THE FOREIGN PORTFOLIO INVESTMENT FLOWS, STOCK PRICES AND EXCHANGE RATE BEFORE AND AFTER THE GLOBAL FINANCIAL CRISIS: A COMPARATIVE STUDY BETWEEN KOREA AND THAILAND

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A Dissertation Submitted in Partial
Fulfillment of the Requirements for the Degree of
Doctor of Philosophy (Economics)
School of Development Economics
National Institute of Development Administration
2015

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ABSTRACT

Title of Dissertation	The Foreign Portfolio Investment Flows, Stock Prices and Exchange Rate before and after the Global Financial Crisis: A Comparative Study between Korea and Thailand
Author	Mr. Nathapong Rujiravanich
Degree	Doctor of Philosophy (Economics)
Year	2015

The purpose of the present study is to investigate the behavior of foreign flows and their impacts on the stock market, especially on stock prices and exchange rate. This research investigates the results of two Asian countries, Thailand and Korea, separating the analysis into three periods: pre-global financial crisis, global financial crisis and post-global financial crisis. The daily data are used with a structural VAR model with three endogenous variables: stock returns, currency returns and foreign normalized net purchases with exogenous global returns. The results reveal positive feedback for trading behavior with respect to local stock returns in both Thailand and Korea before the crisis, but insignificant behavior during the crisis and post-crisis periods. Local currency depreciation lowers stock prices in terms of foreign currency and promotes net purchases of foreign investors. An increase in global returns promotes net purchases of foreign investors into the local stock markets during all periods. Therefore, based on these results, it can be concluded that the positive feedback trading behavior with respect to local stock returns and currency returns does not exist during the crisis period. Foreign investors will consider only global returns in all periods.

The results reveal the positive correlation between foreign net purchases and stock returns. In addition, the predictable and unpredictable component of foreign net flows appears to be a significant driver of local stock returns. The increase in foreign net purchase revalues local currency because the foreign demand for local stock should

lead to an appreciation in local currency. Moreover, the results show that foreign net purchases lead to a change in stock prices volatility and exchange rate volatility. In addition, the behavior of both local institutes and investors is to trade against foreign investors, a negative feedback trading behavior with respect to local stock returns. The results of the comparison between the Thai stock market and Korean stock market demonstrate stronger impacts of foreign flows and market capitalization on the Thai market, which is a relatively smaller economy than on the Korean market.

In addition, the variance decomposition results show that currency returns have the most impact on foreign net purchases when compared with stock returns and global returns. Thus, currency returns were the most important factor for foreign investment decision making during the sample periods in both Thailand and Korea. Therefore, the policies to control the fluctuation in exchange rate will also help reduce the fluctuation in stock market. Policy implication of exchange rate stabilization may be an appropriate choice to prevent the fluctuation in the exchange rate and stock market.

The results of this research demonstrate the behavior of foreign flows such as market returns, currency returns and global returns. These factors can be employed as leading indicators for foreign investors' decision of inflows and outflows, which can be very useful for tendency prediction of foreign flows in the future. Moreover, these results of the impacts of foreign flows on stock markets can provide useful information for analysis and recommendations for trading decisions in order to gain the greatest benefits from foreign buying as well as avoid the negative impacts of foreign selling as well.

ACKNOWLEDGEMENTS

This dissertation would not have been completed without the generosity of many persons. I am very grateful to my chair advisor, Associate Professor Dr. Komain Jiranyakul, who has provided very valuable support, advice guidelines for this dissertation, and Assistant Professor Dr. Wisit Chaisrisawatsuk and Assistant Professor Dr. Yuthana Sethapramote, my co-advisors who also offered useful guidance. I would like to thank to Committee Chairperson, Professor Dr. Paitoon Wiboonchutikula who gave insightful comments and suggestions. I also wish to thank all lecturers, my colleagues and staff of the Faculty of Development Economics, National Institute of Development Administration, who participated in this study and assisted in this research. Finally, my warmest thanks go to my parents who have supported me through all of my life.

Nathapong Rujiravanich

August 2015

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ABBREVIATIONS AND SYMBOLS

Abbreviations	**Equivalence**
SET	Stock Exchange of Thailand
VAR Model	Vector Autoregressive Model
SVAR Model	Structural Vector Autoregressive Model
QE	Quantitative Easing
GDP	Gross Domestic Product
ADF	Augmented Dickey-Fuller

Symbols	**Equivalence**
$Var(Y_t)$	Variance of the series
t	Time trend
Y_t	Vector of observable
μ	Vector of intercept term
$\emptyset_i$	Vector of coefficient
ε_t	Vector of error term
R	Unknown fixed non-singular matrix
A(L)	n×n matrix polynomial in the lag operator L
y(t)	n×1 observation vector
ε(t)	n×1 vector of structural disturbances
set_t	SET index in period t
set_{t-1}	SET index in previous period
fx_t	Exchange rate in period t
fx_{t-1}	Exchange rate in previous period
$msci_t$	MSCI world index in period t

$msci_{t-1}$	MSCI world index in previous period
$Volatility_t$	Volatility for each variable x
lnx_t	Log of variable x
m	Moving-average order

CHAPTER 1

INTRODUCTION

1.1 Statement of the Problem

After the Asian financial crisis, the yearly total trading values in the Thai stock market continuously increased from 929,597 million Baht in 1997 to 10,193,179 million Baht in 2014. The yearly total trading values of foreign investors in the Thai stock market also rose from 402,083 million Baht in 1997 to 2,233,682 million Baht in 2014, as shown in Figure 1.1. This amount of foreign trading values is on average twenty-six percent of the total trading values in the Thai stock market. Figure 1.2 also indicates a significant participation by foreign investors in the Thai stock market in terms of the percentage of total trading values compared to other investor groups: local institutes, proprietary trading and local investors. Therefore, the market participation of foreign investors can possibly have a significant effect on the market structure, market variables and fluctuation in the Thai stock market. These facts lead to questions on foreign portfolio investment flows and their impacts on the Thai stock market.

Empirical answers to these questions, i.e. tests of theories of foreign investor behavior, are discussed in a number of studies such as Dahlquist and Robertsson (2004), Dvořák (2005), Griffin, Nardari and Stulz (2004) and Richards (2005). Griffin et al. (2004) and Richards (2005) employing daily data report a significant positive correlation between current foreign flows and lagged local equity market returns, which suggests that international investors pursue positive feedback trading strategies. Bohn and Tesar (1996) and Bekaert, Harvey and Lumsdaine (2002) found a positive relationship between equity flows and market returns, with equity flows tending to move into markets with a rise in returns. This positive relationship is often hypothesized as “return chasing”. The explanation for return chasing is the search for profit under extrapolative expectations. Investors form a view about future performance based on recent past performance, thus, allocating more funds to where returns have risen and

cutting back otherwise. The studies on the impacts of foreign portfolio investment, including the impacts on stock prices and exchange rate, are presented in many papers. For example, Griffith-Jones (1998) revealed that a large amount of short-term fund flow that moved into developing countries could lead to negative effects. Furthermore, these short-term investments can distort the long-term balance of major macroeconomic variables such as exchange rate, asset price and stock price. Bhagawati (1998) showed that the movement of these severely oscillatory portfolio investments could be a factor of an unstable economy as well as increase inflation rates and strengthen real exchange rates. This will have an impact on a country's export business and their current account balance.

During the Asian financial crisis in 1997, the SET index continuously fell from 788 points in January 1997 point to 214 points in August1998, as shown in Figure 1.5. Foreign investors have been blamed for their role in causing this crisis. Chayawadee (2003) provided insight on the behavior of foreign investors in the Thai stock market during this crisis period by using a tri-variate structural VAR model of daily stock returns, currency returns and scaled net purchases by foreign investors. The study's results demonstrate the difference in trading behaviors of foreigners relative to other groups of investors. During the crisis, local investors were discouraged and their market participation fell, while foreigners remained present as net buyers. This means that foreign net purchases helped prevent a deeper decline of the market during the Asian financial crisis.

Following the Asian financial crisis and during the United States' subprime crisis in 2008, the Thai Stock Market faced such a severe outflow of funds that the SET index dropped to 400 points in November 2008. After the problem was solved and the economy was stimulated, funds flowed back East, especially into emerging ASEAN markets, including Thailand. Those countries that encountered the Asian financial crisis in 1997 and survived used their experience to improve their economic foundations. Banking sectors instituted good disciplines, while business sectors became stronger with higher net profits and continual dividends. These factors encouraged foreign portfolio investment flow to return to the Thai Stock Market, which was reflected by the rebound of the SET index that climbed from 400 points to 1200 points within four years. Furthermore, the U.S. Federal Reserve employed new measures, known as QE1

(Quantitative Easing), in November 2008, buying $600 billion in Mortgage-backed securities (MBS), and QE2 in November 2010, buying $600 billion of Treasury securities, to inject money into the economy. In addition, they announced the QE3 in September 2012, by launching a new $40 billion a month, open-ended, bond purchasing program of agency mortgage-backed securities that continued until at least mid-2015. Moreover, the US FED's policy on interest rate reduction together with the situation of dollar depreciation prompted an enormous funds flow into the stock market.

In the case of South Korea, the Asian financial crisis in 1997 played an important role in the country's economic growth. When it hit, a number of reforms were introduced to encourage liberalization of the economy, increased corporate governance and a more secure social safety net. With these reforms in place, Korea was able to quickly recover from the crisis and now had the foundation for building a strong corporate and financial sector. Its economy accounted for 1.6% of the global GDP (gross domestic product) at the end of 2012. Figures 1.3 and 1.4 show the Korean GDP, which is about three times the size of the Thai GDP as is market capitalization of the Korean stock exchange when compared to the Thai stock exchange. Therefore, with a more developed economy and stock market than Thailand, the impacts of foreign flows on the Korean stock market should be less than the Thai stock market.

Foreign flows may also cause a fluctuation in both stock prices and exchange rate. Therefore, this research attempts to study the behavior of foreign flows and their impacts on the Thai stock market from January 5, 2004 to December 30, 2014 in order to cover the effects of the global financial crisis in 2008 and the liquidities from the quantitative easing measures after the crisis. In addition, this paper uses the volatility index shown in Figure 1.6 for this analysis of three periods: pre-global financial crisis from Jan 5, 2004 to Dec 28, 2007; global financial crisis from Jan 2, 2008 to Nov 24, 2008 and post-global financial crisis from Nov 25, 2008 to Dec 30, 2014. Moreover, to understand the behavior of foreign flows and their impacts on Asian emerging stock markets, results of another Asian country, South Korea, are provided. Thus, the comparison of the empirical results between two stock markets, Thailand's and Korea', will be included in this paper.

1.2 Objective of the Study

The purpose of this research is to study the foreign investment behavior and impacts of foreign portfolio investment using daily data from January 5, 2004 to December 30, 2014 to examine the effects of the global financial crisis in 2008 and the quantitative easing measures after the crisis. This paper uses the data from two Asian countries, Thailand and Korea, to compare the results between these two markets while separating the analysis into three periods: pre-global financial crisis period from Jan 5, 2004 to Dec 28, 2007; global financial crisis period from Jan 2, 2008 to Nov 24, 2008 and post-global financial crisis period from Nov 25, 2008 to Dec 30, 2014. This study employs a structural VAR model with three endogenous variables such as stock returns, currency returns and foreign normalized net purchases by dividing net purchases transactions by the contemporaneous market capitalization. This paper goes one-step further than Chayawadee (2003) by restricting local returns and foreign flows from affecting global returns as the results of Griffin et al. (2004) and Richards (2005) strongly suggest the inclusion of returns on broad markets as determinants of net foreign flows. Failure to impose this restriction may lead to inaccurate results driven by spurious links. So, this paper augments the tri-variate structural VAR model with the exogenous global returns.

In addition, further aims of this study are:

1) To investigate foreign investment behavior, including response of foreign flows to stock returns, currency returns and global returns as well as persistence in foreign flows.

2) To investigate the impacts of foreign portfolio investment, including impacts on stock returns, currency returns, stock prices volatility, exchange rate volatility and local investors.

3) To compare the results in three periods: pre-crisis, crisis and post-crisis as well as the results across the Thai and Korean markets.

4) To provide the utility of foreign net purchases data in order to deal with both positive and negative impacts of foreign flows on the Thai stock market.

1.3 Organization of the Study

The study is divided into 6 chapters. The first chapter describes the statement of the problem, the objective of the study and the organization of the study.

Chapter 2 provides the literature related to the relationship between foreign investors' trading and stock returns to better understand foreign investor behavior and their impacts on the host market, the relationship between stock prices and exchange rate and the summary of the financial crisis during 1997 to 2014.

Chapter 3 explains the research methodology employed for this study: unit root test; structural VAR model including granger causality tests, impulse response analysis and variance decomposition to investigate foreign investment behavior and impacts of foreign portfolio investment.

Chapter 4 gives the details of a preliminary look at the calculated data such as foreign net purchases, stock returns, currency returns and global returns in provide a sense of their general properties, unit root test and structural VAR estimation.

Chapter 5 describes the empirical results of this study: foreign investment behavior, including response of foreign flows to stock returns, currency returns and global returns as well as persistence in foreign flows; the impacts of foreign portfolio investment, including impacts on stock returns, currency returns, stock prices volatility, exchange rate volatility and local investors.

Chapter 6 presents the conclusion, which includes a discussion on the empirical results, the policy implication and recommendations and guidelines for future study.

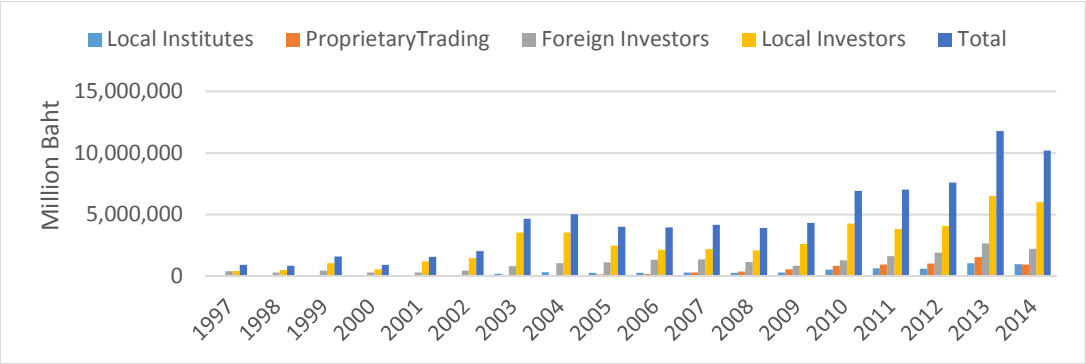

Figure 1.1 Yearly Trading Values of All Investor Groups in Thai Stock Market

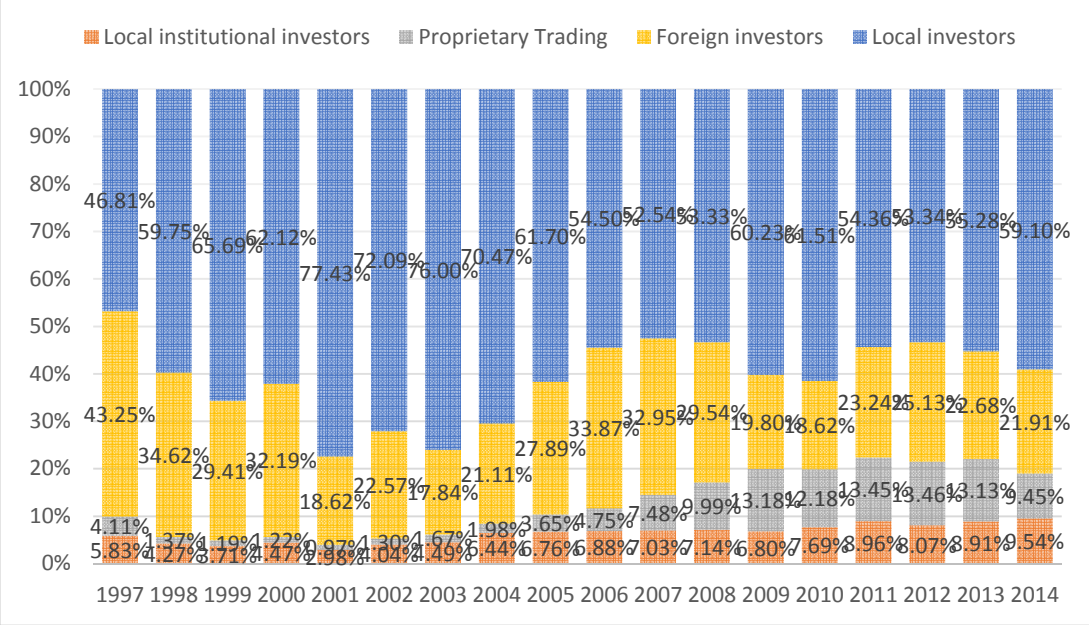

Figure 1.2 Yearly Percentage Turnover of All Investor Groups in Thai Stock Market

