists of capital markets and money market. The stock market is one of the elements under capital markets. Stock markets play a vital role in supporting the growth of the economy. The stock market indirectly provides a channel of gaining capital for companies. Besides, it also mobilizes saving for investment. In addition, stock market is creating investment opportunities for small investors and government capital-raising for the development of projects.

Stock price movement is one of the indications that can be used as to reflect; how good the stock market it is. Due to this indication, the policy makers are interested to know about the stock market behavior. According to Comincioli (1996), the stock price will reflect prospects for the future economy. He also stated a stock price is one of the indicators to explain what is really happen to the economy. Moreover, Pettinger (2015) stated that fall of stock prices would lead to the economic distraction.

Stock price movement is affected by many factors includes political issues and global issues. For example, the moment of terrorist attack in Sept 2001 in the Unites States (US) gives a huge impact on their stock markets. During that time, stock market was very risky. The price of stocks was very volatile. Therefore, anything happens in a country either related to a political issue or social issues will directly affect the stock market. Basically, the volatility of stock market will influence the cost of capital, investment

strategies, and leverage decision. According to Hameed and Ashraf (2006) cited by Ali and Afzal (2012), volatility is an important matter that needs to be considered in order to make decisions of diversification and hedging.

According to Auzairy, Ahmad, Ho and Sapian (2012), Asian Financial crisis in 1997 has given a huge impact on the Asian foreign exchange market and financial market. Essentially, the Asian financial crisis started in Thailand with a significant drop in the Thai Baht value. During the crisis, stock market index had decreased. According to Zakaria, Hussin, Noordin and Sawal (2010), Malaysia had experienced the biggest stock market drop among the Asian countries within the crisis. It is being stated by Mundell (2000), exchange rate volatility is one of the major threat to global wealth that causes unnecessary volatility in capital markets.

Moreover, the current example of an economic issue is on China economy. In mid-2015, the devaluation of Yuan currency had slow down a China economy. China is one of a largest economy in the world, so it gives a direct impact on other countries. Based on Egen (2015), most of the investor view this situation seemed like with the Asian financial crisis in 1997. Based on Mehreen and Cunningham (2015), an extraordinary collapse in China economy had made a terrible day of global trading. They also stated devaluation of Yuan caused the Malaysia's stock market drop and even Ringgit also fall. Malaysia is one of the most affected countries because a large portion of its export is going to China (Kok, 2015). It can conclude, the stock market is delicate to any event that occurs in the economy.

1.1 Background of Study

This study focuses on the integration of ASEAN countries' stock markets. According to Taimur (2011), the study on cointegration of the stock market is crucial because it gives a direct impact on globalization and effect to investors. A stock market or equity market is the place where company's stock is to be traded.

Stock index measures the value of stock and tracks the performance of the specific stocks. Stock index represents a portfolio of stocks, bond, and other investment. Examples of stock indices are FTSE Bursa Malaysia KLCI index, Bangkok (SET) Index, Jakarta Stock Exchange Composite Index, Philippine Stock Exchange, Ho Chi Minh Stock Exchange, Shanghai Stock Exchange, Tokyo Stock Exchange and Strait Times Index. Participants of stock market are individual investors, corporate investors, and large institutions like pension funds, insurance companies, hedge funds, investor groups, mutual funds and banks.

Financial integration is a phenomenon where financial markets in neighbor country, regional or worldwide economy are closely linked together. Besides, the markets can share information and sharing of best practice among financial institutions. According to Chee and Kim (2007), the degree of stock market integration indicates the level of information efficiency in geographical boundaries and technology constraints. The integration of international markets is also important to investors who want to diversify their portfolio across national boundaries and to measure risk characteristics of their portfolio (Teng, 1998). Highly integrated stock market shows there is less opportunity for cross border diversification. According to Lee (2000), assumption of financial market

integration is; i) the price of a security traded will same across the region market. ii) There is no restriction on buying and selling securities in the region. iii) All types of participants can offer their services without restriction throughout the region.

1.1.1 The Development of ASEAN Stock Markets

ASEAN countries consist of Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Vietnam, and Thailand. These countries have their own stock market and the developments of their stock markets differ. This section discusses the development of Malaysia, Thailand, Vietnam, Indonesia and Philippine stock market.

1.1.1.1 Malaysia Stock Market

The Malaysian stock market was established in 1960 as Kuala Lumpur Stock Exchange (KLSE). In order to cater the globalization, few initiatives have been taken such as offering competitive services and infrastructure and implementing an internationally accepted standard. Example is combining of the Financial Times Stock Exchange (FTSE) and Bursa KLCI. The strategy of Bursa Malaysia is to ensure Bursa Malaysia KLCI remains strong in global. In addition, it also to provide a platform for a wider ranges of investment and attractive opportunities.

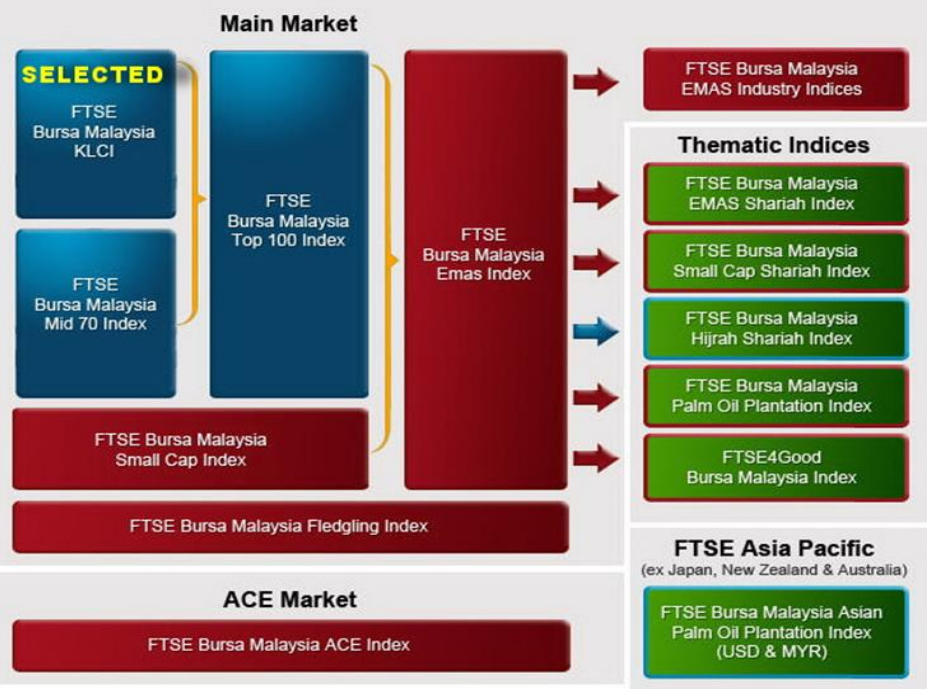


Figure 1.1
Lists of Bursa Malaysia Indices
Source: Bursa Malaysia

Figure 1.1 highlights the list of Bursa Malaysia indices. There are two markets in Bursa Malaysia which are, i) main market; ii) ace market. The indices that represent are FTSE Bursa Malaysia KLCI, FTSE Bursa Malaysia Mid 70 Index, FTSE Bursa Malaysia Top 100 Index, FTSE Bursa Malaysia Small Cap Index, FTSE Bursa Malaysia Fledging Index and FTSE Bursa Malaysia EMAS Index. The ACE market is FTSE Bursa Malaysia ACE Index.

This study focuses on FTSE Bursa Malaysia KLCI. It is a capitalization-weighted stock market index that tracks the performance of 30 companies in Main Market Bursa Malaysia. FTSE Bursa Malaysia KLCI is one of the indices that replace the Kuala Lumpur Composite Index (KLCI) (FTSE Russel, 2016). In July 2006, Bursa Malaysia was partnered with FTSE in order to offer suitable indices for Malaysian market to

enhance KLCI. The primary objective of this partnering is to adopt internationally index calculation to increase transparency.

1.1.1.2 Thailand Stock Market

The Thailand stock market was developed in July 1962 by the establishment of Bangkok Stock Exchange. In Thailand, there are two phases in their capital markets which are privately owned Bangkok Stock Exchange and Securities Exchange of Thailand. The establishment of the stock exchange is to support industrialization and economic development. This study focuses on Bangkok Stock Exchange of Thailand.

1.1.1.3 Vietnam Stock Market

There are two stock markets in Vietnam which are Ho Chi Minh Stock Exchange and Hanoi Stock Exchange. Hanoi stock exchange is a second stock exchange that has been launched in Vietnam in March 2005. Ho Chi Minh Stock Market is the largest stock market exchange in Vietnam. This stock exchange officially started in July 2008 namely Ho Chi Minh City Securities Trading Center. On August 2007, the name was changed and upgraded to Ho Chi Minh Stock Exchange. This study will focus on Ho Chi Minh Stock Exchange.

1.1.1.4 Indonesia Stock Market

Capital market in Indonesia was established before the independence of Indonesia. The first stock exchange is Batavia Stock Exchange in 1912 in Batavia (currently known as Jakarta). The new stock index is Surabaya Stock Exchange. In September 2007, these two stock market has merged namely as Indonesia Stock Exchange (IDX). Basically, there are two primary stock market indices in Indonesia stock exchange which are Jakarta Composite Index and Jakarta Islamic Index (JII). The objective of JII is to evaluate market activities based on Shariah compliance. This study uses Jakarta Composite Index as a proxy to Indonesia stock exchange.

During the global recession in 2008, Indonesia is the only ASEAN countries that growing positively. Consequently, it successfully joins China and India and listed in G20[1] (Monex Boom Securities, 2016).

1.1.1.5 Philippine Stock Market

Currently, there is one stock exchange in the Philippines. It is Philippine Stock Exchange (PSE). PSE is the oldest stock exchange in Asia. Historically, Philippine Stock Exchange is based on two previous stock exchanges which are Manila Stock Exchange (1927) and the Makati Stock Exchange (1963).

In June 1998, Securities and Exchange Commission (SEC) had approved PSE as "Self-Regulatory Organization". The PSE measures the relative changes in free float-adjusted market capitalization of 30 largest companies in Philippine (Dodz, 2016).

[1] G20 is the premier international forum for cooperation on global economic governance

1.2 Problem Statement

The stock market has an important function in an economy. It measures the economic condition; every major change in the economy can be reflected in the share price. In addition, the stock market also contributes to economic growth. For example, when the companies participate in buying and selling securities, it contributes to capital formation and economic development. Next, it also facilitates profitable networks for investor by encouraging habits of savings and investment. However, the globalization gives an impact on stock market. The issues of integration and comovement of ASEAN stock markets are never ending to be debated.

There is no clear picture on the issue of stock market integration. In addition, there is an inconsistent result on the comovement of the ASEAN stock market. Based on the previous studies conducted by (Jian, Kolari and Min, 2003; Saini, Azali, Habibullah and Matthews, 2003; Click and Plummer, 2005; Karim and Karim, 2008; Wang and Huyghebaert, 2010; Park, 2013), they found that the ASEAN stock markets are cointegrated to each other. However, Rim and Setaputra (2010) found that the ASEAN stock markets are not strongly integrated. In contrast, Auzairy et al. (2012) found there was no long run integration between ASEAN stock markets. Their results are consistent with Karim and Gee (2006).

