ASEAN MARKET INTEGRATION: THE IMPACT ON CAPITAL FLOW AND COST OF CAPITAL

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ABSTRACT

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The objectives of this research were as follows: 1) To analyze and compare the impacts of the SET Index on capital flow and cost of capital before and after the ASEAN market integration; 2) To identify the relationship between the SET Index and the indices of the ASEAN stock exchanges before and after ASEAN Market Integration; and 3) To find out the relationship between the SET Index and the index of the MSCI World and that of the Tokyo Stock Exchange before and after the ASEAN market integration.

The data for the correlation study were the indices of the period before the SET entering the ASEAN market integration (October 15, 2007 until October 14, 2012) and the period after the SET joining the ASEAN market integration (October 15, 2012 until August 31, 2016). The data for the study of the effects on capital flow and cost of capital came from the SET Index, the MSCI daily return Index, and the foreign portfolio investment of the periods prior to the SET entering the ASEAN market integration (from October 15, 2007 through October 14, 2012) and after the SET joining the ASEAN market integration (from October 15, 2012 through August 31, 2016).

The results of the data analysis by Vector Auto Regression and Vector Error Correction Model showed that the SET Index could significantly explain the change in capital flow and cost of capital In contrast, the integration of the ASEAN stock exchanges was not found to affect the ability to explain the change of capital flow or the cost of capital. The finding concerning the relationship between the SET Index and the other ASEAN indices (including the MSCI World Index and the Tokyo Stock Index)

showed that after the ASEAN market integration, the SET Index was able to explain the change of every index in the region when compared to the change in the period before the ASEAN market integration.

The recommendations on policy implementations are 1) the net capital flow transactions in the stock exchange should be inspected and controlled to bring about the stabilization of the baht currency exchange rates and 2) The private enterprises sector should be encouraged to seeking market expansion within the ASEAN by raising funds in those exchange markets and, 3) Cooperation among ASEAN stock exchanges should be enhanced to achieve stability and to increase incentives for investment on regional and international investors.

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Yeamyut Sangkittipaiboon

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CHAPTER 1

INTRODUCTION

1.1 Background and Importance of the Problem

The resolution of the 12th ASEAN Summit in February 2007 requires all regional member states form an economic cooperation community so as to strengthen their national competitiveness in the global platform. In addition to the free flow of goods, services, and capital, liberalization of financial services is also a keystone for the establishment of the ASEAN Economic Community (AEC) . International investors have eyed this as an important opportunity for generating returns from more open ASEAN money markets and stock markets.

The ASEAN financial cooperation includes four aspects. First, payment systems have been integrated among member countries to facilitate and improve the securities transactions, trade, investment, international money transfer, payments for retail services, and financial securities deliveries. Next, the free flow of capital is possible by reducing processes and legal barriers to capital outflows to simplify business investment and international financial transactions. For banking, in liberalization the ASEAN the standard for the Qualified ASEAN Bank (QAB) has now been prepared, which will allow eligible commercial banks to operate in all 10 ASEAN member countries in 2020. Moreover, stock market development has been made by linking the stock exchanges in all ASEAN countries together. The ASEAN Exchanges was established as a result of the cooperation of seven stock exchanges in 6 ASEAN countries, i.e. Singapore, Malaysia, Thailand, the Philippines, Indonesia, and Vietnam. Furthermore, the development of more diversified financial products, such as ASEAN Stars, is an integration of Blue Chip stocks based on enterprise market value and liquidity (Business Research Department, The Export-Import Bank of Thailand, 2012).

The global economic systems today are highly interconnected and volatile. Capital flow from investors around the world has been conveniently executed

in seeking the right returns. Investing in the stock market is one of many options investors across the globe pay attention to. The ability to attract international investors is thus vital for the private sector to stimulate funding. For this reason, the ASEAN market integration will help promote recognition of ASEAN in the eyes of international investors. In addition, the cooperation has enabled the ASEAN Exchanges to be ranked the 8th by the World Federation of Exchanges (WFE) after world major markets, e.g. the New York Stock Exchange (NYSE); the National Association of Securities Dealers Automated Quotations (NASDAQ), the second US market which was the first to utilize electronic trading with most listed companies today; the NYSE EURONEXT in the European Union; the Tokyo Stock Exchange in Japan; the London Stock Exchange in the UK; the Shanghai Stock Exchange; and the Hong Kong Stock Exchange in China (The Stock Exchange of Thailand, 2012).

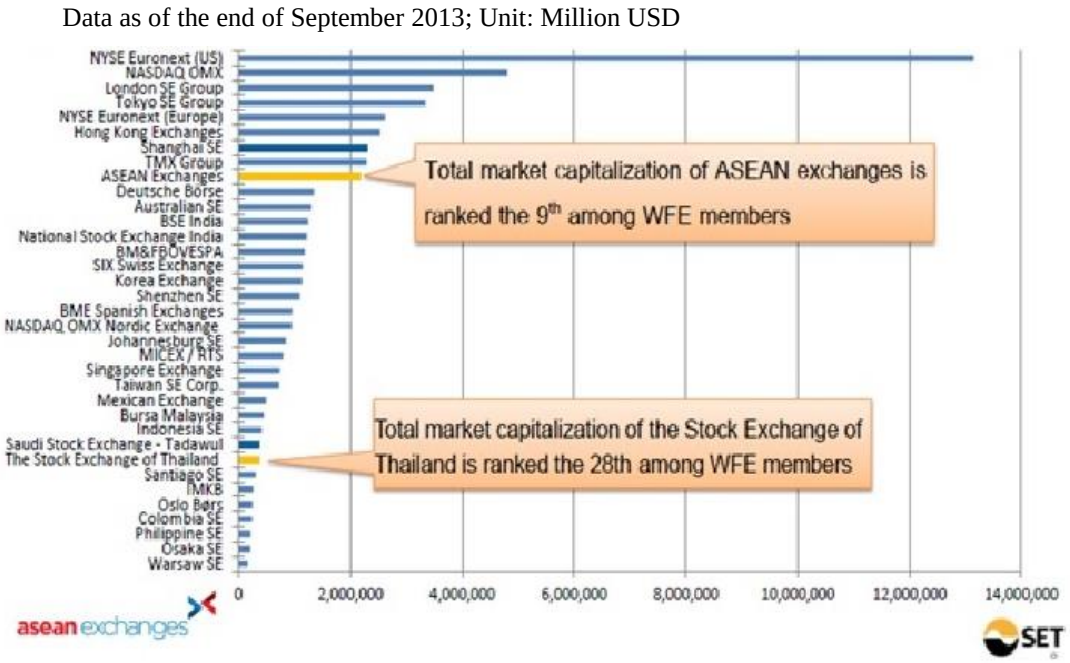

Figure 1.1 Ranks by the World Federation of Exchanges after the SET Joined the ASEAN Exchanges

Source: The Stock Exchange of Thailand, 2012.

Cooperation among 7 ASEAN stock exchanges aims to jointly improve the ASEAN Exchanges' competitive advantage on the global stage through:

1) Promoting the asset class of the ASEAN stock exchanges in the eyes of international investors

2) Supporting the ability of listed companies in ASEAN to get lower costs and to compete for public offering

3) Reducing the costs of trading in the ASEAN Exchanges for regional as well as international investors

Recently, mergers or markets integration has emerged in different regions of the world. For example, in 2006 the NYSE merged with the Euronext, which was a "merger of equals". Cooperation among stock markets in the Nordic-Baltic Region (NOREX Alliance) on the development of the connection system for the stock exchanges ensured more effective securities trading. Each stock exchange revised its trading and subscription criteria for consistency. In 2010 collaboration amongst Santiago (Chile), Lima (Peru), and Bogota (Columbia) stock exchanges created the Integrated Latin American Market (MILA) so as to connect their trading systems, and by the end of 2011, the Mexican stock market joined MILA. Stock exchanges in the BRICS countries worked together on cross-listing of derivatives in 2011 in order to use the equity index reference. It was scheduled to trade in June 2012. Furthermore, in 2014, the European Commission launched the Capital Markets Union (CMU), which aimed to integrate all Europe's capital markets into the single market by 2019, which would enhance the capital mobilization in European Union.

Three stock exchanges in Malaysia, Singapore, and Thailand began their pilot ASEAN market integration. Trading through the ASEAN Link, which connected transactions among the exchanges, was set to begin in the third quarter of 2012 with patterns of the flows as follows.

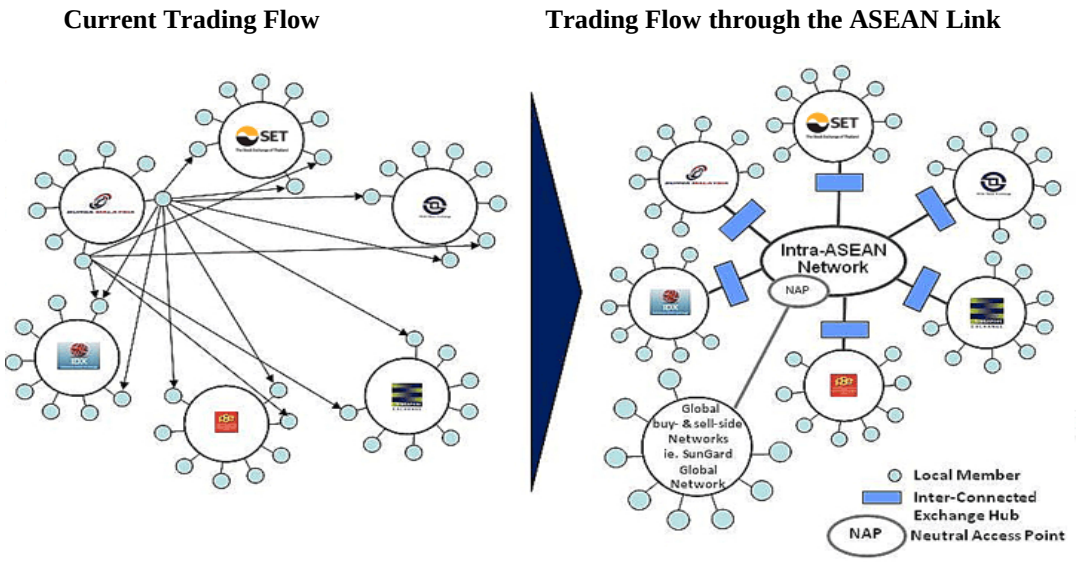

Figure 1.2 Diagram Showing ASEAN Exchanges Connected Through ASEAN Link
Source: The Stock Exchange of Thailand, 2012.

Deals passed through the ASEAN Trading Link, which connected the trading systems of ASEAN stock exchanges, facilitating investors' international transactions and enhancing the efficiency of the securities trading activities, settlement, and securities transfer, along with stock information distribution. Investors are able to trade all securities in any of the 3 markets through the ASEAN Trading Link.

1) Bursa Malaysia (BM) was established in 1964. It currently has 931 listed securities.

2) Singapore Exchange (SGX) was established in 1999. It currently has 774 listed securities.

3) The Stock Exchange of Thailand (SET) was established by the Securities Exchange of Thailand Act, B. E. 2517 (1974) . It currently has 594 listed securities.

Bursa Malaysia and Singapore Exchange commenced their trading through the ASEAN Trading Link on September 18, 2012, while the Stock Exchange of Thailand launched connection with the trading system on October 15, 2012.

In addition, the ASEAN market integration helps minimize the volatility of returns in local stock markets of developing countries, which are usually more

fluctuated than that in the global markets. It also enables higher expected return to be in harmony with that in stock markets of developed countries. This fact is supported by Errunza's finding (2001) that the cost of capital or the expected return of integrated markets is lower than that of unintegrated ones. Chari and Henry (2001), Patro and Wald (2005), Lins et al. (2005), Errunza and Miller (2000) and Karolyi (1998) also advocate that financial liberalization results in lower cost of capital or expected return of securities in the stock markets, thus encouraging more global private investments and capital flow.

As a country in the ASEAN trading link, the Stock Exchange of Thailand (SET) Index ranks 4th in the region following Singapore, Malaysia, and Indonesia and the 28th by WFE. However, the SET is second only to Singapore exchange when considering the number of large securities and the rate of liquidation.

For this reason, it is imperative to study the impacts caused by the Stock Exchange of Thailand's association with the ASEAN Exchanges on its capital flow and cost of capital, direction of changes, as well as the volatility of the Stock Exchange of Thailand in comparison with other ASEAN stock exchanges and major global markets.

1.2 Research Objectives

The objectives of this study were as follows.

1.2.1 To analyze and compare the impacts of the SET Index on capital flow and cost of capital before and after ASEAN market integration

1.2.2 To identify the relationship between the SET Index and the indices of the ASEAN stock exchanges before and after ASEAN market integration

1.2.3 To find out the relationship between the SET Index and the index of the MSCI World and the index of the Tokyo Stock Exchange before and after ASEAN Market integration

1.3 Research Questions

1.3.1 Does the SET Index affect capital flow and cost of capital? If so, how? Are there any differences in the impact of the SET Index on the capital flow and the cost of capital before and after the ASEAN Market Integration? If so, to what degree?

1.3.2 Before and after the ASEAN Market Integration, was the SET Index correlated with the indices of the ASEAN stock exchanges? If so, to what degree?

1.3.3 Before and after the ASEAN Market Integration, was the SET Index correlated with the index of the MSCI World and with the index of the Tokyo Stock Exchange? If so, to what degree?

1.4 Scope of the Study

The ASEAN stock exchanges participating in financial liberalization were population in this research. They were divided into stock exchanges conducting securities trading through the ASEAN Trade Link; those in developed countries trading through MSIC world Index; the US stock exchanges; the Tokyo Stock Exchange. The study focused on and the capital flow and the cost of capital of the SET in Thailand.

The data on the daily stock exchange index were divided in 2 phases. The first phase included the data of a period of 5 years prior to joining the ASEAN Exchanges by the SET (October 15, 2007-October 14, 2012). And the second phase included the date of a period of 3 year and 11 months following the SET's association with the ASEAN Exchanges (October 15, 2012-August 31, 2016). The data on the cost of capital and the capital flow were divided in 2 phases. The first phase involved the data of a period of 5 years before the SET took part in the ASEAN Exchanges (October 1, 2007-October 14, 2012). In the second phase contained the data of a period of 3 years and 11 month after participation in the ASEAN Exchanges by the SET (October 15, 2012-August 31, 2016).

The research covered the impact of ASEAN Market Integration on two dependent variables, i.e., capital flow and cost of capital. These variables came from the studies by Henry (2000); Errunza and Miller (2000); Bekaert and Harvey (2000);

Kim and Singal (2000); Errunza (2001); Edison and Warnock (2003); Bekaert and Harvey (2003); Lins, Strickland, and Zenner (2005), which suggested that market integration was correlated with or affected cost of capital.

Moreover, research by Tesar and Werner (1994); Brennan and Cao (1997); Clark and Berko (1997); Froot, O' Connell, and Seasholes (2001); Bekaert, Harvey, and Lumsdaine (2002); Edison and Warnock (2003) indicated that market integration was correlated with or affected capital flow. These variables, in term, affected current and future rates of return in emerging markets and developed markets (Tesar and Werner, 1994). Therefore, this study was also conducted to find out the direct effect of the ASEAN market integration on capital flow and cost of capital as well as the indirect effect of the ASEAN market integration on capital flow.

1.5 Operational Definitions of the Terms

ASEAN Market Integration means cooperation among 6 ASEAN markets consisting of the stock exchanges of Malaysia, Indonesia, the Philippines, Singapore, Vietnam (Ho Chi Minh), and Thailand. The integration can elevate the ASEAN securities to the asset class recognized by regional and international investors. The common goal is to raise the liquidity of the ASEAN stock exchanges by promoting cross-listing transactions, optimizing markets access, and offering products that can refer to securities in the ASEAN.

Capital flow refers to transactions causing changes in assets and debts of the international finance, which cover direct investment, portfolio investment, financial derivatives, and other investments.

Cost of capital denotes the cost of public offering or fund raising for the company. It comprises the cost of capital from the shareholders or investors. Typically, the cost of public offering through stock exchanges uses the rate of return on dividends from investments in securities, which is a rate of return investors expect to gain from their investments. It also includes the cost of debt, which consists of the interest rate of loans and other related expenses. However, the cost of debt can be included as an expense in the tax calculation.

1.6 Expected Benefits

1.6.1 The SET can apply the study results related to ASEAN market integration as guideline for its design and policy on the market development of the SET.

1.6.2 The additional body of knowledge concerning characters or patterns of the ASEAN market integration, capital flow, cost of capital, and technical knowledge can be beneficial to stock markets, investors and other interested parties.

1.6.3 Listed companies can utilize the study results as a guideline for fund raising approaches through stock exchanges.

1.6.4 General investors and institutional investors can use the study results for their investment planning.

CHAPTER 2

THEORIES CONCEPTS AND RELATED RESEARCH

Literature review of earlier research and documents related to the " ASEAN Market Integration: Impact on Capital Flow and Cost of Capital" covers of the following 9 topics:

2.1 Concept of ASEAN Market Integration
  2.1.1 ASEAN Economic Community (AEC)
  2.1.2 ASEAN Capital Market Integration
  2.1.3 Money Market Integration
2.2 Concept of Capital Market
2.3 Concept of Cost of Capital
2.4 Concept of Capital Flow
2.5 Concept of Potential Impact of Money Market Integration
2.6 Related Statistics of the Stock Exchange of Thailand
2.7 Related Research
2.8 Conceptual Framework
2.9 Hypothesis

2.1 Concept of ASEAN Market Integration

2.1.1 ASEAN Economic Community (AEC)

ASEAN Economic Community refers to the ASEAN community working together on the economy headed for a single market and a single production base. Its goal is to steer toward free flows of goods, services, investment, skilled labor, and capital by the year 2015. ASEAN or the Association of Southeast Asian Nations is an organization established as a result of the Bangkok Declaration on August 8, 1967. It includes 10 member countries, i. e. 6 co-founders (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) and 4 new members (Cambodia, Laos, Myanmar, and Vietnam or CLMV group).

2.1.1.1 Purpose of Founding AEC

The AEC establishment was originally intended to bring peace to the Southeast Asia region, which would, in turn, bring about political stability and economic, social and cultural progress. When global trade has turned tough over tariff barriers, ASEAN deliberately reinforces and expands its economic cooperation. However, the following 3 primary goals must always be intact:

1) To promote economic, social, and cultural development in the region
2) To maintain economic stability and security in the region
3) To act as a mediator over conflicts in the region

2.1.1.2 The Goal of the ASEAN Economic Community

ASEAN became an economic community in 2015, with a single market and production base moving toward more free flows of goods, services, investment, skilled labor, and capital. At first, ASEAN leaders in the ASEAN summit in Bali in October 2003 announced that the goal of ASEAN economic integration (Bali Concord II) was to complete the formation of the ASEAN Economic Community (AEC) by the year 2020. The other 2 pillars of ASEAN Community - security; society and culture - would be developed by 2020. But later the year of the establishment of AEC was changed to 2015. In August 2006, the ASEAN Economic Ministers Meeting in Kuala Lumpur, Malaysia, resolved to develop an integrated economic plan that clearly designated the goal and the timeframe for the implementation of the measures for all 10 member states.

ASEAN finished the plan in November 2007, which has since been in effect. It is aimed at promoting ASEAN prominent properties of:

1) Being one single market and one production base along with having greater free flows of goods, services, investment, skilled labor, and capital as well as pragmatically supporting the integration of ASEAN key branches;

2) Being a highly competitive region, with coordinated policies for fostering economic integration, such as policies on competition, consumer protection, intellectual property rights, electronic commerce, taxation, infrastructure development, transportation, finance, information technology, and energy;

3) Being a region with equal economic development that encourages the development and reinforcement of SME competitiveness and the reduction of the economic development gap among ASEAN nations through projects, such as the Initiative for ASEAN Integration (IAI);

4) Being a region of global integrated economy that focuses on the balance between ASEAN economic policies and those of non-ASEAN countries for the purpose of clearly harmonized action, such as the ASEAN free trade area among partner nations and on promotion of creating networks of producers/distributors within the region that link to the global economy.

2.1.1.3 Free Flow of Goods

Since January 1, 2010, six ASEAN co-founders (Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand) have cut off their tariffs on imports from ASEAN member countries to 0% and 0-5% on imports from CLMV countries, i.e. Cambodia, Laos, Myanmar, and Vietnam. Regulations on the origin of ASEAN products were reviewed and amended to ease the free flow of goods and to encourage the private sector to take more advantages of the free trade area.