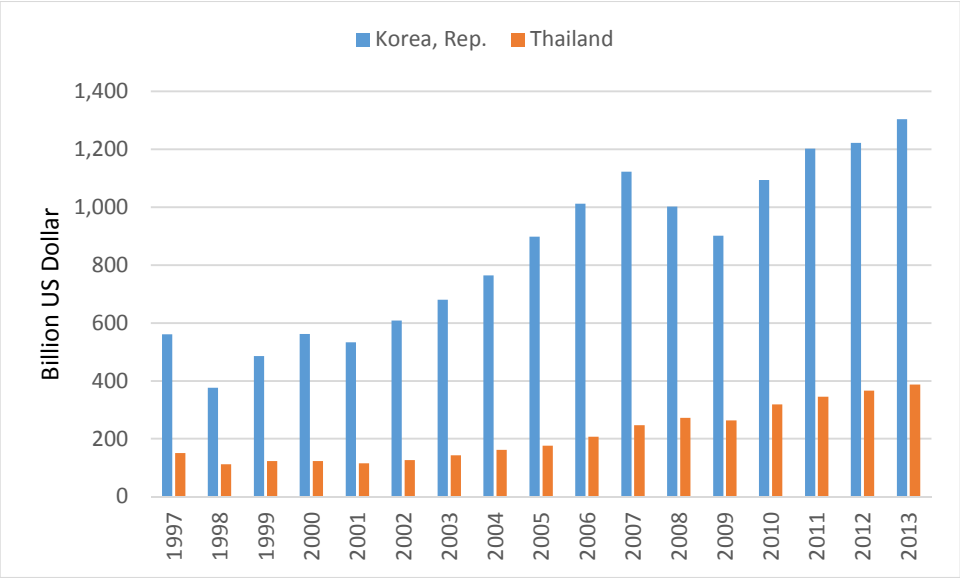

Figure 1.3 Yearly Gross Domestic Product of Thailand and Korea during 1997 to 2013

Sources: worldbank.org

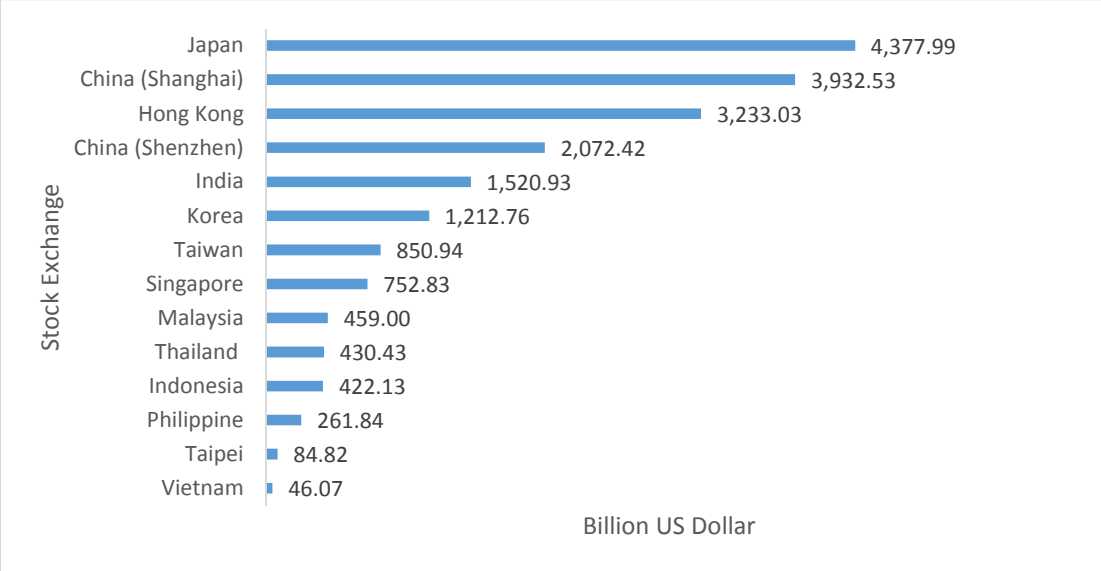

Figure 1.4 Market Capitalization of Stock Exchanges in Asia-Pacific Region in 2014

Sources: world-exchanges.org

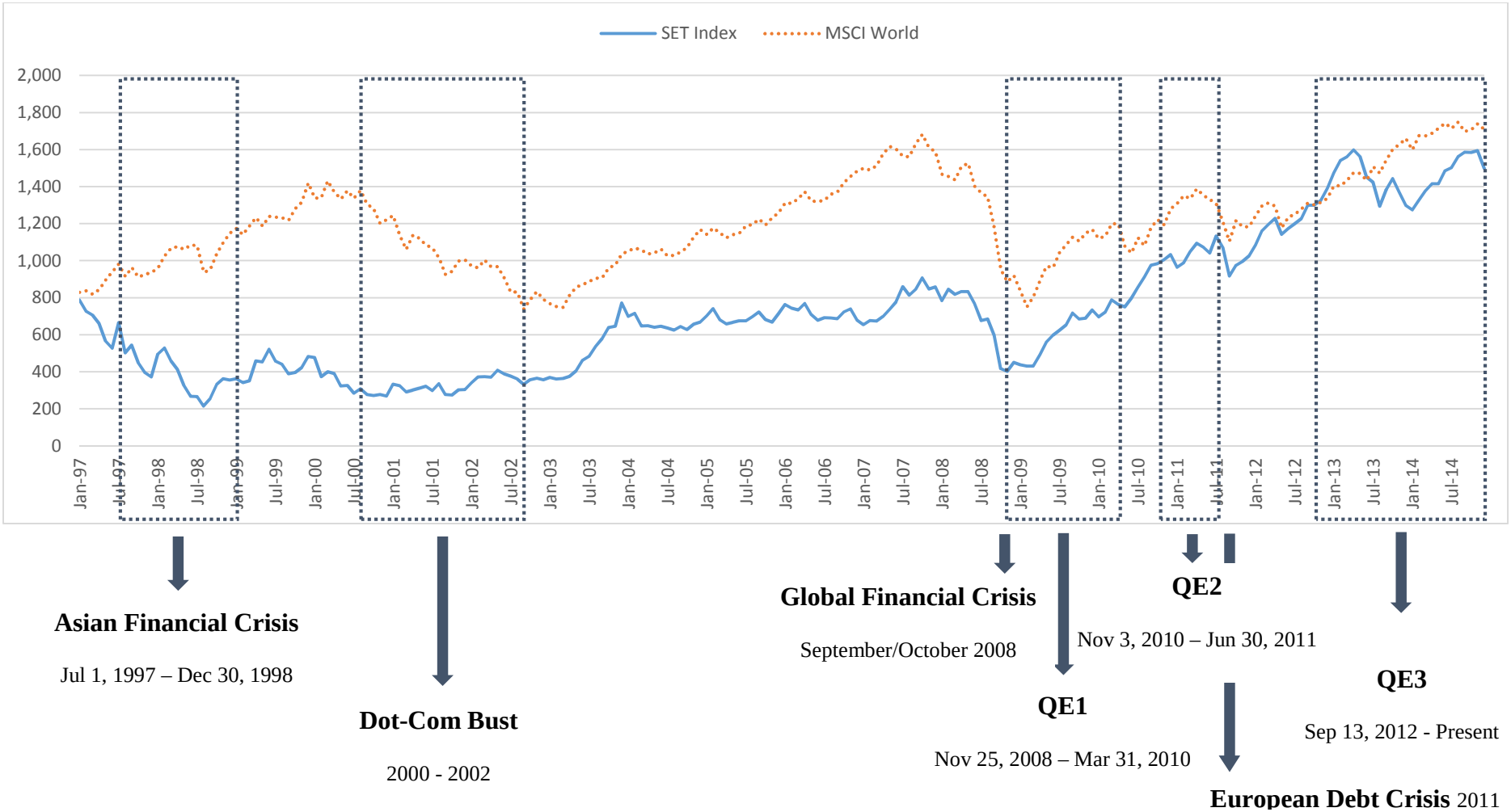

Figure 1.5 SET Index and MSCI World from January 1997 to December 2014

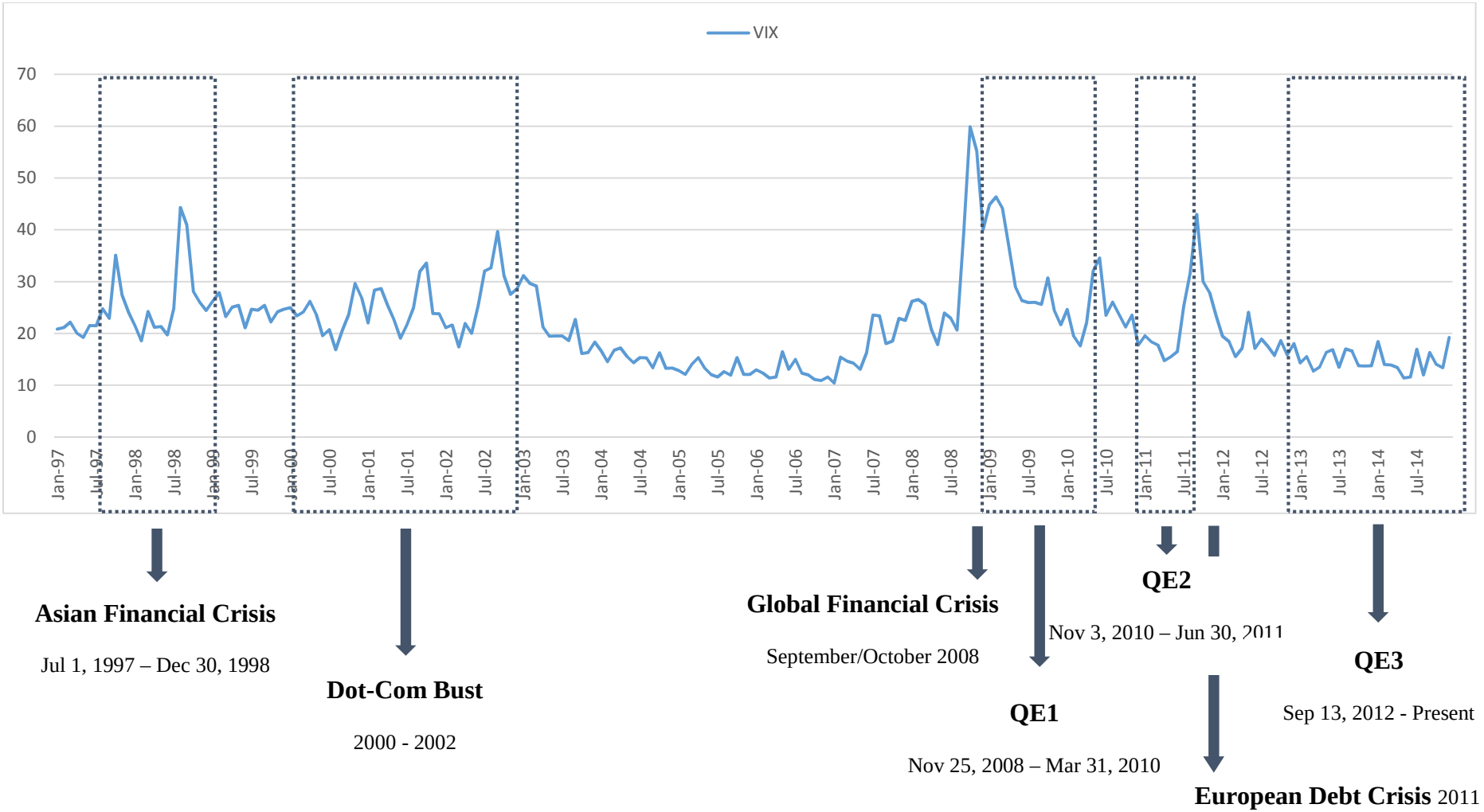

Figure 1.6 Volatility Index from January 1997 to December 2014

CHAPTER 2

LITERATURE REVIEW

This chapter, provides a review of literature related to the relationship between foreign investors' trading and stock returns to help to understand foreign investor behavior and their impacts on a host market. The relationship between stock prices and exchange rate and the summary of the financial crisis during 1997 to 2014 are also provided.

2.1 Studies on Foreign Investment Behavior

Foreign flows data have been used in a number of past studies such as Dahlquist and Robertsson (2004), Dvořák (2005), Griffin et al. (2004) and Richards (2005). They can be separated into three main areas of study: foreign investment behavior, impacts of foreign flows and foreign investors' forecast ability.

The first studies on foreign investment behavior try to answer the question, “Do foreign investors pursue positive feedback trading strategies?” To answer this question, studies examined whether equity flows of foreign investors are determined by past returns. Brennan and Cao (1997) employing quarterly data; Stulz (1999), Bekaert et al. (2002), Dahlquist and Robertsson (2004), Ülkü and İkizlerli (2012) and Porras and Ülkü (2015) employing monthly data; Karolyi (2002) and Kamesaka, Nofsinger and Kawakita (2003) using weekly data and Choe, Kho and Stulz (1999), Froot, O'Connel and Seasholes (2001), Chayawadee (2003), Griffin et al. (2004), Richards (2005) and Kim, Landi and Yoo (2009) employing daily data all reported a significant positive correlation between current foreign flows and lagged local equity market returns, which suggests that international investors pursue positive feedback trading strategies. The empirical evidence has been confined to countries where foreign flows data are available: US markets, Hartman and Pierdzioch (2006) and Boyer and Zeng (2009); emerging markets such as Mexico, Clark and Berko (1997); South Africa, Griffin et al.

(2004); Brazil, Reis, Meurer and Da Silva (2010); Turkey, Ülkü and Ikizlerli (2012); Scandinavian markets, Grinnblatt and Keloharju (2000) and Dahlquist and Robertsson (2004); European stock markets such as Spain, Porras and Ülkü (2015) and Finland, Grinnblatt and Keloharju (2000); Asian emerging markets, Choe et al. (1999), Griffin et al. (2004), Choe, Kho and Stulz (2005), Richards (2005), Dvorák (2005) and Samarakoon (2009); Japan, Karolyi (2002); Korea, Kim and Wei (2002) and Jeon and Moffet's (2010) and Thailand, Chayawadee (2003). The finding of positive feedback trading by foreigners seems to be a uniform result irrespective of the frequency of data used.

The above results raise the question of why international investors are positive feedback traders. The model of Brennan and Cao (1997) predicts foreign investors use recent returns as information signals, because they have an informational disadvantage in emerging markets. Griffin et al. (2004) assert that the expectations of foreign investors regarding local market returns are more extrapolative than local investors, because they are less informed. A behavioral interpretation would be that foreign traders' sentiment is affected by past returns. An alternative explanation examined by Bohn and Tesar (1996) and Bekaert et al. (2002) is that international investors are “return chasers”. The explanation for return-chasing is the search for profit under extrapolative expectations. Investors form a view about future performance based on recent past performance, thus, allocating more funds to where returns have risen and cutting back otherwise. Richards (2005) argues that the positive feedback trading observed in his sample is likely to be due to behavioral factors or foreigners extracting information from recent returns. It is important to note that models incorporating the informational disadvantages, like those used by Brennan and Cao (1997) and Griffin et al. (2004), account for home bias. These models predict both a positive contemporaneous correlation between net foreign flows and local returns and positive feedback trading by the average foreigner. On the other hand, the model of Albuquerque, Bauer and Schneider (2007) highlights within-country heterogeneity which can cause the foreign investor to be less-informed on average; however, within-country heterogeneity is more important than cross country heterogeneity. Thus, the model of Albuquerque et al. (2007) predicts persistence in net foreign flows in addition to a positive contemporaneous correlation between net foreign flows and local returns

and positive feedback trading by the average foreigner. Based on the models of Brennan and Cao (1997) and Griffin et al. (2004), it can be assumed that foreigners have informational disadvantages compared to domestic investors. The global institutional investors with information sources, global experience, talent and institutional resources may have advantages in analyzing global factors, which may afford them superiority at times when domestic markets are highly influenced by global factors (Barron and Ni, 2008). The findings in the literature in this respect can perhaps be best summarized by Dvořák's (2005) conclusion that global investors possess expertise but lack local information.

On the other hand, there are papers such as by Hau and Rey (2004) that report a negative relationship, or negative feedback trading, which is often hypothesized as "portfolio rebalancing" behavior. In these cases, investors reallocate funds away from assets in their portfolio that have appreciated in value due to price rises and currency gains towards those that have depreciated in order to restore the optimal portfolio balance.

In the analysis of foreign investment behavior, it is necessary to consider to what extent capital flows are determined by global factors to adequately describe the relationship between foreign flows and local returns. Foreign investors might affect emerging markets responding to a shock in broad markets by rebalancing their equity portfolios across markets (Kodres and Pritsker, 2002). The model of Griffin et al. (2004) also incorporates portfolio rebalancing effects which suggest that global investors might increase their allocations to emerging markets following increases in their home markets. Thus, net inflows may be partly explained by the inclusion of broader global market returns. Richards (2005) finds that, in addition to local market returns, lagged returns in mature markets, in particular S&P500, are useful in explaining equity flows into emerging markets. He further suggests that those push factors have a larger role than implied by previous work. Griffin et al. (2004) also document similar evidence for nine emerging markets, i.e. lagged US returns are useful in explaining the net inflows toward emerging markets. In addition, Chayawadee and Ho (2008) found that while currency returns tend to show little influence over foreign investors' demand for Asian equities, net equity purchases do have some explanatory power over near-term exchange rate changes.