Moreover, there are limited studies that focus on the integration of Malaysian stock market and ASEAN stock market. Previously, there are several studies that focus on Malaysian stock market but it is concentrate on Malaysian trading partners. For example, a study conducted by Karim and Gee (2006), Karim and Karim (2008) and T.

Shanmugam (2009). Additionally, there are a few studies that include all ASEAN countries' stock market. Briefly, the result of previous studies on stock market integration is mixed. Thus, this topic is still open for further examination. This study is differing from others because it explains which ASEAN stock market influences on the Malaysian stock market.

1.3 Research Questions

The research questions of this study are:

1. Are ASEAN stock markets being represented by FTSE Bursa Malaysia KLCI (FBMKCI), Bangkok Stock Exchange of Thailand (BNGKSET), Ho Chi Minh Stock Exchange (HCMNVNE), Jakarta Composite Index (JAKCOMP) and Philippine Stock Exchange (PSECOMP) cointegrated?

2. Which stock markets have the comovement with Malaysian stock market?

3. Which stock market has the highest influence on Malaysian stock market?

1.4 Research Objectives

The objectives of this study include:

1. To identify the integration of ASEAN stock markets which are represented by FTSE Bursa Malaysia KLCI (FBMKCI), Bangkok Stock Exchange of Thailand (BNGKSET), Ho Chi Minh Stock Exchange (HCMNVNE), Jakarta Composite Index (JAKCOMP) and Philippine Stock Exchange (PSECOMP).

2. To examine the comovement of the Malaysian stock market with respect to other ASEAN stock markets.

3. To investigate the main stock market, among all ASEAN stock markets, that has the highest influence on Malaysian stock markets.

1.5 Significance of Study

Since this study tries to identify the relationship between the selected ASEAN stock markets, the results of this study can provide useful information for many parties especially investors, policy makers, and researchers.

1.5.1 Investors

This study will give useful information to investors who want to invest in the stock market. In this research, it shows whether the changes of the other ASEAN stock markets will give an impact towards Malaysia stock market. In addition, by knowing the relationship of stock return, the investors will have an idea on how to protect their investment. Besides, the investors who want to diversify their portfolio internationally will have a picture on which ASEAN countries is beneficial to them.

1.5.2 Policy Makers

This research is important to policy makers in order to revise any policy that can help to protect and uphold the Malaysian stock market. Theoretically, the stock market is view as

an indicator of the economy. Thus, the great reduction in stock prices will have a future recession. While larger increases in the fund market will contribute to economic development in the future. By having this research, the policy makers will know the real situation and can revise the existing policy.

1.5.3 Researchers and Academicians

This research can give useful information to researchers who want to further study on this topic. Besides, this study also will assist as cross-reference that will give them an overview of the integration among ASEAN stock markets. In addition, this research might offer some realistic message for academician about this integration.

1.6 Scope of Study

This study was conducted with the aim of investigate the comovement and cointegration of ASEAN stock markets. Besides, it is also to examine whether these comovement gives an impact on Malaysian stock market. This study uses monthly indices of each of the stock market index. The selected five ASEAN market indices are namely FTSE Bursa Malaysia KLCI, Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange. This study covers a 15 years period of study.

1.7 Organization of Study

This study is structured into five chapters. Chapter one presents the background of the study, problem statement, research questions, research objectives, scope of the study and significance of the study. Chapter two discusses on theories that related with stock market integration and empirical literature on ASEAN stock market integration. Besides, chapter three discusses the methodology, theoretical framework and variables use. Chapter four presents the finding and analysis of the study. Lastly, chapter five presents conclusion, recommendation, and limitation.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The purpose of this study is to investigate the integration of ASEAN stock market. Besides, it examines the comovement of the Malaysian stock market with other selected ASEAN stock markets. Lastly is to identify the main stock market that has the highest influence of the Malaysian stock market. This chapter will discuss on theoretical literature from the previous study. The purpose is to identify the theories that can explain on stock market integration. It also will review the empirical evidence about the integration among stock markets.

2.1 Theoretical Literature

According to economic theory, financial integration has advantages. The advantages are lower cost of trading financial assets and steady consumption patterns when level of economic activity swings (Park, 2013). Based on a study conducted by Sowmya and Arun (2013), there are two approaches to measuring stock market integration, which are the law of one price and price movement within the market. Law of one price implies an asset pricing theory. Meanwhile, price movement method uses a simple correlation of daily asset return. There are a few theories that related to stock market integration. They are Capital Asset Pricing Model (CAPM), Efficiency Market Hypothesis (EMH), Modern Portfolio Theory (MPT) and Wavelet Theory.

2.1.1 Capital Asset pricing Model (CAPM)

CAPM is a model of the relationship between the risk and expected return of the stock market. CAPM uses the covariance to measure integration. In theory of integration, CAPM considered all the stock markets were perfectly integrated (Kearney and Lucey, 2004). According to Pedersen (2002), CAPM was applied in order to assume markets are integrated with the same risk-adjusted and price identically. In addition, CAPM works by combining the return of the asset that has similar risks (Sowmya and Arun, 2013).

According to Devereux, Lane, Park, and Shang (2011), if the markets were perfectly integrated, only global factors would be priced. Meanwhile, the local factor will be priced if the markets were completely segmented. It is also stated, market was incompletely integrated if both markets were priced. Based on CAPM, stock market integration has a potential to reduce the risk through international diversification (Kearney and Lucy, 2004).

According to Bekaert and Harvey (1995) cited by Kearney & Lucy (2004), CAPM theory can create perfect integrated of the stock market, but it still shows a low or negative correlation. This is due to the combination of an industry. CAPM theory is important to investors to calculate the investment risk. This theory is mainly important to investors who diversified their portfolio into several stock markets. This theory was used by a number studies includes (Teng, 1998; Pedersen, 2002; Kearney and Lucy, 2004; Aurori, 2009; Bit-Kun, Chee, and Arsad, 2010; and Chan et al., 2013; Hong and Daly, 2014).

According to Chan et al. (2013), the flaw of the CAPM theory is a problem of unrealistic assumption in reality. For example, there are no taxes and transportation cost. However, according to Nordell and Stark (2010), it is impossible to practice and achieve the condition in the real world. Fama and French (2004) stated that the empirical problems in CAPM may reflect theoretical shortcomings and will cause many assumptions. Thus, CAPM will provide an inconsistent result to investors and researcher because taxes and transaction cost need to be considered.

2.1.2 Efficient Market Hypothesis

Another theory that related to the stock market return is the Efficient Market Hypothesis. According to Fama (1969), EMH comes in three forms which are the strong form that reflect a share price rapidly change to the accessible new information. Semi-strong form reflects public information. While, weak form reflects a historical price. According to Malkiel (2003) cited from Chan et al. (2013), EMH helped the investors to choose a valuable stock with a low price in order to achieve greater profit.

In addition, based on Chan et al. (2013), the effectiveness of stock market can be reflected thru information on individual and whole stock market. The efficiency of a capital market indicates the degree of stock market integration. According to Heilman (2010), EMH was violated when stock markets were cointegrated. This is because one market has information about others. This theory had been used in studies conducted by (Heilman, 2010; Azizan and Sulong, 2011; Chan et al., 2013; Aimprasittichai and Suppakittiwong, 2015).

2.1.3 Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT) is applied in order to view the implication of investor on stock market integration. According to Azizan and Sorooshian (2014), MPT was introduced by H. Markowitz. MPT is a stock portfolio model that investors used to optimize their return and minimize their risk of a portfolio by measured variance of stock prices. Based on Markowitz (1959) cited by Aimprassittichai and Suppakittiwong (2015), MPT was an idea of diversification where investor invested in more than one asset and it was beneficial to them. In addition, it will reduce the volatility of an entire portfolio. He also stated that good portfolio gives a protection and satisfaction to investors.

Based on Heilman (2010), MPT theory also suggested that investors should diversify their investments if the returns of assets are not perfectly correlated. Besides, if the positive long run relationships between stock markets were presented, international diversification was limited. The previous studies that imply Modern portfolio theory include (Heilman, 2010; Azizan and Sorooshian, 2014; Aimprassittichai and Suppakittiwong, 2015).

2.1.4 Wavelet Theory

Wavelet theory is able to analyze the stock price in time series. Besides, it also able to predict future stock prices by using the detail coefficient. Wavelet analysis is to measure the comovement in the time-frequency. According to Rua and Nunes (2009), the comovement of the stock market was important to investors as they can measure the risk of portfolio. However, the comovement of stock return was diverse over time. Therefore,

by applying this theory, investors supposedly able to capture the fluctuation of time as risk exposure always inconsistent.

One of a method that can analyze comovement of stock market is discrete wavelet transform. The discrete wavelet transform able to analyze the input signal for the different frequency with different resolutions by decomposing original signal. The original signal will decompose into approximation coefficient or detail coefficient. Approximation coefficient indicates an average behavior of indices in long run. While detail coefficient indicates short burst in financial data and it has reactions to news and events. This theory was applied by (Sahu and Sanjeev, 2008; Rua and Nunes, 2009; and Celik and Baydan, 2015).

2.2 Empirical Literature

There are many studies that had been studied on international stock market integration. Financial integration is a multidimensional process by which distribution of financial assets becomes borderless (Aimprasittichai & Suppakittiwong, 2015). According to Karim and Karim (2008), early studies on stock market integration and international portfolio were conducted by Global (1968), Solink (1974) and Levy and Sarnat (1970). This section is dividing a discussion into two parts. The first part will discuss on previous studies conducted on the effect of Malaysian stock market index on the selective Asian stock market indices, ASEAN stock market indices and its major trading partners. The second part discusses previous studies that focus on the integration of the ASEAN stock market during, pre and post-Asian financial crisis-1997 and Subprime Crisis 2008.

A study conducted by Saiti and Masih (2014), examines the comovement of seven major international stock price indices such as FTSE Shariah China Index, Asia Shariah index, Malaysia EMAS Shariah Index, China SSE Composite Index, Hang Seng Index, Nikkei 225 and KOSPI within a period from 26 October 2007 to 1 March 2011. The finding shows that Shariah China Index had a long run comovement with all selective conventional and Islamic markets. Besides, the Shariah China Index was a Granger-caused by all Islamic and conventional markets. Their findings also suggested Malaysia Shariah market is the second rank of Asian market that affected on Shariah Compliant Equity Investment in China.

Furthermore, the study conducted by Karim and Karim (2008), examines the stock market linkage between Malaysia and its major trading partner which were Japan and China. The result shows Malaysian stock market was significantly influenced by development of its major trading partner. Additionally, there are long run bidirectional relationships between Malaysia and Japan and China. Moreover, the studies that used Kuala Lumpur Composite Index as an indicator for Kuala Lumpur stock price index are (Jian et al., 2003; Karim and Karim, 2008; Karim and Karim, 2012; Auzairy et al., 2012; and Arsyad, 2014).