Five ASEAN members (Brunei, Indonesia, Malaysia, Singapore, and Thailand) ended all measures on non-tariff barriers on January 1, 2010, while the Philippines eliminated them on January 1, 2012 and CLMV countries gave them up prior to January 1, 2015. The ASEAN Trade Facilitation Framework has been formulated to ease trade. This includes a roadmap to address non-tariff trade barriers: for example, customs clearance, trading process, standards and certifications, Agreement on the Application of Sanitary and Phytosanitary Measures, ASEAN Single Window, and ASEAN Trade Repository, etc.

2.1.1.4 Free Flow of Services

So far, five negotiations on the opening of free trade services have been concluded. Seven agreements on the opening of free trade services, including market access and national treatment (NT) have been executed. The goal was to liberalize four key services, i.e. tourism, ICT, health, and aviation in 2010, whereas logistics was to be completed in 2013 and other services were scheduled to finish in 2015.

October 28, 2010, the ASEAN economic ministers signed and approved the 8th agreement under the ASEAN Framework Agreement on Services (AFAS) at the 17th ASEAN Summit and other related meetings held in Vietnam.

2.1.1.5 Free Flow of Investment

In 2009, the ASEAN Agreement for the Promotion and Protection of Investment (ASEAN Investment Guarantee Agreement: ASEAN IGA 1987) and the Agreement on the Framework of the ASEAN Investment Area (AIA 1998) were reviewed, revised and annexed to "ASEAN Comprehensive Investment Agreement (ACIA 2009)", which included four key aspects: namely, liberalization, promotion, facilitation, and investment protection. These would support Foreign Direct Investment (FDI) and portfolio investment by eight ASEAN members (excluding Indonesia and Thailand). The ACIA has been ratified. Indonesia is currently in the process of setting a reservation list, while Thailand is working on its course of getting the Cabinet's approval and parliament endorsement for the reservation list and ratification.

2.1.1.6 Free Flow of Capital

Implementation of the ASEAN financial and fiscal integration plan encompasses three major areas as follows.

1) Financial Liberalization: Five agreements on the opening of financial services market have been made.

2) Capital Account Liberalization: Restrictions on the flow of capital, including current account and investment in securities, have been relevantly relaxed.

3) Capital Market Development: The development involves infrastructure and ASEAN stock exchanges integration.

2.1.1.7 Free Flow of Skilled Labor

Member states signed the Mutual Recognition Agreement covering seven professions: doctor, dentist, accountant, engineer, nurse, architect, and surveyor. Currently, the agreement has been implemented.

2.1.2 ASEAN Capital Market Integration

1) History

The ASEAN Capital Market Integration is the cooperation among seven stock exchanges within six ASEAN nations. It includes stock exchanges in Malaysia, Indonesia, the Philippines, Singapore, Thailand, and Vietnam (Ho Chi Minh, Hanoi), with 3,788 listed companies and the market value of 2 trillion USD. Such integration has boosted the prospect of investor base expansion as well as the visibility of listed companies in the exchanges and upgraded the ASEAN securities to regional and global investors' recognition (The Stock Exchange of Thailand, 2012). It has also reduced costs in terms of financing and securities trading. The cooperation has been made possible following the agreement of the 12th ASEAN Summit (Economic Intelligence Center, Siam Commercial Bank, 2013).

The ASEAN Capital Market Integration strives for 1) increase of liquidity in the ASEAN stock exchanges through cross-listing promotion, 2) ease of market access efficacy within the ASEAN Exchanges, 3) delivery of product reference in the ASEAN Exchanges, and 4) rise of attractiveness for investment in the region (The Stock Exchange of Thailand, 2012).

Furthermore, the ASEAN Stars was invented, consisting of large shares based on the market value and the liquidity of 30 securities for each country totaling 180 securities with an aim to consolidate a large portfolio of appealing securities of each stock exchange. These securities are also known as "blue chips" of the ASEAN Exchanges. This assists unfamiliar investors to pick preferred stocks for their investment in the ASEAN stock exchanges.

As for transaction channels, the integration of the ASEAN stock markets has created an important avenue, the ASEAN Trading Link. It combines securities trading systems within the ASEAN stock exchanges so that investors can effortlessly trade international securities. It also improves the efficiency of securities trading, settlement, securities transfer, and stock information distribution processes. Investors can trade equity instruments or securities inall the stock markets. The first 3 exchanges that implemented trading through the ASEAN Trading Link were those in Malaysia, Singapore, and Thailand. The Malaysian and Singaporean stock exchanges began their ASEAN Trading Link on September 18, 2012, while the Stock Exchange of Thailand inaugurated the trading link on October 15, 2012.

2) The Malaysian Stock Exchange (Bursa Malaysia: BM)

Bursa Malaysia was established in 1964 as a public holding company that offers trading services on securities, derivatives, and future contract. There are now 931 listed securities in this stock market.

3) The Singapore Exchange (SGX)

Founded in 1999 as a holding company, the Singapore Exchange has since then offers trading services on securities, derivatives, and future contracts. Currently, there are 774 listed securities in the exchange.

4) The Stock Exchange of Thailand (SET)

The SET was established by the Securities Exchange of Thailand Act, B.E. 2517 (1974) and is under the supervision of the Office of the Securities and Exchange Commission (SEC). The first official trading was held on April 30, 1975. It serves as a secondary market of listed companies for their equity trading and convenient capital raising from the public. Currently, The Stock Exchange of Thailand is empowered by the Securities and Exchange Act B.E. 2535 (1992). There are now 594 listed securities. The SET Index is calculated by using the indices that reflect the movement of prices of individual registered shares in the Stock Exchange of Thailand (including the property fund listed on the Exchange) except for shares with the SP sign for more than one year.

In calculation of the SET Index, market capitalization is weighed by comparing the current market value with the base market value as of April 30, 1975, which has the initial index of 100 points.

2.1.3 Roles of Stock Exchanges in National Development

The stock exchange is established to serve as the center for securities trading to obtain both operation and information efficiency. It must adhere to fairness and international standards so as to promote domestic savings and financing, which are a keystone in national development and a path to fulfill the national economic goal. The following are the principal roles of the stock market as defined by Supachai Srisuchart (1999).

1) Promoting savings and financing: The stock market acts as the center in issuing new company shares to the public. It is a place where parties needing

more capitals and investors exchange their demands. New securities issuance for financing in the stock exchange as a primary market results in the capital being invested into the business sector and in more employment. Meanwhile, investors receive their returns in the form of share premium and dividends from securities invested.

2) Creating liquidity: Financing in the secondary market refers to securities trading of companies that have already issued securities. It helps contribute to liquidity in the securities trading and responds to the purpose of investors and parties seeking capital. Without this secondary market, securities trading transactions would be otherwise difficult because investors may not have confidence due to the changing value of securities and may not be able to exchange them quickly.

3) Aiding in restructuring of business: Sound financial structure positively affects the company value, especially the structure of debt compared to the owner's equity, which may be measured via debt to equity ratio. Through issuing of shares, company financing can also be in the form of bank loans or debenture issuance to the public. Moreover, funds can be raised through the stock market to fulfill development plans and needs. When equities are issued at an opportune time, it supports the growth and strength of the company and is, in turn, beneficial to national development.

4) Acting as a medium of organized securities trading: The stock market as the center of securities trading facilitates fair information distribution and securities trading procedures. The trading is based on market demand and supply for that period of time. There are arrangements on collection and settlement standards as well as proper fraud protection and monitoring that make trading in stock exchange fair to all parties.

5) Encouraging public participation in business ownership: Financing through the issuance of securities in the private sector creates joint ownership with the investors who are shareholders. Investors may opt to invest in companies and industries in accordance with their objectives. Such investment affects the growth of the national economy in the long run.

6) Protecting the interests of concerned parties in the market: To be fair to those involved, the stock exchange has the duty to protect confidential data in

order to make securities trading fair. It also has to supervise and monitor any action deemed adverse to the market and investors: for example, market manipulation and misuse of insider trading, etc.

7) Creating an information system beneficial to the economy: Listed companies are obliged to follow the regulations set forth by the stock exchange. These regulations include the submission of financial statements and other pertinent company information within time specified. Investors can applicably use such information to make sound investment decisions as well as to verify credibility of the listed companies and corporate transparency of the executives.

8) Expanding the tax base for the government: Since information published by the stock exchange is reliable, the estimated revenue of the company is thus accurate. The government can use such information for effective tax collection. Transactions pertaining to income can be used as a tax base as well.

9) Acting as an index of national economic development: Although growth of the stock market may not be a result of business sector's direct investment, the growth of capital market can be an important indicator of economic growth. Because investors have more confidence, investment for shared ownership of listed companies is thus achievable. This signals the likelihood of expansion of the business sector.

Additionally, a study by Kunt and Levine (1996) concluded that the stock market is substantially vital to the nation's economic development. The international capital market integration tends to increase due to investors' higher attention caused by such integration. It also reduces the volatility of shares in each market. According to Karajazyk (1995), market shares in developing countries are higher than those in developed markets and may nonetheless decline if there are more capital market integrations.

Ayuso and Blanco (1999) suggested that asymmetric integration, along with the integration among stock markets at an international level, better deployed in developed nations than in developing countries. Their research found the correlation of the stock exchange index and the ability to make profits, which could be described as a form of returns from other markets.

2.1.4 Money Market Integration

The Meaning of Money Market Integration

In her research, Tipsuda Thavaramara (2012) defined money market integration as the ability of investors on free trading of regional securities and financial instruments under the same and equal supervision. The complete integration should normalize trading prices of risky securities and returns after the exchange rate adjustment for each currency has been performed. Because in a free flow of capital scenario, investors will buy securities in a country that offers lower prices and then sell them in a country that offers higher prices. The prices in two countries will be matched eventually.

The current global stock market indices tend to be more integrated. This statement was supported by Fratzscher (2002) who found that the European stock markets were more integrated. Especially after the countries eliminated or lessened their regulations concerning the regional flow of capital, the level of integration or cooperation were higher (Bekaert & Harvey, 1995; Ng, 2000).

2.2 Concept of Capital Market

2.2.1 Markowitz Portfolio Theory

Markowitz Portfolio Theory, which concerns investment options in securities or portfolio selection, was proposed by Herry Markowitz in 1952. It contains a basic concept that diversification of risk in securities investment can be achieved only when investing in each pair of securities does not hold significance with a complete variation (correlation coefficient lower than 1). So investors diversify investment risk by investing in securities that yield the expected return at the lowest risk.

Such a concept confines only certain securities portfolio as efficient portfolio. The following are assumptions of the investors' behaviors.

1) Investors consider investment options by using probability distribution from expected return at a certain period of time.

2) Investors are people who seek wealth maximization. They expect a maximum benefit within the time period of investing.

3) Investors calculate a risk of securities portfolios by checking the variance or standard deviation of returns.

4) Investors use only 2 factors - expected return and risk - for their investment decision.

5) Investors are risk averters who choose to invest in options with the highest return for the same level of risk, which is used to determine the characters of the portfolio they pick to invest.

The above assumptions hint that investors will invest in efficient frontier securities portfolio in accordance with their plan. The key factors for consideration are: 1) the number of securities in the portfolio, 2) standard deviation of the returns of securities in the portfolio, 3) the relationship between the volatility of the returns of securities in the portfolio, and 4) proportion of capital.

2.2.2 Capital Asset Pricing Model Theory

Capital Asset Pricing Model (CAPM) was developed in 1964 by Sharpe, Litner, and Jan Mossin. The concept of Markowitz's (1952) Modern Portfolio Theory was applied in the model. It presumes that risk diversification can reduce risk. A good risk diversification can be achieved by choosing non-correlated financial assets in investment. A negative correlation can even better reduce the risk of investment. To classify the best portfolio, the developed CAPM utilizing the principle of investment diversification takes into account the investment risk assessment, expected return, and cost of financial calculation as follows.

$$\mathrm{E}(R_{i,t}) = R_{f,t} + \beta_{i,t}((\mathrm{E}R_{m,t}) - R_f)$$

Whereas:

$\mathrm{E}(R_{i,t})$: Expected return of financial asset i at time t

$\beta_{i,t}$: Beta Coefficient, which measures non-diversified risk of asset i at time t

$(\mathrm{E}R_{m,t})$: The average expected return of risky asset or market return at time t

$R_{f,t}$: The return on risk-free asset

CAPM shows the correlation between expected return on asset $E(Ri)$ with systemic risk of asset Bi. The systematic risk is a non-diversified risk through good investment diversification. It is regarded as beta in the model. The standalone risk of securities does not exist according to the assumption that investors eliminate all risks but systemic risk from portfolio so as to diversify their investment risks. Thus, it is possible to recap that CAPM can determine the balance of expected return from holding of risky assets, which is equal to return on risk-free asset plus return on risk premium via CAPM.

2.3 Concept of the Cost of Capital

Typically, the volatility of returns in stock markets of developing countries tends to fluctuate at a higher rate than that of stock markets in developed nations. As a result, investors' expected return is higher. Listed companies in developing markets, therefore, have a higher cost of capital in issuing stocks. However, cooperation among stock markets in developing countries results in lower expected return or cost of securities (capital) along the line of markets in developed countries. This phenomenon supports Errunza (2001), who observes that cost of capital or expected return of securities in stock exchanges that implement market integration implementing is lower than in stock exchanges that have not implemented market integration due to the fact that most securities trading on the market is carried out by local investors.

The expected return depends upon domestic risk and risk of variability at the national level. But when stock exchanges have their markets integrated, such domestic risk and risk of variability will fluctuate in accordance with stock markets in developed countries, resulting in lower risk. The expected return of securities, as well as the cost of capital will be decreased as a result of reduction of information asymmetry. And the prices of securities in the stock exchanges that underwent market integration will depend on the global systematic risk; meanwhile the domestic risk will be eliminated.

Moreover, research by Bakaert and Harvey (2000) revealed that money market integration directly affected cost of capital. They conducted a cross-sectional study based on the time series model with a sample group of stock exchanges in 20

developing countries by employing the dividend yield to measure the cost of capital. The results showed that the dividend yield decreased significantly when compared with that before liberalization of stock markets. And a study of stock exchanges in developing countries in 2002 indicated that the expected return or cost of capital decreased when money market integration had been implemented. The finding was consistent with Henry (2000) and Kim and Singal (2000), who found that the average return of the securities fell after financial liberalization.

Furthermore, Chari and Henry (2001), Patro and Wald (2005), Lins et al. (2005), Errunza and Miller (2000), and Karolyi (1998) advocated that financial liberalization resulted in a decline of cost of capital or expected return of securities. Similarly, Stulz's (1999) study showed that globalization affected corporate governance and cost of capital, and that the reduction of cost of capital affected international capital budgeting, which might result in more private investments in foreign countries.

2.4 Concept of Capital Flow

A number of studies until today has involved the relationship between international capital flows and equity prices - both foreign and domestic. Tesar and Werner (1994) found that international capital flows positively affected not only current expected return but also future return of the emerging and developed markets. The findings revealed that domestic investors had an information edge over their foreign counterparts. Moreover, Brennan and Cao (1997) indicated that the inflow and outflow of capital across borders might result in equity prices swinging due to the fact that foreign investors bought assets abroad when the returns on assets there were high and sold them when the returns on assets were low. They affirmed that foreign investors had more problems in access to market information than local investors. The finding was supported by Bhattacharya et al. (2000) who found securities trading in Mexico Stock Exchange (BMV) was unregulated and that internal trading was irresponsive to any organization's news. They noticed that the insiders use their information advantage in trading prior to news announcement. A study by Choe et al. (2005) presented evidence that the number of local investors who traded domestic stocks was higher than that of foreign investors. Dvorak's work (2005) summed up

the data from Indonesia, saying that local investors made a higher profit than foreign investors. and suggested that a combination of area information and global expertise would create a higher profit.

Froot et al. (2001) and Clark and Berko (1997) found that prices surged after capital inflows. Such a finding indicated that the flow of new markets brought a positive impact on the return of equity. The data suggested that foreign investors were in an edge position over local investors in emerging markets. Froot and Ramadorai's study (2008) showed that the flow of institutions could predict the movement of open-end funds, return on investment, and return of price on the new markets. It implied that foreign investors had information advantage. Moreover, Froot and Ramadorai cited research findings contradicting to the rest that foreign investors could better predict equity premium in the market of other countries, and that local investors had information, which could be used to predict price difference more effectively. They also showed evidence on foreign investors' financial transactions indicating returns of securities in the present day and in the future of emerging and developed markets.

Bekaert and Harvey (2003) summarized in their study that market integration affected the capital flow and that it was necessary to carefully control the structural changes of market integration. Bekaert et al. (2002) conducted studies during different periods of time and the results revealed that market integration increased capital flows as well as the global interest rate. The finding was in agreement with those of Froot et al. (2001) in whose study the variable of dividend yield ratio was controlled because the growth of the world interest rate would lead to an increase in inflow of capital. Bekaert et al. (2002) found that market integration and capital flows were positively correlated with statistical significance once the variable was controlled. And the reduction of dividend yield ratio led to a permanent decrease of cost of capital. However, the study result indicated that a short term increase could cause change in domestic prices of goods. They concluded that market integration helps increase capital flows. It induced a permanent decrease in the cost of capital and temporary increase of price changes. Lastly, Edison and Warnock (2003) also found that emerging markets would not benefit from investors' widespread trading because investment in multinational companies did not increase. Even though market integration affected multinational companies, it did not affect any other company in the country.

2.5 Concept of Potential Impact of Money Market Integration

A study by Tipsuda Thavaramara (2012) indicated that market integration could yield benefits of risk diversification and efficient resource allocation, resulting in financial system development and economic growth. The research results can be summed up as follows.

2.5.1 Money Market Integration Could Result in More Effective Risk Diversification

Money market integration helps companies and people involved in money market to manage risks more effectively, which results in flows of money among countries that want to use the money in different ways. A country can more easily invest its excessive savings in other countries that need capital. It also contributes to the international business capability of financial institutions that expand their customer bases overseas because of lower potential risk of being default. Investors can conveniently divert risk by choosing to invest in countries with lower risk.

2.5.2 Money Market Integration Could Result in More Effective Allocation of Financial Resources

Money market integration enables companies and entrepreneurs to better access to capital sources and to reduce in cost of capital in company financing and financial institution operation due to the economy of scale. It thus affects the long-term productivity growth.

Stock markets will also experience an influx of capital from overseas, which causes more liquidity in them. This affects not only investment foundation in the changing stock market but also concerned parties who conduct research findings of which can be used in the management of financial resource allocation that affects the development of the national economy in the long run.

2.5.3 Money Market Integration Can Promote Overall Development of the Monetary System and the Economic Growth

Money market integration and stock exchange integration can drive the development of new financial products used for companies' restructuring so that they

can better compete. Foreign financial institutions can conveniently conduct their business in any country. They can also offer new financial products to companies, investors, and fundraisers in other countries so that they can increase the ability to compete in the business sector due to financing with lower cost of capital, etc. Moreover, countries with a higher national income per capita have a higher size of financial depth and a higher level of economic growth as well.

Stock markets with alternatives to present across countries can reduce their fees on securities trading and payment, resulting in lower cost of securities trading. Investors are also able to select channels for purchasing securities through the country with the lowest cost and price.

Developing countries, however, need to continue their development of basic economy, corporate governance, regulations, along with financial systems and financial institutions so that they will have proper readiness and stability to better cope with the versatile capital flow.

Stock Return Volatility

Stock exchange integration and money market integration usually affect the volatility of securities returns in a short term only, which has often been caused by the influx of capital. In spite of this, such volatility will diminish in a long term and can be predicted. However, attention should be paid to both short-term and long-term (Errunza, 2001) impacts.

The results of research in developing countries showed that market integration did not affect the volatility of securities returns, and such volatility did not affect the economic growth, either (Bekaert, Havey, & Lundblad, 2006).

2.6 Related Statistics of the Stock Exchange of Thailand

2.6.1 Calculation of the SET Index

The SET Index is calculated by using Market Capitalization Weight. The formula is as follows:

$$\text{SET Index} = \frac{Current\ Market\ Value}{Base\ Market\ Value} \text{ x100}$$

Source: The Stock Exchange of Thailand, 2015.

Factors Affecting Index Calculation

The SET Index is calculated by Market Capitalization Weight, which is taken from the product of the total number of shares multiplied by stock price. Important factors that affect the stock index are thus changes in stock prices and the number of shares. In order for the stock index to reflect changes in stock prices alone, it is necessary to cut the impact of changes in the number of shares off by adjusting the calculation base to eliminate such impact. The principle is as follows:

Index after change = Index before change

$$\frac{CMV_n}{BMV_n} = \frac{CMV_o}{BMV_o}$$

$$BMV_{\boldsymbol{n}} = BMV_o \times \frac{CMV_n}{CMV_o}$$

Whereas

BMVo means base market value

CMVo means current market value without consideration of change

BMVn means base market value after adjustment

CMVn means current market value with consideration of change

Source: The Stock Exchange of Thailand, 2015.