2.2 Studies on Impacts of Foreign Flows

The second studies focus on the impacts of foreign flows on local returns. Much of research such as by Brennan and Cao (1997), Clark and Berko (1997), Froot et al. (2001), Dahlquist and Robertsson (2004) and Richards (2005) uniformly report a positive contemporaneous relation between foreigners' net buying and local stock market returns. This conclusion holds irrespective of the frequency of the data. Then, an issue of particular interest is whether the effect is temporary or permanent. If the price increase is temporary, it may reflect pure price pressure. If it is permanent, it may be a reflection of risk sharing benefits of a stock market liberalization (Kim and Singal, 1997; Henry, 2000; Froot and Ramadorai, 2001; and Dahlquist and Robertsson, 2004). The latter encompasses a proposition that foreign net purchases incorporate fundamental prospects, making the effect of equity flows on returns permanent. Studies employing monthly data, Clark and Berko (1997) and Dahlquist and Robertsson (2004) find no evidence of price pressure, while Bekaert et al. (2002) report that only a small portion of returns due to flow shocks are reversed subsequently.

Several studies report estimates of the price impact of foreigners' net purchases. Clark and Berko (1997), using monthly data from Mexico for the period January 1989 – March 1996, found that unexpected net foreign purchases that amount to 1% of market capitalization are associated with a price increase of about 13%. Studying the investment behavior and impact of foreign investors on the Swedish market using monthly data covering the post-liberalization period, Dahlquist and Robertsson (2004) estimate that net foreign inflows equivalent to 1% of total market capitalization are associated with a 10% price increase. Richards (2005), employing daily data from six Asia-Pacific emerging markets, found that net foreign purchases equivalent to 1% of market capitalization are associated with a median of 38% cumulative price increase. Ülkü and Weber (2011) showed that within the contemporaneous period returns are more likely to affect foreign flows rather than vice versa, even at the daily frequency; hence, the interpretation of “price impact” requires caution. In reporting the price impact, several studies make a useful distinction between the expected and surprise components of foreign flows. Most of the price impact comes from the surprise component (Richards, 2005). On daily data from Thailand, Pavabutr and Yan (2007)

showed that the expected component, which is associated with positive feedback trading, has insignificant price impact.

Griffith-Jones (1998) revealed that a large amount of short-term fund flow that moved into developing countries could lead to negative effects. Furthermore, these short-term investments can distort the long-term balance of major macroeconomic variables such as exchange rate, asset price and stock price. Bhagawati (1998) showed that the movement of these severely oscillatory portfolio investments could be a factor of an unstable economy as well as increase inflation rates and strengthen real exchange rates. This will have an impact on a country's export business and their current account balance. In addition, Calvo and Reinhart (1996) and Corbo and Hernandez (1996) concluded that foreign fund flow is a cause of a country's undue real exchange rate appreciation, increasing inflation rate and strengthening real exchange rates, which can affect export business and current account balance. Gyntelberg, Loretan, Subhanj, and Chan (2009) presented empirical evidence that the Thai exchange rate is driven in part by international investors' cross-border portfolio rebalancing decisions. He then found that net purchases of Thai equities by nonresident investors lead to an appreciation of the Thai baht. In addition, higher returns in the Thai equity market relative to a reference stock market are associated both with net sales of Thai equities by these investors and with a depreciation of the Thai baht. Sapphasak (2012) studied the investment behavior and impact of foreign investment behavior on the fluctuation of SET during when the market rose and fell. The results of the study showed that there was no significant implication of foreign investor's behavior during the market-up period. While during the market-down period, it was found that foreign investors significantly behaved against the market trend.

2.3 The Relationship between Stock Prices and Exchange Rate

The flow-oriented theory by Dornbusch and Fisher (1980) states that a depreciation of domestic currency can have a crucial impact on stock prices by increasing firms' competitiveness, while, in turn, raising their profitability. When firms are able to pay more dividends to stockholders, stock prices will increase. Thus, there should be a positive relationship between exchange rate and stock prices. In this case,

the exchange rate leads stock prices. On the contrary, Branson and Henderson (1985) offered the “portfolio balance approach” that they say indicates that stock prices lead exchange rates on the grounds that a rising trend in stock prices induces foreign investors to invest more in domestic stocks. This will cause more capital inflows, which in turn cause domestic currency appreciation. In addition, a rise in domestic stock prices causes wealth to increase, and thus induces investors to increase their demand for money, which results in a rise in domestic interest rates. Higher interest rates induce capital inflows and thus cause an appreciation in domestic currency. According to this approach, stock prices lead exchange rates with a negative relationship.

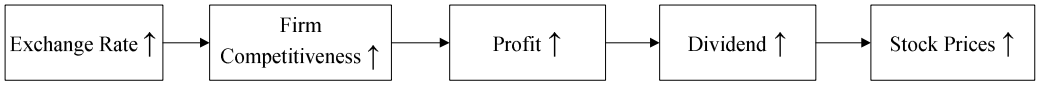

Figure 2.1 Flow-Oriented Theory

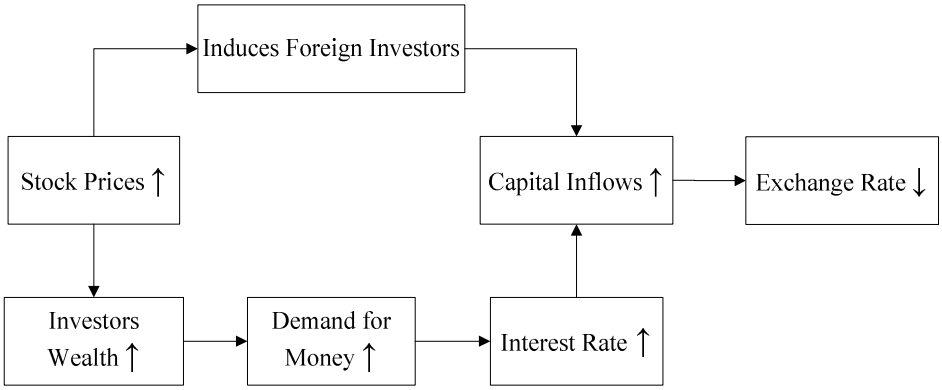

Figure 2.2 Portfolio Balance Approach

2.4 Financial Crisis during 1997 to 2014

2.4.1 Asian Financial Crisis from 1997 to 1998

The Asian financial crisis gripped much of Asia beginning in July 1997 as it raised fears of a worldwide economic meltdown due to financial contagion. This regional financial crisis was started by the hedge fund manager George Soros by manipulating the bandwagon effect that intended to attack the weak and unregulated currencies for the capital gain by forcing the currencies to float to appreciate and depreciate to the level of the estimated exchange rates in the international currency market. This crushed the buy-in and sell-out of the currencies by local governments without sound fiscal policy history (fiscal surplus). It also strained foreign reserve of governments that lacked rigid financial supervision to defend the attack. Ultimately, as the result of a series of financial attacks, this paralyzed specific government's continuing fiscal accountability, which then affected many other economies, leading to national bankruptcies, like South Korea.

The crisis started in Thailand with the financial collapse of the Thai baht after the Thai government was forced to float the baht (due to a lack of foreign currency to support its fixed exchange rate). Thailand was forced to cut its peg to the U.S. dollar after exhaustive efforts to support it in the face of a severe financial overextension that was in part real estate driven. At the time, Thailand had acquired a burden of foreign debt that made the country effectively bankrupt even before the collapse of its currency. As the crisis spread, most of Southeast Asia and Japan saw slumping currencies, devalued stock markets and other asset prices, and a precipitous rise in private debt. Indonesia, South Korea and Thailand were the countries most affected by the crisis. Hong Kong, Malaysia, Laos and the Philippines were also hurt by the slump. China, Taiwan, Singapore, Brunei and Vietnam were less affected, although all suffered from a loss of demand and confidence throughout the region.

In Thailand, the economy grew at an average of over 9% per year, the highest economic growth rate of any country from 1985 to 1996. Inflation was kept reasonably low, within a range of 3.4%–5.7%. The baht was pegged at 25 to the US dollar. On May 14 and 15, 1997, the Thai baht was hit by massive speculative attacks. The Thai government failed to defend the baht, which was pegged to the basket of currencies in

which the U.S. dollar was the main component, against international speculators. Thailand's booming economy came to a halt amid massive layoffs in finance, real estate and construction that resulted in huge numbers of workers returning to their villages in the countryside and 600,000 foreign workers being sent back to their home countries. The baht devalued swiftly and lost more than half of its value. The baht reached its lowest point of 56 units to the US dollar in January 1998. The Thai stock market dropped 75%. Finance One, the largest Thai finance company until then, collapsed. Without foreign reserves to support the US-Baht currency peg, the Thai government was eventually forced to float the Baht, on July 2, 1997, allowing the value of the Baht to be set by the currency market. On August 11, 1997, the IMF unveiled a rescue package for Thailand with more than $17 billion, subject to conditions such as passing laws relating to bankruptcy (reorganizing and restructuring) procedures and establishing strong regulation frameworks for banks and other financial institutions. On August 20, 1997, the IMF approved, another bailout package of $3.9 billion. By 2001, Thailand's economy had recovered. The increasing tax revenues allowed the country to balance its budget and repay its debts to the IMF in 2003, four years ahead of schedule. The Thai baht continued to appreciate to 29 Baht to the US dollar in October 2010. In addition, the SET index continuously decreased from 788.04s points in January 1997 to 214.53 points in August 1998. Then, the index started to recover, reaching 772.15 points in December 2003.

2.4.2 Global Financial Crisis and Subprime Mortgage Crisis from 2007 to 2009

The financial crisis of 2007–2008, also known as the global financial crisis 2008, is considered by many economists to be the worst financial crisis since the Great Depression of the 1930s. It resulted in the threat of total collapse of large financial institutions, the bailout of banks by national governments and downturns in stock markets around the world. The housing markets in many countries also suffered, resulting in evictions, foreclosures and prolonged unemployment. The crisis played a significant role in the failure of key businesses, declines in consumer wealth estimated in trillions of US dollars and a downturn in economic activity, which lead to the 2008–2012 global recession and European sovereign-debt crisis. The active phase of the crisis, which manifested as a liquidity crisis, can be dated from August 7, 2007, when

BNP Paribas terminated withdrawals from three hedge funds, citing "a complete evaporation of liquidity".

The bursting of the U.S. housing bubble, which peaked in 2006, caused the value of securities tied to U.S. real estate pricing to plummet, damaging financial institutions globally. The financial crisis was triggered by a complex interplay of policies that encouraged home ownership, providing easier access to loans for subprime borrowers, overvaluation of bundled sub-prime mortgages based on the theory that housing prices would continue to escalate, questionable trading practices on behalf of both buyers and sellers, compensation structures that prioritize short-term deal flow over long-term value creation and a lack of adequate capital holdings from banks and insurance companies to back the financial commitments they were making. Questions regarding bank solvency, declines in credit availability and damaged investor confidence had an impact on global stock markets, where securities suffered large losses during 2008 and early 2009. Economies worldwide slowed during this period, as credit tightened and international trade declined. Governments and central banks responded with unprecedented fiscal stimulus, monetary policy expansion and institutional bailouts. In the U.S., Congress passed the American Recovery and Reinvestment Act of 2009. In the EU, the UK responded with austerity measures of spending cuts and tax increases without export growth, after which it slid into a double-dip recession.

The U.S. subprime mortgage crisis was a set of events and conditions that led to the late-2000s financial crisis, characterized by a rise in subprime mortgage delinquencies and foreclosures and the resulting decline of securities backed by said mortgages. Several major financial institutions collapsed in September 2008, with significant disruption in the flow of credit to businesses and consumers and the onset of a severe global recession. There were many causes of the crisis, with commentators assigning different levels of blame to financial institutions, regulators, credit agencies, government housing policies and consumers, among others. A proximate cause was the rise in subprime lending. The percentage of new lower-quality subprime mortgages rose from the historical 8% or lower range to approximately 20% from 2004 to 2006, with much higher ratios in some parts of the U.S. A high percentage of these subprime mortgages, over 90% in 2006, for example, were adjustable-rate mortgages. These two

changes were part of a broader trend of lowered lending standards and higher-risk mortgage products. Further, U.S. households had become increasingly indebted, with the ratio of debt to disposable personal income rising from 77% in 1990 to 127% at the end of 2007, much of this increase mortgage-related. After U.S. house sale prices peaked in mid-2006 and began their steep decline forthwith, refinancing became more difficult. As adjustable-rate mortgages began to reset at higher interest rates (causing higher monthly payments), mortgage delinquencies soared. Securities backed with mortgages, including subprime mortgages, widely held by financial firms globally, lost most of their value. Global investors also drastically reduced purchases of mortgage-backed debt and other securities as part of a decline in the capacity and willingness of the private financial system to support lending. Concerns about the soundness of U.S. credit and financial markets led to tightening credit around the world and slowing economic growth in the U.S. and Europe.

The crisis had severe, long-lasting consequences for the U.S. and European economies. The U.S. entered a deep recession, with nearly 9 million jobs lost during 2008 and 2009, roughly 6% of the workforce. U.S. housing prices fell nearly 30% on average, and the U.S. stock market fell approximately 50% by early 2009. As of early 2013, the U.S. stock market had recovered to its pre-crisis peak, but housing prices remained near their low point and unemployment remained elevated. Economic growth remained below pre-crisis levels. Europe also continued to struggle with its own economic crisis.

In Thailand, SET index dramatically dropped from 907.28 points in October 2007 to 401.84 points in November 2008, falling about 500 points in only one year because of the subprime crisis in the USA. Meanwhile, the exchange rate dramatically appreciated from 41.7064 Baht per US Dollar in July 2005 to 31.4116 Baht per US Dollar in March 2008, which is about a 10 Baht per US Dollar appreciation for three years because of the increase in capital flow for investment in Thailand.

2.4.3 Quantitative Easing from 2008 to 2014

Quantitative easing (QE) is an unconventional monetary policy used by central banks to stimulate their national economy when conventional monetary policy has become ineffective. A central bank implements quantitative easing by buying financial assets from commercial banks and other private institutions, thus, creating money and injecting a pre-determined amount into the economy. This is distinguished from the more usual policy of buying or selling government bonds to alter the money supply to keep market interest rates at a specified target value. Quantitative easing increases the excess reserves of the banks and raises the prices of the financial assets bought, which lowers their yield. Expansionary monetary policy typically involves the central bank buying short-term government bonds to lower short-term market interest rates. However, when short-term interest rates are either at, or close to, zero, normal monetary policy can no longer lower interest rates. Quantitative easing may then be used by the monetary authorities to further stimulate the economy by purchasing assets of longer maturity than only short-term government bonds, thereby, lowering longer-term interest rates further out on the yield curve. Quantitative easing can be used to help ensure inflation does not fall below target. Risks include the policy being more effective than intended in acting against deflation – leading to higher inflation - or not being effective enough if banks do not lend additional reserves.

The U.S. Federal Reserve held between $700 billion and $800 billion of Treasury notes on its balance sheet before the recession. In late November 2008, the Fed started buying $600 billion in Mortgage-backed securities (MBS). By March 2009, it held $1.75 trillion of bank debt, MBS and Treasury notes, and reached a peak of $2.1 trillion in June 2010. Further purchases were halted as the economy started to improve, but they resumed in August 2010 when the Fed decided the economy was not growing robustly. After the halt in June, holdings started falling naturally as debt matured and were projected to fall to $1.7 trillion by 2012. The Fed's revised goal became to keep holdings at the $2.054 trillion level. To maintain that level, the Fed bought $30 billion in 2–10-year Treasury notes a month. In November 2010, the Fed announced a second round of quantitative easing, or "QE2", buying $600 billion of Treasury securities by the end of the second quarter of 2011. A third round of quantitative easing, or "QE3", was announced by the Federal Reserve in September 2012. The third round included a

plan to purchase US$40 billion of mortgage-backed securities (MBS) per month. Additionally, the Federal Open Market Committee (FOMC) announced that it would likely maintain the federal funds rate near zero at least through 2015.

In Thailand, as the US was hit by the subprime crisis, the SET index dramatically dropped to 401.84 points in November 2008. After this, the SET index began to recover, with the SET index climbing from 400 points to 1200 points within four years, nearly setting a new high level in 2012. In addition, when the subprime crisis hit, the exchange rate depreciated from 31.4116 Baht per US Dollar in March 2008 to 35.7344 Baht per US Dollar in March 2009. After that the exchange rate depreciated and stabilized around 30 Baht per US Dollar in 2012.

CHAPTER 3

METHODOLOGY

This chapter will discuss the research methodology that consists of two main parts. First, the unit root test was employed to investigate whether a time series variable is stationary or not. Second, a structural VAR model, including granger causality tests, impulse response analysis and variance decomposition, was used to investigate foreign investment behavior and impacts of foreign portfolio investment.

3.1 Unit Root Test

Before processing each time series, this study needed to test each variable's unit root to determine whether a time series variable is non-stationary. Non-stationary data could cause spurious regression and therefore bias the study. For this reason, the popular Augmented Dickey-Fuller (ADF) test (1979) was employed. This method tests for the existence of a unit root; if the process has a unit root, then it is a non-stationary time series, which means that the movements of stochastic process depend on time trend as well as the variance of the series diverging to infinity with time trend. So,

$$Var(Y_t) = \sum_{i=1}^{t} \sigma^2 = t\sigma^2 \tag{3.1}$$

$Var(Y_t)$ = variance of the series

t = time trend

For the unit root test, the null hypothesis of the ADF test is that the variable is non-stationary. It is the method to determine whether time series data is consistent with an I(1) process with a stochastic trend (non-stationary) or I(0) process that is stationary.