The study conducted by Karim and Gee (2006), found the Malaysian stock market was started to weak and no cointegration with its trading partners like the Philippines, United States, Indonesia, and China after the financial crisis. Besides, Malaysia stock market has a long run relationship with Philippines and U.S before the crisis. There is a short run relationship between Indonesia and China. Other than that, there is a bidirectional relationship between Malaysia and Hong Kong and Thailand stock market index.

Based on a study conducted by Arsyad (2014), the result shows there was integration between Southeast and East Asia equity markets although the integration process was not completed. This study covers the period from 2003 to 2013. Moreover, according to Jian et al. (2003), the result suggests ten Asian countries like Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, Singapore, Thailand, Taiwan and the US has long run cointegrated relationship during the financial crisis. On the other hand, it was more integrated after the financial crisis. They used 10-year period of study by using cointegration analysis.

This study consistent with Azizan and Sulong (2011), the result found Japan, Singapore, Hong Kong, Taiwan, Korea, and China more integrated after the financial crisis. Besides, Malaysia has integration among other Asian countries. In addition, Wang and Huyghebaert (2010) found East Asian stock markets except China are integrated during the financial crisis and most stock markets in East Asia reacted to international shocks. The studies that had focused on East and Southeast Asia includes (Lim, 2007; Wang and Huyghebaert, 2010; Chow, Shin and Linlin, 2011; Ardliansyah, 2012).

Second part, there are many studies conducted on the integration of the ASEAN stock market during pre and post financial crisis in 1997 (such as Bachman, Choi, Jeon and Kopeeky, 1996; Masih and Masih, 1999; Saini et al., 2002; Jian et al., 2003; Click and Plummer, 2005; Yusof and Majid, 2006; Majid and Kassim, 2009; Karim and Karim, 2012; Auzairy et al., 2012; Park 2013). However, their finding differed.

According to Karim and Karim (2012), the result indicates that ASEAN-5 stock markets, which are Malaysia, Thailand, Indonesia, Philippines, and Singapore were integrated

during, pre, post-1997 and post-subprime. Therefore, the investors who diversified their portfolio in these stock markets cannot really enjoy the international diversification. In contrast, Majid, Meera, Omar and Aziz (2009) found ASEAN countries such as Malaysia, Thailand, Indonesia, Philippines and Singapore are cointegrated in pre- and post- 1997.

Based on a study conducted by Click and Plummer (2005), examines a cointegration among Indonesia, Malaysia, Philippine, Singapore and Thailand stock market in the period of 1998 to 2002. They found these ASEAN stock markets were integrated only after the financial crisis. Their finding also shows this relationship was not completely segmented. Moreover, it also stated Malaysia was integrated with Singapore during Asian financial crisis. Other that, Malaysian stock market was not completely segmented with world stock market. In contrast, a study conducted by Bit-Kun et al. (2010), shows the Malaysian stock market was segmented with world stock during the financial crisis and it closely integrated during the global crisis. It has due to capital reform and capital controls that were imposed by the Malaysia government.

Besides, a study conducted by Janor and Ali (2007), examines regional and global financial market integration for Malaysia, Singapore, Thailand, Indonesia and Philippines. Their result showed some of the ASEAN countries were regionally and globally integrated. However, they were not completely segmented by national borders. Their study also stated Malaysia was cointegrated with Thailand and Philippine during pre- and a post-Asian financial crisis in 1997.

A study conducted by Saini et al. (2002) found five countries which are Indonesia, Malaysia, Philippine, and Thailand was cointegrated among them. However, Singapore stock market not affected by others except Philippine in Asian financial crisis. It is because Singapore's investment was dominated in the Philippines. So, it is not surprising if any changes in Philippines stock market effect on the stock price of the Singapore stock market.

Besides, according to Auzairy et al. (2012), there was no long run integration between Asian stock market and world stock markets. However, they found short run integration between them. They used a 13-year period of study by using Asian stock market includes Malaysia, Thailand, Indonesia and South Korea.

A study conducted by Rim and Setaputra (2010), examines a cointegration between ASEAN stock market with US market by using daily returns market indices around the Asian Financial crisis in 1997. The period of study was in 1992 to 2006. The result indicates US stock market had strongly influenced in ASEAN markets (Malaysia, Philippine, Thailand, and Singapore). Besides, there was cointegration relationship between them. However, ASEAN markets had little impact on US markets except Thailand.

There are several empirical studies had conducted on Subprime crisis. The previous studies are (Majid and Kassim, 2010; Yoshida, 2010; Karim et al., 2011; Rahman and Sidek, 2011; Siew and Isa; 2014; Ma and Masih, 2014; Zhang and Hamid, 2015). According to Yoshida (2010), there are few differences between Financial Asian Crisis in 1997 and Subprime Crisis in 2008. It had shown the participants in the stock market were

more aware of any upcoming crack in the stock market. It is supported by Auzairy et al. (2012), where a subprime crisis in 2008 did not affect the Asian as bad as European.

According to Karim and Karim (2012), the degree of integration had significantly increased either in short run or long run in Subprime Crisis. The result suggested Indonesia and Malaysia stock market were responded more in shock of the UK and US market in pre-subprime crisis. However, Malaysia was affected more by shock in the US market during the crisis.

It was supported by Majid and Kassim (2009). By using cointegration and vector autoregressive, it shows there was long run equilibrium among stock markets (KLCI, JCI, Nikkei225, FTSE100, and S&P500) during a crisis. Besides, Indonesia (JCI) and Malaysia (KLCI) have a long run relationship but only during the crisis. Both of them were responded more to shocks in UK and US. However, Malaysian stock market was most affected by shocks in US markets.

According to Siew and Isa (2014), Malaysian and European stock market have a cointegration relationship after the subprime crisis. Besides, there was a weak cointegration between Asia-Pacific developed and emerging markets except on peak of the subprime crisis. Malaysia seems had little influenced by other global markets except with its neighbor countries which are Thailand, Indonesia, and Philippines during the crisis. Their study had concluded that Malaysian stock market had less influenced by the subprime crisis.

Based on a study conducted by Karim, Jais and Karim (2011), a subprime crisis did not give an effect to the comovement of the stock market in Singapore, Malaysia, USA, UK,

and Japan. The finding also indicates no cointegration among stock market will give a potential benefit for international portfolio diversification. This is because each of stock market indices does not contain information on common stochastic trends. They used the period of study in 2001 to 2009.

In addition, Ma and Mansur (2014), were examined the contagion effect of subprime crisis on ASEAN-5 (Malaysia, Indonesia, Singapore, Thailand, and Philippines). The finding suggests there was a significant transmission effect of the subprime crisis to ASEAN-5. Besides, it also indicates there is long run comovement between most of the ASEAN-5 stock market and US stock markets. This finding was supported by Rahman and Sidek (2011), a small country like ASEAN-5 cannot avoid any transmission of financial impulses. Hence, this ASEAN-5 was an inappropriate market for investors to diversify their portfolio.

Briefly, this chapter provides a view about the integration of Asian and ASEAN stock markets. Although there are many studies had been conducted, the results are still not consistent.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the methodology that is used in this study. In achieving the objectives, this study adopts Cointegration test and Vector Error Correction Model (VECM).

3.1 Variables and Measurement

The variables use in the study can be categorized into two which are dependent variables and independent variables.

3.1.1 Dependent Variable

The dependent variable is the Malaysia stock index, which is FTSE Bursa Malaysia KLCI (FBMKLCI).

3.1.2 Independent Variable

The independent variables are Bangkok Stock Exchange (BNGKSET), Ho Chi Minh Stock Exchange (HCMNVNE), Jakarta Composite Index (JAKCOMP) and Philippine Stock Exchange (PSECOMP).

3.2 Theoretical Framework

Figure 3.1 shows the theoretical framework that consists of four independent variables and FBMKLCI as the dependent variable.

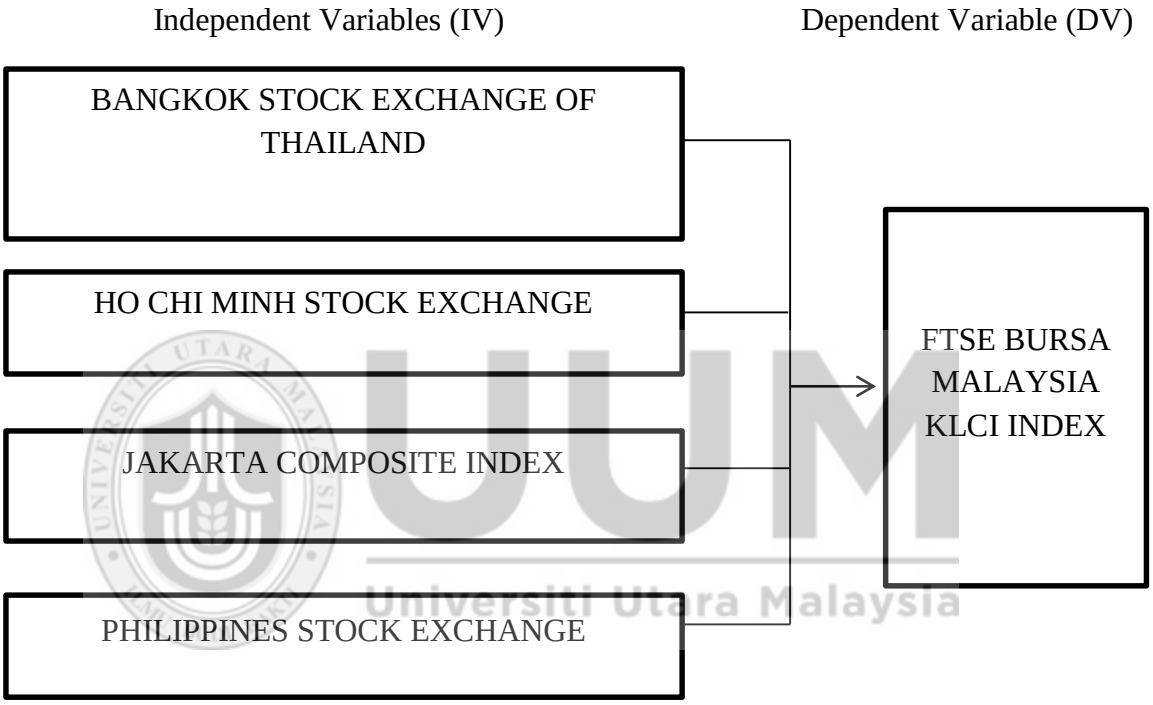


Figure 3.1
Theoretical Framework

This paper focuses on five ASEAN stock markets. Theoretical framework shows the relationship between FTSE Bursa Malaysia KLCI and Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange.