The Stock Exchange of Thailand will recalculate the index in cases of new listing, delisting, increase or decrease in capital, change in market, inclusion of new stocks and exclusion of stocks from the index, and switch of the industry or sector group.

However, in case of split par no calculation will occur. This is also the case for stock dividends because it is merely a corporate event. That is, it is only transfer of retained earnings to paid-in capital, so no adjustment of the index is required.

2.7 Related Research

Furstenberg and Jeon (1989) found that without potential risk from international investment and volatility of exchange rate, investors expected a similar return on investment.

Arshanapalli et al. (1995) and Masih and Masih (1997, 1999, 2001) found that there existed only one direction of integration in developing and developed countries.

Janakiramanan and Lamba (1998) revealed that return on investment in the US stock exchange affected stock markets in the Asia-Pacific region (Australia, Hong Kong, Japan, New Zealand, Singapore, Indonesia, Malaysia, and Thailand).

Aloui (2014) found that the co-movement and dependence among Gulf Cooperation Council (GCC) Countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates) stock markets was increased and it may impact to the multi-country portfolio's value at risk levels.

Coffee (2002) and Stulz (1999) and Karolyi (2006) indicated that cross-listing improved visibility and domestic markets opening to foreign investors.

Tan and Tse (2002) showed that the exchange rate of local currency to USD and JPY was correlated with that in ASEAN stock markets, especially in the period of the post Asian financial crisis.

Doidge, Karolyi, and Stulz (2004) observed that cross-listing companies had an average value of 16.5% higher than those listed on a single market.

Cavoli, McIver, and Nowland (2011) found that cross-listing contributed to a higher chance of securities purchasing. Besides, foreign listing ratio negatively affected decisions of Foreign Direct Investment (FDI).

Kim, Moshirian and Wu (2005) suggested that the European Union' s monetary policy affected market integration in the same direction. In addition, global market integration fluctuated in accordance with macro-economy.

The impacts of market integration on the cost of capital and the capital flow from previous studies were summed up as follows.

1) Impact on Cost of Capital

Errunza (2001) found that market integration caused an increase in cost of capital. Bekaert and Harvey (2000), Henry (2000), Kim and Singal (2000), together

with Edison and Warnock (2003) , revealed that market integration resulted in a decrease in the rate of dividend yield with statistical significance. Bekaert and Harvey (2003) concluded that during the pre and post liberalization periods, expected return or cost of capital would fall but only in the market integration of developed nations. Errunza and Miller (2000) studied a sample of 32 countries and found that market integration reduced cost of capital with statistical significance. Lins, Strickland, and Zenner (2005) wrapped up that market integration rendered a significant drop in cost of capital.

2) Impact on Capital Flow

Tesar and Werner (1994) and Brennan and Cao (1997) concluded that inflows or outflows of capital between countries contributed to share price fall or rise. Clark and Berko (1997) and Froot, O'Connell, and Seasholes (2001) found that after inflow of capital, share price would rise. Bekaert, Harvey, and Lumsdaine (2002) stated that market integration resulted in an increase of capital flows. And after market integration, dividend yield would be shrunk and cost of capital would be permanently fallen. Edison and Warnock (2003) maintained that investors would invest more in other stock markets, not in cross-listed firms.

Based on the above mentioned information, the following table has been synthesized by the researcher.

Table 2.1 Synthesis of Impact of Market Integration

Researcher/Impact	Correlation	Cost of Capital or Expected Rated of Return	Capital Flows	Liquidity	Diversification of Benefits and Risk
King , Sentana and Wadhwani (1994)	✓				
Tesar and Werner (1994)			✓		
Brennan and Cao (1997)			✓		

Table 2.1 (Continued)

Researcher/Impact	Correlation	Cost of Capital or Expected Rated of Return	Capital Flows	Liquidity	Diversification of Benefits and Risk
Domowitz, Glen and Madhavan (1996)				✓	
Rouwenhorst (1999)					✓
Bekaert and Harvey (2000)	✓	✓	✓		
Errunza and Miller (2000)					
Henry (2000)		✓			
Kim and Singal (2000)		✓			
Errunza (2001)		✓			
Froot, O'Connell, and Seasholes (2001)					
Bekaert, Harvey, and Lumsdaine (2002)	✓		✓		
Bekaert and Harvey (2003)	✓		✓	✓	
Edison and Warnock (2003)		✓	✓		
Lins, Strickland, and Zenner (2005)		✓			✓
Baele, Pungulescu and Ter Horst (2007)					✓
Eiling and Garrad (2007)	✓				
Bekaert, Hodrick and Zhang (2009)	✓				

2.8 Conceptual Framework

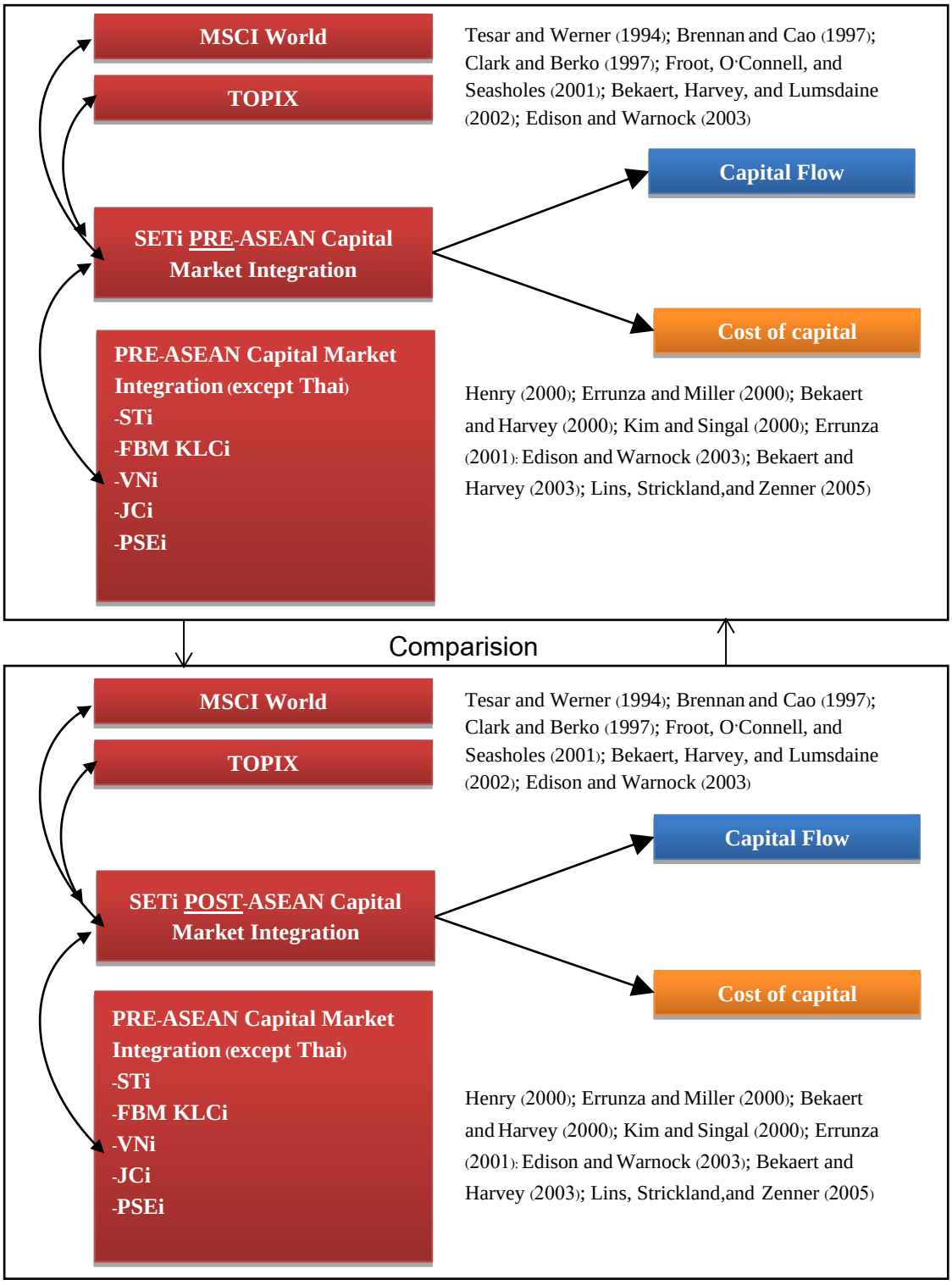

Figure 2.1 Conceptual Framework

2.9 Hypothesis

1) There is a significant difference in the impact on the capital flow and the cost of capital caused by the SET Index between before and after ASEAN market integration.

2) The SET Index is positively correlated with the indices of ASEAN stock exchanges after ASEAN market integration.

3) The SET Index is positively correlated with the MSCI World Index and with the Index of Tokyo Stock Exchange after ASEAN market integration.

CHAPTER 3

RESEARCH METHODOLOGY

The study of "ASEAN Market Integration: Impact on Capital Flow and Cost of Capital" was quantitative research. The details are as follows.

3.1 Research Design

This quantitative research collected and analyzed only non-classified secondary data, i.e., the indices of ASEAN and other leading stock exchanges, which were taken from the reports of the World Federation of Exchanges.

3.2 Unit of Analysis

The Population in this research was stock markets, i.e. 1) the Stock Exchange of Thailand; 2) other five stock exchanges in ASEAN countries: the Singapore Stock Exchange (SGX), the Bursa Malaysia (BM), the Ho Chi Minh Stock Exchange (VNI), the Indonesia Stock Exchange (IDX), and the Philippines Stock Exchange (PSE); 3) the US Stock Exchanges; 4) the Tokyo Stock Exchange; and 5) MSCI World Index (Although the MSCI World Index was not a stock market, it was also included in the study as it was a benchmarking of return on investment in stock exchanges around the world).

3.3 Operational Definition

There were 11 variables in this research, two of which were dependent variables: capital flow and cost of capital. The definitions of all the variables are as follows.

1) The Stock Exchange of Thailand Index or the SET Index reflects the price movement of all securities (Composite Index), measured from the daily stock exchange index at closing.

2) Capital Flow means transactions which bring about change to assets and debts of international finance, which is measured from capital flows in securities transactions by global investors (portfolio investment)

3) Cost of Capital denotes investors' cost of investing in the Stock Exchange of Thailand, or cost of funding of listed companies as measured by the Thailand MSCI Daily Total Return Index (MSCI DTR TH) in USD currency, and is calculated by Morgan Stanley Capital International.

4) The ASEAN Exchanges Index refers to the stock price index of integrated stock markets in ASEAN countries. The index reflects all movements of securities prices as measured from, the daily index in each market at closing. The index consists of 5 variables: the Singapore Stock Exchange (SGX), the Malaysia Stock Exchange (Bursa, Malaysia: BM), the Ho Chi Minh Stock Exchange (VNI), the Indonesia Stock Exchange (IDX), and the Philippines Stock Exchange (PSE).

5) The MSCI World Index is calculated by Morgan Stanley Capital International or MSCI Barra, which is widely used in benchmarking of return on investment in stock exchanges around the world. The index is calculated using only stock trading in the exchanges (Free Float-Adjusted Market Capitalization Weighted) in 23 developed countries, i. e., Australia Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong SAR, Israel, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom, and the United States of America.

6) The Tokyo Stock Exchange Index or the Tokyo market index (TOPIX) is calculated by using market capitalization weighted by comparing the current market value with the base market value. It reflects the daily movement of securities prices at closing.

7) The US Stock Exchange Index refers to S&P 500, which reflects the movement of all securities prices, which is calculated using market capitalization weighted by comparing the current market value with the base market value. It covers indices from exchanges such as the New York Stock Exchange (NYSE) and the NASDAQ Stock Exchange at their closing.

3.4 Population and Sample

The population used in the study of relationship among indices consisted of stock exchanges in different countries.

The samples in the study were ASEAN stock exchanges that were integrated in term of the financial liberalization. They were grouped 1) into exchanges that implemented the ASEAN Trade Link in 2012, consisting of the Stock Exchange of Thailand, the Singapore Stock Exchange (SGX), and the Malaysia Stock Exchange (Bursa Malaysia: BM), and 2) exchanges that did not implement the ASEAN Trade Link in 2012, consisting of the Ho Chi Minh Stock Exchange (VNI), the Indonesia Stock Exchange (IDX), and the Philippines Stock Exchange (PSE). Other leading global markets were additionally included via the MSCI World Index, which represented stock exchanges in 23 developed countries –including the Singapore stock exchange, stock exchanges in the US, and the Tokyo Stock Exchange (TSE).

The samples were mostly ASEAN stock exchanges with an exception of Hanoi Stock Exchange because of its recent commencement and few index data. The samples in the leading stock markets were selected by purposive sampling. For example, the MSCI World Index was selected because it reflected return on investment in the stock markets in developed countries worldwide, including the Tokyo Stock Exchange and the US Stock Exchange. Both Tokyo and US exchanges are the two largest markets in the world, one in Asia and the other in North America which is ranked by the market value as of December 31, 2012 (the World Federation of Exchanges, 2012).

Another population was capital flow and cost of capital in different countries. The sample was data on capital flow and cost of capital in Thailand.

3.5 Research Instrument

The tool used in this research was two types of data recording sheets, i.e., one type of recording for closing index prices of sample markets, and the other for the capital flow and the cost of capital. The following are the examples.

Table 3.1 Data Recording Sheet for Closing Index Prices of Markets

Date	MSCI	SP500	TOPIX	SET	STI	KLCI	PSEI	JCI	VNI
15 Oct 07									
16 Oct 07									
17 Oct 07									
18 Oct 07									
19 Oct 07									
22 Oct 07									
…									
31 Aug 16									

Table 3.2 Data Recording Sheet for Capital Flow and Cost of Capital

Date	Capital Flow	Cost of Capital
15 Oct 07		
16 Oct 07		
17 Oct 07		
18 Oct 07		
19 Oct 07		
22 Oct 07		
…		
31 Aug 16		

3.6 Data Collection

The daily data were collected from the following.

1) The Stock Exchange Index Data were gathered from the daily index published through Datastream by Thomson Reuters. The data was divided into two phases. Phase one was a period of 5 years prior to entering the ASEAN Exchanges by the Stock Exchange of Thailand (October 15, 2007-October 14, 2012). Phase 2 was a

period that covered 3 years 11 months after the Stock Exchange of Thailand joined the ASEAN Exchanges (October 15, 2012-August 31, 2016).

2) Thailand's MSCI Daily Total Return Index (MSCI DTR TH) Data and Portfolio Investment of Foreign Investors Data were collected from published databases via Datastream by Thomson Reuters and databases from website: www.ceicdata.com, respectively. The data consisted of 2 phases. Phase 1 encompassed the period of 5 years before the Stock Exchange of Thailand joining the ASEAN Exchanges (October 15, 2007-October 14, 2012) and Phase 2 covered a period of 3 years and 11 months following the ASEAN Exchanges integration (October 15, 2012-August 31, 2016).

3.7 Data Analysis

The researcher converted the variables into the form of natural logarithm and made data analysis step by step as follows.

1) The Test of Unit Root Analysis was carried out. Given that this study was involved with time series data, the variables were normally correlated in the same direction. The test of stationary state of data was also required to meet an assumption that mean, variance, and covariance did not change with time. The Augmented Dickey-Fuller (ADF) test was executed since it is acceptable and popular in the study of time series data. Three equations were tested to see the correlation of variables, which were:

$(\Delta y_t = \gamma y_{t-1} + \sum_{t-1}^{p} \emptyset y_{t-i} + \varepsilon_t)$ *:* Random walk process

$(\Delta y_t = \alpha + \gamma y_{t-1} + \sum_{t-1}^{p} \emptyset y_{t-i} + \varepsilon_t)$ *:* Random walk with drift

$(\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \sum_{t-1}^{p} \emptyset y_{t-i} + \varepsilon_t)$ *:* Random walk with drift and linear time trend

Whereas null hypothesis and alternative hypothesis were:

$H_0 : \gamma = 0$ and

$H_0 : \gamma \neq 0$

The stationary test of variables was conducted for the order of integration equivalent to 0 or I (0). In the event of non-stationary variables at the

confidence levels of 90, 95, and 99 percent, additional data tests must be performed for the order of integration equal to 1 or I (1) or first difference in order to find out the stationary state of the analyzed variables. The results were employed for Co-Integration Analysis in the next step.

2) Co-Integration Analysis was employed for hypothesis testing to find out the correlation among: 1) the SET Index, the ASEAN stock exchanges indices, the MSCI World Index, and the Tokyo Stock Exchange Index. The data were divided into 2 phases: pre and post ASEAN market integration: 2) the SET Index and the cost of capital and the capital flow. The reason for using Co-Integration Analysis was the nature of time series data and the stationary state. Co-Integration Analysis was therefore more appropriate than Correlation Analysis in Johansen's (1995) method. Co-Integration Analysis was made on multiple variables in the form of equation. Since variables in this study were 9 stock exchange indices, they could be analyzed for correlation concurrently through the following principal statistics.

(1) Trance Test was performed with the following equation.

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n} ln(1-\hat{\lambda}_i) \text{ ; r =0, 1.., n-1}$$

Assumptions were:

H0 : r = 0	against	H_1 : r > 0
H0 : r ≤ 1	against	H_1 : r > 1 up until
H0 : r ≥ n	against	H_1 : r > n

(2) Maximum Eigenvalue was performed with the following equation.

$$\lambda_{max}(r, r+1) = -Tln(1-\hat{\lambda}_{r+1}) \text{ ; r =0, 1.., n-1}$$

Assumptions were:

H0 : r = 0	against	H_1 : r ≥ 1
H0 : r = 1	against	H_1 : r ≥ 2l
H0 : rank (Π) = r	against	H_1 : rank (Π) ≥ r+1

3) Vector Auto Regression (VAR) was applied to forecast the effects of the SET Index on the other indices, on the capital flow, and on the cost of capital. The two periods to be studied were pre and post ASEAN market integration periods.

VAR is a popular model used in the study of time series with the data in the past, or lagged variables. One lagged variable was considered for its effect on current variables. The stationary state of the variable was checked before testing in order to avoid the spurious relationship problem. After that the results can be analyzed. The VAR model can be used to study and explain the casual relationship of variables. A study by Sims (1980) and Litterman (1979) indicated that unlike others, forecast by the VAR model can show the relationship among endogenous variables. In addition, the VAR model also be used on multivariate time-series data that simultaneously consider several endogenous variables within a single equation. The following is the unrestricted VAR: VAR (p) equation.

$$y_t = v + A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + \boldsymbol{\epsilon_t}$$

4) Vector Error Correction Model (VECM) Analysis was made to forecast the short run adjustment of co-integration to enter the long run equilibrium of the SET Index and the other indices. Thailand' s capital flow and cost of capital. Before and after ASEAN Market Integration were used for this analysis.

VECM is regarded as a restricted VAR model commonly used to study the co-integration of time series variables. The adjustment model of co-integration must be considered when a short run adjustment of each variable occurs. The following is the equation.

$$\Delta y_t = v + \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-1} + \boldsymbol{\epsilon_t}$$

Whereas

$\Pi = \sum_{j=1}^{j=p} A_j - \mathrm{I}_k$ and at $\Gamma_i = \sum_{j=i+1}^{j=p} A_j$

And

$y_t =$ K x 1 Vector of Variable

$v =$ K x 1 Vector of Parameter

$\epsilon_t =$ K x 1 Vector Disturbance

The VEC model when integrated with constant and linear trend can be:

$$\Delta y_t = \alpha(\beta'^{y_{t-1}} + \mu + \rho t) + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \boldsymbol{\gamma} + \boldsymbol{\tau t} + \boldsymbol{\epsilon_t}$$

Whereas

$\mu, \rho =$ r x 1 Vector of Parameter

$\gamma, \tau =$ K x 1 Vector of Parameter

CHAPTER 4

STUDY RESULTS

The study on ASEAN Market Integration: Impact on Capital Flow and Cost of Capital aimed to 1) analyze and compare the effects of the SET Index on capital flow and cost of capital before and after ASEAN market integration, 2) identify the relationship between the SET Index and indices of the ASEAN Exchanges before and after ASEAN market integration, and 3) find out the relationship between the SET Index and the MSCI World Index and the Tokyo Stock Exchange Index before and after ASEAN market integration. The data for the correlation study were the indices of the periods before entering the ASEAN market integration (October 15, 2007 through October 14, 2012) and after the SET joining the ASEAN market integration (October 15, 2012 through August 31, 2016). The data for the study of the effects on capital flow and cost of capital came from the SET Index, the MSCI daily return Index, and the foreign portfolio investment of the periods prior to the SET entering the ASEAN market integration (from October 15, 2007 through October 14, 2012) and after the SET joining the ASEAN market integration (from October 15, 2012 through August 31, 2016). The data were analyzed using statistical analysis programs, i.e., Unit Root Analysis for testing the stationary state of the data, Co-Integration Analysis for testing the co-integrated correlation of variables, and Vector Auto Regression Analysis and Vector Error Correction Analysis for forecasting the SET Index impacts on other indices and on capital flow and on cost of capital before and after ASEAN market integration. The research findings are summarized as follows.