The form for the infinite-order autoregressive model is:

$$\Delta y_t = \mu + \gamma y_{t-1} + \sum_{i=2}^{\infty} \beta_i \Delta y_{t-i+1} + \varepsilon_t \tag{3.2}$$

If $\gamma = 0$, this is entirely in first difference or I(1) process and has a unit root. This means that the time series data is non-stationary at its level. Therefore, the unit root test is conducted for this data to check if the process is stationary.

3.2 Structural VAR model

For the study of foreign investment behavior and impacts of foreign portfolio investment, a structural VAR (SVAR) model is employed as Hasbrouck (1991) suggested that the bilateral interaction between foreign flows and returns should be modeled as a VAR system. VAR methodology has been a standard in much of the literature on this subject. VARs have also been used by Froot et al. (2001), Karolyi (2002), Dahlquist and Robertsson (2004), Richards (2005), Ülkü and İkizlerli (2012) and others to examine the correlation between foreign inflows and returns in other contexts. In the case of Thailand, Chayawadee (2003) employed a tri-variate structural VAR model of daily stock returns, currency returns and scaled net purchases by dividing net purchase transactions by wealth holdings of the same period. This paper goes one-step further than Chayawadee (2003) by restricting local returns and foreign flows from affecting global returns as the results of Griffin et al. (2004) and Richards (2005) strongly suggest the inclusion of returns on broad markets as determinants of net foreign flows. Failure to impose this restriction may lead to inaccurate results driven by spurious links. Thus, this paper augments the tri-variate structural VAR model with world market returns. It also compares the results of two countries, Thailand and Korea for the periods: full sample, pre-crisis, crisis and post-crisis.

The VAR approach affords a number of advantages, like investigations of multivariate models, identifying structural shock through variance decomposition, and determining foreign investment behavior and impacts of foreign portfolio investment.. It is one of the most popular methods and widely used for time series analysis. Vector Auto Regressive (VAR) models have been used in many empirical studies of macroeconomic issues since they were introduced for such purposes by Sims (1980). He suggests that it should be feasible to estimate large scale macro models as unrestricted reduced forms, treating all variable as endogenous. All the variables in a VAR model are treated symmetrically by including each variable with the equation

explaining each variables evolution based on its own lags and the lags of all the other variables in the model. This means that a VAR model seeks patterns in available data, with no assumptions, as opposed to empirical specifications derived from theoretical models that predict the way the variables will affect each other. Sims also criticized the way that the classical simultaneous equations models identified as well as questioned exogenous assumptions for some variables, which were not necessarily backed by a theoretical framework. In contrast, VAR models overcome this problem by treating all variables as endogenous variables. They put no theoretical restrictions on the way the variables affect one another internally. In practice, there are many tools employed by VAR analysis, like the cointegration test, error correction mechanism, and impulse response analysis and variance decomposition. These applications can explain the relationship among variables and their behaviors. However, in this study, to the first test is to check if the process is stationary followed by the cointegration test, error correction mechanism, impulse response analysis and variance decomposition.

To investigate foreign investment behavior and the impacts of foreign portfolio investment, this paper estimates a structural VAR model with three endogenous variables, stock returns, currency returns and foreign normalized net purchases by dividing net purchase transactions by the contemporaneous market capitalization. The tri-variate model is augmented with the exogenous global returns. Then, the results of Granger causality test are used to explain cause and effect between these variables or pairwise analysis as well as show that these relationships are significant or not. The results of the impulse response analysis present the direction of the linkage between these variables, and the results of the Variance decomposition provide the component and proportion of the movements in a sequence from its own shocks and shocks to other variables to determine the importance of each variable.

Basically, the VAR process can be expressed as:

$$Y_t = \mu + \sum_{i=1}^{p} \emptyset_i Y_{t-i} + u_t \qquad (3.3)$$

$$\mathrm{u_t} = \mathrm{R}\varepsilon_t$$

t = 1, 2,…,T

p ≥ 1 and 1 ≤ i ≤ p

where,

Y_t = vector of observable

μ = vector of intercept term

$\emptyset_i$ = vector of coefficient

ε_t = vector of error term

R = unknown fixed non-singular matrix

$\varepsilon_t \sim iid\ N(0, I)$

In the VAR model, the vectors $Y_t = (Y_{1t}, Y_{2t}, \dots, Y_{kt})'$, t = -p + 1,2,…,T, are observable; p is a specified non-negative integer (p ≥1) and $\mu = (\mu_1, \mu_2, \dots, \mu_k)'$ is an unknown k×1 vector of intercept term. Vector $\emptyset_i = [\emptyset_{ijl}]_{j\times l=1,2,\dots,k}$ is the unknown k×k matrix of coefficient matrices (1 ≤ i ≤ p); R is an unknown fixed non-singular matrix. In this section, the process is tested to determine if it is stationary. This is followed by the cointegration test, error correction mechanism, impulse response analysis and variance decomposition.

A structural VAR model allows for the analysis of variable behavior relative to another variable of interest, holding the remaining variables constant. To isolate each variable's effect, the system applies a short-run identification assumption. Short-run identification defines the contemporaneous response of each variable. As the contemporaneous interaction between variables is significant, a structural VAR (SVAR) model is employed. Foreign normalized net purchases (F), local stock returns (S) and currency returns (C) comprise the vector of local variables (y_1). The tri-variate model is augmented with exogenous global returns (G) contained in vector (y_2). Thus, this study's approach involves examining the interaction between foreign flows and returns after controlling their common global drivers. The reduced-form can be specified as:

$$A(L)Y_t = \varepsilon_t \tag{3.4}$$

where A(L) is an n×n matrix polynomial in the lag operator L; y(t) is the n×1 observation vector and ε(t) is the n×1 vector of structural disturbances (n is the number of variables in the system, three here). The specified model is shown in Equation (3.5):

$$Y_t = \begin{bmatrix} y_1 \\ y_2 \end{bmatrix} \quad A(L) = \begin{bmatrix} A_{11}(L) & A_{12}(L) \\ 0 & A_{22}(L) \end{bmatrix} \quad \varepsilon_t = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \end{bmatrix} \tag{3.5}$$

where the assumptions are that ε_t is uncorrelated with past Y_{t-k} for k>0, and the coefficient matrix of L, A, is non-singular. Vectors are defined as $y_1 = [F, S, C]'$ and $y_2 = [G]'$. Block exogeneity is represented by $A_{21}(L) = 0$ and implies that the second block y_2 is exogenous to the first block both contemporaneously and for lagged values.

3.3 Granger Causality Tests

To investigate a relationship between two variables, the causality test, first introduced by Granger (1969), is a technique to determine whether one variables is useful in forecasting another. It explains cause and effect between two variables, or pairwise analysis. The Granger causality test has been carried out to create the direction of causality of the linkage between variables. It is based on the regression of each volatility proxy on its lagged values and the lagged values of all other variables. This part thus investigates the cause and effect among four variables, foreign net purchases, stock returns, currency returns and global returns. This test provides four possible outcomes, including X causes Y only, Y causes X only, bi-directional causality and no causality. Based on the Granger causality model procedure, four variable time series are tested.

This study also applies the Granger causality with the vector autoregressive model (VAR). Hence, it can represent a causal chain model that takes account of the prior information concerning the ordering of the variables and non-sensitive to normal distribution of error term (Hacker and Hatemi, 2006). This is useful in financial economic studies since many financial variables are likely to show non-normality, including exchange rate in this study.

The Granger causality test estimates the results of two regressions as expressed in equations (3.5) and (3.6) (Granger C.W.J., 1969).

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{P} \alpha_i \Delta Y_{t-i} + \sum_{i=1}^{P} \beta_i \Delta X_{t-i} + e_t \qquad (3.5)$$

(X_t causes Y_t if β_i is not equal to zero.)

$$\Delta X_t = \delta_0 + \sum_{i=1}^{P} \delta_i \Delta Y_{t-i} + \sum_{i=1}^{P} \gamma_i \Delta X_{t-i} + u_t \quad (3.6)$$

(Y_t causes X_t if δ_i is not equal to zero)

If the χ-squared statistic is above critical value for the χ-squared distribution, then the null hypothesis that X does not Granger cause Y equation (3.5) is rejected, meaning that X Granger causes Y. Similar to equation (3.5), the null hypothesis that Y does not Granger cause X in equation (3.6) is rejected, if the χ-squared statistic is above critical value for the χ-squared distribution as well.

3.4 Impulse Response Analysis

Impulse response analysis is one of the more popular applications in the empirical studies covering the dynamic relationship among economic variables within VAR models. It measures the time profile to the effect of shock or impulse on the expected future values of a variable. For a VAR model, a shock to any single variable transmits dynamically to all the endogenous variables. An impulse response function traces the effect of a one-time shock on current as well as future values of the endogenous variables. From equation (3.3), the set of $\emptyset_i$ is called the impulse response functions. Plotting the impulse response functions is a practical way to visually represent the behavior of time series in response to the various shocks at the time of the shock and over subsequent points in time (Enders, 2004). For this study, impulse response analysis presents the response of foreign flows to returns and vice versa, the response of returns to foreign flows.

3.5 Variance Decomposition

Variance decomposition is another way to characterize the dynamic behavior of a VAR system through forecast future fluctuation. It separates the variation in an endogenous variable into the component shocks and simply apportions the variance of forecast error in the selected variable to those of the other variables and its own shock as well. The forecast error variance decomposition shows the proportion of the

movements in a sequence from its own shocks and shocks to other variables (Enders, 2004). Thus, it helps to explain impact of foreign flows to returns and vice versa, impact of returns to foreign flows.

CHAPTER 4

DATA AND ESTIMATION

This chapter presents the results of a preliminary look at the calculated data such as foreign net purchases, stock returns, currency returns and global returns to provide a sense of their general properties. Unit root test and structural VAR estimation are provided as well.

4.1 Data Description

The full sample analysis uses the daily data from January 5, 2004 to December 30, 2014 to examine the effects of the global financial crisis in 2008 and the quantitative easing measures after the crisis. In some analysis, the monthly and yearly data from January 1997 to December 2014 is used. The daily values of stock purchases and sales are obtained from the Stock Exchange of Thailand and the Korea Exchange. These data consist of transactions by four types of investor groups: local institutes, proprietary trading, foreign investors and local investors. The daily stock indices and total market capitalization are also obtained from the Stock Exchange of Thailand and Korea Exchange. The daily exchange rate in terms of Thai Baht per US dollar, the daily exchange rate in terms of Korean Won per US dollar and the MSCI world index are taken from the Datastream international database.

4.1.1 Foreign Net Purchases

Foreign net purchases are defined as the value of their purchases of local stocks minus the value of their sales in each day from foreign investors in unit of local currency.

$$\begin{matrix} net\ purchases\ as\ a\ percentage\ of \\ total\ market\ capitalization \end{matrix} = \frac{purchases - sales}{market\ capitalization} \qquad (4.1)$$

Then, daily foreign net purchases are normalized by dividing by the contemporaneous market capitalization as in other studies such as Bekaert et al. (2002), Dahlquist and Robertsson (2004), Griffin et al. (2004), Richards (2005) and Ülkü and İkizlerli (2012). Such normalization enables comparisons across different markets and stocks, and it is also useful to determine how important the net foreign demand is compared to total supply of shares. Foreign net purchases as a percentage of total market capitalization throughout the sample period are shown in Figure 4.1 and Figure 4.2 for Thailand and Korea, respectively.

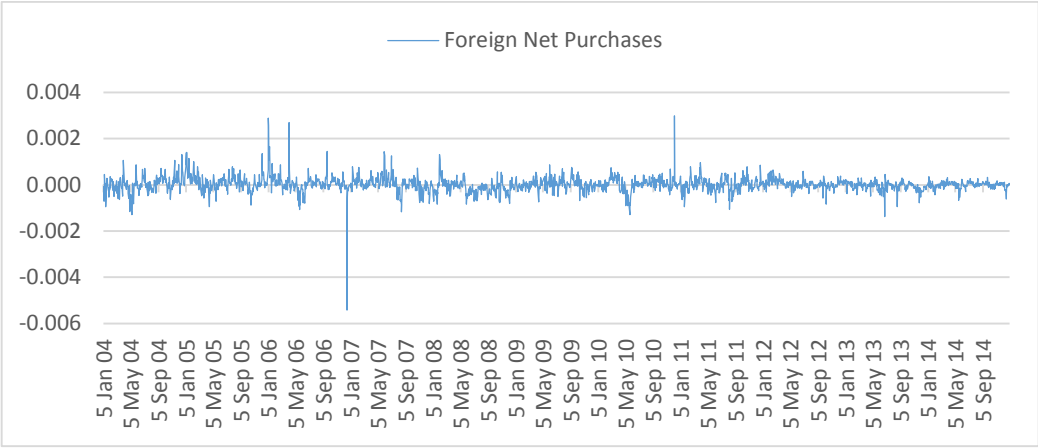

Figure 4.1 Foreign Net Purchases as a percentage of total market capitalization (Thailand)

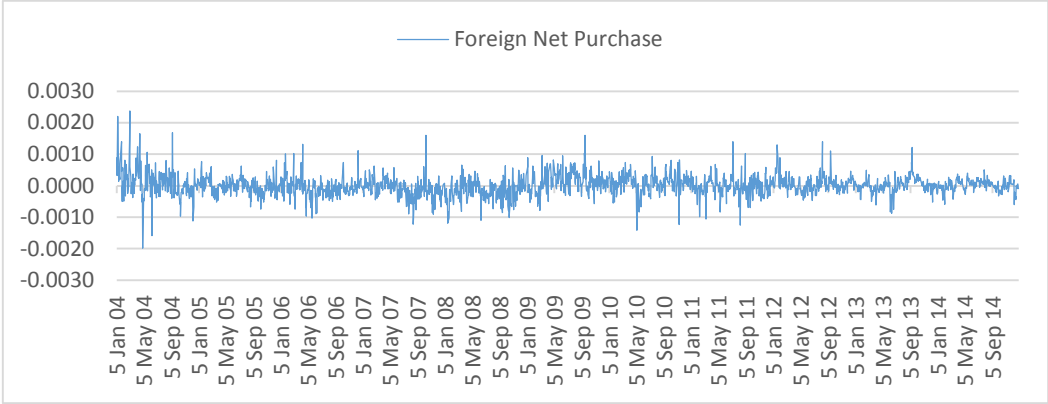

Figure 4.2 Foreign Net Purchases as a percentage of total market capitalization (Korea)

4.1.2 Stock Returns

Stock returns are calculated by log differencing of the daily stock index closing values. Stock returns throughout the sample period are shown in Figure 4.3 and Figure 4.4 for Thailand and Korea, respectively.

$$stock\ returns = log(set_t) - log(set_{t-1}) \quad (4.2)$$

Given,

set_t = SET index in period t

set_{t-1} = SET index in previous period

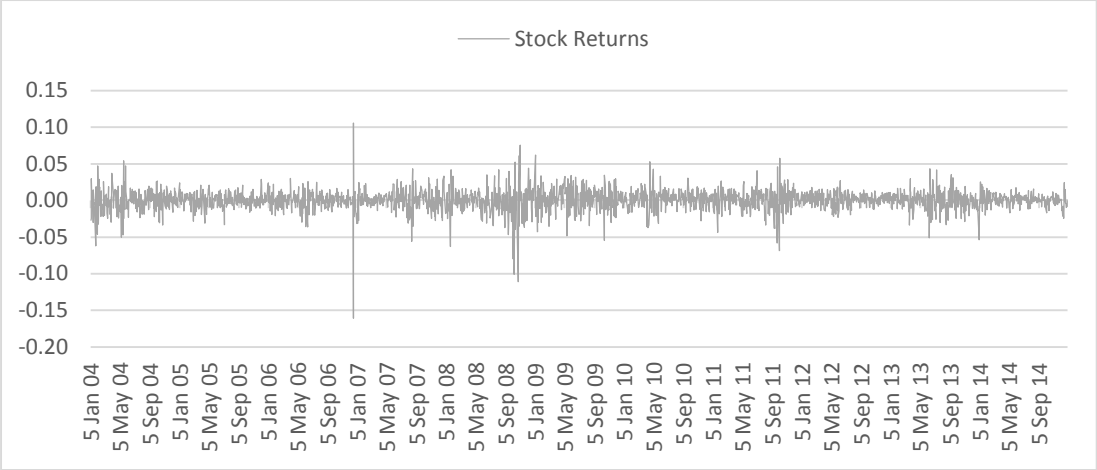

Figure 4.3 Stock Returns (Thailand)

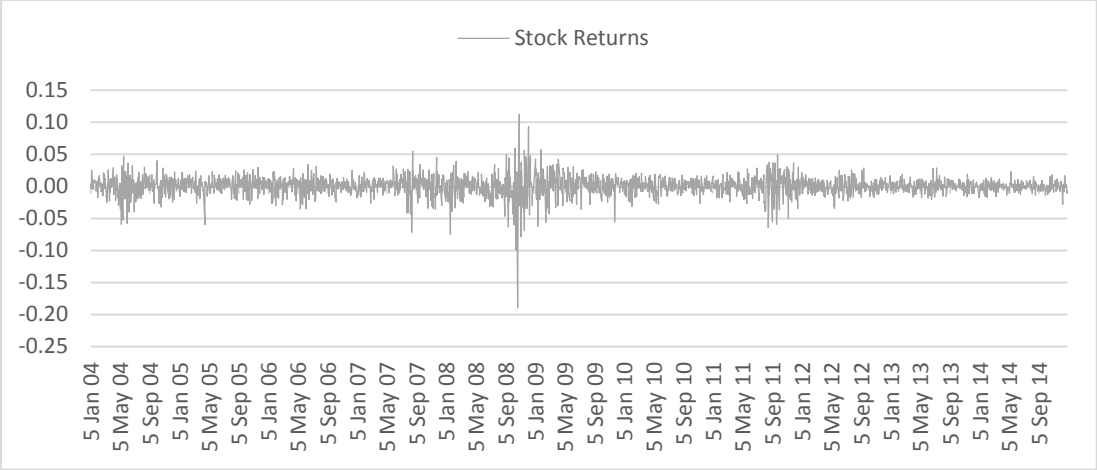

Figure 4.4 Stock Returns (Korea)