3.3 Theoretical Model

The research methodology uses a monthly time series data which are consists of four independent variables and one dependent variable. This study covers a 15-year period of study. The model is as follows:

$$\ln(FBMKLCI_t) = \alpha + \beta 1\ln(BNGKSET_t) + \beta 2\ln(HCMNVNE_t) + \beta 3\ln(JAKCOMP_t) + \beta 4\ln(PSECOMP_t) + u_t \quad (3.1)$$

Where:

FBMKLCI = FTSE Bursa Malaysia KLCI

BNGKSET = Bangkok Stock Exchange of Thailand

HCMNVNE = Ho Chi Minh Stock Exchange

JAKCOMP = Jakarta Composite Index

PSECOMP = Philippine Stock Exchange

I_n = log natural

α = constant term

u_t = disturbance term

3.4 Hypothesis

Based on the research objective, there are three hypotheses testing:

Hypothesis 1

H_0: There is no cointegration relationship between FTSE Bursa Malaysia KLCI and Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange.

H_1: There is a cointegration relationship between FTSE Bursa Malaysia KLCI and Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange.

Hypothesis 2

H_0: There is no comovement relationship between FTSE Bursa Malaysia KLCI and other ASEAN stock markets, which are Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange.

H_2: There is a comovement relationship between FTSE Bursa Malaysia KLCI and other ASEAN stock market, which are Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippine Stock Exchange.

Hypothesis 3

H_0: There is no significant relationship between FTSE Bursa Malaysia KLCI and other ASEAN stock markets.

H_3: There is a significant relationship between FTSE Bursa Malaysia KLCI and other ASEAN stock markets.

3.5 Data

The data are obtained from Yahoo Finance and DataStream Databases. The period of study is on monthly basis. It is from January 2001 to December 2015. The data are transformed into a logarithm. The purpose of transforming data into the log is to normalize the data and make the pattern more visible. According to Feng, Wang, LU, Chen, HE, LE and Tu (2014), log transformation is used to make the data conform to normality and to reduce the variability of data. Other that, it is also can reduce skewness and create linear and additive relationships.

3.6 Estimation Technique

This study employs Cointegration test and Vector Error Correction Model (VECM). The purpose of these tests is to reveal the cointegration relationship between FTSE Bursa Malaysia and Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, Jakarta Composite Index, and Philippines Stock Exchange. However, before proceed with these two tests; descriptive statistics and unit root test are needed. Firstly, the variables need to pass on descriptive statistics and unit root test. Then, this study also has conducted diagnostic test. Lastly, CUSUM test is to test the stability of the variables.

3.6.1 Unit Root Test

The unit root test is a process of generating data by identifying the stationary of variables. If the data contain unit root meaning that these series are non-stationary. Based Asari, Baharuddin, Jusoh, Mohamad, Samsudin and Jusoff (2011), the main purpose of unit root test is to ensure the data is stationary at level. According to Mohamed (2008), the stationary test is important because it influences the behavior of variables. In addition, if the data is not stationary at a level, the data need to test by using first difference. Another approach like a log for non-linear trend, log seasonal difference for seasonality, square and lag also can be used (Juehui, 2014).

Additionally, there are two alternative tests which are Augmented Dickey-Fuller test and KPSS (Kwiatkowski, Phillips, Schmidt, and Shin) test. However, most of the previous studies use augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test to determine the stationary of each variable. Based on Kamal (2014), ADF is a general popular method in order to test the unit root. This study uses Augmented Dickey-Fuller (ADF) test proposed by Dickey & Fuller (1979) and Philip-Perrons (PP). This test is to identify the different level of form. Furthermore, the first difference is describing the stationary of variables. According to Kamal (2014), the model below is to check the unit root:

$$\Delta x_{t} = \lambda_0 + \lambda_1 X_{t-1} + \lambda_2 T + \sum_{i=1}^{n} \varphi \, \Delta Xt - 1 + \in \qquad (3.2)$$

Where Δ is the difference operator, X is the natural logarithm. T is the trend variable. λ and φ are a parameter to be estimated and ∈ is the error term.

3.6.1.1 Augmented Dickey Fuller (ADF) Test

Augmented Dickey-Fuller is one of the unit root tests in a time series analysis. Based on Ibrahim, Long, Ghani and Salleh (2011), unit root hypothesis can be rejected if t-test statistic of the study shows negatively less than critical value presented. In the series of two-tails, the level of confidence is at 1%, 5% and 10% level of significance. The series is:

H_0 = X is not stationary at 5% significance level.

H_1 = X is stationary at 5% significance level

3.6.1.2 Phillip-Perrons (PP) Test

Phillip-Perrons is conduct in order to rid serial correlation that exists in Dickey-Fuller test.

$$y_t = \pi y_{t-1} + (constant, time\ trend) + \mu_t \quad (3.3)$$

The equation (3.3) will correct for any serial correlation and heteroskedasticity in the errorsμ_t. The PP test differs from ADF on how they deal with serial correlation and

heteroskedasticity in the errors. However, according to Davidson and Mackinnon (2004) Phillips-Perrons test performs worse in predictable the models compare to augmented Dickey-Fuller test.

3.6.2 Cointegration Test

The cointegration test has several steps to check whether the variables show positive relationships (Sjo, 2008). Cointegration test is closely related to unit root test. Based to Sjo (2008), there are two motives behind unit root test. First, examine the order of integration is crucial because it is a key to establish an econometric model. Second, an economic theory recommends certain variables should be integrated.

In cointegration test, the most common approaches that identify the presence of multiple cointegration vectors are Engle-Granger (1987) and Johansen-Juselius (1990). However, Johansen and Juselius approach is one that widely used. Samsu, Derus, Ai-yee and Ghazali (2008) stated Johansen and Juselius method is more powerful for testing the order of cointegrating vectors compare to Engle and Granger. It is supported by Sjo (2008). He had stated Johansen test is the most fundamental test. Furthermore, Johansen and Juselius recommend two likelihood ratio test statistics to identify the order of cointegration, r which is trace test and Max-eigenvalue test. The equation of both tests is below;

$$\text{Trace} = -T \sum_{i=q+1}^{n} l_n(1 - \hat{\lambda}_{i)} \quad (3.4)$$

$$\lambda^{max} = -T \ln(1- \hat{\lambda}_{q+1}) \quad (3.5)$$

Based on the equation, the trace test will decide the number of maximum cointegration relationship. Meanwhile, Max-eigenvalue test (λ^{max}) is to identify the specific alternative hypothesis. According to Ssekuma (2011), Johansen applies the maximum likelihood estimation using the progressive test to identify a number of cointegrating vectors. In addition, when the p-value is less than 5 percent, it shows there is cointegration relationship between variables. Besides, in Johansen test, the series is:

H_0 = no relationship between x and y

H_1 = have a relationship between x and y

Johansen test has an advantage compared to the Engle and Granger method, where it can estimate one or more cointegration relationship (Ssekuma, 2011). It is supported by Parlow (2010).

3.6.2.1 Determination of Lags

Basically, when using regressions in time series data, lagged values of the dependent variable and independent variables are included. Number of stars in lagged indicate on how many numbers of lagged should be used in the study. Other that, an essential element in the specification of VAR models is the determination of the lag length of VAR (Ozcicek, and McMilin, 1999). Besides, according to Braun and Mittnik (1993) cited by Ozcicek and McMilin (1999), lag length determination is important because if

the estimation of VAR used lags length differs from a true lag length, it showed an inconsistent result with impulse functions and variance decompositions from the VAR.

This paper has five criteria. However, according to Princeton University Library (2007), the most criteria that used are Akaike Information Criterion (AIC) and Schwarz' Bayesian Information Criterion (SBIC). Below are explanations on AIC and SIC (the following model is from Gujarati, 2003):

$$\text{AIC} = e^{2k/n} \frac{\sum \hat{u}2i}{n} = e^{2k/n} \frac{RSS}{n} \tag{3.6}$$

$$\text{SIC} = n^{k/n} \frac{\sum \hat{u}2}{n} = n^{k/n} \frac{RSS}{n} \tag{3.7}$$

Where *k* is the number of regressors, while *n* is the number of observations that included in this model. Other 2*k/n* is a penalty factor in AIC and [*k/n* ln *n*] in SIC.

However, these two criteria cannot use at one time. The guideline of Akaike Information Criterion (AIC) is lower the AIC value, the better the model. It also stated by Gujarati (2003). So, once the number of lagged had determined, cointegration test can be conducted in order to determine the cointegration between variables.

3.7 Vector Error Correction Model (VECM)

Vector Error Correction Model (VECM) is a common framework to describe the interrelationship among the stationary variables. Before proceeding to VECM model, the first step that needs to do is determine the levels of the data and it needs to be stationary.

In VECM, the variables will automatically change into 1st different if the variables are non-stationary at level.

If cointegration had been detected, it is shown there was a long term causal relationship between the variables. According to Asari et al. (2011), if long run relationship between variables exists, VECM need to conduct in order to estimate short-run properties of the cointegrated series. In VECM, cointegration rank shows the number of cointegrating vectors. A negative and significant coefficient of the Vector Error Correction Model shows the short term fluctuation between the independent and dependent variables. Besides, it also indicates there is a long run relationship between the variables.

By assuming each equation consists of *k* lag values of FBMKLCI, below is pair of regression estimation that was adapted from Gujarati and Porter (2009):

$$FBMKLCI_{t1} = \propto + \sum_{j=1}^{k} \propto i\, FBMKLCI_{t-j} + \sum_{j=1}^{n} y_j X_{t-j} + \mu_{1t} \quad (3.8)$$

$$BNGKSET_t = \propto + \sum_{i=1}^{n} \lambda i\, FBMKLCI_{t-i} + \sum_{j=1}^{n} \delta j\ BNGKSET_{t-j} + \mu_{2t} \quad (3.9)$$

$$HCMNVNE_t = \propto + \sum_{i=1}^{n} \lambda i\, FBMKLCI_{t-i} + \sum_{j=1}^{n} \delta j\ XHCMNVNE_{t-j} + \mu_{2t} \quad (3.10)$$

$$JAKCOMP_t = \propto + \sum_{i=1}^{n} \lambda i\, FBMKLCI_{t-i} + \sum_{j=1}^{n} \delta j\ JAKCOMP_{t-j} + \mu_{2t} \quad (3.11)$$

$$PSECOMP_t = \propto + \sum_{i=1}^{n} \lambda i\, FBMKLCI_{t-i} + \sum_{j=1}^{n} \delta j\ PSECOMP_{t-j} + \mu_{2t} \quad (3.12)$$

In the equation above, disturbances of μ_{1t} and μ_{2t} are uncorrelated. Above equation also indicates dependent and independent will influence each other's.