4.1 Result of Unit Root Analysis

Unit Root Analysis was used to test the stationary state of the data. The Augmented Dickey-Fuller (ADF) test was used to check the stationary state of the data against ADF statistics and MacKinnon's critical value of the model. Statistical

ADF of higher than MacKinnon's critical value indicated that data series was non-stationary, which could be corrected by performing the first difference or until the time series data reached the stationary state.

The result of Unit Root Analysis of 9 market indices indicated that the Vietnam Ho Chi Minh Stock Index (VNi) shows the stationary state of time series data at the confidence level of 99% because the statistics was over the critical value (ADF test), with the stationary model in the form of a pure random walk with drift and linear time trend.

The indices of 8 markets - i.e. 1) the Stock the Exchange of Thailand Index (SETi), 2) the MSCI World Index, 3) the S&P 500 Index, 4) the Tokyo Stock Price Index (TOPIX), 5) the Philippines Stock Exchange Index (PSEi), 6) the Strait Times Index (STi), 7) the Kuala Lumpur Composite Index (FBM KLCi), and 8) the Jakarta Stock Exchange Composite Index (JCi) -, at an integrated of order 1 at the confidence level of 99% the displayed the stationary state of time series data because the statistics were over the critical value (ADF test), the stationary model in the form of a pure random walk. The details are shown in Table 4.1.

Table 4.1 Statistics for Unit Root Analysis Test of Market Index

Variable	At Level		1st Difference		Stationary model
	ADF-Stat	P-Value	ADF-Stat	P-Value	
Ln_SETi	-2.1191	0.5343	-46.8175	0.0001	Pure random walk model
Ln_MSCI	-3.1347	0.0984	-34.6253	0.0000	Pure random walk model
Ln_S&P 500	-3.3523	0.0583	-53.4610	0.0001	Pure random walk model
Ln_TOPIX	-2.8696	0.1727	-47.9889	0.0001	Pure random walk model
Ln_STi	-2.6434	0.2609	-46.3026	0.0001	Pure random walk model
Ln_ KLCi	-1.7741	0.7172	-43.3722	0.0001	Pure random walk model
Ln_JCi	-1.9670	0.6184	-28.1301	0.0000	Pure random walk model
Ln_PSEi	-3.0842	0.1103	-42.3370	0.0001	Pure random walk model
Ln_VNi	-4.0256	0.0081	-	-	Pure random walk with drift and linear time trend

The result of Unit Root Analysis of SET Index, capital flow and cost of capital indicated that the capital flow shows the stationary state of time series data at the confidence level of 99% because the statistics was over the critical value (ADF test), with the stationary model in the form of a pure random walk with drift and linear time trend.

The SET Index and the cost of capital at an integrated of order 1 at the confidence level of 99% the displayed the stationary state of time series data because the statistics were over the critical value (ADF test), the stationary model in the form of a pure random walk. The details are shown in Table 4.2.

Table 4.2 Statistics for Unit Root Analysis Test of SET Index, Cost of Capital and Capital Flow

Variable	At Level		1st Difference		Stationary model
	ADF-Stat	P-Value	ADF-Stat	P-Value	
Ln_SET	-2.124636	0.5311	-44.1168	0.0001	Pure random walk model
LnMSCI_DRT_TH	-1.786283	0.7113	-44.6281	0.0001	Pure random walk model
LnFPI_Inflow	-10.79359	0	-	-	Pure random walk with drift and linear time trend

4.2 Result of Vector Auto Regression Analysis and Vector Error Correction Analysis among the SET Index, Capital Flow, and Cost of Capital

The researcher converted the studied variables into the form of natural logarithm, i.e. the SET Index, capital flow, and cost of capital. Such variables may hold simultaneity. Therefore, this research employed Vector Auto Regression and Vector Error Correction in co-integration analysis.

Step 1 involved the selection of appropriate lag length first. The appropriate number of lags in the model test showed lag equal to 1, which was good for the model, considering the lowest value of AIC and SC in all lags.

Table 4.3 Results of the Number of Lag Test for the SET Index, Capital Flow, and Cost of Capital

Lag	AIC	SC
0	-2.615757	-2.599833
1	-13.26224	**-13.22243***
2	-13.28087	-13.21718
3	-13.2831	-13.19552
4	**-13.28594***	-13.17447
5	-13.28376	-13.1484
6	-13.2784	-13.11916
7	-13.27912	-13.096
8	-13.273	-13.06599

Step 2 Co-integration by Johansen test was carried out starting with 1) the defining of null hypothesis. No co-integration was found (r= 0) or the hypothesis rejected because the statistics of Trace and Max-Eigen significance was higher than 0. 05; hence next step of testing was carried out 2) The determination of the correlation hypothesis of 1 set (r= 1) and of 2 sets (r= 2) . It was found that the hypothesis could not be rejected with 2 sets of correlation due to the statistics of Trace and Max-Eigen significance being lower than 0.05. Two sets of correlated variables in co-integration could not be determined as shown in Table 4.7.

Table 4.4 Results of Co-Integration between the SET Index and the Capital Flow and between the SET Index and the Cost of Capital

	Trace	**Max-Eigen**	**Critical Value (5%)**		**Prob.**	
	Statstic	**Statistic**	**Trace**	**Max-Eigen**	**Trace**	**Max-Eigen**
r=0	457.6162*	426.6023*	42.91525	25.82321	0.0001	0.0001
r=1	31.01391*	25.90808*	25.87211	19.38704	0.0105	0.0049
r=2	5.105832	5.105832	12.51798	12.51798	0.5812	0.5812

The study was aimed at testing of the impact of the SET Index on the capital flow and the cost of capital. Thus, t-test of parameters by Vector Error Correction was calculated by the researcher considering coefficient of error t-1. If a negative coefficient of such parameters was yielded, then those parameters were correlated. The test was executed via 1) correlation analysis of the SET Index and the capital flow and 2) correlation analysis of the SET Index and the cost of capital.

4.2.1 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis between the SET Index and the Cost of Capital

LnMSCI_DRT_TH = 0.033803 + 1.011826 (LnMSCI_DRT_TH-1)* + 0.002129 (Ln_FPI_Inflow-1)* - 0.018633 (LnSET-1)* + 0.002317 (Dummy)

(4.1 VAR)

△ LnMSCI_ DRT_TH = 2.116916 - 1.244967($\triangle LnSET_t$)

(4.2 Cointegration)

$\triangle$**LnMSCI_DRT_TH$_t$** = -0.000103 - 0.134613$\triangle$($LnMSCI\_DRT\_TH_{t-1}$) - 0.001378$\triangle$($LnFPI\_Inflow_{t-1}$) - 0.134607$\triangle$($LnSET_{t-1}$) + 0.000903 ($Dummy_t$) + 0.014887$\hat{\varepsilon}_t$

(4.3 VECM)

With regard to co-integration analysis, in the long run there is a significant negative correlation between the SET Index and the cost of capital invested in the portfolio. In other words, a 1% increase in the Thailand Stock Exchange index leads to considerable decrease in the cost of funds invested in the portfolio by 1.244967% on average, ceteris paribus (Equation 4.2). In addition, the vector error correction analysis showed that, in the short run, if the cost of capital diverts from its long run equilibrium, it will return such equilibrium, at a 0.0148872 speed of adjustment per period (Equation 4.3).

However, the collaboration of ASEAN market integration had no impact on the cost of capital because the co-efficiency of the DUMMY variable had no significance in the explanation of the cost of capital (Equation 4.1).

4.2.2 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis between the SET Index and the Capital Flow

$$\textbf{LnFPI\_Inflow} = 0.353697 + 0.53337(\text{LnFPI\_Inflow}_{t-1})^{*} + 0.082533 (\text{LnMSCI\_DRT\_TH}_{t-1}) + 0.459123 (\text{LnSET}_{t-1})^{*} + 0.02942 (\text{Dummy}) \quad \text{(4.4 VAR)}$$

$$\triangle\textbf{LnFPI\_Inflow}_{t} = -0.33519 - 1.211414(\triangle \text{LnSET}_{t}) \quad \text{(4.5 Cointegration)}$$

$$\triangle\textbf{FPI\_Inflow}_{t} = -0.007285 - 0.113747\triangle(\text{LnFPI\_Inflow}_{t-1}) + 1.012836\triangle(\text{LnMSCI\_DRT\_TH}_{-1}) + 0.761133\triangle(\text{LnSET}_{t-1}) – 0.016222 (\text{Dummy}_{t}) - 0.424276\hat{\varepsilon}_{t} \quad \text{(4.6 VECM)}$$

With regard to co-integration analysis, a significantly-negative correlation was found between the SET Index and the capital flow invested in the portfolio in the long run. In other words, a 1% increase in the index of the SET led to a considerable decrease in the cost of funds invested in the portfolio by 1.211414% , on average, ceteris paribus (Equation 4.5). In addition, the vector error correction analysis showed that, in the short run, if the capital flow diverted from its long-run equilibrium, it would return to such equilibrium at a 0.424276 speed of adjustment per period (Equation 4.6).

However, the collaboration of ASEAN market integration had no impact on the cost of capital because the co-efficiency of the DUMMY variable had no significance in the explanation of the capital flow (Equation 4.4).

Table 4.5 Results of Vector Error Correction between the SET Index, the Capital Flow, and the Cost of Capital

Cointegrating Eq:	**CointEq1**	**CointEq2**
LN_MSCI_DRT_TH(-1)	1	0
LN_FPI_INFLOW(-1)	0	**1**
LNSETI(-1)	-1.244967	-1.211414
	-0.0494	-0.08481
	[-25.2015]	[-14.2838]
TREND(10/15/7)	0.0000751	-0.00000887
	-0.000036	-0.000061
	[2.10456]	[-0.14473]
C	2.116916	-0.33519
Error Correction:	D(LN_MSCI_DRT_TH)	D(LN_FPI_INFLOW)
CointEq1	0.014887	0.07803
	-0.00756	-0.15186
	[1.96918]	[0.51382]
CointEq2	0.002305	-0.424276
	-0.00105	-0.02109
	[2.19550]	[-20.1147]
D(LN_MSCI_DRT_TH(-1))	0.134613	1.012836
	-0.08425	-1.69236
	[1.59785]	[0.59848]
D(LN_FPI_INFLOW (-1))	-0.001378	-0.113747
	-0.00108	-0.02165
	[-1.27819]	[-5.25394]
D(LNSETI(-1))	-0.134607	0.761133
	-0.10714	-2.15219
	[-1.25640]	[0.35365]
C	-0.000103	-0.007285
	-0.00055	-0.0111
	[-0.18651]	[-0.65639]

Table 4.5 (Continued)

Cointegrating Eq:	CointEq1	CointEq2
DUMMY	0.000903	0.016222
	-0.00096	-0.01931
	[0.93970]	[0.83993]
R-squared	0.006949	0.24441
Adj. R-squared	0.004185	0.242308
Sum sq. resids	0.60336	243.4777
S.E. equation	0.016729	0.336051
F-statistic	2.514363	116.2335
Log likelihood	5782.366	-706.9238
Akaike AIC	-5.340144	0.660124
Schwarz SC	-5.321764	0.678503
Mean dependent	0.000297	0.00026
S.D. dependent	0.016764	0.386064

4.3 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis among ASEAN Market Integration, the Capital Flow, and the Cost of Capital

The researcher further examined how ASEAN market integration affected the cost of capital in 3 stock exchanges, which joined the ASEAN market integration, i.e. the Stock Exchange of Thailand, the Stock Exchange of Singapore, and the Stock Exchange of Malaysia. The examination followed the steps described in 4. 4. However, due to the limitation of the data on the capital flow in some countries where no daily data were available and only net capital flow data were kept, the researcher thus was unable to conduct a comparative study of daily data and different results than previous research might result. So the researcher further investigated on the ASEAN market integration and its effect on the cost of capital of 3 stock markets only. The following are the summary of the findings.

4.3.1 ASEAN Market Integration and Cost of Capital

The researcher converted the variables into the form of natural logarithm using MSCI_DRT_TH, MSCI_DRT_SG, and MSCI_DRT_MY, which were daily return or the cost of capital from investments in the Stock Exchange of Thailand, the Stock Exchange of Singapore, and the Stock Exchange of Malaysia, respectively. When testing the stationary state by Augmented Dickey-Fuller (ADF), Unit Root Analysis of the cost of capital from the 3 market indices yielded stationary time series data at the confidence level of 99% because statistics were over the critical value (ADF test). The stationary model was a pure random walk with drift and linear time trend.

MSCI_DRT_TH = 0.000551 + 0.017877(MSCI_DRT_TH(-1)) - 0.189002(MSCI_DRT_SG(-1)) + 0.281384(MSCI_DRT_MY(-1))+0.0000139(DUMMY)
[0.01929]

MSCI_DRT_SG = 0.000061 + 0.168845(MSCI_DRT_TH(-1)) - 0.244615(MSCI_DRT_SG(-1)) + 0.378354(MSCI_DRT_MY(-1))+0.000755(DUMMY)
[1.31100]

MSCI_DRT_MY = 0.000253 + 0.128203(MSCI_DRT_TH(-1)) - 0.189358MSCI_DRT_SG(-1) + 0.19566(MSCI_DRT_MY(-1)) + 0.0005(DUMMY)
[1.22160]

(4.3.1 VAR)

Equation 4.4.1 signified that the dummy variable, which represented the ASEAN Market Integration, had significantly no effect on the MSCI Net Total Return of each country. The ASEAN market integration might not significantly affect the cost of capital.

4.4 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis of the SET Index and Other Indices

In the correlation study of the time series data of 9 market indices, the MSCI World Index was designated as a dependent variable. The 8 market indices, - i. e. 1) the Stock the Exchange of Thailand Index (SETi), 2) the S&P 500 Index, 3) the Tokyo Stock Price Index (TOPIX) , 4) the Philippines Stock Exchange Index (PSEi), 5) the Strait Times Index (STi), 6) the Kuala Lumpur Composite Index (FBM KLCi), 7) the Jakarta Stock Exchange Composite Index (JCi), and 8) the Vietnam Ho Chi Minh Stock Index (VNi) - were assigned as independent variables. The system equation model was used in the study. Since the market index variables may be of simultaneity, the researcher therefore employed Vector Auto Regression for the analysis of correlation and impact and Vector Error Correction on the analysis of co-integration. The test results were divided into two periods: before ASEAN market integration and after ASEAN market integration. The details are as follows.

4.4.1 Pre ASEAN Market Integration

The co-integration test of time series data before the ASEAN Market Integration is exhibited in the following charts of co-integration among 8 market indices and the SET Index.