4.1.3 Currency Returns

Currency returns are calculated by log differencing of the daily closing values of exchange rate in terms of local currency per US dollar. Currency returns throughout the sample period are shown in Figure 4.5 and Figure 4.6 for Thailand and Korea, respectively.

$$currency\ returns = log(fx_t) - log(fx_{t-1}) \quad (4.3)$$

Given,

fx_t = exchange rate in period t

fx_{t-1} = exchange rate in previous period

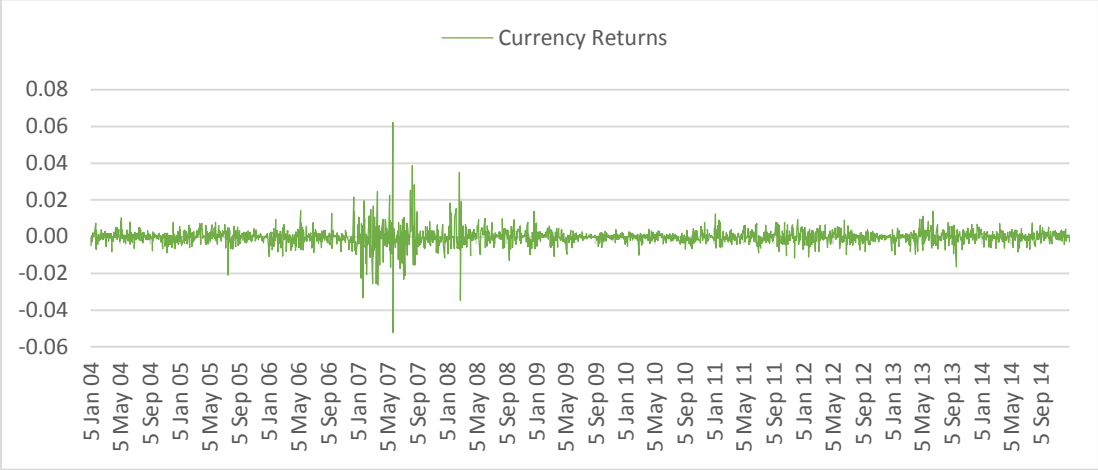

Figure 4.5 Currency Returns (Thailand)

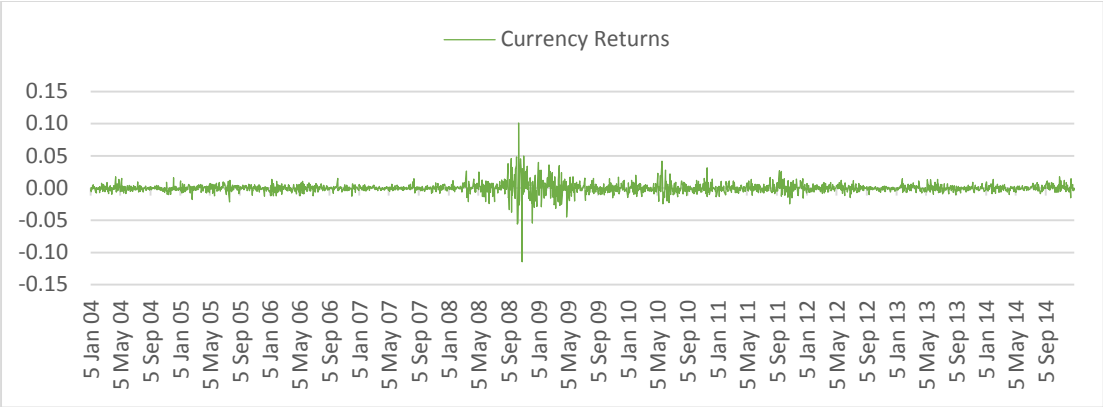

Figure 4.6 Currency Returns (Korea)

4.1.4 Global Returns

Global returns are calculated by log differencing of the daily closing values of the MSCI World index. Global returns throughout the sample period are shown in Figure 4.7.

$$global\ returns = log(msci_t) - log(msci_{t-1}) \quad (4.4)$$

Given,

$msci_t$ = MSCI world index in period t

$msci_{t-1}$ = MSCI world index in previous period

This paper uses global returns data to control non-domestic information that might affect foreign investor flows as in the study of Ülkü and İkizlerli (2012). Portfolio rebalancing effects as described by Griffin et al., (2004) and Kodres and Pritsker (2002), suggest that net flows may be partly explained by the inclusion of returns on developed markets. As local returns are strongly related to world returns, failure to control global returns may lead to biased inferences, for example, an overstatement of the price impact of net foreign flows or failure to distinguish past global versus local returns in foreigners' feedback trading behavior. So, the MSCI World index is used as a proxy for global returns.

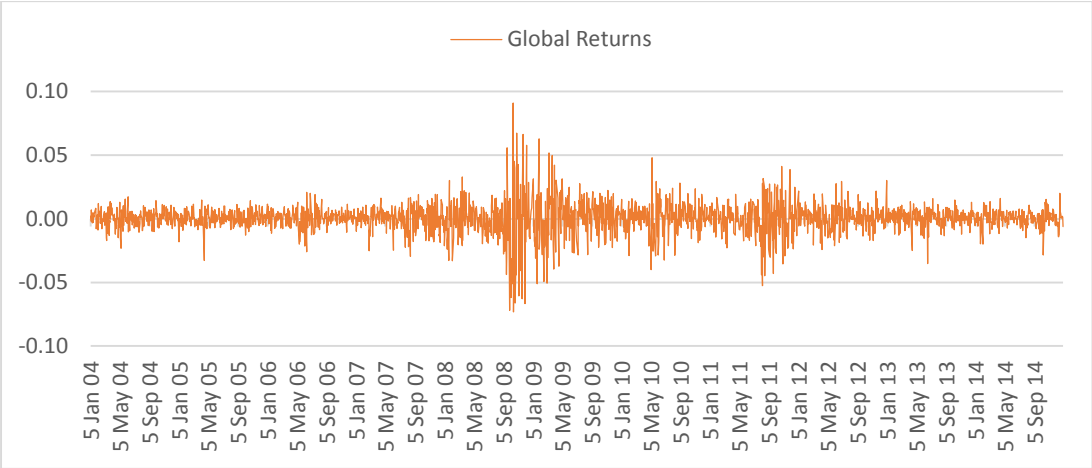

Figure 4.7 Global Returns

4.1.5 Descriptive Statistics

The statistics of daily net purchases of each investor group and the returns, including means, standard deviations, maximums, minimums and medians in the Thai and Korean stock markets are presented in Table 4.1. Table 4.3 and Table 4.4 show the descriptive statistics during the pre-crisis and post-crisis periods. Figures 4.8 and 4.9 present the daily net purchases of foreign investors in the Thai and Korean stock markets from January 2008 to December 2014, respectively.

Before the global financial crisis in 2008, foreign investors were, on average, the net buyers in the Thai stock market, as shown in Table 4.3. On the contrary, foreign investors were, on average, the net sellers in the Korean stock market. During the global financial crisis in 2008, foreign investors were, on average, the net sellers in both the Thai and Korean stock markets, as shown in Table 4.3. The average net purchases show that foreign investors were the major net sellers in the market during this crisis period in Thailand. This result is supported by the negative mean and median of foreign net purchases. On the other hand, with the positive mean and median, local institutes and local investors were the net buyers in the Thai stock market. The mean of the net purchases explains the pattern of investor participation in the market. The average trading of foreign investors was relatively higher than the other investor groups, which means foreign investors were the largest group of traders. The most volatile group was the local investors followed by foreign investors, local institutes and proprietary trading, respectively.

Then, the position was reversed on November 25, 2008, after the introduction of the first quantitative easing measures (QE1). This foreign activity shows that the foreign investors left the market during the global financial crisis in 2008, which caused the market downturn. These results contradict the findings of Chayawadee (2003), which showed that the foreign investors did not leave the Thai stock market during this crisis or the Asian financial crisis in 1997 and that foreign net purchases helped to prevent a deeper decline of the market at that time.

After the global financial crisis in 2008, the foreign flows came back again when the quantitative easing measures (QE1, QE2 and QE3) were announced. These measures promoted the fund flows into the Thai stock market. The result is supported by the fact that during the period of the first quantitative easing (QE1), net purchases

of foreign investors became positive, which means that foreign investors were, on average, the net buyers for this first period as well as during the second quantitative easing (QE2) in both the Thai and Korean stock markets. Unfortunately, the results in for the third quantitative easing (QE3) were different. Foreign investors were, on average, the net sellers in the Thai stock market during that period. This may be because of the crisis recovery in their home countries, their alternative source of investment and profit taking during that period. Another interesting reason could be that foreign investors moved their investments into the Thai bond market. This fact is supported by a significant increase in foreign net purchases in the Thai bond market after the second quantitative easing (QE2), as shown in Figure 4.10.

In addition, the movement of the exchange rate (Thai Baht/USD) is presented in Figure 4.10. During the global financial crisis in 2008, the Thai currency depreciated dramatically because of foreign outflows. After the crisis, foreign flows returned when the quantitative easing measures were announced. For this reason, the Thai currency continuously appreciated because of the foreign inflows until the third quantitative easing (QE3), as foreign investors were the net sellers during the crisis, the net buyers during the first and the second quantitative easing (QE1 and QE2) and the net sellers during the third quantitative easing (QE3).

To understand the interactions among all investor groups: local institutes, proprietary trading, foreign investors and local investors, Table 4.2 and Figure 4.11 provide the net purchases' correlation of all investor groups. Foreign net purchases show negative correlation to the net purchases of local institutes and local investors, thus, revealing opposite trading behaviors. This result is related to the fact that foreign investors were, on average, the net sellers while local institutes and local investors were, on average, the net buyers during the crisis period, as shown in Table 4.3.

Moreover, Figure 4.12 presents the monthly percentage turnover of all investor groups in the Thai Stock Market from January 1997 to December 2014. Turnover, or trading volume, is the sum of purchases and sales divided by two. The rate of turnover is derived by dividing turnover of each investor group by the average total transactions. From the figure, local investors are the major market participants followed by foreign investors are the second followed by local institutes and proprietary trading,

respectively. This shows that foreign investors are important participants who affect the fluctuation of the Thai Stock Market.

Table 4.1 Descriptive Statistics

	Mean	Std. Dev.	Max	Min	Median
Thailand					
Local Institutes Net Purchases (Millions of Baht)	37.10	1,082.04	9,393.07	-6,736.29	7.37
Prop Trade Net Purchases (Millions of Baht)	0.94	572.11	3,982.50	-3,699.29	-1.99
Foreign Net Purchases (Millions of Baht)	11.78	2,106.90	24,888.32	-25,124.97	44.71
Local Investors Net Purchases (Millions of Baht)	-49.82	2,211.82	28,029.89	-26,957.80	-52.17
Stock Returns (%)	0.02	1.42	10.58	-16.06	0.07
Currency Returns (%)	-0.01	0.45	6.23	-5.22	0
Global Returns (%)	0.0194	1.1382	9.0967	-7.32	0.08
Korea					
Foreign Net Purchases (Millions of Korean Won)	2,919.92	265,682.70	1,719,998	-1,309,443	107
Stock Returns (%)	0.03	1.46	11.28	-18.95	0.09
Currency Returns (%)	-0.01	0.79	10.13	-11.48	-0.01

statistics of daily transactions from January 5, 2004 to December 30, 2014 (2,538 observations)

Table 4.2 Correlation of All Investor Groups in Thailand

	Local Institutes	Prop Trade	Foreign Investors	Local Investors
Local Institutes	1			
Prop Trade	-0.01	1		
Foreign Investors	-0.23	0.01	1	
Local Investors	-0.27	-0.25	-0.84	1

Table 4.3 Descriptive Statistics during Pre-Crisis, Crisis and Post-Crisis periods

	Pre-Crisis Period Jan 5, 2004 – Dec 28, 2007		Crisis Period Jan 2, 2008 – Nov 24, 2008		Post-Crisis Period Nov 25, 2008 – Dec 30, 2014	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Thailand						
Local Institutes Net Purchases (Millions of Baht)	-57.74	737.60	156.77	699.32	83	1,298.55
Prop Trade Net Purchases (Millions of Baht)	-3.11	178.40	5.15	292.12	3.03	750.30
Foreign Net Purchases (Millions of Baht)	269.38	2,087.84	-672.12	1,754.91	-58.98	2,140.69
Local Investors Net Purchases (Millions of Baht)	-208.53	1,936.29	510.20	1,588.05	-27.05	2,441.08
Stock Returns (%)	0.01	1.38	-0.38	2.26	0.10	1.26
Currency Returns (%)	-0.03	0.59	0.08	0.56	-0.01	0.30
Global Returns (%)	0.04	0.68	-0.30	2.21	0.05	1.14
Korea						
Foreign Net Purchases (Millions of Korean Won)	-28,844.51	212,221.60	-158,427.1	256,491.3	48,559.60	286,238.70
Stock Returns (%)	0.09	1.34	-0.32	2.69	0.05	1.26
Currency Returns (%)	-0.02	0.40	0.23	1.81	-0.02	0.72

Table 4.4 Descriptive Statistics during Post-Crisis Period

	Post-Crisis Period					
	QE1 Nov 25, 2008 – Mar 31, 2010		QE2 Nov 3, 2010 – Jun 30, 2011		QE3 Sep 13, 2012 – Dec 30, 2014	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Thailand						
Local Institutes Net Purchases (Millions of Baht)	8.18	848.20	77.79	1,250.33	368.45	1,507.42
Prop Trade Net Purchases (Millions of Baht)	8.80	448.88	-6.33	512.42	-0.08	930.57
Foreign Net Purchases (Millions of Baht)	219.59	1,242.02	47.57	3,102.29	-444.45	2,247.26
Local Investors Net Purchases (Millions of Baht)	-236.57	1,611.62	-119.02	3,631.24	76.07	2,442.51
Stock Returns (%)	0.23	1.54	0.02	1.14	0.03	1.04
Currency Returns (%)	-0.03	0.26	0.02	0.30	0.01	0.31
Global Returns (%)	0.11	1.54	0.05	0.86	0.05	0.66
Korea						
Foreign Net Purchases (Millions of Korean Won)	114,134.30	244,403.40	19,036.27	343,229.20	22,926.67	241,473.70
Stock Returns (%)	0.18	1.71	0.06	1.03	-0.01	0.75
Currency Returns (%)	-0.09	1.09	-0.03	0.61	-0.01	0.41

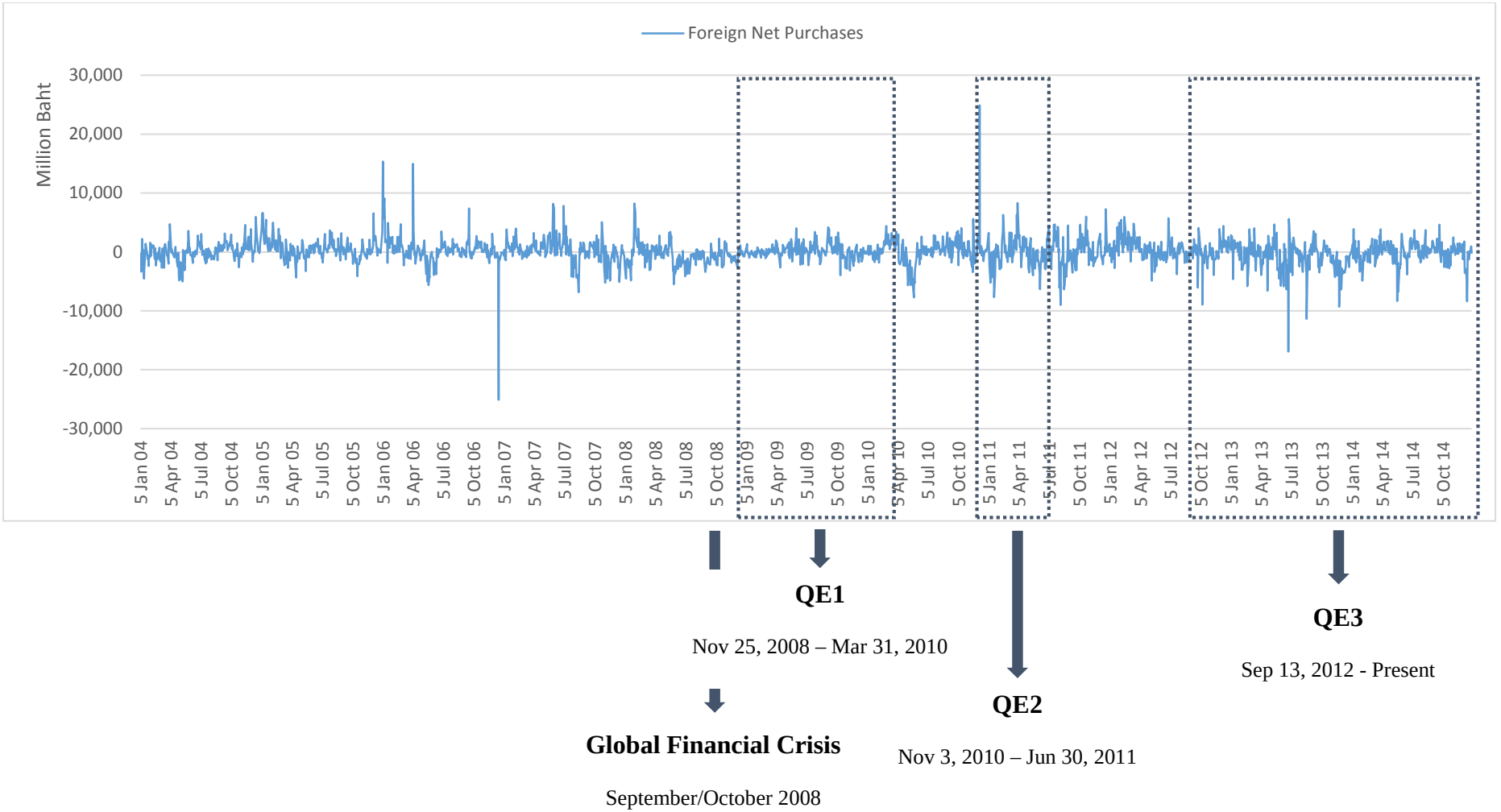

Figure 4.8 Daily Net Purchases of Foreign Investors in Thai Stock Market from January 2, 2008 to December 30, 2014