3.8 Variance Decomposition

Variance decomposition can identify which variables have short and long run relationship with dependent variables. Variance decomposition also can describe the percentage of the fluctuations in time series of variables. In addition, it also can explain the changes in the dependent variable can be explained by the chosen independent variables. Variance is explained on the relationship between Y and X. The variance of Y (dependent variable) will expect two conditions:

E (Var [Y|X]) = explained variation directly because of changes in X

Var (E [Y|X]) = unexplained variation that comes from other than X

Variance decomposition is based on complete variance decomposition of uncertainty of y. It is expressed as follows:

$$V\ (FBMKLCI) = \sum_{j=1}^{nX} Vj + \sum_{j=1}^{nX} \sum_{k=j+1}^{nX} Vjk + \ldots = V_{12\ldots nx,} \quad (3.13)$$

Where:

V j = Contribution of $_{xj}$ to V (*FBMKLCI*)

V j_k = Contribution of the interaction $_{of\ xj}$ and $_{xk}$ to V (*FBMKLCI*)

V 12…$_n$X = Contribution of interaction of x1, x2… $_n$X to V (*FBMKLCI)*

3.9 Impulse Response

The impulse response is applied to illustrate the effect of shocks on variables. Based on equation of Vector Error Correction Model (VECM):

$$FBMKLCI_{t1} = \propto + \sum_{j=1}^{k} \propto i\, FBMKLCI_{t-j} + \sum_{j=1}^{n} y_j\, X_{t-j} + \mu_{1t} \quad (3.14)$$

$$X_t = \propto + \sum_{i=1}^{n} \lambda i\, FBMKLCI_{t-i} + \sum_{j=1}^{n} \delta j\ X_{t-j} + \mu_{2t} \quad (3.15)$$

μ is a stochastic error term or called as impulse or shocks (Gujarati and Porter, 2009). Other that, he also stated this shock probably comes from a lag length (*k*) chosen. If many lags include on few observations, it will cause a degree of freedom and multicollinearity exist. Meanwhile, fewer lags include will lead to specifications error. So, the maximum lag length is important.

3.10 Diagnostic Test

The purpose of diagnostic test is to know whether the model can be acceptable or not. There are several specifications that need to fulfill. The three specifications are; i) the model should not have serial correlations; ii) the model should not have heteroskedasticity; iii) the residual of the model should be normally distributed. This study will highlight on R^2 of serial correlation, hetereskedasticity, and normality.

For serial correlation, test statistic computes as $y_t = X_t b + e_t$ with a null hypothesis, there is no serial correlation. To detect heteroskedasticity, all assumptions of Ordinary

least squares (OLS) need to be considered. It is because OLS are consistent with the heteroskedasticity. Moreover, if the model is normally distributed, the histogram will be bell-shaped and Jarque-Bera statistic would not significant (Brooks, 2008). In normality test, p-value should more than 5 percent significance level in order to reject the null hypothesis.

3.11 CUSUM Test

The statistical cumulative sum control chart (CUSUM) is a serial analysis. The objective is to monitor the changes of the variables in the model. Besides, it is also to ensure the stability of the model. CUSUM chart is a time-weighted control chart that displays the cumulative sums of the sample. According to Minitab Inc (2016), CUSUM chart has two types which are One-sided CUSUM chart and Two-sided CUSUM chart. The common CUSUM test is Two-sided CUSUM chart that applies a V-mask. The purpose of V- mask is to identify when an out-of-control situation has happened.

CHAPTER FOUR

RESULT AND DISCUSSION

4.0 Introduction

This chapter discusses the results that have been accomplished. These results will explain based on descriptive statistics, unit root test, cointegration tests, vector error correction model, diagnostic tests, variance decomposition, impulse response and CUSUM test.

4.1 Descriptive Statistics

Descriptive statistics describe the simple structure of the data. It also explains a basic review of the whole data. The values for several descriptive statistics are presented in Table 4.1 below:

Table 4.1:
Descriptive Statistics

Descriptive Statistic					
	Y_FBMKLCI	X_BNGKSET	X_HCMNVNE	X_JAKCOMP	X_PSECOMP
MEAN	3.056457	2.881559	2.593047	3.247897	3.459711
MEDIAN	3.087242	2.866859	2.640247	3.351941	3.46698
SKEWNESS	-0.21391	-0.274434	-0.196933	-0.427630	0.011724
KURTOSIS	1.699582	2.186452	2.536792	1.808117	1.791024
JARQUE-BERA	14.05587	7.22338	2.772693	16.14042	10.9663
PROBABILITY	0.000887	0.027006	0.249987	0.0000313	0.004156

Based on table 4.1, the mean value of FBMKLCI is 3.056457. Meanwhile, BNGKSET, HCMNVNE, JAKCOMP, and PSECOMP are recorded mean value of 2.881559, 2.593047, 3.247897 and 3.459711 respectively. Moreover, the median value for FBMKLCI, BNGKSET, HCMNVNE, JAKCOMP and PSECOMP are 3.08722, 2.866859, 2.640247, 3.351941, and 3.46698 respectively. In addition, the value of skewness indicates most of the variables have a long left tail except PSECOMP. PSCOMP has a long right tail. For kurtosis, only HCMNVNE exceed the normal distribution where their distribution is from peak to normal. Meanwhile, distribution of FBMKLCI, BNGKSET, JAKCOMP, and PSECOMP is flat compared to normal. It can conclude the data set of variables has lighter tails except for HCMNVNE.

Based on Jarque-Bera probabilities, most of ASEAN stock market indices are not normally distributed at 5 percent significance level except for HCMNVNE. However, by considering 1 percent significance level, BNGKSET and PSECOMP are a normally distributed. Somehow rather, it is acceptable. Based on McDonald (2014), significantly non-normal data would be perfectly fitting for an ANOVA and other parametric tests. It is supported by Motulsky (2007). He stated t-test and ANOVA are fairly strong to a violation of normality assumption. In addition, according to Agung (2011), any hypothesis testing on the distribution of a random variable includes normal distribution, does not have any concrete result and will cause a circular problem. It is because any statistics that used for conducting a test depends on the assumption; statistical test must have a specific distribution function.

4.2 Unit Root Test

The result is highlights based on Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP). The results are dividing into two which are intercepting only and trend and intercept.

4.2.1 Augmented Dickey-Fuller (ADF) Test

Table 4.2 summarizes the finding of augmented Dickey-Fuller test. The details of the results are as follows:

Table 4.2

Unit Root Test based on the ADF Test

	Augmented Dickey-Fuller			
	Intercept Only		**Trend and Intercept**	
	t-stat	critical values	t-stat	critical values
	Levels			
Y_FBMKLCI	-0.8855960	-2.877544	-2.361982	-3.435125
X_BNGKSET	-1.380060	-2.877544	-2.246839	-3.435269
X_HCMNVNE	-2.078024	-2.877636	-2.636267	-3.435269
X_JAKCOMP	-1.228893	-2.877636	-1.966388	-3.435269
X_PSECOMP	-0.114185	-2.877544	-3.00372	-3.435125
	First Differences			
Y_FBMKLCI	-11.23043**	-3.467205	-11.20232**	-4.010440
X_BNGKSET	-11.85016**	-3.467205	-11.84428**	-4.010440
X_HCMNVNE	-9.239653**	-3.467205	-9.213393**	-4.010440
X_JAKCOMP	-10.42629**	-3.467205	-10.43909**	-4.010440
X_PSECOMP	-12.08155**	-3.467205	-12.07261**	-4.010440

Notes: 1) at level use test critical value at 5% level
2) at first differences use test critical value at 1% level
3) ** indicate 1% level significance levels

The null hypothesis of ADF and PP tests; the variables have a unit root test. It means the variables are non-stationary. Based on Table 4.2, both of intercepts only or trend and intercept show FBMKLCI is non-stationary at a level. The result shows the p-value is greater than t-stat. Thus, null hypothesis is accepted. Besides, BNGKSET, HCMNVNE, JAKCOMP, and PSECOMP also show the same result. However, at first differences, p-value is smaller than t-stat. So, it indicates all the variables are stationary. So, the null hypothesis can be rejected. As a result, the ADF test indicates that dependent variable and all independent variables are *I* (1).

4.2.2. Phillip-Perrons (PP) Test

Table 4.3 summarizes the finding from Phillip-Perrons test. The detail of the finding is displays as below:

Table 4.3

Unit Root Test based on the Phillip-Perrons Test

Phillip-Perrons				
	Intercept Only		**Trend and Intercept**	
	t-stat	critical values	t-stat	critical values
		Levels		
Y_FBMKLCI	-0.997344	-2.877544	-3.00694	-3.435125
X_BNGKSET	-1.477279	-2.877544	-2.489864	-3.435125
X_HCMNVNE	-1.766629	-2.877544	-2.19442	-3.435125
X_JAKCOMP	-1.216682	-2.877544	-1.884517	-3.435125
X_PSECOMP	-0.316502	-2.877544	-3.325798	-3.435125
		First Differences		
Y_FBMKLCI	-11.21837**	-3.467205	-11.18963**	-4.010440
X_BNGKSET	-12.01676**	-3.467205	12.00151**	-4.010440
X_HCMNVNE	-8.953509**	-3.467205	-8.924919**	-4.010440
X_JAKCOMP	-10.4257**	-3.467205	-10.43033**	-4.010440
X_PSECOMP	-12.17981**	-3.467205	-12.17213**	-4.010440

Notes: 1) at level use test critical value at 5% level
2) at first differences use test critical value at 1% level
3) ** indicate 1% level significance levels

For Phillip-Perron (PP), both of intercept only and trend and intercept show all variables are non-stationary at the level. Nevertheless, at the first differences, all variables can reject a null hypothesis. So, the variables are stationary at first difference. It can summarize, the results from ADF and PP show the variables which are FBMKLCI, BNGKSET, HCMNVNE, JAKCOMP and PSECOMP are *I* (1) and none of the variables are *I* (2). Next, cointegration test can be proceeding.

4.3 Cointegration Test

Table 4.4 used to report the result of cointegration tests for the model. The result is based on the maximum eigenvalues and trace test statistics.

Table 4.4
Johansen-Juselius Cointegration Test

Model:Y_FBMKLCI,X_BNGKSET,X_HCMNVNE,X_JAKCOMP,X_PSECOMP,X_STI

(Y_FBMKLCI IS THE DEPENDENT VARIABLE)

	Trace			Maximum Eigenvalue		
	Trace Statistic	Critical value	Prob*	Max-Eigen	Critical value	Prob*
None*	114.7701	76.97277	0.0000	42.0302	34.80587	0.0058
At most 1*	72.73989	54.07904	0.0005	31.35677	28.588808	0.0215
At most 2*	41.38312	35.19275	0.0095	20.60929	22.29962	0.0846
At most 3*	20.77384	20.26184	0.0425	15.26464	15.8921	0.0625
At most 4	5.509195	9.164546	0.2322	5.509195	9.16455	0.2322

Notes: * denotes rejection of the hypothesis at the 0.05 level
* Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* Max-Eigenvalue test indicates 2 cointerating eqn(s) at the 0.05 level

The null hypothesis; there is no cointegration between the variables. Based on trace test statistics, the model has four cointegrating relationships. It shows FBMKLCI and other explanatory variables move closely in order to achieve the long run equilibrium. Moreover, maximum eigenvalue test shows there are two cointegration relationships. Hence, based on these two tests, there is a long run association ship between the variables in the model. So, this study accepts H_1 and rejects H_0.