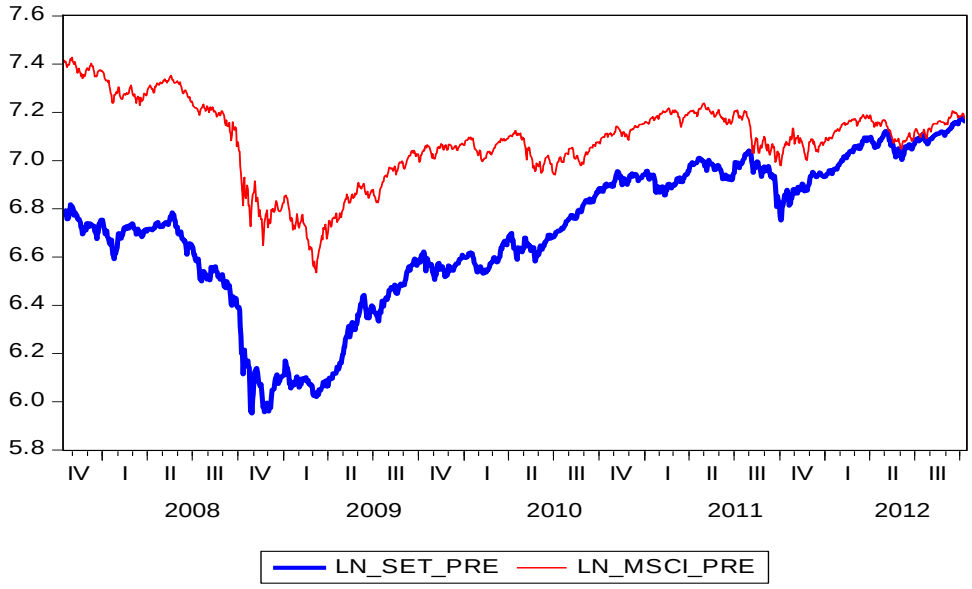

Figure 4.1 MSCI World Index of Pre ASEAN Market Integration

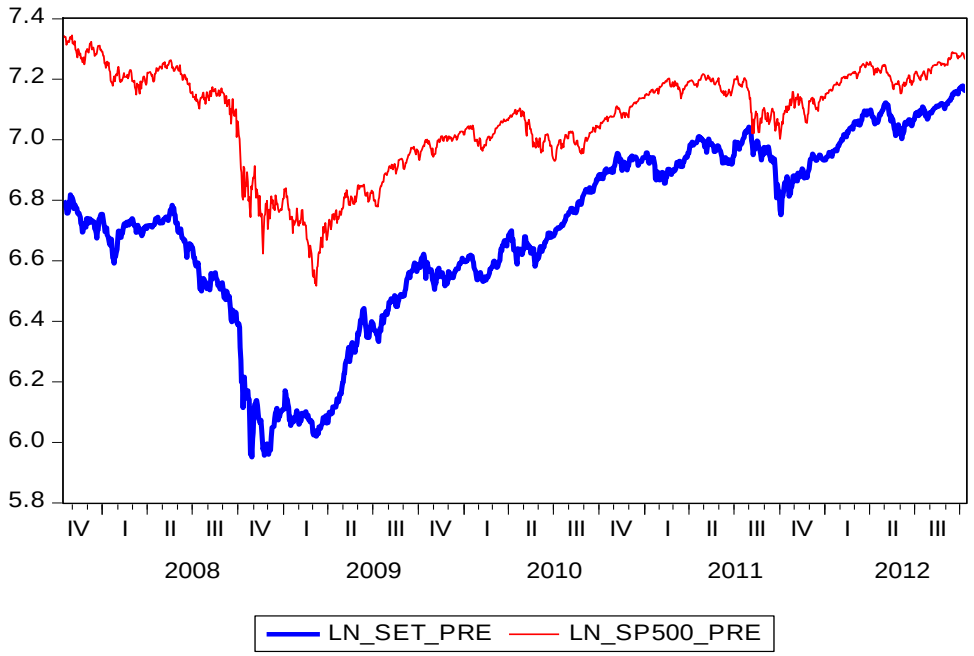

Figure 4.2 S&P 500 Index of Pre ASEAN Market Integration

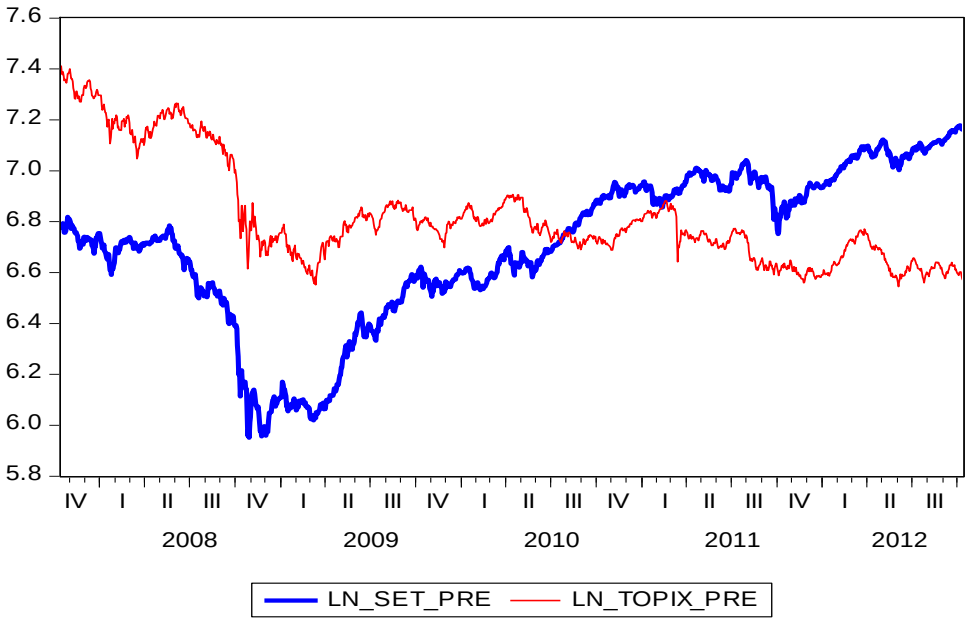

Figure 4.3 Tokyo Stock Price Index (TOPIX) of Pre ASEAN Market Integration

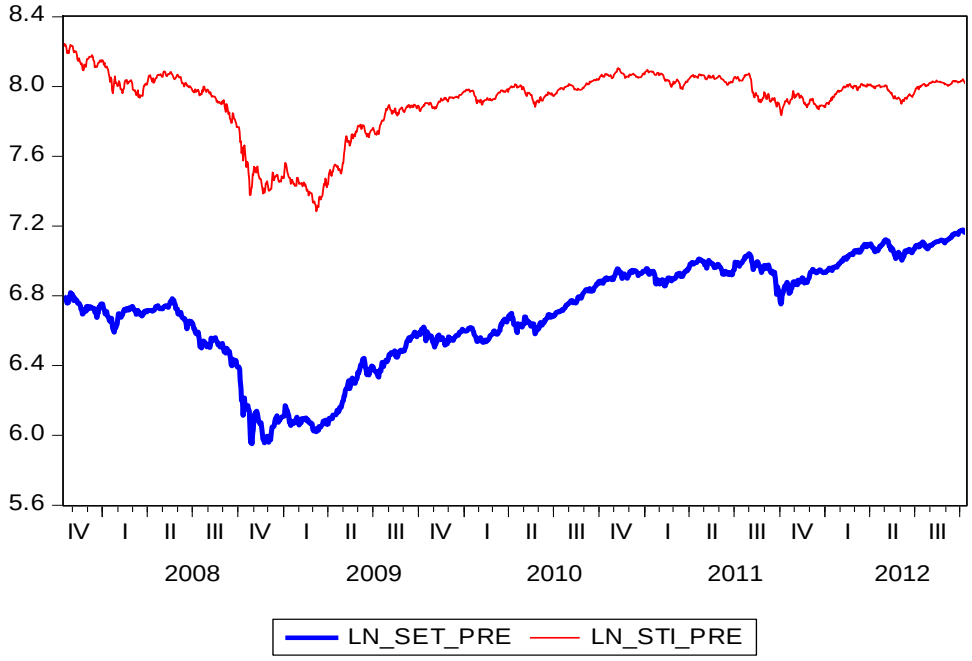

Figure 4.4 Strait Times Index (STi) of Pre ASEAN Market Integration

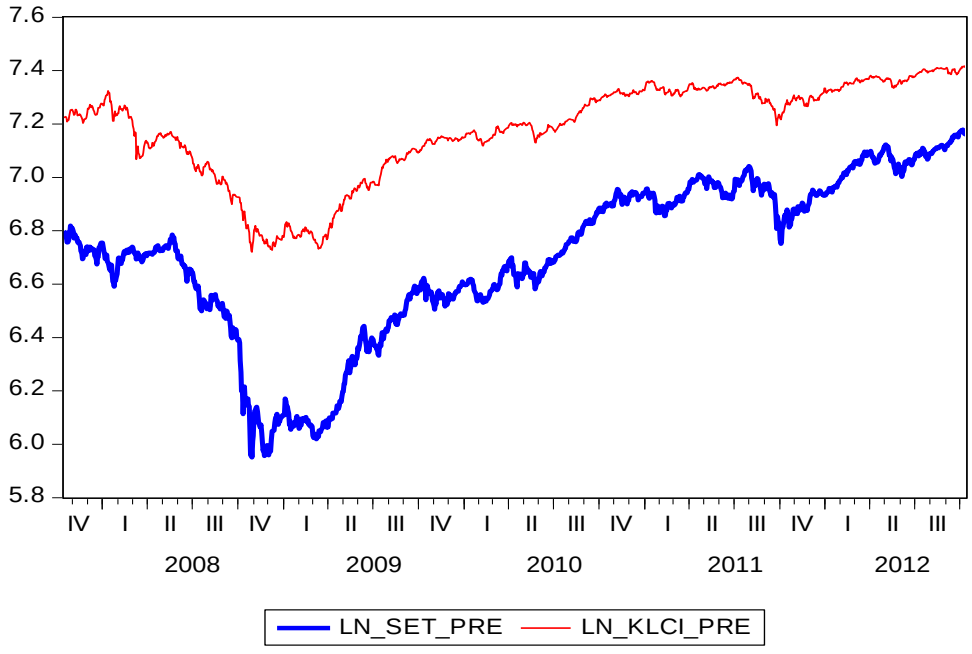

Figure 4.5 Kuala Lumpur Composite Index (FBM KLCi) of Pre ASEAN Market Integration

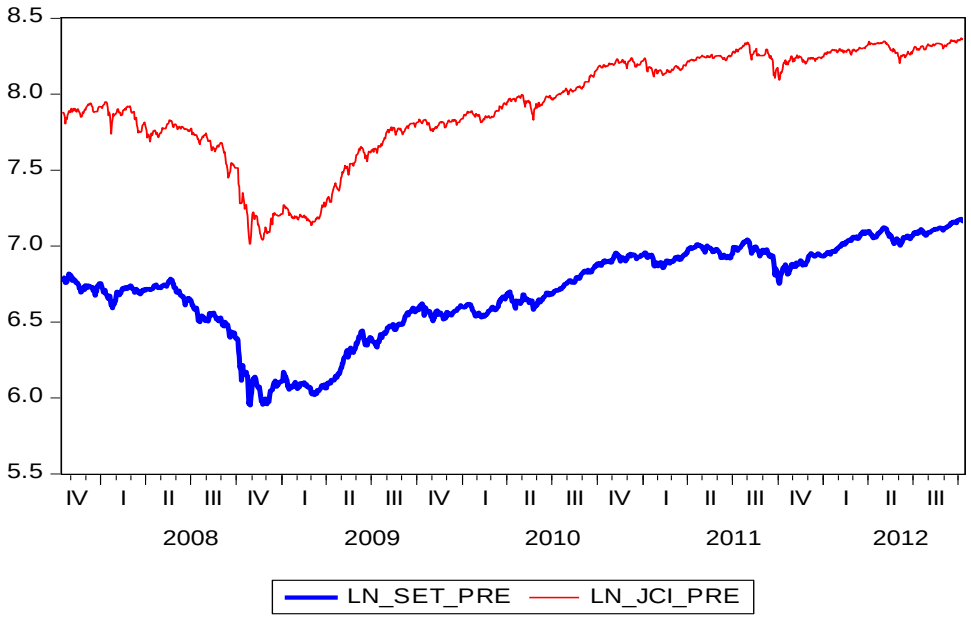

Figure 4.6 Jakarta Stock Exchange Composite Index (JCi) of Pre ASEAN Market Integration

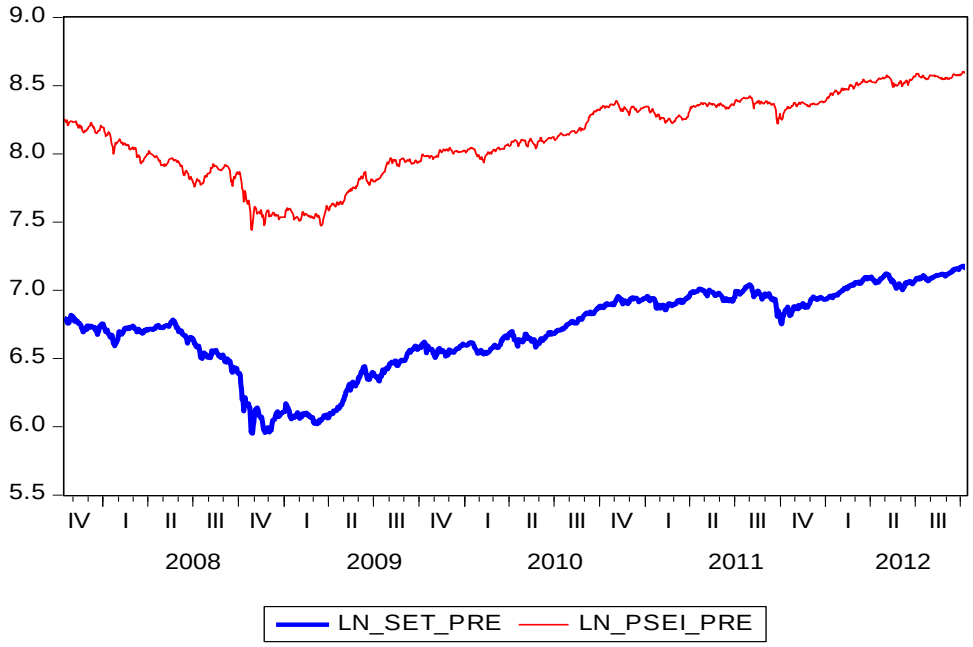

Figure 4.7 The Philippines Stock Exchange Index (PSEi) of Pre ASEAN Market Integration

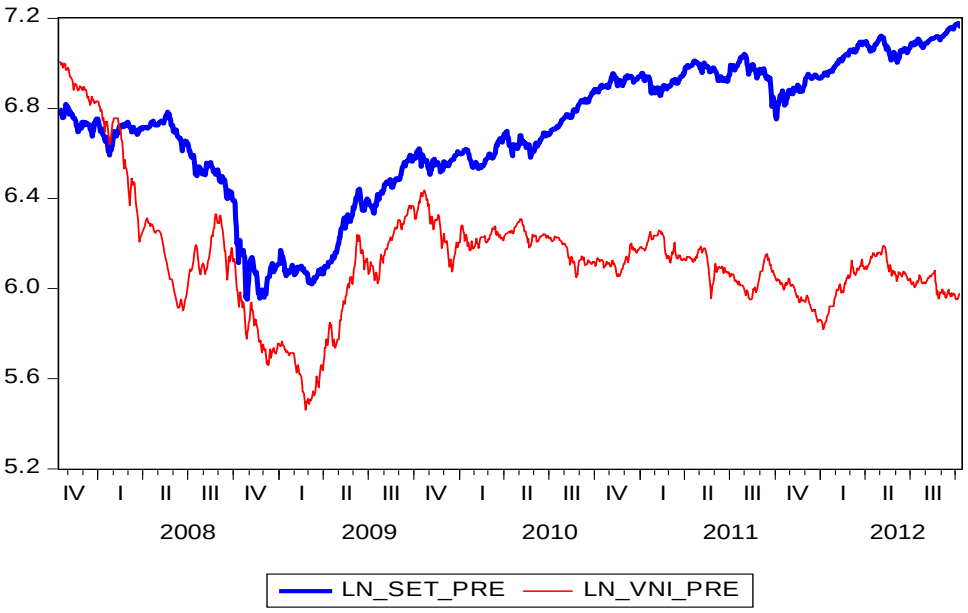

Figure 4.8 Vietnam Ho Chi Minh Stock Index (VNi) of Pre ASEAN Market Integration

Step 1 Unit Root Analysis was conducted to test the stationary state of the data. The result showed that the Vietnam Ho Chi Minh Stock Index (VNi) indicated time series data at a stationary level. The stationary model was a pure random walk with the drift and linear time trend as shown in Table 4.1.

The time series data of the 8 market indices integrated with order 1 at the confidence level of 99% displayed that the data were stationary because the statistics were over the critical value (ADF test). The stationary model was a pure random.

Appropriate lag length was then selected. The appropriate number of lags in the model test showed lag equal to two, which was good for the model, considering the lowest value of AIC and SC in all lags.

Table 4.6 Results of the Number of Lag Test for 9 Market Indices

Lag	AIC	SC
0	-23.31341	-23.24877
1	-48.50592	-48.18274
2	-49.30518	**-48.72346***
3	-49.42239	-48.58212
4	-49.42570*	-48.32688
5	-49.41764	-48.06028
6	-49.37642	-47.76051
7	-49.35334	-47.47889
8	-49.31826	-47.18527

Step 2 Co-integration as measured by Johansen test was carried out starting with 1) the defining of the null hypothesis. The 4 sets of correlation (r=3) were found incontestable to the hypothesis due to the statistics of Trace and Max-Eigen significance being lower than 0. 05. The result indicated 4 sets of correlation. However, the correlation of variables could not be determined as shown in Table 4.3.

Table 4.7 Result of Co-Integration between the SET Index and 8 Market Indices

	Trace	Max-Eigen	Critical Value (5%)		Prob.	
	Statistic	Statistic	Trace	Max-Eigen	Trace	Max-Eigen
r=0	865.3216*	699.2454*	159.5297	52.36261	0	0.0001
r=1	166.0762*	49.35652	125.6154	46.23142	0	0.0225
r=2	116.7196*	39.83771	95.75366	40.07757	0.0009	0.0532
r=3	76.88192*	30.31635	69.81889	33.87687	0.0122	0.1256

4.4.1.1 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis between the SET Index and Other Indices-Pre ASEAN Market Integration

LN_SET_PRE = -0.151532 + 0.896969LN_SET_PRE(-1)* + 0.044215LN_SET_PRE(-2) + 0.084281LN_SP500_PRE(-1) - 0.057298LN_SP500_PRE(-2) - 0.039856LN_TOPIX_PRE(-1) + 0.033782LN_TOPIX_PRE(-2) + 0.039141LN_JCI_PRE(-1) - 0.017947LN_JCI_PRE(-2) - 0.108172LN_STI_PRE(-1)* + 0.115663LN_STI_PRE(-2)* + 0.052876LN_KLCI_PRE(-1) - 0.040996LN_KLCI_PRE(-2) + 0.109382LN_PSEI_PRE(-1)* - 0.098175LN_PSEI_PRE(-2)* + 0.036802LN_VNI_PRE(-1)* - 0.043735LN_VNI_PRE(-2)* + 0.42111LN_MSCI_PRE* - 0.207212LN_MSCI_PRE(-1)* - 0.20886LN_MSCI_PRE(-2)*

(4.4.1.1 VAR)

Equation 4. 4. 1. 1 signified that at time t-1 the Philippines Stock Exchange Index (PSEi) could explain the SET Index movement at time t in the positive direction, while the MSCI World Index and the Strait Times Index (STi) at time t-1 could explain the SET Index movement at time t in the negative direction.

Moreover, at time t-2 the Strait Times Index (STi) could explain the SET Index movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi), the Vietnam Ho Chi Minh Stock Index (VNi) and the MSCI World Index could explain the SET Index movement at time t in the negative direction.

LN_SP500_PRE = 0.009814 - 0.01278LN_SET_PRE(-1) + 0.008761LN_SET_PRE(-2) + 0.549716LN_SP500_PRE(-1) + 0.413227LN_SP500_PRE(-2) -0.008339LN_TOPIX_PRE(-1) + 0.012144LN_TOPIX_PRE(-2) + 0.027937LN_JCI_PRE(-1)* - 0.020621LN_JCI_PRE(-2)* +0.001188LN_STI_PRE(-1) -

0.015397LN_STI_PRE(-2) -0.0101LN_KLCI_PRE(-1) + 0.005642LN_KLCI_PRE(-2) -0.051902LN_PSEI_PRE(-1) + 0.062316LN_PSEI_PRE(-2) -0.002496LN_VNI_PRE(-1) + 0.001246LN_VNI_PRE(-2) + 1.0855LN_MSCI_PRE - 0.847207LN_MSCI_PRE(-1)* -0.201167LN_MSCI_PRE(-2)*

(4.4.1.2 VAR)

Equation 4.4.1.2 signified that at time t-1 the MSCI World Index and the Jakarta Stock Exchange Composite Index (JCi) could explain the S&P 500 Index movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi) at time t-1 could explain the S&P 500 Index movement at time t in the negative direction.

Moreover, at time t-2 the Philippines Stock Exchange Index (PSEi) could explain the S&P 500 Index movement at time t in the positive direction, while the MSCI World Index could explain the S&P 500 Index movement at time t in the negative direction.

LN_ TOPIX_PRE = - 0.018936 - 0.038413LN_SET_PRE(-1) + 0.024448LN_SET_PRE(-2) + 0.18278LN_SP500_PRE(-1)* - 0.155077LN_SP500_PRE(-2)* + 0.798726LN_TOPIX_PRE(-1) + 0.173381LN_TOPIX_PRE(-2) - 0.032015LN_JCI_PRE(-1) + 0.024815LN_JCI_PRE(-2) + 0.124857LN_STI_PRE(-1)* - 0.104224LN_STI_PRE(-2)* -0.034207LN_KLCI_PRE(-1) + 0.039266LN_KLCI_PRE(-2) -0.010246LN_PSEI_PRE(-1) - 0.000852LN_PSEI_PRE(-2) + 0.007562LN_VNI_PRE(-1) - 0.009411LN_VNI_PRE(-2) + 0.363626LN_MSCI_PRE + 0.07591LN_MSCI_PRE(-1)* -0.430322LN_MSCI_PRE(-2)*

(4.4.1.3 VAR)

Equation 4.4.1.3 signified that at time t-1 the S&P 500 Index and the Strait Times Index (STi) could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the positive direction. No index could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the negative direction.

Moreover, at time t-2 no index could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the positive direction, while the S&P 500 Index, the MSCI World Index, and the Strait Times Index (STi) could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the negative direction.

LN_JCI_PRE = -0.099858 - 0.004241LN_SET_PRE(-1) - 0.005514LN_SET_PRE(-2) + 0.119327LN_SP500_PRE(-1)* - 0.114417LN_SP500_PRE(-2) -0.119791LN_TOPIX_PRE(-1)* + 0.107345LN_TOPIX_PRE(-2)* + 0.97098LN_JCI_PRE(-1)* + 0.003158LN_JCI_PRE(-2)* + 0.046524LN_STI_PRE(-1) - 0.03019LN_STI_PRE(-2) + 0.0000424LN_KLCI_PRE(-1) + 0.037645LN_KLCI_PRE(-2) + 0.115421LN_PSEI_PRE(-1) - 0.112384LN_PSEI_PRE(-2) + 0.02796LN_VNI_PRE(-1) - 0.03286LN_VNI_PRE(-2) + 0.346157LN_MSCI_PRE - 0.103065LN_MSCI_PRE(-1) -0.239366LN_MSCI_PRE(-2)*

(4.4.1.4 VAR)

Equation 4.4.1.4 signified that at time t-1 the S&P 500 Index and the Philippines Stock Exchange Index (PSEi) could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the positive direction, while the Tokyo Stock Price Index (TOPIX) at time t-1 could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the negative direction.

Moreover, at time t-2 the Tokyo Stock Price Index (TOPIX) could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi) and the MSCI World Index could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the negative direction.

LN_STI_PRE = 0.046509 - 0.08355LN_SET_PRE(-1)* + 0.077545LN_SET_PRE(-2)* + 0.083771LN_SP500_PRE(-1) - 0.072651LN_SP500_PRE(-2) - 0.084805LN_TOPIX_PRE(-1)* + 0.069567LN_TOPIX_PRE(-2)* - 0.008359LN_JCI_PRE(-1) + 0.015278LN_JCI_PRE(-2) + 0.915722LN_STI_PRE(-1) + 0.07275LN_STI_PRE(-2) - 0.062973LN_KLCI_PRE(-1) + 0.0692LN_KLCI_PRE(-2) + 0.082066LN_PSEI_PRE(-1)* - 0.096086LN_PSEI_PRE(-2)* + 0.02436LN_VNI_PRE(-1) - 0.021086LN_VNI_PRE(-2) + 0.470161LN_MSCI_PRE - 0.175904LN_MSCI_PRE(-1)* -0.2795LN_MSCI_PRE(-2)*

(4.4.1.5 VAR)

Equation 4. 4. 1. 5 signified that at time t-1 the Philippines Stock Exchange Index (PSEi) could explain the Strait Times Index (STi) movement at time t in the positive direction, while at time t-1 the SET Index, the MSCI World Index, and the Tokyo Stock Price Index (TOPIX) could explain the Strait Times Index (STi) movement at time t in the negative direction.