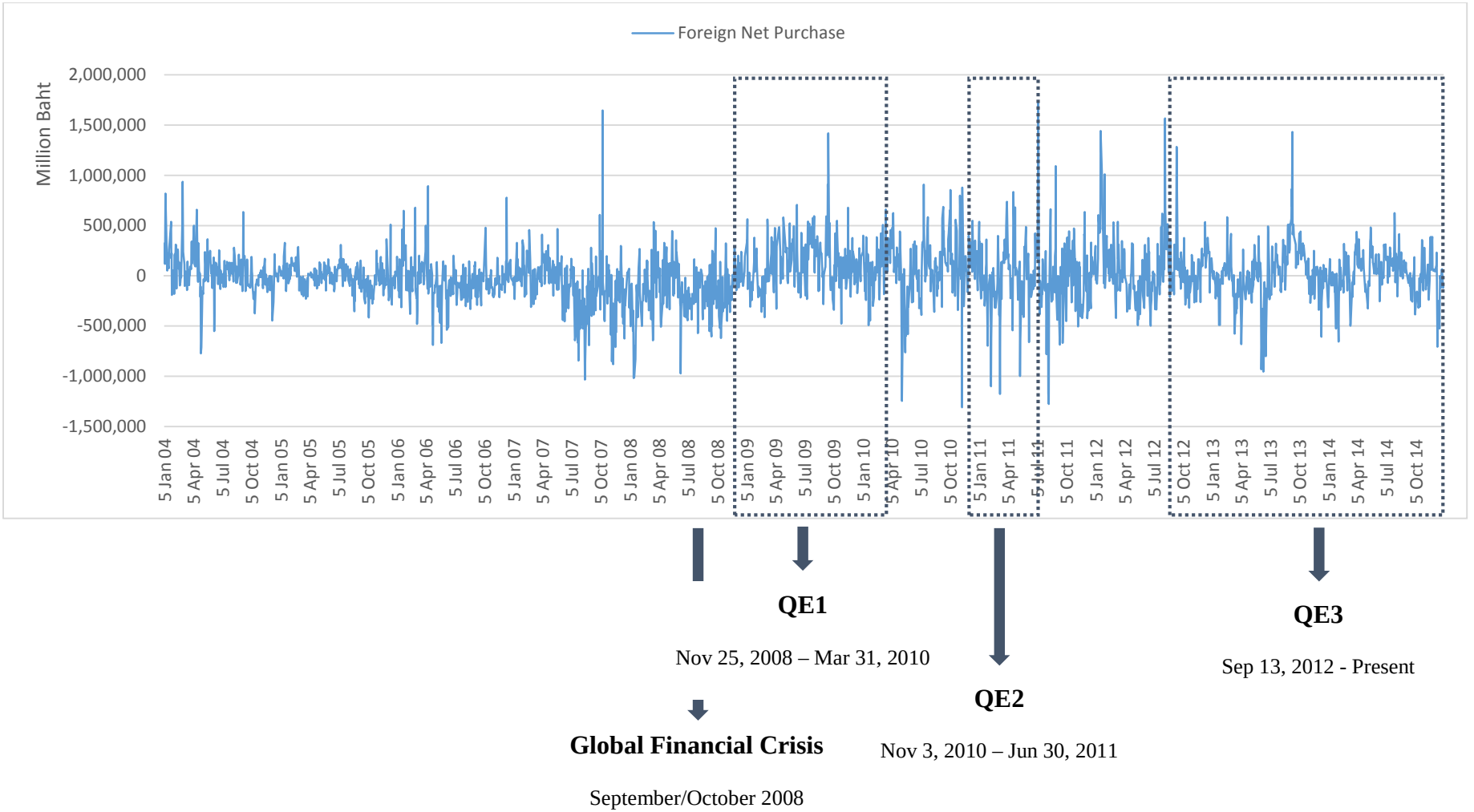

Figure 4.9 Daily Net Purchases of Foreign Investors in Korean Stock Market from January 2, 2008 to December 30, 2014

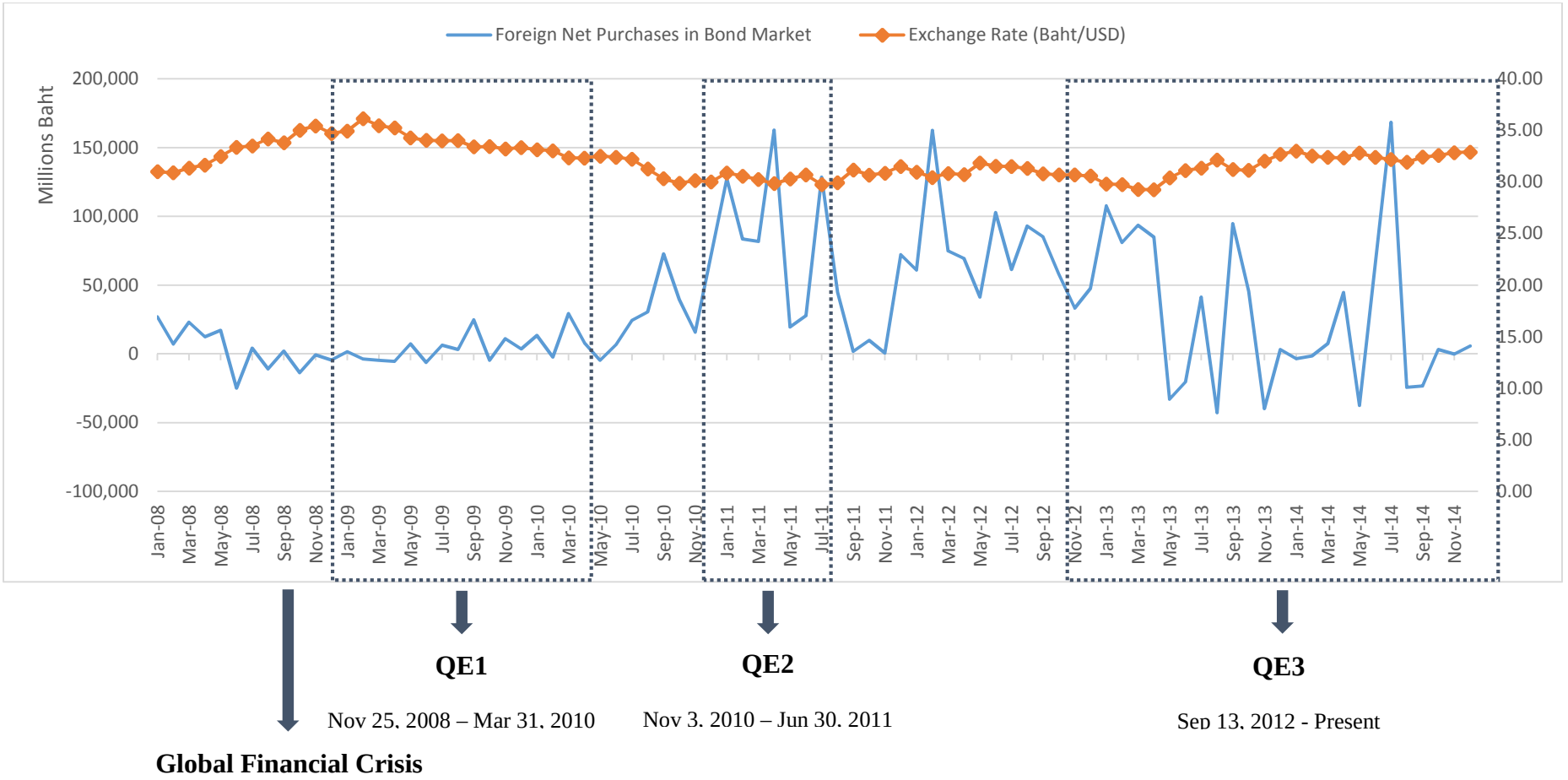

Figure 4.10 Monthly Net Purchases of Foreign Investors in Thai Bond Market and Exchange Rate from January 2008 to December 2014

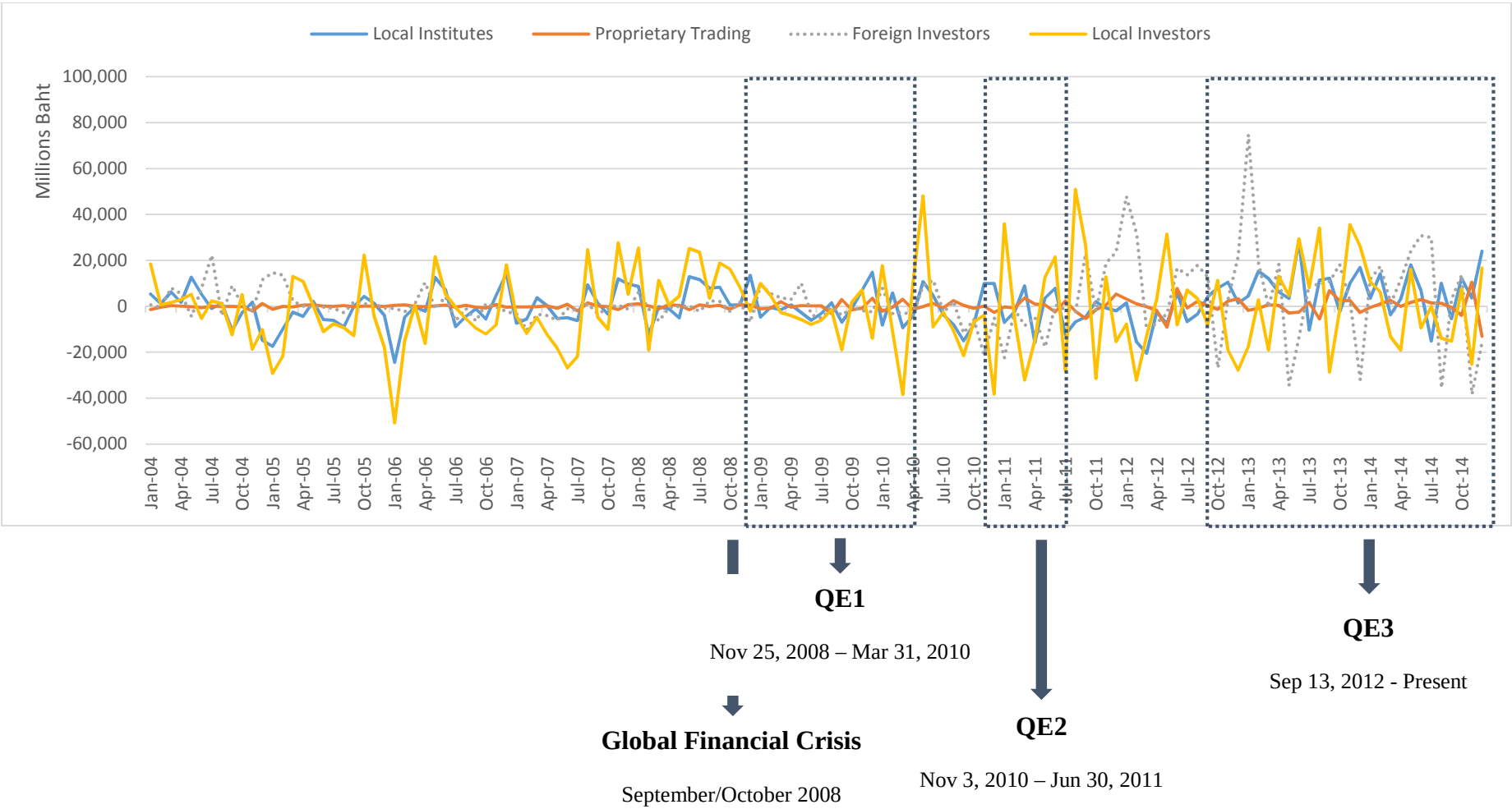

Figure 4.11 Monthly Net Purchases of All Investor Groups in Thai Stock Market from January 2008 to December 2014

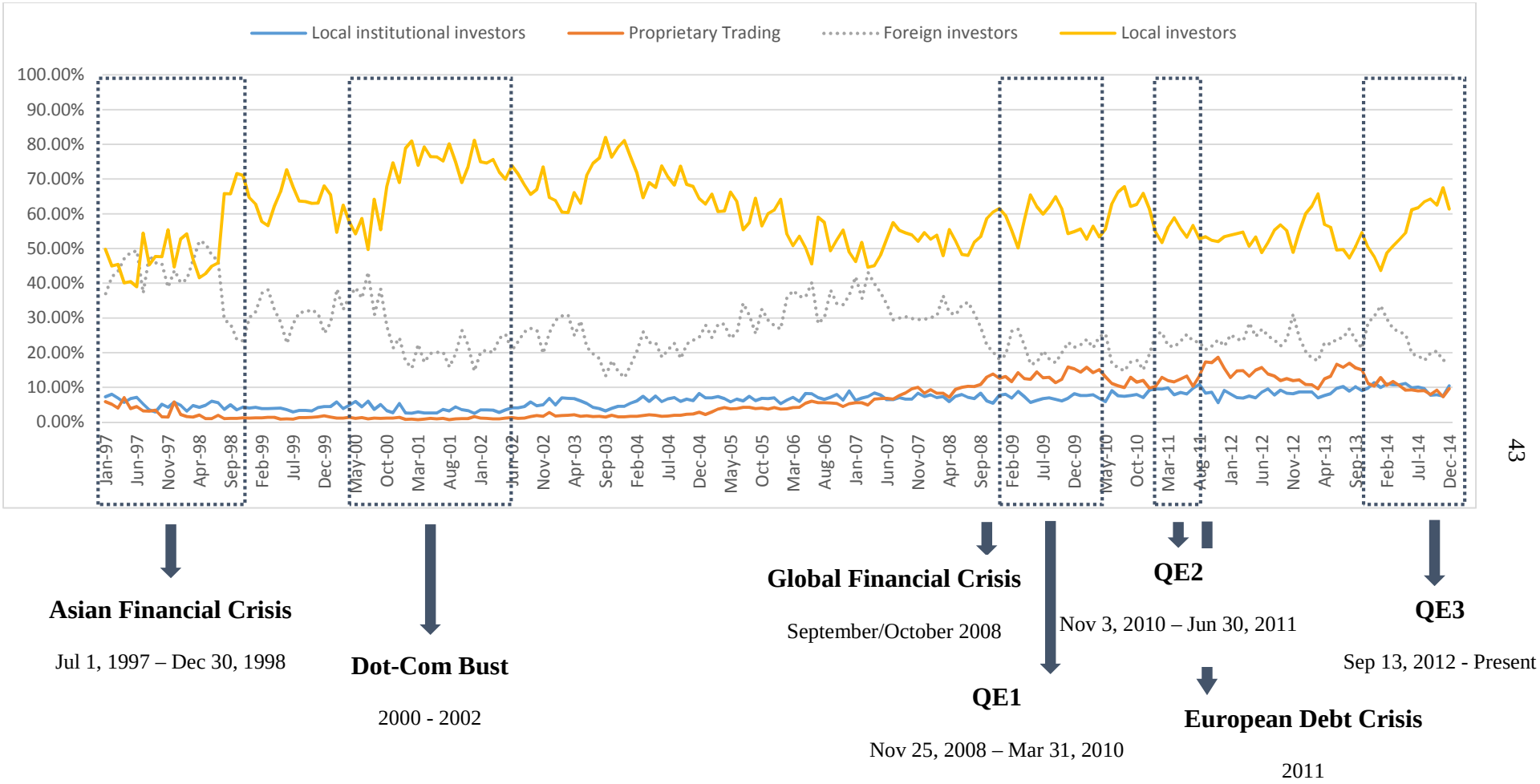

Figure 4.12 Monthly Percentage Turnover of All Investor Groups in Thai Stock Market from January 1997 to December 2014

4.2 Unit Root Test

First, a test was performed to check if all variables are stationary using the Augmented Dickey-Fuller (ADF) Unit Root Test with and without trends. The results are presented in Table 4.5. For Thailand, the test found that for a test without a trend assumption, local institutes' net purchases, proprietary trading net purchases, foreign net purchases, local investors' net purchases, stock returns, currency returns, global returns, stock prices volatility and exchange rate volatility rejected the hypothesis that there is a unit root process. Therefore, local institutes' net purchases, proprietary trading net purchases, foreign net purchases, local investors' net purchases, stock returns, currency returns, global returns, stock prices volatility and exchange rate volatility are stationary, or I(0) process. Under the ADF test with a trend assumption, local institutes' net purchases, proprietary trading net purchases, foreign net purchases, local investors' net purchases, stock returns, currency returns, global returns, stock prices volatility and exchange rate volatility also rejected the hypothesis that there is a unit root process. Therefore, local institutes' net purchases, proprietary trading net purchases, foreign net purchases, local investors' net purchases, stock returns, currency returns, global returns, stock prices volatility and exchange rate volatility are stationary or I(0) process.