The cointegration relationship between the ASEAN stock market indices is due to an increasing percentage of bilateral trade between the countries in the region. It was supported by Bakri & Hoe (2013), who found bilateral trade and volatility has a significant influence on the stock market integration in the region. This finding is similar with Masih & Masih (1999), and Kearney and Lucey (2004). They suggested the stronger mutual trade ties among the countries, the higher the degree of comovement. Moreover, Malaysia also has strong mutual trade within its neighbor countries. It was proved by Malaysia, Ministry of Foreign Affairs (2016), Malaysia has bilateral affairs with its neighbor countries (Brunei, Philippines, Singapore, and Thailand). However, Thailand is one of its neighboring that has fruitful mutual cooperation. In addition, Malaysia-Thailand also had decided to increase mutual trade (The Nation, 2014).

4.4 Vector Error Correction Model (VECM)

Table 4.5 is recaps the finding of Vector Error Correction Model (VECM). The details of the results show are as follows:

Table 4.5
Vector Error Correction Model

Vector Error Correction Estimates			
(Y_FBMKLCI IS THE DEPENDENT VARIABLE)			
Variables	Coefficients	Standard Error	T-statistic
Y_FBMKLCI	1.000000		
X_BNGKSET	-0.357724	0.06602	-5.41813
X_HCMNVNE	-0.066043	0.03168	-2.08439
X_JAKCOMP	-0.204017	0.03355	-6.08068
X_PSECOMP	0.02273	0.07039	0.32293
C	-1.269278		

The table 4.4 shows there is a long run relationship between the stock market indices. Table 4.5 indicates vector error correction model (VECM). It shows the direction of the relationship of the model, the result is extracted and expressed in the following coefficients equation are:

FBMKLCI= 1.269278 + 0.357724BNGKSET + 0.066043HCMNVNE +

0.204017JAKCOMP – 0.02273PSECOMP (4.1)

Based on table 4.5 and equation above, the result shows there is a negative and positive significant relationship between independent and dependent variable. The result shows there are three independent variables have positively significant with FTSE Bursa Malaysia KLCI (FBMKLCI). They are Bangkok Stock Exchange of Thailand (BNGKSET), Ho Chi Minh Stock Exchange (HCMNVNE) and Jakarta Composite Index (JAKCOMP) by referring t-stat (respectively). However, Philippines Stock Exchange (PSECOMP) has an insignificant relationship with FBMKLCI.

By investigating the long run equilibrium of FBMKLCI and BNGKSET, the equation shows a trend value of + 0.357724. It means 1 percent increase in BNGKSET, the FBMKLCI also increase by 0.357724 percent. This finding is parallel with Valadkhani and Chancharat (2008). They found that Malaysia stock market return is interrelated with Thailand and Singapore. In addition, the result also indicates every 1 percent increase in HCMNVNE, FBMKLCI will increase by 0.066043 percent. According to Thao and Daly (2012), Vietnam's stock market has a long run relationship with Malaysia, Thailand, Philippine and Singapore's stock market. However, Ardliansyah (2012) found Vietnamese market is not correlated with other ASEAN stock markets.

In addition, on the equilibrium relationship of JAKCOMP and FBMKLCI, 1 percent increases in JAKCOMP, FBMKLCI will increase by 0.204017 percent. This result is similar with Karim and Gee (2006) and Arsyad (2014). However, it contradicts with Click and Plummer (2005). They had found Indonesia stock market does not have positive long run equilibrium with Malaysia. In addition, the result also indicates there is negative long run equilibrium between PSECOMP and FBMKLCI. However, the relationship is an insignificant at any level. The relationships of variables are in the line with Chen et al. (2003), Majid et al. (2009) and Karim and Karim (2012). Their findings found all five ASEAN stock markets (Malaysia, Indonesia, Singapore, Philippines, and Thailand) were integrated.

Briefly, VECM test indicates Thailand, Vietnam, and Indonesia stock market index have a positive significant long run relationship with Malaysia stock market index. This positive significant relationship is due to the close geographical distance and similarity of economic development. It is supported by Ng (2002) cited by Karim and Karim (2012).

In addition, it is also due to the implementation plan of ASEAN Capital Market Forum (ACMF)[2]. The blueprint of ACMF is to promote the development of an integrated ASEAN capital market. Essentially, this plan is necessary in order to stabilize ASEAN's resilience. However, it also has drawbacks that need to bear by ASEAN countries. For example, as local investors in the region will rely on the larger and more liquidity market outside ASEAN, so it will make the ASEAN stock market less relevant.

Moreover, a positive long run relationship between ASEAN's stock market will limit the international portfolio diversification in the region. According to Heilman (2010), if there are positive long run relationships between different markets, international diversification will be limited. It is because they had shared a common information and risk-sharing. According to Kasa (1992) cited from Majid et al. (2009), the presence of integration among ASEAN stock markets indicates common stochastic trends in those markets. Therefore, any investors who intend to invest internationally in these four stock market indices will not get a huge profit. Besides, they may get a zero losses from this diversification. It is because when Malaysia stock price is decline, these four ASEAN's stock price also decline. Thus, investors are suggested to invest domestically due to the presence of integration among ASEAN stock markets.

Moreover, Philippine Stock Exchange (PSECOMP) has an insignificant relationship with FTSE Bursa Malaysia KLCI (FBMKLCI). Thus, any fluctuation in PSECOMP does not give a long term impact to FBMKLCI because it is insignificant at any level of 1 percent, 5 percent or 10 percent. According to Majid et al. (2009), the result found Malaysia and

[2]ACMF is a forum which comprises capital market regulators from 10 ASEAN under support of ASEAN Finance Ministers, ACMF meets twice a year

Philippine have a lower correlated stock return. In short, the result shows there are long run equilibrium between the variables except for PSECOMP. Therefore, this study accepts H_2 and rejects H_0.

The finding also suggests the Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, and Jakarta Stock Exchange are significantly influenced on FTSE Bursa Malaysia KLCI. However, Bangkok Stock Exchange of Thailand (BNGKSET) is the one that most influential to the FTSE Bursa Malaysia KLCI (FBMKLCI). It was supported by Ooi and Ghazali (2009). Their finding found long run relationship and dynamic causal relationship exists between stock prices in Malaysia and Thailand.

In addition, the result also in a line with the study conducted by Karim and Gee (2006). They found a Malaysia stock market has a strong influence towards the Thailand stock market and directional relationship exists between these two stock market indices. This is because Malaysia and Thailand have a similar economic condition. For example, these two countries have a high degree of government support; the investors will get government support if the investment is from the industry that high priority of government.

Besides, Network ASEAN forum[3] stated that Malaysia and Thailand are an established domestic market. They had maintained a broad base of local investors with domestic institutions. Besides, they also had implemented an ownership quote and capital. According to Sukcharoensin and Sukcharoesin (2013), Singapore, Thailand and Malaysia

[3] CIMB ASEAN Research Institute (CARI) proudly to present first Network ASEAN Forum (NAF 2013) has been held on 22nd to 23rd August 2013 in Singapore.

are well-developed equity market. Thus, it may share common characteristics in the market. Therefore, this study accepts H_3.

4.5 Variance Decomposition

By referring to appendix C.2, FBMKLCI has shown a decreasing degree of explaining variations in its own shock. FBMKLCI is depends on other stock markets in order to explain itself. Therefore, FBMKLCI is an endogenous variable. The result also suggests the degree of explaining of all independent variables is increase. It shows BNGKSET, HCMNVNE, JAKCOMP and PSECOMP can explain on any shock in FBMKLCI. Nearly 8.63 percent of the variation in the FBMKLCI is explained by BNGKSET in 15th period. As for the PSECOMP, it shows the lowest value degree of explaining among others. Based on the 15th-period horizon, the result suggests these four stock markets are the most important variable that influencing FBMKLCI.

4.6 Impulse Response

Appendix C.3 has shown FTSE Bursa Malaysia KLCI (FBMKLCI) has a response on any changes happen in the selected ASEAN stock market indices. Based on the graph, it shows BNGKSET give a small effect to FBMKLCI. However, it is a positive effect. Next, JAKCOMP is responding positively to FBMKLCI. It means any shocks in JAKCOMP will an impact on FTSE Bursa Malaysia KLCI. In addition, PSECOMP also positively respond to FBMKLCI although the impacts started to rise after months 5. Lastly, any external shock in HCMNVNE gives a small effect to FBMKLCI.

4.7 Diagnostic Test

In order to make sure this model is acceptable, a few diagnostic tests have been conducted includes serial correlation test, heteroskedasticity test, and normality test. The details of each test are as follows:

4.7.1 Serial Correlation

Table 4.6 highlights the result of serial correlation of the model. The specification of test; the model should not have a serial correlation. The result shows is as follows:

Table 4.6
Serial Correlation

VEC Residual Serial Correlation LM Tests		
Lags	LM-Stat	Prob
1	28.30418	0.2940
2	23.30306	0.5599
3	33.59884	0.1168
4	29.69217	0.2360
5	22.83278	0.5873
6	28.28286	0.2950
7	23.73170	0.5349
8	18.20968	0.8334
9	34.12588	0.1052
10	22.39745	0.6127
11	20.94180	0.6959
12	29.18994	0.2561

Based on the table, P-value is more than 5 percent. So, cannot reject the null hypothesis. To summarize, these model do not have a serial correlation.

4.7.2 Heteroskedasticty

Table 4.7 shows a heteroskedasticity test. This model should free from heteroskedasticity problem in order to make the model is acceptable. The result shows is as follows:

Table 4.7
Heteroskdasticity

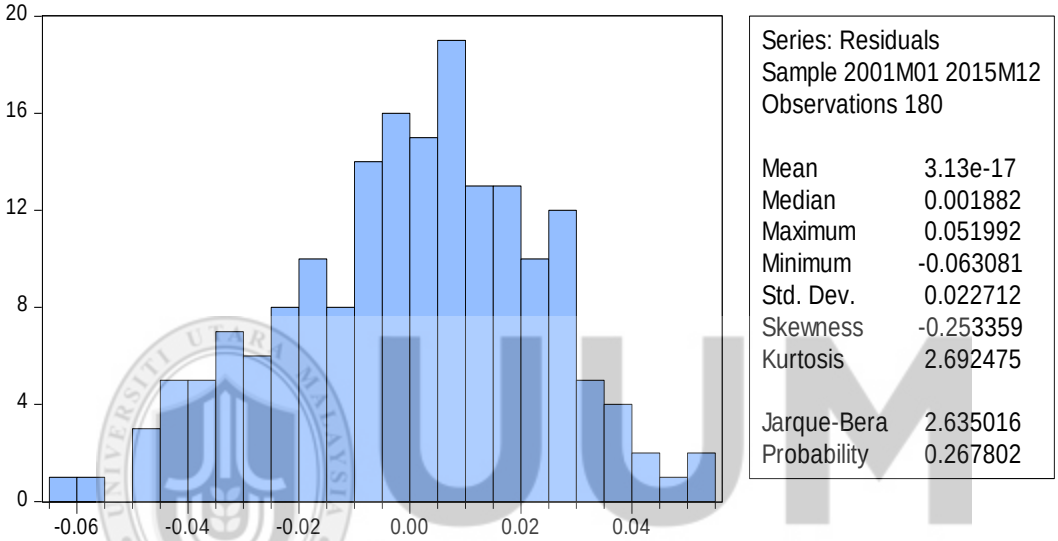
VEC Residual Heteroskedasticity Test		
Chi-sq	Df	Prob.
1611.635	1530	0.0718

The result suggests there is no heteroskedasticity, where the p-value of the model is 0.07. It is more than 5 percent significance level. Thus, accept null hypothesis; no heterskedasticity in the model.