Moreover, at time t-2 the SET Index and the Tokyo Stock Price Index (TOPIX) could explain the Strait Times Index (STi) movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi) and the MSCI World Index could explain the Strait Times Index (STi) movement at time t in the negative direction.

LN_KLCI_PRE = 0.062623 - 0.022945LN_SET_PRE(-1) + 0.01885LN_SET_PRE(-2) + 0.078207LN_SP500_PRE(-1)* - 0.067598LN_SP500_PRE(-2)* - 0.069459LN_TOPIX_PRE(-1)* + 0.058059LN_TOPIX_PRE(-2)* + 0.079242LN_JCI_PRE(-1)*

- 0.075401LN_JCI_PRE(-2)* -0.004511LN_STI_PRE(-1) + 0.017376LN_STI_PRE(-2) + 0.95334LN_KLCI_PRE(-1) + 0.018322LN_KLCI_PRE(-2) + 0.078302LN_PSEI_PRE(-1)* - 0.074902LN_PSEI_PRE(-2)* -0.009178LN_VNI_PRE(-1) + 0.012017LN_VNI_PRE(-2) + 0.155888LN_MSCI_PRE* - 0.027928LN_MSCI_PRE(-1) - 0.128842LN_MSCI_PRE(-2)*

(4.4.1.6 VAR)

Equation 4.4.1.6 signified that at time t-1 the S&P 500 Index, the Jakarta Stock Exchange Composite Index (JCi), and the Philippines Stock Exchange Index (PSEi) could explain the Kuala Lumpur Composite Index (KLCi) movement at time t in the positive direction, while at time t-1 the Tokyo Stock Price Index (TOPIX) could explain the Kuala Lumpur Composite Index (KLCi) movement at time t in the negative direction.

Moreover, at time t-2 the Tokyo Stock Price Index (TOPIX) could explain the Strait Times Index (STi) movement at time t in the positive direction, while the S&P 500 Index, the Jakarta Stock Exchange Composite Index (JCi), the Philippines Stock Exchange Index (PSEi), and the MSCI World Index could explain the Strait Times Index (STi) movement at time t in the negative direction.

LN_PSEI_PRE = 0.040765 - 0.003272LN_SET_PRE(-1) + 0.001151LN_SET_PRE(-2) + 0.33489LN_SP500_PRE(-1)* - 0.280381LN_SP500_PRE(-2)* - 0.071856LN_TOPIX_PRE(-1)* + 0.063953LN_TOPIX_PRE(-2)* + 0.103896LN_JCI_PRE(-1)* - 0.087442LN_JCI_PRE(-2)* + 0.022542LN_STI_PRE(-1) - 0.012556LN_STI_PRE(-2) + 0.045272LN_KLCI_PRE(-1) - 0.043148LN_KLCI_PRE(-2) + 1.052664LN_PSEI_PRE(-1) - 0.086107LN_PSEI_PRE(-2) - 0.001923LN_VNI_PRE(-1) + 0.004655LN_VNI_PRE(-2) + 0.124101LN_MSCI_PRE* + 0.019029LN_MSCI_PRE(-1) - 0.189397LN_MSCI_PRE(-2)*

(4.4.1.7 VAR)

Equation 4.4.1.7 signified that at time t-1 the S&P 500 Index and the Jakarta Stock Exchange Composite Index (JCi) could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the positive direction, while at time t-1 the Tokyo Stock Price Index (TOPIX) could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the negative direction.

Moreover, at time t-2 the Tokyo Stock Price Index (TOPIX) could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the positive direction, while the S&P 500 Index, the Jakarta Stock Exchange Composite Index (JCi), and the MSCI World Index could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the negative direction.

LN_VNI_PRE = -0.098676 - 0.000524LN_SET_PRE(-1) - 0.034823LN_SET_PRE(-2) + 0.168961LN_SP500_PRE(-1)* - 0.18139LN_SP500_PRE(-2)* + 0.038779LN_TOPIX_PRE(-1) - 0.008717LN_TOPIX_PRE(-2) + 0.016985LN_JCI_PRE(-1) + 0.008215LN_JCI_PRE(-2) - 0.014467LN_STI_PRE(-1) + 0.0336LN_STI_PRE(-2) + 0.28958LN_KLCI_PRE(-1)* - 0.315194LN_KLCI_PRE(-2)* - 0.097405LN_PSEI_PRE(-1)* + 0.128304LN_PSEI_PRE(-2)* + 1.233885LN_VNI_PRE(-1) - 0.253642LN_VNI_PRE(-2) + 0.091442LN_MSCI_PRE* + 0.056749LN_MSCI_PRE(-1) - 0.159384LN_MSCI_PRE(-2)

(4.4.1.8 VAR)

Equation 4.4.1.8 signified that at time t-1 the S&P 500 Index and the Kuala Lumpur Composite Index (KLCi) could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the positive direction., while at time t-1 the Philippines Stock Exchange Index (PSEi) could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the negative direction.

Moreover, at time t-2 the Philippines Stock Exchange Index (PSEi) could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the positive direction, while the S&P 500 Index and the Kuala Lumpur Composite Index

(KLCi) could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the negative direction.

In addition, the MSCI World Index at time t could explain the movements of all indices at time t in the positive direction.

In Vector Error Correction Analysis, the result of co-integration by using Johansen test starting with the defining of the null hypothesis indicated the correlation of 4 sets, which can be summed up as follows.

$$\begin{aligned}\triangle \mathbf{LN\_SET\_PRE_t} = \; & 0.032545 - 0.04694\triangle(LN\_SET\_PRE_{t-1}) + \\ & 0.004396\triangle(LN\_SET\_PRE_{t-2}) + \\ & 0.172543\triangle(LN\_SP500\_PRE_{t-1}) + \\ & 0.17635\triangle(LN\_SP500\_PRE_{t-2}) - \\ & 0.060396\triangle(LN\_TOPIX\_PRE_{t-1}) + \\ & 0.060375\triangle(LN\_TOPIX\_PRE_{t-2}) + \\ & 0.030505\triangle(LN\_JCI\_PRE_{t-1}) + 0.120632\triangle(LN\_JCI\_PRE_{t-2}) \\ & - 0.106353\triangle(LN\_STI\_PRE_{t-1}) - 0.046518\triangle(LN\_STI\_PRE_{t-2}) - 0.011216\triangle(LN\_KLCI\_PRE_{t-1}) - \\ & 0.120677\triangle(LN\_KLCI\_PRE_{t-2}) + \\ & 0.001444\triangle(LN\_PSEI\_PRE_{t-1}) + \\ & 0.055663\triangle(LN\_PSEI\_PRE_{t-2}) + \\ & 0.010209\triangle(LN\_VNI\_PRE_{t-1}) + 0.032058\triangle(LN\_VNI\_PRE_{t-2}) + 0.411522\ (LN\_MSCI\_PRE) - 0.314783 \\ & (LN\_MSCI\_PRE_{t-1}) - 0.10128\ (LN\_MSCI\_PRE_{t-2})\end{aligned}$$

(4.4.1.9 VECM)

Equation 4. 4. 1. 9 signified that once the SET Index was out of co-integration, it rebounded to co-integration at a velocity of 0.04392 per period. In other words, 0.04392 was the speed of adjustment to co-integration in the short run.

$$\triangle \mathbf{LN\_SP500\_PRE_t} = -0.073293 - 0.02081\triangle(LN\_SET\_PRE_{t-1}) - 0.002385\triangle(LN\_SET\_PRE_{t-2}) - 0.480874\triangle(LN\_SP500\_PRE_{t-1}) - 0.082838\triangle(LN\_SP500\_PRE_{t-2}) + 0.013351\triangle(LN\_TOPIX\_PRE_{t-1}) + 0.026394\triangle(LN\_TOPIX\_PRE_{t-2}) + 0.020351\triangle(LN\_JCI\_PRE_{t-1}) - 0.013953\triangle(LN\_JCI\_PRE_{t-2}) + 0.005403\triangle(LN\_STI\_PRE_{t-1}) - 0.027154\triangle(LN\_STI\_PRE_{t-2}) + 0.002062\triangle(LN\_KLCI\_PRE_{t-1}) - 0.028537\triangle(LN\_KLCI\_PRE_{t-2}) - 0.019205\triangle(LN\_PSEI\_PRE_{t-1}) + 0.030842\triangle(LN\_PSEI\_PRE_{t-2}) + 0.007316\triangle(LN\_VNI\_PRE_{t-1}) + 0.001834\triangle(LN\_VNI\_PRE_{t-2}) + 1.089284(LN\_MSCI\_PRE) - 0.802301\ (LN\_MSCI\_PRE_{t-1}) - 0.276609\ (LN\_MSCI\_PRE_{t-2})$$

(4.4.1.10 VECM)

Equation 4.4.1.10 signified that once the S&P 500 Index was out of co-integration, it rebounded to co-integration at a velocity of 0.014901 per period. In other words, 0.014901 was the speed of adjustment to co-integration in the short run.

$$\triangle \mathbf{LN\_JCI\_PRE_t} = 0.141427 - 0.008479\ \triangle(LN\_SET\_PRE_{t-1}) + 0.058735\triangle(LN\_SET\_PRE_{t-2}) + 0.254256\triangle(LN\_SP500\_PRE_{t-1}) + 0.140952\triangle(LN\_SP500\_PRE_{t-2}) - 0.216446\triangle(LN\_TOPIX\_PRE_{t-1}) - 0.067125\triangle(LN\_TOPIX\_PRE_{t-2}) - 0.025569\triangle(LN\_JCI\_PRE_{t-1}) + 0.042285\triangle(LN\_JCI\_PRE_{t-2}) + 0.123426\triangle(LN\_STI\_PRE_{t-1}) + 0.012605\triangle(LN\_STI\_PRE_{t-2}) -$$

$0.080635\triangle(LN\_KLCI\_PRE_{t-1}) -$
$0.034725\triangle(LN\_KLCI\_PRE_{t-2}) -$
$0.073767\triangle(LN\_PSEI\_PRE_{t-1}) +$
$0.028081\triangle(LN\_PSEI\_PRE_{t-2}) -$
$0.001637\triangle(LN\_VNI\_PRE_{t-1}) -$
$0.006007\triangle(LN\_VNI\_PRE_{t-2}) +$
$0.354627(LN\_MSCI\_PRE) - 0.039686$
$(LN\_MSCI\_PRE_{t-1}) - 0.334995\ (LN\_MSCI\_PRE_{t-2})$

(4.4.1.11 VECM)

Equation 4. 4. 1. 11 signified that once the Jakarta Stock Exchange Composite Index (JCi) was out of co-integration, it rebounded to co-integration at a velocity of 0. 017089 per period. In other words, 0. 017089 was the speed of adjustment to co-integration in the short run.

$\triangle LN\_TOPIX\_PRE_t =$ $0.003519 + 0.006476\triangle(LN\_SET\_PRE_{t-1}) -$
$0.024217\triangle(LN\_SET\_PRE_{t-2}) +$
$0.189854\triangle(LN\_SP500\_PRE_{t-1}) +$
$0.111064\triangle(LN\_SP500\_PRE_{t-2}) -$
$0.123921\triangle(LN\_TOPIX\_PRE_{t-1}) -$
$0.078177\triangle(LN\_TOPIX\_PRE_{t-2}) +$
$0.001106\triangle(LN\_JCI\_PRE_{t-1}) + 0.032389\triangle(LN\_JCI\_PRE_{t-2}) + 0.039151\triangle(LN\_STI\_PRE_{t-1}) -$
$0.000958\triangle(LN\_STI\_PRE_{t-2}) - 0.060076\triangle(LN\_KLCI\_PRE_{t-1}) - 0.070936\triangle(LN\_KLCI\_PRE_{t-2}) +$
$0.054069\triangle(LN\_PSEI\_PRE_{t-1}) +$
$0.035248\triangle(LN\_PSEI\_PRE_{t-2}) +$
$0.014125\triangle(LN\_VNI\_PRE_{t-1}) + 0.003536\triangle(LN\_VNI\_PRE_{t-2}) + 0.344099\triangle(LN\_MSCI\_PRE) -$
$0.177492\triangle(LN\_MSCI\_PRE_{t-1}) -$
$0.167039\triangle(LN\_MSCI\_PRE_{t-2})$

(4.4.1.12 VECM)

Equation 4. 4. 1. 12 signified that once the Tokyo Stock Price Index (TOPIX) was out of co-integration, it rebounded to co-integration at a velocity of 0.027589 per period. In other words, 0.027589 was the speed of adjustment to co-integration in the short run.

4.4.2 Post ASEAN Market Integration

The test of co-integration of time series data by the co-integration process after ASEAN Market Integration was exhibited in the following charts of co-integration among 8 market indices and the SET.