For Korea, the test found that under a test without a trend assumption, foreign net purchases, stock returns, currency returns, stock prices volatility and exchange rate volatility rejected the hypothesis that there is a unit root process. Therefore, foreign net purchases, stock returns, currency returns, stock prices volatility and exchange rate volatility are stationary or I(0) process. Under the ADF test with a trend assumption, foreign net purchases, stock returns, currency returns, stock prices volatility and exchange rate volatility also rejected the hypothesis that there is a unit root process. Therefore, foreign net purchases, stock returns, currency returns, stock prices volatility and exchange rate volatility are stationary or I(0) process.

Table 4.5 Unit Root Test

Variable	Without Trend		With Trend	
	ADF t-Statistic	P-Value	ADF t-Statistic	P-Value
Thailand				
Local Institutes Net Purchases	-12.02530**	0.0000	-12.15665**	0.0000
Prop Trade Net Purchases	-12.69277**	0.0000	-12.69144**	0.0000
Foreign Net Purchases	-10.68953**	0.0000	-10.80381**	0.0000
Local Investors Net Purchases	-13.00975**	0.0000	-13.06962**	0.0000
Stock Returns	-12.36281**	0.0000	-12.38554**	0.0000
Currency Returns	-10.81158**	0.0000	-10.84452**	0.0000
Stock Prices Volatility	-5.851895**	0.0000	-5.904807**	0.0000
Exchange Rate Volatility	-4.119934**	0.0000	-4.241890**	0.0039
Global Returns	-37.12445**	0.0000	-37.11889**	0.0000
Korea				
Foreign Net Purchases	-6.529281**	0.0000	-6.598028**	0.0000
Stock Returns	-16.22127**	0.0000	-16.24624**	0.0000
Currency Returns	-12.18749**	0.0000	-12.19391**	0.0000
Stock Prices Volatility	-3.944508**	0.0018	-4.178422**	0.0048
Exchange Rate Volatility	-3.809297**	0.0029	-3.807490**	0.0163

4.3 Structural VAR Estimation

The estimation of a SVAR model firstly requires the explicit choice of lag length in the model. The appropriate lag length selection of the SVAR is another important step. Too few lags mean that regression residuals do not behave as white noise processes. The model will not be able to capture the actual error process very well so that γ and its standard error cannot be well estimated. On the other hand, too many lags reduce the power of the test to reject the null hypothesis and lost degree of freedom as well (Ender, 2004). For this study, the appropriate lag length of the SVAR is presented in Table 4.6.

Table 4.6 Lag Length Criteria

Period	Lag Criteria	LR	FPE	AIC	SC	HQ
Thailand						
Full Sample	4	6	4	4	2	3
Pre-Crisis	2	2	2	2	1	2
Crisis	2	6	2	2	1	2
Post-Crisis	4	8	4	4	1	2
Korea						
Full Sample	8	8	8	8	3	4
Pre-Crisis	2	8	2	2	1	1
Crisis	8	8	8	8	1	4
Post-Crisis	7	7	7	7	2	3

For the SVAR estimation, the results of the two countries, Thailand and Korea, for the periods: full sample, pre-crisis, crisis and post-crisis, are presented in Table 4.7 to Table 14.

Table 4.7 Structural VAR Estimation (Full Sample in Thailand)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-21.04384**	3.794311	-5.546157	0.0000
C(4)	0.407520**	0.020829	19.56505	0.0000
C(5)	15.80538**	1.308167	12.08208	0.0000
C(7)	0.006141**	0.001259	4.875852	0.0000
C(8)	0.071838**	0.015294	4.697145	0.0000
C(9)	0.003709**	0.000895	4.141485	0.0000
C(1)	0.011247**	0.000158	71.17584	0.0000
C(3)	0.006700**	0.000750	8.928718	0.0000
C(6)	0.011562**	0.000164	70.48104	0.0000
C(10)	0.000411**	5.39E-05	7.618263	0.0000
Log likelihood	42990.98			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	21.04384	
-0.407520	0.000000	1.000000	-15.80538	
-0.006141	-0.071838	-0.003709	1.000000	
Estimated B matrix:				
0.011247	0.000000	0.000000	0.000000	
0.000000	0.006700	0.000000	0.000000	
0.000000	0.000000	0.011562	0.000000	
0.000000	0.000000	0.000000	0.000411	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.8 Structural VAR Estimation (Pre-Crisis in Thailand)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-13.83669**	4.561306	-3.033494	0.0024
C(4)	0.374830**	0.052668	7.116810	0.0000
C(5)	19.30860**	2.156210	8.954880	0.0000
C(7)	0.009024**	0.002791	3.233776	0.0012
C(8)	0.039650**	0.015699	2.525592	0.0116
C(9)	0.004534**	0.001906	2.378422	0.0174
C(1)	0.006814**	0.000158	43.24350	0.0000
C(3)	0.006975**	0.000878	7.941323	0.0000
C(6)	0.010467**	0.000252	41.53957	0.0000
C(10)	0.000383**	6.10E-05	6.271129	0.0000
Log likelihood	15974.99			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	13.83669	
-0.374830	0.000000	1.000000	-19.30860	
-0.009024	-0.039650	-0.004534	1.000000	
Estimated B matrix:				
0.006814	0.000000	0.000000	0.000000	
0.000000	0.006975	0.000000	0.000000	
0.000000	0.000000	0.010467	0.000000	
0.000000	0.000000	0.000000	0.000383	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.9 Structural VAR Estimation (Crisis in Thailand)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	0.423670	6.523949	0.064941	0.9482
C(4)	0.307129	1.032159	0.297559	0.7660
C(5)	90.61847	354.3993	0.255696	0.7982
C(7)	0.010997	0.064882	0.169492	0.8654
C(8)	0.003938	0.009449	0.416718	0.6769
C(9)	-0.014193	0.113732	-0.124791	0.9007
C(1)	0.020498**	0.001003	20.44505	0.0000
C(3)	0.005618**	0.000282	19.92525	0.0000
C(6)	0.020781	0.045767	0.454063	0.6498
C(10)	0.000372	0.001678	0.221702	0.8245
Log likelihood	3341.928			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	-0.423670	
-0.307129	0.000000	1.000000	-90.61847	
-0.010997	-0.003938	0.014193	1.000000	
Estimated B matrix:				
0.020498	0.000000	0.000000	0.000000	
0.000000	0.005618	0.000000	0.000000	
0.000000	0.000000	0.020781	0.000000	
0.000000	0.000000	0.000000	0.000372	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.10 Structural VAR Estimation (Post-Crisis in Thailand)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-41.21831**	9.476210	-4.349662	0.0000
C(4)	0.385446**	0.026240	14.68932	0.0000
C(5)	8.956446**	1.753695	5.107186	0.0000
C(7)	0.019098**	0.005786	3.300927	0.0010
C(8)	0.256395**	0.077805	3.295349	0.0010
C(9)	0.013684**	0.003862	3.542877	0.0004
C(1)	0.011322**	0.000215	52.74467	0.0000
C(3)	0.008521**	0.001816	4.692122	0.0000
C(6)	0.010967**	0.000209	52.42506	0.0000
C(10)	0.000739**	0.000206	3.594524	0.0003
Log likelihood	24663.48			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	41.21831	
-0.385446	0.000000	1.000000	-8.956446	
-0.019098	-0.256395	-0.013684	1.000000	
Estimated B matrix:				
0.011322	0.000000	0.000000	0.000000	
0.000000	0.008521	0.000000	0.000000	
0.000000	0.000000	0.010967	0.000000	
0.000000	0.000000	0.000000	0.000739	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.11 Structural VAR Estimation (Full Sample in Korea)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-98.25310**	16.05448	-6.119980	0.0000
C(4)	0.496654**	0.021150	23.48229	0.0000
C(5)	8.674229**	1.151402	7.533624	0.0000
C(7)	0.030820**	0.006572	4.689379	0.0000
C(8)	0.155287**	0.032325	4.803980	0.0000
C(9)	0.026833**	0.005150	5.209959	0.0000
C(1)	0.011123**	0.000156	71.11962	0.0000
C(3)	0.024741**	0.003865	6.401641	0.0000
C(6)	0.011697**	0.000166	70.46033	0.0000
C(10)	0.001041**	0.000204	5.099797	0.0000
Log likelihood	42013.63			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	98.25310	
-0.496654	0.000000	1.000000	-8.674229	
-0.030820	-0.155287	-0.026833	1.000000	
Estimated B matrix:				
0.011123	0.000000	0.000000	0.000000	
0.000000	0.024741	0.000000	0.000000	
0.000000	0.000000	0.011697	0.000000	
0.000000	0.000000	0.000000	0.001041	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.12 Structural VAR Estimation (Pre-Crisis in Korea)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-70.37652	56.05795	-1.255425	0.2093
C(4)	0.751452**	0.054080	13.89519	0.0000
C(5)	3.263005**	1.448194	2.253154	0.0242
C(7)	0.050538	0.051225	0.986582	0.3238
C(8)	0.518311	0.523332	0.990406	0.3220
C(9)	0.020940	0.020762	1.008571	0.3132
C(1)	0.006808**	0.000157	43.24350	0.0000
C(3)	0.020674	0.016064	1.286920	0.1981
C(6)	0.011245**	0.000260	43.21695	0.0000
C(10)	0.001968	0.001935	1.017218	0.3090
Log likelihood	16393.45			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	70.37652	
-0.751452	0.000000	1.000000	-3.263005	
-0.050538	-0.518311	-0.020940	1.000000	
Estimated B matrix:				
0.006808	0.000000	0.000000	0.000000	
0.000000	0.020674	0.000000	0.000000	
0.000000	0.000000	0.011245	0.000000	
0.000000	0.000000	0.000000	0.001968	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.13 Structural VAR Estimation (Crisis in Korea)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-380.1783	488.0420	-0.778987	0.4360
C(4)	0.614892**	0.074901	8.209354	0.0000
C(5)	13.85436*	7.264714	1.907076	0.0565
C(7)	0.023201	0.034945	0.663929	0.5067
C(8)	0.158504	0.230513	0.687615	0.4917
C(9)	0.034316	0.048437	0.708463	0.4787
C(1)	0.018463**	0.000903	20.44505	0.0000
C(3)	0.094942	0.120916	0.785189	0.4323
C(6)	0.019942**	0.000979	20.37355	0.0000
C(10)	0.001966	0.002815	0.698491	0.4849
Log likelihood	3119.231			
Estimated A matrix:				
1.000000	0.000000	0.000000	0.000000	
0.000000	1.000000	0.000000	380.1783	
-0.614892	0.000000	1.000000	-13.85436	
-0.023201	-0.158504	-0.034316	1.000000	
Estimated B matrix:				
0.018463	0.000000	0.000000	0.000000	
0.000000	0.094942	0.000000	0.000000	
0.000000	0.000000	0.019942	0.000000	
0.000000	0.000000	0.000000	0.001966	

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

Table 4.14 Structural VAR Estimation (Post-Crisis in Korea)

Variable	Coefficient	Std. Error	z-Statistic	P-Value
C(2)	-63.46490**	8.106525	-7.828866	0.0000
C(4)	0.358591**	0.022875	15.67595	0.0000
C(5)	14.61831**	1.576019	9.275467	0.0000
C(7)	0.015654**	0.002739	5.715547	0.0000
C(8)	0.076796**	0.012610	6.089986	0.0000
C(9)	0.020644**	0.002627	7.859251	0.0000
C(1)	0.011170**	0.000212	52.74467	0.0000
C(3)	0.013975**	0.001584	8.824267	0.0000
C(6)	0.009135**	0.000181	50.40826	0.0000
C(10)	0.000493**	6.86E-05	7.182175	0.0000

Log likelihood	23810.83

Estimated A matrix:			
1.000000	0.000000	0.000000	0.000000
0.000000	1.000000	0.000000	63.46490
-0.358591	0.000000	1.000000	-14.61831
-0.015654	-0.076796	-0.020644	1.000000
Estimated B matrix:			
0.011170	0.000000	0.000000	0.000000
0.000000	0.013975	0.000000	0.000000
0.000000	0.000000	0.009135	0.000000
0.000000	0.000000	0.000000	0.000493

*and** denote significance at the 10% and 5% level, respectively.

Model: Ae = Bu where E[uu']=I
Restriction Type: short-run text form
@e1 = C(1)*@u1
@e2 = C(2)*@e4 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e4 + C(6)*@u3
@e4 = C(7)*@e1 + C(8)*@e2 + C(9)*@e3 + C(10)*@u4
where
@e1 represents GLOBAL_RETURNS residuals
@e2 represents CURRENCY_RETURNS residuals
@e3 represents STOCK_RETURNS residuals
@e4 represents FOREIGN_NET_PURCHASES residuals

CHAPTER 5

EMPIRICAL RESULTS

This chapter discusses the study's empirical results that consist of two main parts. First, foreign investment behavior, including response of foreign flows to stock returns, currency returns and global returns as well as persistence in foreign flows, is presented. Second, impacts of foreign portfolio investment, including impacts on stock returns, currency returns, stock prices volatility, exchange rate volatility and local investors, are provided.

5.1 Foreign Investment Behavior

For the study of foreign investment behavior, a structural VAR model is examined with three endogenous variables: stock returns, currency returns and foreign net purchases and one exogenous: global returns. Granger causality tests, impulse response and variance decomposition are used in this analysis and the results are shown below.

5.1.1 Response of Foreign Flows to Stock Returns

The empirical results from granger causality analysis, presented in Table 5.1, reveal that there is a relationship between foreign net purchases and stock returns with high significance, at the 5% level, during the full sample period in both Thailand and Korea. Stock returns indeed lead the change in foreign net purchases. Alternative ways to assess the relative effects of foreign net purchases and stock returns are variance decomposition and impulse response of the VAR system. Variance decomposition of foreign net purchases analysis shown in Tables 5.2 to 5.9 reveals that the share of shock to foreign net purchases comes from stock returns about 0.45% in the first day and 1.8% in the tenth day for Thailand and about 0.6% in the first day and 2.3% in the tenth day for Korea.

As presented in Figures 5.1 and 5.2, impulse response results display the impact of one standard deviation shock from stock returns on foreign net purchases. The impacts of one standard deviation innovations in stock returns is a cumulative increase in foreign net purchases equivalent to 0.006% of market capitalization in the fourth day for Thailand and 0.004% of market capitalization in the second day for Korea. Therefore, these suggest that foreign net purchases respond to contemporaneous change from stock returns. In other words, foreign net purchases are contemporaneously affected by change in stock returns.

In addition, the results of impulse responses reveal the positive correlation between stock returns and foreign net purchases during the full sample period in both Thailand and Korea. This implies that with positive feedback trading behavior with respect to local stock returns, net purchases of foreign investors are determined by past returns. These results support the findings of Choe et al. (1999), Froot et al. (2001), Griffin et al. (2004), Richards (2005), Kim et al. (2009) and Ülkü and Weber (2014), who, employing daily data reports, found a significant positive correlation between current foreign flows and lagged local equity market returns, which suggests that international investors pursue positive feedback trading strategies.

Unfortunately, the results are not consistent in all periods. The results are significant during the pre-crisis period but insignificant during the crisis and post-crisis periods. This may be because of the conditions in mature markets (push factors) that on average affect foreign flows more than conditions in domestic markets (pull factors) as Calvo, Leiderman, and Reinhart (1993) argued when they said that foreign flows to emerging markets are substantially driven by conditions in mature markets.

Table 5.1 Granger Causality Test between Foreign Net Purchases and Other Variables

Dependent variable:	Thailand		Korea	
Foreign Net Purchases	Chi-sq.	P-Value	Chi-sq.	P-Value
Full Sample				
Stock Returns	40.893**	0.0000	36.486**	0.0000
Currency Returns	29.520**	0.0000	36.147**	0.0000
Global Returns	133.774**	0.0000	370.804**	0.0000
Pre-Crisis				
Stock Returns	28.526**	0.0000	28.303**	0.0000
Currency Returns	10.345**	0.0057	0.712	0.7003
Global Returns	71.919**	0.0000	89.547**	0.0000
Crisis				
Stock Returns	1.676	0.4325	2.433	0.9648
Currency Returns	4.613*	0.0996	26.670**	0.0008
Global Returns	23.747**	0.0000	74.475**	0.0000
Post-Crisis				
Stock Returns	20.474**	0.0004	5.984	0.5416
Currency Returns	6.985	0.1367	4.468	0.7245
Global Returns	105.627**	0.0000	275.707**	0.0000

*and** denote significance at the 10% and 5% level, respectively.