4.7.3 Normality

Figure 4.1 shows the normality test for this model. In this test, the model needs to be normally distributed.

Figure 4.1
Normality



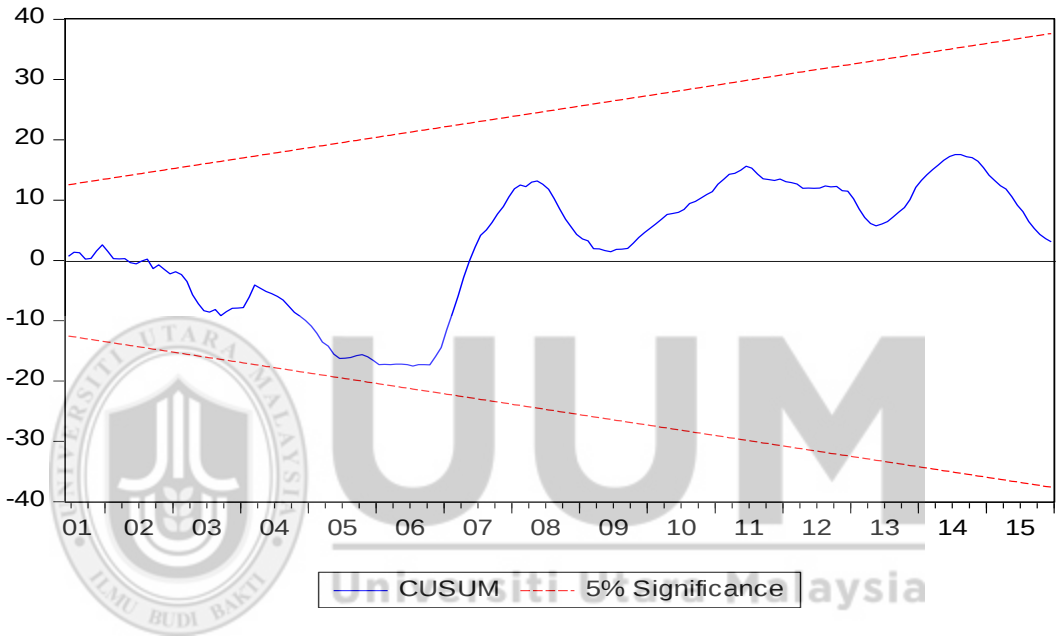
Based on Jarque-Bera probability, the model is normally distributed. The p-value is more than 5 percent significance level. Briefly, this model had fulfilled all the specifications in a diagnostic test.

Concisely, all the specifications have been fulfilled. So, this model is acceptable.

4.8 Cumulative Sum of Recursive Residuals Test (CUSUM)

CUSUM test is conducted in order to know the stability of the models. Figure 4.2 shows the cumulative sum of recursive residual test of the model. The result shows is as follows:

Figure 4.2
Cumulative Sum of Recursive Residual Test



The figure 4.2 shows the period is located in the area between two critical lines. The figure shows the variables in this model are stable. Thus, this model is stable.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter is concluding based on research objective of the study. The objective of the study is to identify the integration of ASEAN stock markets. Second is to investigate the comovement of the Malaysian stock market with respect to other ASEAN stock market. Lastly is to examine stock market that has the highest influence on the Malaysian stock market. This chapter also covers the recommendations to investors and future researchers.

5.1 Summary

This research was done in order to find out whether there are cointegration and significant relationship between the variables stated. This study focuses on fifthteen years of selected ASEAN stock markets in order to meet the objective of this research.

Specifically, all the objectives have been observe and achieve positively. Through this study, it is analyze the cointegration and the relationship of FTSE Bursa Malaysia KLCI with four ASEAN stock market indexes. The result shows there is cointegration relationship between Malaysia stock market (FBMKLCI) and other four ASEAN stock market which are Thailand (BNGKSET), Vietnam (HCMNVNE), Indonesia (JAKCOMP) and Philippine (PSECOMP).

Then, in order to respond to the second objective, this study investigates the relationship between the selected ASEAN stock market indices. Based on VECM, it shows independent variables have a positive significant long run relationship with FBMKLCI except PSECOMP. The result suggests that investors who want internationally diversified their portfolio should aware on FTSE Bursa Malaysia KLCI (FBMKLCI), Bangkok Stock Exchange of Thailand (BNGKSET), Ho Chi Minh Stock Exchange (HCMNVNE) and Jakarta Composite Index (JAKCOMP). It is because these markets have shared common information that generates similar returns in the long run. Therefore, the diversification thru these markets is limited. Otherwise, there is an insignificant relationship between Philippine Stock Exchange (PSECOMP) and FTSE Bursa Malaysia KLCI (FBMKLCI). Lastly, the third objective also achieves. The result found that the Stock Exchange of Thailand (BNGKSET) has the highest influence on FTSE Bursa Malaysia KLCI.

The aim of ASEAN Economic community (AEC) is to promote integration among ASEAN countries. This aim will give benefits in term of strengthening domestic capital, reducing trade barrier and placing ASEAN in a better position to compete with the global market. However, there are several actions need to be considered. For instance, a huge gap in the development of ASEAN capital markets can generates instability when a single market is formed. Besides, the ASEAN markets still vulnerable to external shocks.

5.2 Recommendation

This study will give a recommendation to investors and future research.

5.2.1 Investors

This study is beneficial to investors who seek an opportunity to invest in the ASEAN stock market. The main objective of an investor is to minimize risk and maximize financial return. So, they need to consider all possible factors to achieve its objective. One of the factors is the integration between the stock markets.

This study shows there is a significant positive relationship between FTSE Bursa Malaysia KLCI and Bangkok Stock Exchange of Thailand, Ho Chi Minh Stock Exchange, and Jakarta Composite Index. Thus, investors should give extra attention on these relationships in order to avoid any risk in their investment.

5.2.2 Future Research

This study is beneficial for researchers as it gives a useful information and guideline. There are several recommendations for those who want to study further on this topic:

5.2.2.1 Variable

For those who are interested to further on this topic, they should include more ASEAN stock market indices as their independent variables. For example are the Straits Times Index, Laos Securities Exchange, Yangon Stock Exchange and Cambodia Securities Exchange. So, the researcher can clearly identify the level of integration of ASEAN stock markets.

5.2.2.2 Time Frame

The future researchers are advised to take a longer period of time to get better results. In carrying out the study, the longer the period, the more accurate result will be found.

5.3 Limitations of Study

There are some limitations while conducting this study. By using secondary data, accuracy and reliability of the data are depending on sources information such as DataStream. So, any error in data will make the result irrelevant. Besides, there is difficulty in gathering period of data. It is because not all ASEAN stock markets indices are available around the year 2001 to 2015. Other than that, the establishment of ASEAN stock exchanges differs to each other. For example, Brunei is planning to build own stock exchange by 2017. In addition, Cambodia just has its own stock exchange in 2009.

REFERENCES

Afzal, M. & Ali, R. (2012). Impact of global financial crisis on stock markets: evidence from Pakistan and India. *Journal of Business Management and Economics, 3*(7), 275-282.

Agung, I., N. (2011). Time series data analysis using Eviews. Singapore: John Wiley &Sons.

Aimprasittichai, S. & Suppakittiwong, T. (2015). A study of a relationship between the U.S. stock market and emerging stock markets in Southeast Asia (Degree's Project). Available from http://www.diva-portal.org/smash/get/diva2:861617/FULLTEXT01.pdf.

Ardliansyah, R. (2012). Stock market integration and international portfolio diversification between U.S. and ASEAN equity markets. *Centre for Economic and Financial Studies, University of Glasgow.*

Arsyad, E. (2015). Integration between East and Southeast Asian equity markets. *Journal of Financial Economic Policy, 7*(2), 104-121.

Asari, F. F. A. H., Baharuddin, N. S., Jusoh, N., Mohamad, Z., Shamsudin, N., & Jusoff, K. (2011). A vector error correction model (VECM) approach in explaining the relationship between interest rate and inflation towards exchange rate volatility in Malaysia. *World Applied Sciences Journal 12*, 49-56.

Aurori, M. E. H. (2009). Are stock markets integrated? Evidence from a partially segmented ICAPM with asymmetric effects. *arXiv preprint arXiv: 0905.3875.*

Auzairy, N. A , Ahmad, R., Ho, C. F. S, Sapian, Z.Z.R. (2012). Integration of asian stock markets. *International Journal of Social, Behavioural, Educational, Economic and Management Engineering, 6*(12), 740-746.

Azizan, N. A., Sulong, H. (2011). The preparation towards ASEAN exchange link between Malaysia stock market and Asia countries macroeconomics variables interdependency. *International Journal of Business and Social Science, 2*(5), 127-134.

Azizan, N. A. & Sorooshian, S. (2014). Stock market performance and modern portfolio theory: case on Malaysian stock market and Asian indices. *WSEAS Transaction on Business and Economics,* 11, 303-313.

Bachman, D., Choi, J. J., Jean, B. N., & Kpecky, K. J. (1996). Common factors in international stock prices: Evidence from a cointegration study. *International Review of Financial Analysis, 5*(1), 39-53.

Bit-Kun, Y., Chen, W. H. & Arsad, Z. (2010). Time-varying world integration of the Malaysian stock market: A Kalman Filter approach. *Asian Academy of Management Journal of Accounting and Finance, 6*(2), 1-17.

Brook, C. (2014). Introductory econometrics for finance (2nd ed.). Cambridge: Cambrige University Press.

Chan, W. F., Lai, J. W., Loh, K. X., Loh, X. Y., & Loh, X. Z. (2013). Study on behaviour of stock market volatility in perspective of Malaysia (Degree's Thesis). Available from http://eprints.utar.edu.my/1050/1/FN-2013-0902970-1.pdf.

Chow, G. C., Shin C. H., & Linlin, N. (2011). Econometric analysis of stock price comovement in the economic integration of East Asia. *Wang Yanan Institute,* 1-21.

Celik, S. & Baydan, E. (2015). Bringing a new perspective on co-movement of stock markets in emerging economies through causality and wavelet analysis. *Topics in Middle Eastern and African Economies, 17*(1), 26-51.

Click, P. & Plummer, M. G (2005). Stock market integration in ASEAN after the financial crisis. *Journal of ASIAN Economics, 16*(1), 5-28.

Comincioli, B. (1996). The stock market as a leading indicator: an application of granger causality. *The Park Place Economist, 1*(1), 31-40.

Davidson, R., & Mackinnon, J. G. (2004). Econometric theory and methods (Vol. 5). New York: Oxford University Press.