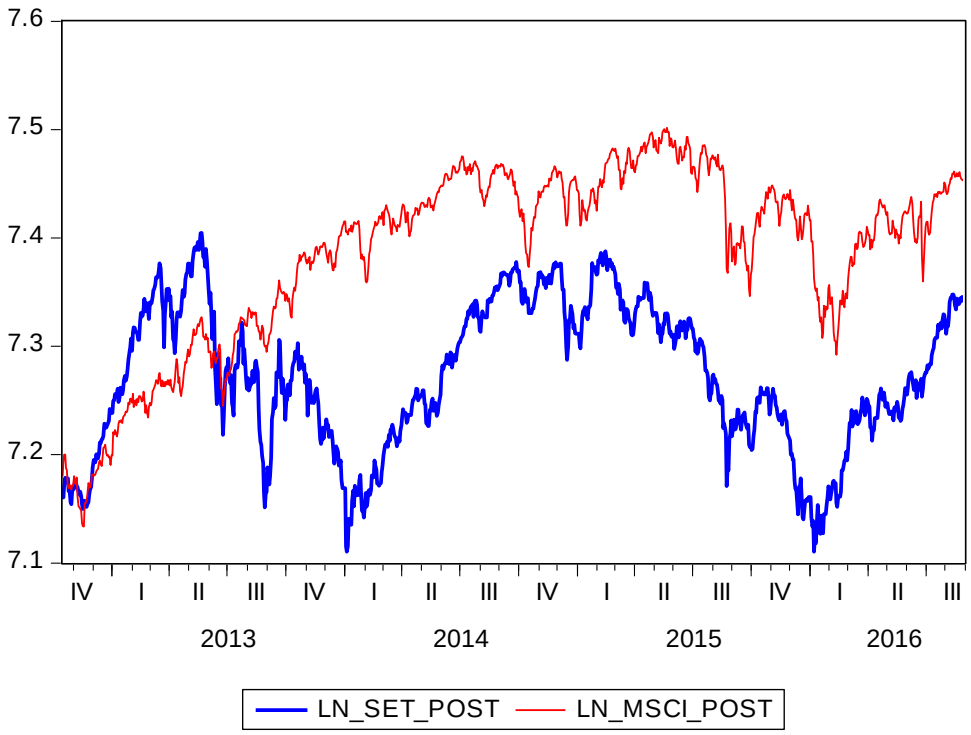

Figure 4.9 MSCI World Index of Post ASEAN Market Integration

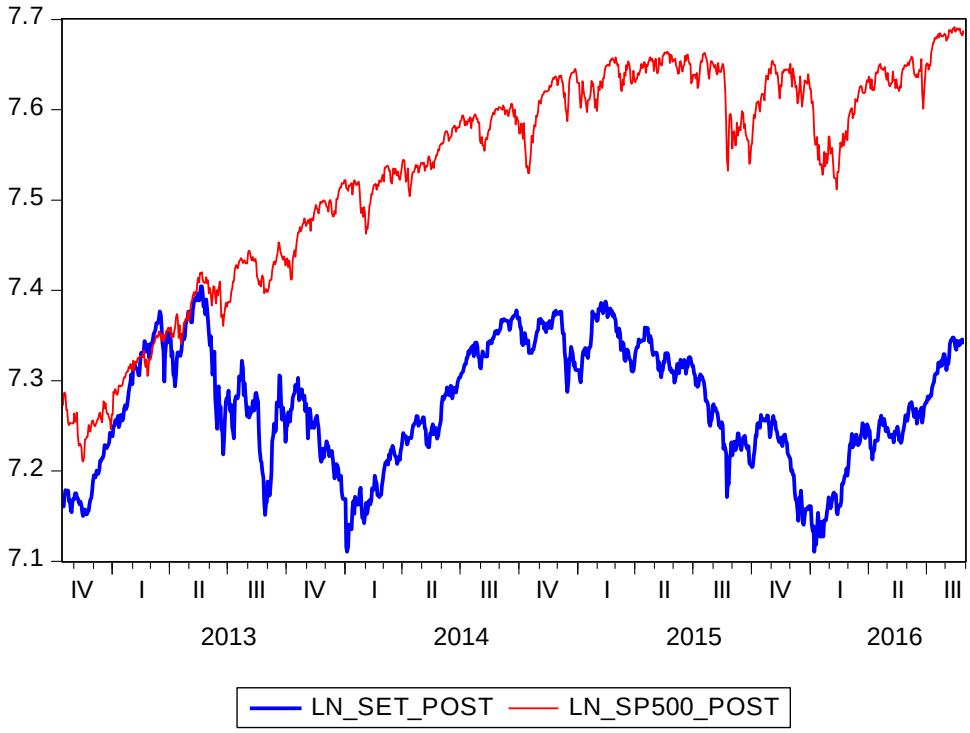

Figure 4.10 S&P 500 Index of Post ASEAN Market Integration

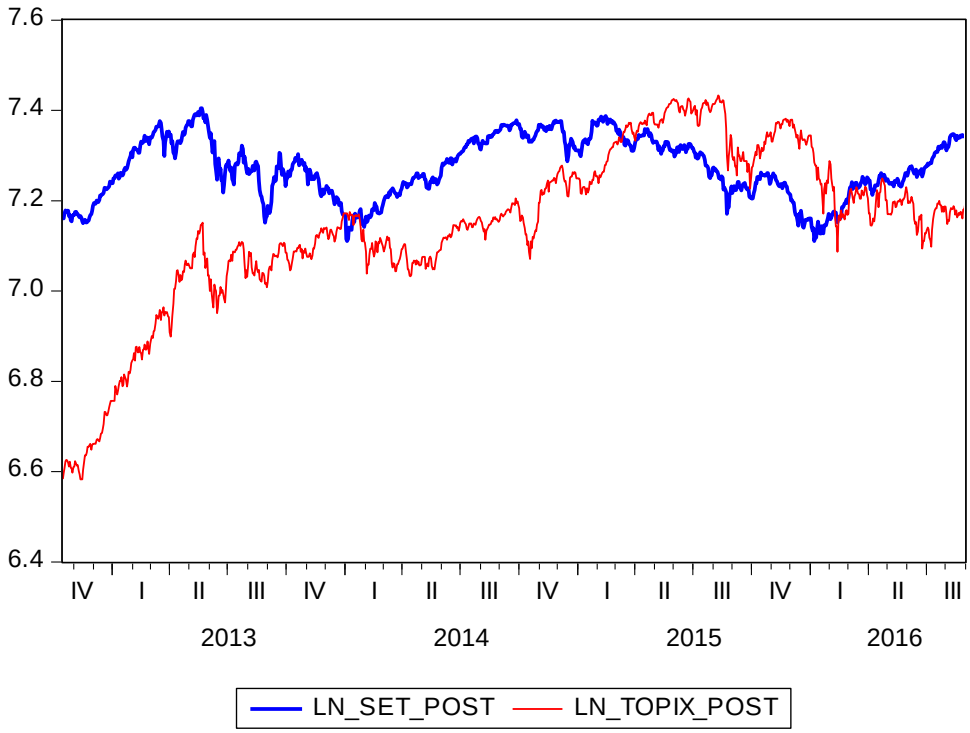

Figure 4.11 Tokyo Stock Price Index (TOPIX) of Post ASEAN Market Integration

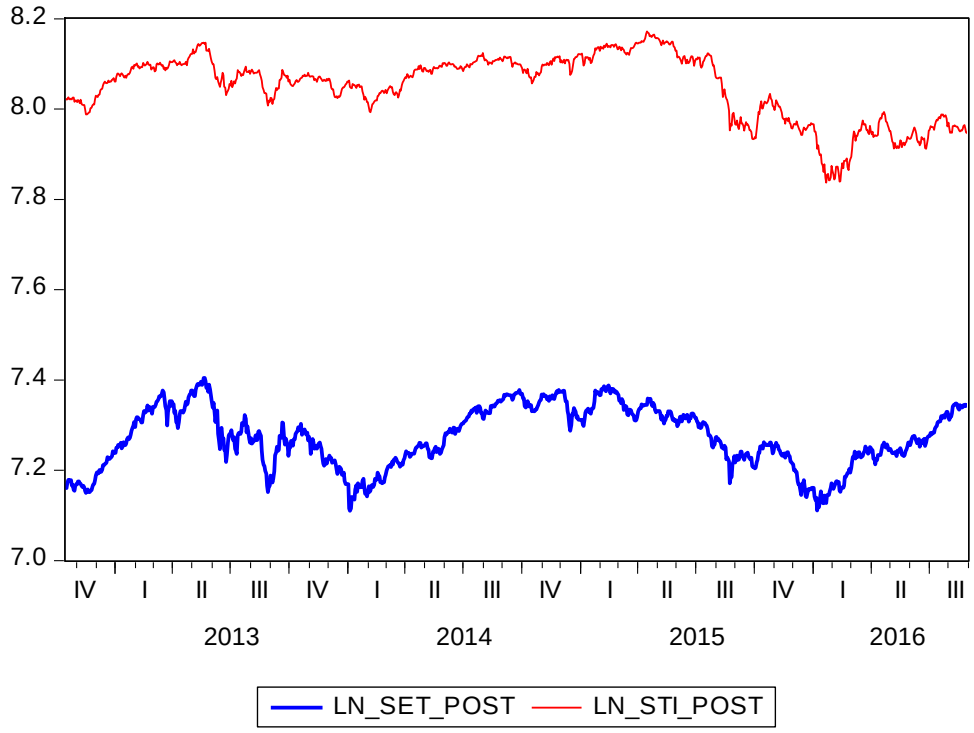

Figure 4.12 Strait Times Index (STi) of Post ASEAN Market Integration

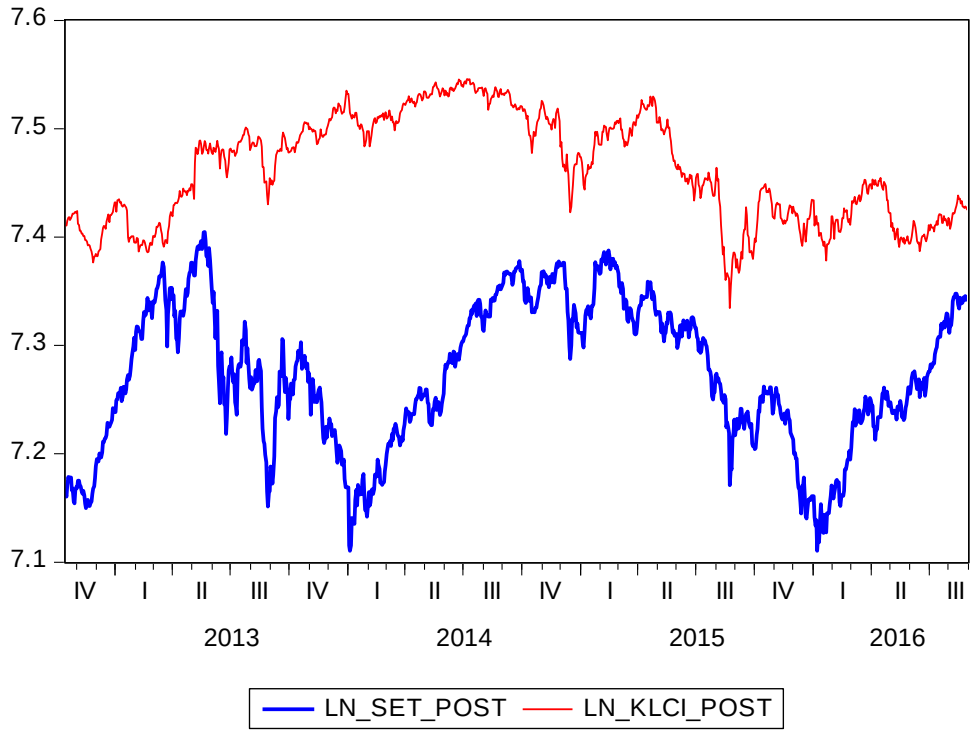

Figure 4.13 Kuala Lumpur Composite Index (FBM KLCi) of Post ASEAN Market Integration

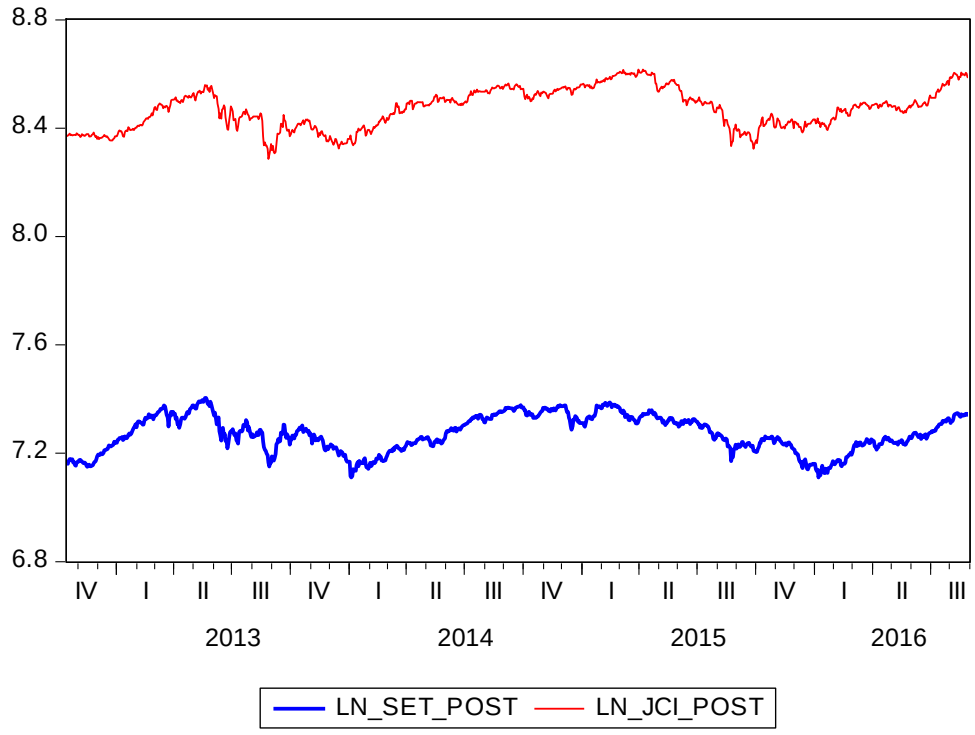

Figure 4.14 Jakarta Stock Exchange Composite Index (JCi) of Post ASEAN Market Integration

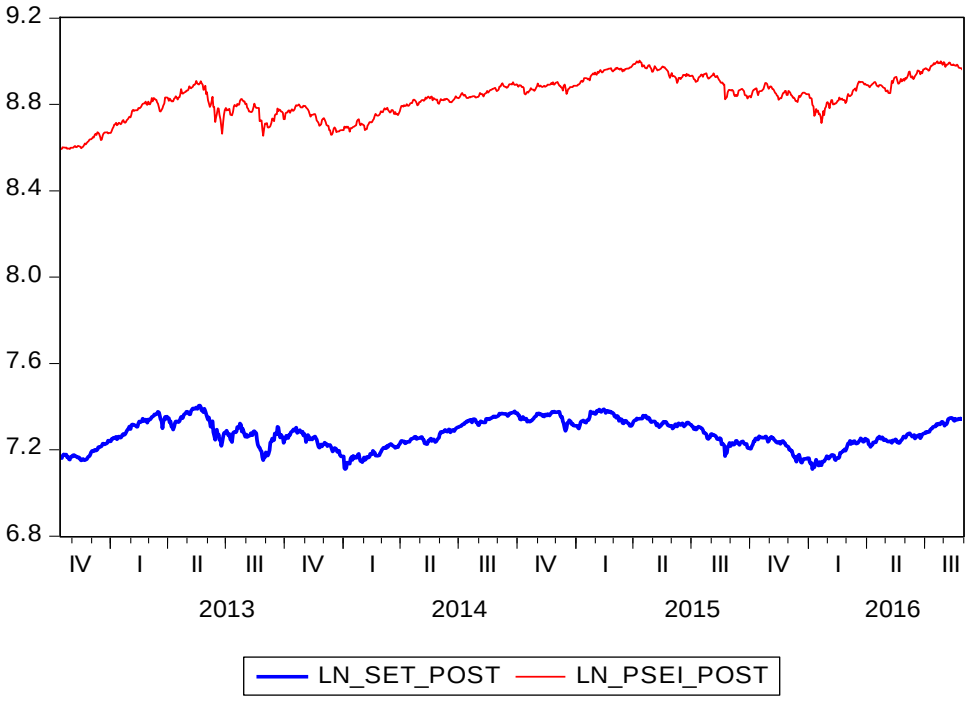

Figure 4.15 The Philippines Stock Exchange Index (PSEi) of Post ASEAN Market Integration

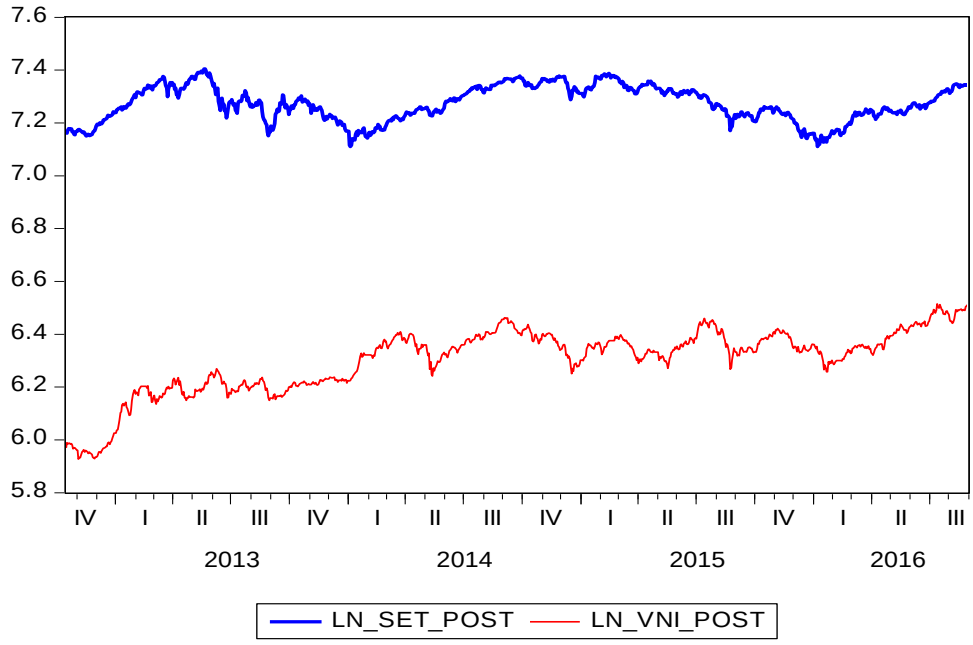

Figure 4.16 Vietnam Ho Chi Minh Stock Index (VNi) of Post ASEAN Market Integration

Appropriate lag length was selected. The appropriate number of lag in the model test showed lag equal to 1, which was good for the model, considering of the lowest value of AIC and SC in all lags.

Table 4.8 Result from Number of Lag Test for 9 Market Indices

Lag	AIC	SC
0	-29.5006	-29.421
1	-54.55126	-54.15324*
2	-54.86579*	-54.14936
3	-54.86502	-53.83018
4	-54.8382	-53.48495
5	-54.80797	-53.13631
6	-54.7718	-52.78173
7	-54.71596	-52.40747
8	-54.66361	-52.03671

Step 2 Co-integration by Johansen test was carried out starting with the defining of the null hypothesis. The 2 sets of correlation (r= 1) were found incontestable to the hypothesis due to the statistics of Trace and Max-Eigen significance being lower than 0.05. The result of co-integration indicated 2 sets of correlation. However, correlation of variables could not be determined as shown in Table 4.5.

Table 4.9 Result from Co-Integration between the SET Index and 8 Market Indices

	Trace	**Max-Eigen**	**Critical Value (5%)**		**Prob.**	
	Statistic	**Statistic**	**Trace**	**Max-Eigen**	**Trace**	**Max-Eigen**
r=0	487.8527*	343.5279*	159.5297	52.36261	0	0.0001
r=1	144.3249*	52.9641*	125.6154	46.23142	0.0022	0.0083
r=2	91.36075	31.1139	95.75366	40.07757	0.0966	0.3538
r=3	60.24685	26.03286	69.81889	33.87687	0.2279	0.3187

4.4.2.1 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis between the SET Index and Other Indices-Post ASEAN Market Integration

LN_SET_POST = 0.107563 - 0.003192LN_PSEI_POST(-1) - 0.032318LN_KLCI_POST(-1)* + 0.974222LN_SET_POST(-1) + 0.022036LN_JCI_POST(-1)* - 0.014417LN_SP500_POST(-1) - 0.00985LN_TOPIX_POST(-1)* + 0.00324LN_STI_POST(-1) - 0.001LN_VNI_POST(-1) + 0.453204LN_MSCI_POST - 0.409624LN_MSCI_POST(-1)*

(4.4.2.1 VAR)

Equation 4.4.2.1 signified that at time t-1 the Jakarta Stock Exchange Composite Index (JCi) could explain the SET Index movement at time t in the

positive direction, while the MSCI World Index, the Tokyo Stock Price Index (TOPIX), and the Kuala Lumpur Composite Index (FBM KLCi) at time t-1 could explain the SET Index movement at time t in the negative direction.

LN_PSEI_POST = 0.292713 + 0.907853LN_PSEI_POST(-1) - 0.070621LN_KLCI_POST(-1)* + 0.044327LN_SET_POST(-1)* + 0.0458LN_JCI_POST(-1)* + 0.016083LN_SP500_POST(-1) - 0.0000314LN_TOPIX_POST(-1) - 0.011411LN_STI_POST(-1) - 0.009018LN_VNI_POST(-1) + 0.311908LN_MSCI_POST* - 0.26234LN_MSCI_POST(-1)*

(4.4.2.2 VAR)

Equation 4.4.2.2 signified that at time t-1 the Kuala Lumpur Composite Index (FBM KLCi), the SET Index, and the Jakarta Stock Exchange Composite Index (JCi) could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the positive direction, while the MSCI World Index at time t-1 could explain the Philippines Stock Exchange Index (PSEi) movement at time t in the negative direction.

LN_KLCI_POST = 0.124508 - 0.018749LN_PSEI_POST(-1)* + 0.97205LN_KLCI_POST(-1) + 0.018002LN_SET_POST(-1)* + 0.010814LN_JCI_POST(-1) - 0.017115LN_SP500_POST(-1)* - 0.000762LN_TOPIX_POST(-1) - 0.018829LN_STI_POST(-1)* - 0.009686LN_VNI_POST(-1)* + 0.236313LN_MSCI_POST* - 0.185659LN_MSCI_POST(-1)*

(4.4.2.3 VAR)

Equation 4.4.2.3 signified that at time t-1 the SET Index and the Jakarta Stock Exchange Composite Index (JCi) could explain the Kuala Lumpur Composite Index (FBM KLCi) movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi), the Strait Times Index (STi), Vietnam Ho Chi Minh Stock Index (VNi), and the MSCI World Index at time t-1 could explain the Kuala Lumpur Composite Index (FBM KLCi) movement at time t in the negative direction.

LN_JCI_POST = 0.131817 - 0.02585LN_PSEI_POST(-1)* - 0.02649LN_KLCI_POST(-1)* + 0.031638LN_SET_POST(-1)* + 0.9843LN_JCI_POST(-1) + 0.024986LN_SP500_POST(-1) - 0.01148LN_TOPIX_POST(-1)* - 0.006614LN_STI_POST(-1) - 0.008324LN_VNI_POST(-1) + 0.338486LN_MSCI_POST* - 0.31184LN_MSCI_POST(-1)*

(4.4.2.4 VAR)

Equation 4.4.2.4 signified that at time t-1 the SET Index could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the positive direction, while the Philippines Stock Exchange Index (PSEi) , Kuala Lumpur Composite Index (FBM KLCi), the Tokyo Stock Price Index (TOPIX), and the MSCI World Index at time t-1 could explain the Jakarta Stock Exchange Composite Index (JCi) movement at time t in the negative direction.

LN_SP500_POST= 0.014844 + 0.004418LN_PSEI_POST(-1) - 0.000256LN_KLCI_POST(-1) - 0.00134LN_SET_POST(-1) + 0.004635LN_JCI_POST(-1) + 0.972894LN_SP500_POST(-1) + 0.0051LN_TOPIX_POST(-1)* - 0.009015LN_STI_POST(-1)* + 0.004954LN_VNI_POST(-1)* + 1.02155LN_MSCI_POST* - 1.004252LN_MSCI_POST(-1)*

(4.4.2.5 VAR)

Equation 4.4.2.5 signified that at time t-1 the Tokyo Stock Price Index (TOPIX) and the Vietnam Ho Chi Minh Stock Index (VNi) could explain the S&P 500 Index movement at time t in the positive direction, while the Strait Times Index (STi) and the MSCI World Index at time t-1 could explain the S&P 500 Index movement at time t in the negative direction.

LN_TOPIX_POST= 0.014844 + 0.004418LN_PSEI_POST(-1) - 0.000256LN_KLCI_POST(-1) - 0.00134LN_SET_POST(-1) + 0.004635LN_JCI_POST(-1) + 0.972894LN_SP500_POST(-1) + 0.0051LN_TOPIX_POST(-1)* - 0.009015LN_STI_POST(-1)* + 0.004954LN_VNI_POST(-1)* + 1.02155LN_MSCI_POST* - 1.004252LN_MSCI_POST(-1)*

(4.4.2.6 VAR)

Equation 4.4.2.6 signified that at time t-1 the SET Index and the S&P 500 Index could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the positive direction, while the Vietnam Ho Chi Minh Stock Index (VNi) and the MSCI World Index at time t-1 could explain the Tokyo Stock Price Index (TOPIX) movement at time t in the negative direction.

LN_STI_POST = 0.001264 - 0.006376LN_PSEI_POST(-1) - 0.005954LN_KLCI_POST(-1) + 0.024185LN_SET_POST(-1)* + 0.003452LN_JCI_POST(-1) - 0.010781LN_SP500_POST(-1)* - 0.007174LN_TOPIX_POST(-1) + 0.966779LN_STI_POST(-1) - 0.021167LN_VNI_POST(-1)* + 0.435936LN_MSCI_POST - 0.378062LN_MSCI_POST(-1)*

(4.4.2.7 VAR)

Equation 4.4.2.7 signified that at time t-1 the SET Index could explain the Strait Times Index (STi) movement at time t in the positive direction. While the Tokyo Stock Price Index (TOPIX), Vietnam Ho Chi Minh Stock Index (VNi), and the

MSCI World Index at time t-1 could explain the Strait Times Index (STi) movement at time t in the negative direction.

LN_VNI_POST = -0.011318 - 0.00101LN_PSEI_POST(-1) - 0.012553LN_KLCI_POST(-1) + 0.026244LN_SET_POST(-1)* + 0.003629LN_JCI_POST(-1) - 0.016527LN_SP500_POST(-1) - 0.007561LN_TOPIX_POST(-1) -0.037936LN_STI_POST(-1)* + 0.963624LN_VNI_POST(-1) + 0.148589LN_MSCI_POST* - 0.066546LN_MSCI_POST(-1)

(4.4.2.8 VAR)

Equation 4.4.2.8 signified that at time t-1 the SET Index could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the positive direction, while the Strait Times Index (STi) at time t-1 could explain the Vietnam Ho Chi Minh Stock Index (VNi) movement at time t in the negative direction.

In addition, the MSCI World Index at time t could explain the movements of all indices at time t in the positive direction. The research findings are shown in Appendix 2.

In Vector Error Correction Analysis of post ASEAN Market Integration, no co-integration of the SET Index was found. In Vector Error Correction Analysis, result of co-integration by Johansen test starting with the defining of the null hypothesis indicated the correlation of 2 sets. The details can be summed up as follows.

$\triangle$**LN_ PSEI_POST**$_t$ = - 0.210177 + 0.034083$\triangle$(LN_PSEI_POST$_{t-1}$) + 0.001837$\triangle$(LN_KLCI_POST$_{t-1}$) + 0.067571$\triangle$(LN_SET_POST$_{t-1}$) + 0.021528$\triangle$(LN_JCI_PRE$_{t-1}$) + 0.418025$\triangle$(LN_SP500_POST$_{t-1}$) - 0.09013$\triangle$(LN_TOPIX_POST$_{t-1}$) + 0.13102$\triangle$(LN_STI_POST$_{t-1}$) -

$0.04306\triangle(LN\_VNI\_POST_{t-1}) + 0.22405$
$(LN\_MSCI\_POST) - 0.19557(LN\_MSCI\_POST_{t-1})$

(4.4.2.9 VECM)

Equation 4.4.2.9 signified that once the Philippines Stock Exchange Index (PSEi) was out of co-integration, it rebounded to co-integration at a velocity of 0.08453 per period. In other words, 0.08453 was the speed of adjustment to co-integration in the short run.

$$\triangle LN\_KLCI\_POST_t = - 0.18089 - 0.01469\triangle(LN\_PSEI\_POST_{t-1}) + 0.06109\triangle(LN\_KLCI\_POST_{t-1}) + 0.00855\triangle(LN\_SET\_POST_{t-1}) + 0.02885\triangle(LN\_JCI\_PRE_{t-1}) + 0.19358\triangle(LN\_SP500\_POST_{t-1}) - 0.02252\triangle(LN\_TOPIX\_POST_{t-1}) - 0.0202\triangle(LN\_STI\_POST_{t-1}) - 0.02912\triangle(LN\_VNI\_POST_{t-1}) + 0.19292 (LN\_MSCI\_POST) - 0.16844(LN\_MSCI\_POST_{t-1})$$

(4.4.2.10 VECM)

Equation 4.4.2.10 signified that once the Kuala Lumpur Composite Index (KLCi) was out of co-integration, it rebounded to co-integration at a velocity of 0.01469 per period. In other words, 0.01469 was the speed of adjustment to co-integration in the short run.

CHAPTER 5

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

The quantitative research on "ASEAN Market Integration: Impact on Capital Flow and Cost of Capital" had 3 objectives: 1) To make an analysis and comparison of the effects of the SET Index on the capital flow and the cost of capital before and after ASEAN market integration; 2) To investigate the relationship between the SET Index and indices of the ASEAN Exchanges before and after ASEAN market integration; and 3) to examine the relationship between the SET Index and the MSCI World Index as well as the Tokyo Stock Exchange Index before and after ASEAN market integration.

The data were taken from non-confidential secondary sources of information. They included the market index data of stock exchanges in ASEAN and others leading exchanges from the World Federation of Exchanges. The samples were divided into two groups, i.e. 1) the majority of markets in the ASEAN Exchanges and 2) other leading markets selected by purposive sampling: the Tokyo Stock Exchange, the S&P 500, and the MSCI World Index. The data were divided into 2 periods of time. The first was the period of 5 years before the Stock Exchange of Thailand entering the ASEAN Exchanges (October 15, 2007-October 14, 2012), and the second was the period of 3 years and 10 months after the Stock Exchange of Thailand joining the ASEAN Exchanges (October 15, 2012-August 31, 2016) . Statistical analysis programs were utilized for data analysis. In the testing of the stationary state of data, Unit Root Analysis was employed. Co-integrated correlation of variables was calculated by using Vector Auto Regression Analysis and Vector Error Correction Analysis were used to forecast the impacts of the SET Index on other market indices. Regarding the capital flow and the cost of capital, the data were divided into 2 periods of time. They were the period between October 15, 2007 and October 14, 2012 and the period between October 15, 2012 and August 31, 2016, after joining the ASEAN exchanges by the Stock Exchange of Thailand. Vector Auto

Regression Analysis and Vector Error Correction Analysis were conducted to forecast the impacts of the SET Index on the capital flow and the cost of capital. The following is the summary of research findings.

5.1 Conclusion

5.1.1 Result of Unit Root Test

Table 5.1 Results of Unit Root Testing of Indices

Indices	Stationary Level	Model
MSCI	1	Pure random walk model
S&P 500	1	Pure random walk model
Tokyo Stock Price Index (TOPIX)	1	Pure random walk model
Stock Exchange of Thailand (SETi)	1	Pure random walk model
Philippines Stock Exchange Index (PSEi)	**1**	Pure random walk model
Strait Times Index (STi)	1	Pure random walk model
Kuala Lumpur Composite Index (FBM KLCi)	1	Pure random walk model
Jakarta Stock Exchange Composite Index (JCi)	1	Pure random walk model
Vietnam Ho Chi Minh Stock Index (VNi)	**level**	Pure random walk with drift and linear time trend

Table 5.2 Results of Unit Root Testing of the SET Index, the Capital Flow, and the SET Index and the Cost of Capital

Indices	Stationary Level	Model
Ln_SET	1	Pure random walk model
LnMSCI_ DRT_TH	1	Pure random walk model
LnFPI_Inflow	Level	Pure random walk with drift and linear time trend

The summary of the findings in 5.1.2 answered the first objective: make an analysis and comparison of the effects of the SET Index on the capital flow and the cost of capital before and after ASEAN market integration. And the summary in 5.1.3answered the second objective: investigation of the relationship between the SET Index and indices of the ASEAN Exchanges before and after ASEAN market integration. And the third objective: examination of the relationship between the SET Index and the MSCI World Index as well as the Tokyo Stock Exchange Index before and after ASEAN market integration. The details are as follows.

5.1.2 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis of the relationship between the SET Index and the Capital flow, and between the SET Index and the Cost of Capital

1) The analysis of the relationship between the SET Index and capital flow revealed that, in the long run, there was a significantly-negative correlation between the SET Index and the capital flow invested in the portfolio. In other words, a 1% increase in the Thailand Stock Exchange index led to a considerable decrease in the cost of funds invested in the portfolio by 1.211414%, on average, ceteris paribus. In addition, the vector error correction analysis showed that, in the short run, if the capital flow diverted from its long-run equilibrium, it would return to such equilibrium, at the speed of adjustment of 0.424276 per period.

However, the collaboration of ASEAN market integration had no impact on the cost of capital because the co-efficiency of the DUMMY variable was not statistically significant in explaining the capital flow.

2) The analysis of the relationship between the SET Index and the cost of capital revealed that, in the long run, there was a significant negative correlation between the SET Index and the cost of capital invested in the portfolio. In other words, a 1% increase in the Thailand Stock Exchange index led to considerable decrease in the cost of funds invested in the portfolio by 1.244967% on average, ceteris paribus. In addition, the vector error correction analysis showed that, in the short run, if the cost of capital diverted from its long run equilibrium, it would return to such equilibrium, at the speed of adjustment of 0.0148872 per period.

However, the collaboration of ASEAN market integration had no impact on the cost of capital because the co-efficiency of the DUMMY variable was not statistically significant in explaining the cost of capital.

5.1.3 Results of Vector Auto Regression Analysis and Vector Error Correction Analysis between the SET Index and Other Indices

5.1.3.1 Results of Vector Auto Regression Testing

Table 5.3 Results of VAR Test-Pre ASEAN Market Integration at Time t-1

Pre ASEAN Market Integration

Indices	**Sig**	**Impact to SET at t-1**	**Sig**	**Impact from SET at t-1**
LN_SP500_PRE(-1)	X	-	X	-
LN_TOPIX_PRE(-1)	X	-	✓	**Negative**
LN_JCI_PRE(-1)	X	-	X	-
LN_STI_PRE(-1)	✓	**Negative**	✓	**Negative**
LN_KLCI_PRE(-1)	**X**	-	X	-
LN_PSEI_PRE(-1)	✓	**Positive**	X	-
LN_VNI_PRE(-1)	X	-	X	-
LN_MSCI_PRE(-1)	✓	**Negative**		n.a.

Table 5.4 Result of VAR Test-Pre ASEAN Market Integration at Time t-2

Indices	**Sig**	**Impact to SET at t-2**	**Sig**	**Impact from SET at t-2**
LN_SP500_PRE(-2)	X	-	X	-
LN_TOPIX_PRE(-2)	X	-	X	-
LN_JCI_PRE(-2)	X	-	X	-
LN_STI_PRE(-2)	✓	**Positive**	✓	**Positive**
LN_KLCI_PRE(-2)	**X**	-	X	-
LN_PSEI_PRE(-2)	✓	**Negative**	X	-
LN_VNI_PRE(-2)	✓	**Negative**	X	-
LN_MSCI_PRE(-2)	✓	**Negative**		**n.a.**

In explaining the SET Index movement at time t-1 before ASEAN market integration, only the Philippines Stock Exchange Index (PSEi) could explain the SET Index movement in the positive direction , , while the Strait Times Index (STi), the Philippines Stock Exchange Index (PSEi), the Vietnam Ho Chi Minh Stock Index (VNi), and the MSCI World Index could explain it in the negative direction. Moreover, at time t-2 only the Strait Times Index (STi) could explain the SET Index movement in the positive direction, while the others could explain the movement in the negative direction (See Tables 5.3 and 5.4).

However, the SET Index could explain the movements of only the Strait Times Index (STi) and the Tokyo Stock Price Index (TOPIX).

Table 5.5 Results of VAR Test-Post ASEAN Market Integration at Time t-1

Post ASEAN Market Integration

Indices	**Sig**	**Impact to SET at t-1**	**Sig**	**Impact from SET at t-1**
LN_PSEI_POST(-1)	x	Negative	✓	Positive
LN_KLCI_POST(-1)	✓	Negative	✓	Positive

Table 5.5 (Continued)

Indices	**Sig**	**Impact to SET at t-1**	**Sig**	**Impact from SET at t-1**
LN_JCI_POST(-1)	✓	Positive	✓	Positive
LN_SP500_POST(-1)	x	Negative	✓	Positive
LN_TOPIX_POST(-1)	✓	Negative	x	Negative
LN_STI_POST(-1)	x	Positive	✓	Positive
LN_VNI_POST(-1)	x	Negative	✓	Positive
LN_MSCI_POST(-1)	✓	Negative		

In explaining the SET Index movement at time t-1 after ASEAN market integration, the Jakarta Stock Exchange Composite Index (JCi) could explain the SET Index movement in the positive direction, , while the MSCI World Index and the Tokyo Stock Price Index (TOPIX), and the Kuala Lumpur Composite Index (KLCi) could explain the movement in the negative direction.

However, the SET Index could explain the movements of the all regional indices and other leading indices with the exception of only the S&P 500 Index. The result differed from that of the pre ASEAN market integration period when it could explain the movements of two indices only.

5.1.3.2 Results of Vector Error Regression Testing

Table 5.6 Results of VECM Test-Pre ASEAN Market Integration

Pre ASEAN Market Integration

Indices	**Co-integration**	**Speed of Adjustment**
LN_SET_PRE	✓	**0.04392**
LN_SP500_PRE	✓	**0.0149**
LN_TOPIX_PRE	✓	**0.01709**
LN_JCI_PRE	✓	**0.02759**

Table 5.6 (Continued)

Indices	**Co-integration**	**Speed of Adjustment**
LN_STI_PRE	X	-
LN_KLCI_PRE	X	-
LN_PSEI_PRE	X	-
LN_VNI_PRE	X	-

Table 5.6 shows that prior to the ASEAN Market Integration, the SET Index, S&P 500, the Tokyo Stock Price Index (TOPIX), and the Jakarta Stock Exchange Composite Index (JCi) could divert from the long run equilibrium, but would be back to the long run equilibrium with the speed of adjustments of 0.04392, 0.0149, 0.01709, and 0.2759 per period, respectively.

Table 5.7 Results of VECM Test-Post ASEAN Market Integration

Indices	**Co-integration**	**Speed of Adjustment**
LN_SP500_PRE	X	-
LN_TOPIX_PRE	X	-
LN_JCI_PRE	X	-
LN_STI_PRE	X	-
LN_KLCI_PRE	✓	**0.01469**
LN_PSEI_PRE	✓	**0.08453**
LN_VNI_PRE	X	-

Table 5.7 shows that after the ASEAN Market Integration, only the Kuala Lumpur Composite Index (KLCi) and the Philippines Stock Exchange Index (PSEi) diverted from the long run equilibrium, but would be back to the long run equilibrium, with the speed of adjustments of 0.01469 and 0.08453 per period, respectively.

5.2 Discussion

The research findings indicated that the SET Index had an effect on the capital flow. In the short run, once the capital flow was out of co-integration, it rebounded to co-integration at a velocity of 0.424276 per period. This finding is consistent with a study by Brennan and Cao (1997), which found that the changing of stock prices resulted in the inflow and outflow of capital across borders. This is because foreign investors buy assets abroad when the returns on assets there are high and sell them when the returns on assets are low. The results are also in line with the studies by Tesar and Werner (1994) and by Froot, O' Connell, and Seasholes (2001). Furthermore, fair practice of financial supervision also yielded such results. A study of a integration of stock exchanges in regions in Europe, Asia, Canada and the U.S by Wellons (1997), which was cited in Lee's (2000) work also suggested that perfect integration should result in the same securities trading price for markets with the same characteristics of return and risk levels after adjustment of currency exchange rates. This was due to capital flow being freely executed by investors in buying securities in a country with lower prices and selling them in another country with higher prices until prices in the two countries were matched.

The research findings indicated that the SET Index had an effect on the cost of capital. In the short run, once capital flow was out of co-integration, it rebounded to co-integration at a velocity of 0.014887 per period. This finding is consistent with a study by Errunza (2001) who found market integration significantly reduced the cost of capital. Such a notion was also echoed by Bekaert and Harvey (2000); Henry (2000); Kim and Singal (2000); Edison and Warnock (2003); Errunza and Miller (2000); Lins, Strickland, and Zenner (2005).

In addition, the research findings suggested that the SET Index scores of pre and post ASEAN market integration had no effect on the capital flow and the cost of capital. This was probably due to the fact that emerging markets did not benefit from investors' extensive trading, and that investments in multinational companies did not increase despite being affected, so it bore no effect on domestic companies (Edison and Warnock, 2003). ASEAN market integration might affect the SET Index in a short term only. This finding is in accordance with studies by Errunza (2001) as well

as Claesens Dooley and Werner (2005). They stated that normally market integration and money market integration affected only the short-term volatility of returns on the securities, which was often caused by an inflow of capital. Moreover, Bekaert et al. (2002) found out that market integration and capital flow were positively correlated with statistical significance. And reduction of the dividend yield led to a permanent decrease on the cost of capital but only in a short term. This rendered the cost of capital in pre and post ASEAN Market Integration unchanged with statistical significance.

Regarding the relationship between the SET Index and other market indices, comparisons were made among of the MSCI World Index, the S&P 500 Index, the Tokyo Stock Price Index (TOPIX), the Strait Times Index (STi), and the Vietnam Ho Chi Minh Stock Index (VNi) before and after ASEAN market integration. It was found that after ASEAN market integration all the market indices already mentioned and those of other regional and global leading indices affected the SET Index. Co-integration between the SET Index and other indices was also found, while, the co-integration among indices tended to decrease. This finding is consistent with a research finding by Bekaert, Havey, and Lundblad (2006) that market integration did not affect the volatility of returns of securities in developing countries and such volatility did not affect their economic growth. Wong, Penm, Terrell, and Lim (2004) found that the SET Index had no correlation with the markets in the US, Japan, and the UK at some point. This probably was the result of the relationship between market indices in developing and developed countries being able to fluctuate at any time depending upon the economic relationship, related rules and regulations, foreign exchange and inter-trade. Phylaktis and Ravazzolo (2002) also found that economic cooperation affected correlation and co-movement of market indices.

The SET Index and indices of the ASEAN Exchanges were found to be correlated. The finding supported that of Chintrakarn and Komonrat (2010) who found that daily price indices of regional markets and world leading markets were correlated and usually moved in the same direction. Similarly, such correlation was found to be likely to rise. Particularly after the ASEAN Market Integration, the SET Index could explain all regional indices movements. The finding corresponded to Boyer, Kumagai and Yuan (2006), who found that foreign investors' role affected

regional market indices movements. That is, a large number of securities portfolios held by foreign investors were often highly volatile and were correlated in the same direction as the regional movement and could intensify the severity of the financial crisis in the region.

5.3 Limitations of the Study

Limitations in this research might stem from the fact that the ASEAN market integration was still in its early years of establishment, resulting in incomplete coverage of market integration. Some of the markets have not yet participated in the integration. If they had joined the integration, once full integration takes place, this could bring about positive or negative effects on the study results.

5.4 Recommendations

5.4.1 Recommendations for Policy Setting

The effects that change of the SET Index have over capital flow, which represents transactions on the Stock Exchange of Thailand, should be brought into consideration by the Stock Exchange and the Bank of Thailand when they set a policy. The details are as follows.

1) Policies on inspection and control of the net capital flow transactions in the stock exchange can bring about the stabilization of the baht currency exchange rates. The Stock Exchange of Thailand and the Bank of Thailand should work together on tracking and watching the inflow and the outflow of foreign investments, especially when the SET Index is highly volatile or the suspicious transactions seem able to cause damage to the local and regional stock markets so that the Bank of Thailand can maintain stability of the exchange rates in time. However, intervention for defending the exchange rates by the Bank of Thailand must be made immediately when situations are deemed utmost necessary because such engagement could impinge on investors' stock market investment.

2) As the research results indicated that regional stock indices were correlated in the same direction, a policy should be formulated so that competitive

private enterprises seeking market expansion within the ASEAN countries can raise funds in those foreign markets so as to minimize their risk of foreign exchange as well as to improve the image of Thai listed companies in promoting strength of the ASEAN Exchanges.

3) There should be a policy on elevation of cooperation in the regional stock exchanges. After ASEAN market integration, all regional as well as global major markets were co-integrated; as a result, agencies involved in administration and development of the stock markets in member states should cooperate and focus on the elevation of integration in order to reach the stability and increase the investment incentive for regional and international investors. Procedural and operational instructions can be framed to boost the ASEAN market integration.

5.4.2 Recommendations for Promoting the ASEAN Market Integration

The research findings indicated that after ASEAN market integration, the integration and volatility of all regional markets were consistently related to global leading markets, such as the MSCI World Index, the S&P 500 Index, and the Tokyo Stock Exchange Index. Particularly, the SET Index was be able be explain and forecast changes in other markets. The Stock Exchange of Thailand and relevant agencies should use the results of this study to formulate a development policy and to set the direction for the Stock Exchange of Thailand so that complete ASEAN market integration can be achieved. The details are as follows:

1) Investment promotion in markets within the ASEAN market integration should be carried out by agencies responsible for administrating and developing the Stock Exchange of Thailand. The stock markets in the member states should launch a public relations campaign of the ASEAN market integration to attract both local and global investors or to draw money from investors in order to raise the market values of member countries.

2) Credit rating and leveraging of prominent securities in each country should be rated. The ASEAN Exchanges presently ranks 30 leading stock securities in each member state based on the value of market capitalization and liquidity. Such ranking may nevertheless not be sufficient to boost foreign investors' confidence. Credit rating thus should be used to weigh against each other. Securities information,

i.e. dividend yield, earning per share, of each country and exchange rate risks, should also be published for each group of industries so that investors can gain the facts necessary for their investment decisions.

3) Improvement and expansion of the trade link system among markets, along with development of securities settlement and delivery system, should be implemented. Though many asset management companies in Thailand today are able to represent their clients on trading in the member countries, they are not well recognized the retail investors. This is probably due to the pattern of availability of information and inter-trading system among the markets. Therefore, concerned authorities in each member state should give priority to the trade link systems which are accessible from all countries, e. g. Streaming Pro from the Stock Exchange of Thailand. It enables securities trading on the markets of member countries, etc. Securities settlement and delivery are currently operated according to the regulation of each exchange in the countries that issue orders. The Stock Exchange of Singapore, the Stock Exchange of Malaysia, and the Stock Exchange of Thailand are on t+3, which may pose a risk of exchange rate fluctuation, clear terms on exchange rates and settlement systems should thus be established.

Retail investors and Thai institutional investors can apply the study results. Results on co-integration in particular can be used to manage their portfolio in order to address practical returns and investment risk diversification.

5.4.3 Recommendations for Future Research

Results from this research can be used as a guide for future research, for example:

1) Future research should further examine additional leading stock exchanges, e.g. the Shanghai Stock Exchange, the London Stock Exchange and other exchanges in countries that utilize cross listing. Volatility and related effects should be investigated for the purpose of improving the ASEAN market integration.

2) Future research should further explore other important variables such as exchange rates, growth rate of gross domestic product, potential performance of the listed companies in the country, and key variables like the stability or risk level of the country and political stability variable so that the additional body of knowledge can be obtained.

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