Devereux, M. B., Lane, P. R., Park, C. Y., Shang, J. W. (2011). The dynamics of Asian financial integration. USA & Canada: Routledge.

Dodz (2016, January 19). History of Philippines stock exchange [Blog post]. Retrieved on 03 May, 2016 from https://dodzpersonalkoleksyons.blogspot.my/2016/01/history-of-philippine-stock-exchange.html.

Egen, M. (2015, July 27). China's economy is getting sick. Will it infect America?. CNN money. Retrieved from http://money.cnn.com/2015/07/26/investing/china-slowdown-impact-us-stocks/.

Fama, E. F. (1969). Efficient capital markets: a view of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Fama, E. F., French, K. R. (2004). The Capital Asset Pricing Model: theory and evidence. *Journal of Economic Perspectives, 18*(3), 25-46.

Feng, C., Wang, H., Lu, N., Chen, T., He, H., Lu, Y., & Tu, X. M. (2014). Log-transformation and its implications for data analysis. *Shanghai Archives of Psychiatry, 26(*2), 105-109.

FTSERussel (2016). FTSE bursa Malaysia index series. Retrieved April 23, 2015, from http://www.ftse.com/products/indices/bursa-malaysia.

Gujarati, D. N., & Porter, D. C. (2009). Basic econometric (5th ed.).New York: McGraw-Hill Education.

Heilman, K. (2010). Stock market linkages – a cointegration approach (Master's Dissertation). Available from http://econweb.ucsd.edu/~kheilman/pdfs/stockmarketcointegration.pdf.

Hong, L. & Daly, V. (2014). Stock market integration and financial crises: evidence from Chinese sector portfolios (Working Paper No. 14). Retrieved from School of Contemporary Chinese Studies China Policy Institute website https://www.nottingham.ac.uk/cpi/documents/working-papers/working-paper14.pdf.

Janor, H. & Ali, R. (2007). Financial integration of the ASEAN-5 markets: financial crisis effects based on bivariate and multivariate cointegration approach. *Investment Management and Financial Innovations, 4*(4), 144-158.

Jian, Y., Kolari, W.J., Min, I. (2003). Stock market integration and financial crises: the case of Asia. *Applied Financial Economics, 13*(7), 477-486.

Juehui, S. (2014). Comprehensive time-series regression models using great – U.S. GDP and government consumption expenditures & gross investment from 1980 -2013. *Comprehensive Time-Series Regression Models*, 1-82.

Kamal, R. D. (2014). Estimation of short and long run equilibrium coefficients in error correction model: empirical evidence from Nepal. *International Journal of Econometrics and Financial Management, 2*(6), 214-219.

Karim, M. Z. & Gee, C. S. (2006). Stock market integration between Malaysia and its major trading partners. *Applied Econometrics and International Development, 6*(3), 203- 224.

Karim, Z. A. & Karim, Z. A. (2008). Stock market integration: Malaysia and its major trading partners. *MPRA Paper No, 26976*, 1-21.

Karim, B. A., Jais, M. & Karim, S. A. (2011). the subprime crisis and stock index futures markets integration. *Journal of Risk Finance, 2*(5), 400-408.

Karim, A. B. & Karim, Z. A (2012). Integration of asean-5 stock markets: a revisit. *Asian Academy of Management Journal of Accounting and Finance, 8*(2), 21-41.

Karim, B. A., & Hoe, X. N. (2013). Driving forces of the ASEAN-5 stock markets integration. *Asia-Pacific Journal of Business Administration, 5*(3), 186-191.

Kearney, C. & Lucey, B. M. (2004). International equity market integration: theory, evidence and implications, *International Review of Financial Analysis, 13*(5), 571-583.

Kok, C. (2015, August, 15). How devaluation of Yuan affects other economies. The Star Online. Retrieved April 28, 2016, from http://www.thestar.com.my/business/business-news/2015/08/15/how-devaluation-of-yuan-affects-other-economies/.

Lim, L. K. (2007). Linkage between ASEAN stock markets: a cointegration approach. In *MODSIM 2007 International Congress on Modeling and Simulation. Modeling and Simullation Society of Australia and New Zealand*, pp 1818- 1824.

Ma, C., & Masih, M. (2014). Contagion effects of us subprime crisis on asean-5 stock markets: evidence from MGARCH-DCC application. *MPRA Paper No 57004,* 1-31.

Majid, M. S. A., Meera, A. K. M., Omar, M. A., & Aziz, H. A. (2009). Dynamic linkages among ASEAN-5 emerging stock markets. *International Journal of Emerging Markets, 4*(2), 160-184.

Majid, M. S. A., & Kassim, S. (2009). Impact of the 2007 US financial crisis on the emerging equity markets. *International Journal of Emerging Markets,* 4(4), 341-357.

Malaysia, Ministry of Foreign Affairs (2016). Bilateral diplomacy. Retrieved from http://www.kln.gov.my/web/guest/bd-south_east_asia.

Masih, A. M. M. & Masih, R. (1999). Are Asian stock market fluctuations due mainly to intra-regional contagion effects? Evidence Based on Asian Emerging Stock Markets. *Pacific-Basin Finance Journal,* 7, 251-282.

McDonald, J. H. (2014). Normality. *Handbook of Biological Statistics.* Retrieved May 3, 2016 from http://www.biostathandbook.com/normality.html.

Mehreen, K., Cunningham, T. (2015, August 24). Stock market meltdown wipes billions off global indices as China fears decimate investors. Retrieved April 28, 2016, from http://www.telegraph.co.uk/finance/markets/11821662/Black-Monday-Stock-market-meltdown-wipes-billions-off-global-indices-as-China-fears-decimate-investors.html.

Motulsky, H. (2007). Prim 5 statistics guide, 2007. *GraphPad Software*, 1-26

Mundell, R. A. (2000). Currency areas, exchange rate systems and international monetary reform. *Journal of Applied Economics, 3*(2), 217-256.

Nordell, E. & Stark, C. (2010). Diversifying in the integrated markets of ASEAN+3 – a quantitative study of stock market correlation (Degree's Thesis). Available from http://www.diva-portal.org/smash/get/diva2:322334/FULLTEXT01.pdf.

Ozcicek, O., & McMilin, W. D. (1999). Lag length selection in vector autoregressive models: symmetric and asymmetric lags. *Applied Economics, 31*(4), 517-524.

Park, C.Y. (2013). Asian capital market integration: theory and evidence (Working Paper No.351). Retrieved from Asian Development Bank Economics website http://www.adb.org/sites/default/files/publication/30284/ewp-351.pdf

Pedersen, M. (2002). Finding evidence of stock market integration applying a CAPM or testing for common stochastic trends. Is there a connection? (EUI Working Paper No 17). Retrieved from European University Institute website http://cadmus.eui.eu/bitstream/id/1132/ECO2002-17.pdf/.

Pettinger, T. (2015, August 2). How does the stock market effect the economy? [Blog post]. Retrieved April 28, 2016, from http://www.economicshelp.org/blog/221/stock-market/how-does-the-stock-market-effect-the-economy-2/.

Rahman, A. A, & Sidek, N. Z. M. (2011). Spill-over effect of US Subprime crisis on ASEAN-5 stock markets. *International Review of Business Research Papers, 7*(3), 207-217.

Rim, H., & Setaputra, R. (2010). Study on relationships between financial markets in the US and ASEAN countries. *International Business & Economics Research Journal, 9* (8), 1- 6.

Rua, A., & Nunes, L. C. (2009). International comovement fo stock market returns: a wavelet analysis. *Working Paper*, No. 4.

Saini, W. N. A., Azali, M., Habibullah, M. S. & Matthews, K. G. (2002). financial integration and the ASEAN-5 equity markets. *Applied Economics, 34*(8), 2283-2288.

Saiti, B., & Masih, B. (2014). The co-movement of selective conventional and Islamic stock markets in east Asia: is there any impact on shariah compliant equity investment in China?. *Munich Personal RePEc Archive paper no. 56992,* 1-18.

Siew, P. L., & Isa, M. (2014). Stock market integration and the impact of the subprime financial crisis: A Malaysian perspective. *Asian Journal of Business and Accounting, 7*(1), 29-54.

Samsu, S. H., derus, A. M., Oii, A., & Ghazali, M. F. (2008). Causal links between foreign direct investment and exports: evidence from Malaysia. *International Journal of Business and Management, 3*(12), 177-183.

Sjo, B. (2008). Testing for Unit Roots and Cointegration. *Web adresi*, 1-26.

Sowmya, D., & Arun, K. G. (2013). Dynamic interdependence between US and Asian markets: an empirical study. *Journal of Financial Economic Policy, 5*(2), 220-237.

Ssekuma, R. (2011). A study of cointegration models with applications (Master's Thesis). Available from http://uir.unisa.ac.za/bitstream/handle/10500/4821/thesis_ssekuma_r.pdf.

Sukcharoensin, P., & Sukcharoensin, S. (2013). The analysis of stock market development indicators: evidence from the ASEAN-5 equity markets. *International Journal of Trade, Economics and Finance, 4*(6), 343-346.

Taimur, K. (2011). Cointegration of international stock markets: an investigation of diversification opportunities. *Undergraduate Economic Review, 8*(7), 1-50.

Teng, T. T. (1998). An entropic approach to equity market integration and consumption-based Capital Asset Pricing Models. *Retrospective Theses and Dissertations,* Paper 11896.

Thao, P. T., & Daly, K. (2012). the impacts of the global financial crisis on Southeast Asian equity markets integration. *International Journal of Trade, Economic and Finance, 3*(4), 299 – 304.

The Nation. (2014, December 1). Thailand and Malaysia agree to boost mutual trade. Retrieved from http://news.asiaone.com/news/business/thailand-and-malaysia-agree-boost-mutual-trade.

Wang, L. & Huyghebaert, N. (2010). The co-movement of stock markets in East Asia. Is the 1997-1998 Asian financial crisis really strengthen stock market integration?. *China Economic Review, 21*(1), 98-112.

Minitab. (2016, May 4). What is a CUSUM chart?. Retrieved from http://support.minitab.com/en-us/minitab/17/topic-library/quality-tools/control-charts/understanding-time-weighted-control-charts/what-is-a-cusum-chart/.

Valadkhani, A., & Chancharat, S. (2008). Dynamic linkages between Thailand and international stock market. *Journal of Economic Studies, 35*(5), 425-411.

Yusof, R. M., Majid, M. S. A. (2006). Who moves the Malaysian stock market – the US or Japan? Empirical evidence from the pre-, during, and post-1997 Asian financial crisis. *Gadjah Mada International Journal of Business, 8*(3), 367-406.

Zakaria, Z., Husin, Z., Noordin, N., Sawal, M.M.Z.H (2010). Financial crisis 1997/1998 in Malaysia: causes, impacts and recovery plans. *Voice of Academia, 5*(1), 79-96.

Zhang, H., & Hamid, Z. (2015). The impact of Subprime crisis on Asia-Pacific Islamic stock markets. *Journal of Asia-Pacific Business, 16*(2), 105-127.