Table 5.2 Variance Decomposition of Foreign Net Purchases (Full Sample Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011247	1.808162	56.54649	0.448790	41.19656
2	0.011349	11.46046	47.21224	2.082094	39.24521
3	0.011406	13.32236	45.42092	1.956117	39.30060
4	0.011423	13.78307	45.43201	1.870756	38.91416
5	0.011425	14.07621	45.44984	1.850257	38.62370
6	0.011426	14.28645	45.38706	1.826756	38.49973
7	0.011426	14.36256	45.33294	1.809674	38.49483
8	0.011426	14.40968	45.31041	1.798873	38.48104
9	0.011426	14.44207	45.29068	1.792256	38.47499
10	0.011426	14.46306	45.28223	1.788338	38.46638

Table 5.3 Variance Decomposition of Foreign Net Purchases (Pre-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006814	2.316306	33.18355	0.976997	63.52315
2	0.006860	13.24793	25.96965	3.579345	57.20308
3	0.006875	14.52706	24.44982	3.293821	57.72930
4	0.006875	15.27398	23.92474	3.340766	57.46052
5	0.006876	15.52770	23.69243	3.313270	57.46660
6	0.006876	15.64492	23.59537	3.307659	57.45206
7	0.006876	15.69318	23.55500	3.304372	57.44744
8	0.006876	15.71412	23.53739	3.303048	57.44545
9	0.006876	15.72309	23.52984	3.302476	57.44459
10	0.006876	15.72696	23.52659	3.302229	57.44422

Table 5.4 Variance Decomposition of Foreign Net Purchases (Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.020498	7.576544	0.200229	35.59998	56.62324
2	0.021128	23.43009	1.064151	26.46214	49.04362
3	0.022150	23.30768	0.995990	26.59052	49.10581
4	0.022489	22.48593	1.007029	26.26793	50.23911
5	0.022575	22.10393	1.011201	26.22961	50.65526
6	0.022671	22.22405	1.015119	26.09720	50.66363
7	0.022673	22.31880	1.015008	26.04252	50.62367
8	0.022693	22.29872	1.015034	26.02681	50.65944
9	0.022694	22.27364	1.015264	26.02174	50.68935
10	0.022697	22.26878	1.015499	26.01671	50.69901

Table 5.5 Variance Decomposition of Foreign Net Purchases (Post-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011322	1.405371	88.09046	0.415707	10.08846
2	0.011385	13.32440	75.00988	1.835717	9.830005
3	0.011404	16.04747	72.63521	1.756791	9.560529
4	0.011416	16.77923	71.80965	1.719654	9.691466
5	0.011454	17.44500	71.11400	1.661314	9.779683
6	0.011454	17.61096	70.98779	1.662205	9.739048
7	0.011455	17.70507	70.91037	1.653876	9.730679
8	0.011455	17.76610	70.85205	1.646653	9.735200
9	0.011455	17.81064	70.81364	1.641123	9.734598
10	0.011455	17.84362	70.78494	1.638413	9.733023

Table 5.6 Variance Decomposition of Foreign Net Purchases (Full Sample Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011123	1.490091	91.21072	0.608749	6.690444
2	0.011216	18.58284	75.33101	1.117990	4.968165
3	0.011285	21.26755	72.93161	1.111503	4.689334
4	0.011321	21.88437	72.38951	1.175493	4.550630
5	0.011341	21.98803	72.22980	1.299983	4.482191
6	0.011356	21.72674	72.27007	1.573585	4.429602
7	0.011385	22.18597	71.84190	1.600419	4.371712
8	0.011404	22.33934	71.38421	1.935355	4.341100
9	0.011452	22.24441	71.07371	2.210091	4.471787
10	0.011463	22.24550	70.98522	2.339271	4.430007

Table 5.7 Variance Decomposition of Foreign Net Purchases (Pre-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006808	0.171126	96.52495	0.046613	3.257309
2	0.006851	13.25236	81.97279	2.044582	2.730264
3	0.006874	14.37535	81.21430	1.907273	2.503083
4	0.006875	14.74807	80.86529	1.950213	2.436429
5	0.006875	14.88181	80.74164	1.960061	2.416484
6	0.006876	14.93642	80.69901	1.956035	2.408535
7	0.006876	14.95133	80.68735	1.955498	2.405820
8	0.006876	14.95700	80.68248	1.955626	2.404890
9	0.006876	14.95916	80.68074	1.955543	2.404552
10	0.006876	14.95988	80.68017	1.955517	2.404432

Table 5.8 Variance Decomposition of Foreign Net Purchases (Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.018463	0.289035	97.83821	0.202324	1.670429
2	0.019361	27.90324	70.49991	0.147074	1.449780
3	0.020374	29.03719	69.30615	0.156646	1.500018
4	0.021031	28.95029	67.35274	0.796392	2.900575
5	0.021542	28.40199	65.37217	0.809892	5.415955
6	0.021559	27.96989	64.30708	0.947609	6.775416
7	0.022108	31.95203	60.00356	0.878027	7.166384
8	0.023116	32.01344	59.71606	1.123739	7.146756
9	0.023598	33.49647	57.89321	1.683167	6.927154
10	0.023883	33.91232	56.79627	1.943742	7.347663

Table 5.9 Variance Decomposition of Foreign Net Purchases (Post-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011170	4.432068	76.95682	2.375920	16.23519
2	0.011231	25.92653	59.58064	2.083578	12.40925
3	0.011279	30.23992	56.23081	1.934255	11.59501
4	0.011307	31.90638	54.92635	1.874093	11.29317
5	0.011402	32.35176	54.55845	1.841002	11.24879
6	0.011445	32.07559	54.61857	1.826781	11.47906
7	0.011477	32.61815	53.96315	1.862643	11.55606
8	0.011484	32.89827	53.67817	1.863790	11.55976
9	0.011486	32.96948	53.48918	1.908666	11.63267
10	0.011489	33.06070	53.40447	1.902456	11.63237

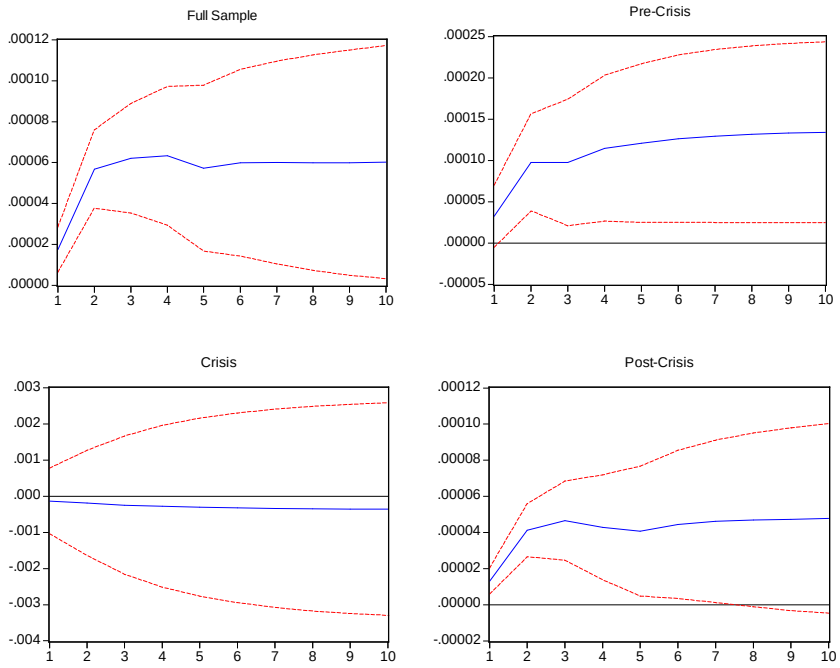

Figure 5.1 Impulse Response of Foreign Net Purchases to a shock in Stock Returns (Thailand)

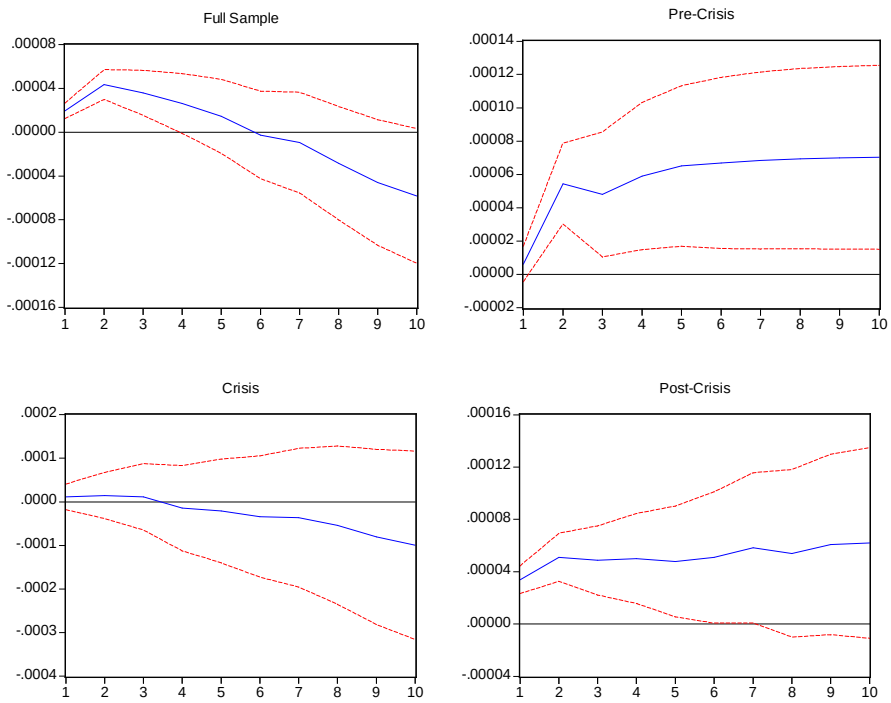

Figure 5.2 Impulse Response of Foreign Net Purchases to a shock in Stock Returns (Korea)

5.1.2 Response of Foreign Flows to Currency Returns

The empirical results from the granger causality analysis, presented in Table 5.1, reveal that there is a relationship between foreign net purchases and currency returns with high significance at the 5% level during the full sample period in both Thailand and Korea. Currency returns indeed lead the change in foreign net purchases. Alternative ways to assess the relative effects of foreign net purchases and currency returns are variance decomposition and impulse response of the VAR system. Variance decomposition of foreign net purchases analysis shown in Tables 5.2 to 5.9 reveal that the share of shock to foreign net purchases comes from currency returns about 56.5% in the first day and 45.3% in the tenth day for Thailand and about 91.2% in the first day and 80% in the tenth day for Korea.

As presented in Figures 5.3 and 5.4, impulse response results display the impact of one standard deviation shock from currency returns on foreign net purchases. The impacts of one standard deviation innovation in currency returns is a cumulative

increase in foreign net purchases equivalent to 0.045% in the tenth day for Thailand and 0.058% in the tenth day for Korea. Therefore, these suggest that foreign net purchases respond to contemporaneous change from currency returns. In other words, foreign net purchases are contemporaneously affected by change in currency returns.

In addition, foreign net purchases continuously increase in response to one standard deviation of a shock in depreciation. This implies that a local currency depreciation increasing in currency returns, lowers stock prices in terms of foreign currency and promotes net purchases of foreign investors. These results support the findings of Chayawadee and Ho (2008), who stated that currency returns tend to show influence over foreign investors' demand for Asian equities.

Moreover, the variance decomposition results show that currency returns have the most impact on foreign net purchases when compared with stock returns and global returns. Thus, currency returns are the most important factor for foreign investment decision making during the sample periods.

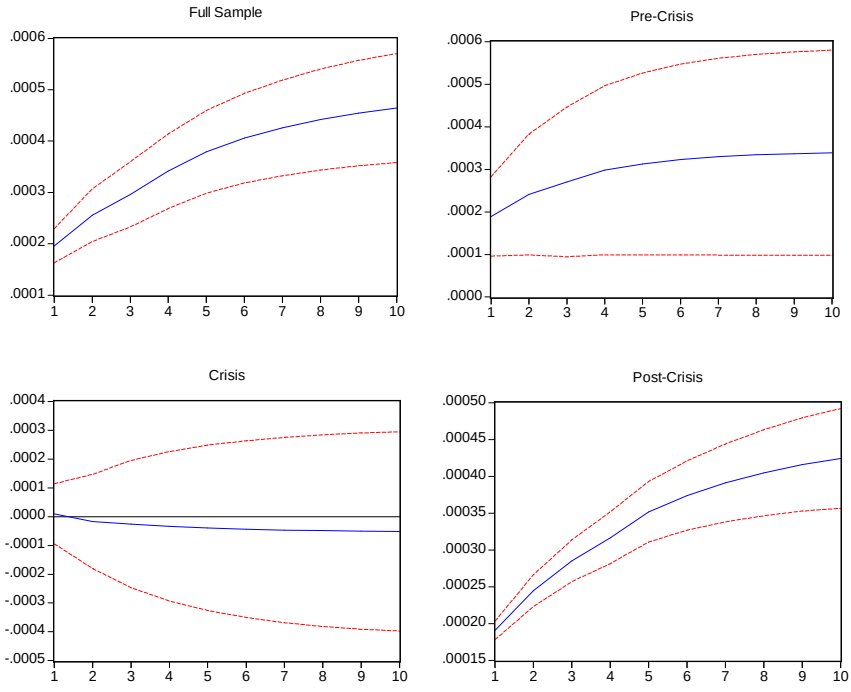

Figure 5.3 Impulse Response of Foreign Net Purchases to a shock in Currency Returns (Thailand)

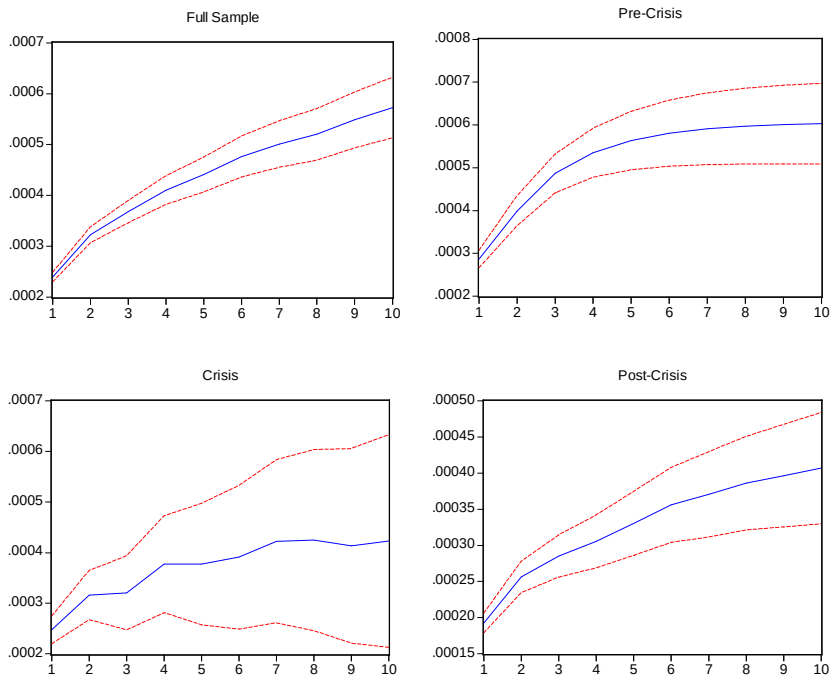

Figure 5.4 Impulse Response of Foreign Net Purchases to a shock in Currency Returns (Korea)

5.1.3 Response of Foreign Flows to Global Returns

The empirical results from granger causality analysis, presented in Table 5.1, reveal that there is a relationship between foreign net purchases and global returns with high significance at the 5% level during the full sample period in both Thailand and Korea. Global returns indeed lead the change in foreign net purchases. Alternative ways to assess the relative effects of foreign net purchases and global returns are variance decomposition and impulse response of the VAR system. Variance decomposition of foreign net purchases analysis, as shown in Tables 5.2 to 5.9, reveals that the share of shock to foreign net purchases comes from global returns about 1.8% in the first day and 14.5% in the tenth day for Thailand and about 1.5% in the first day and 22.2% in the tenth day for Korea.

Moreover, the variance in foreign flows can be decomposed to see whether local returns or global returns are more important. Local returns account for 1.8% of the variance in foreign net purchases, while global returns account for 14.5% in the tenth day for Thailand. At the same time, local returns account for 2.3% of the variance in

foreign net purchases, while global returns account for 22.2% in the tenth day for Korea. Thus, it can be concluded that conditions in mature markets (push factors) on average affect foreign flows more than conditions in domestic markets (pull factors) as argued by Calvo, Leiderman, and Reinhart (1993), who said that foreign flows to emerging markets are substantially driven by conditions in mature markets.

As can be seen in Figures 5.5 and 5.6, impulse response results display the impact of one standard deviation shock from global returns on foreign net purchases. The impacts of one standard deviation innovation in global returns is a cumulative increase in foreign net purchases equivalent to 0.03% in the tenth day for Thailand and 0.035% in the tenth day for Korea. Therefore, these suggest that foreign net purchases respond to contemporaneous change from global returns. In other words, foreign net purchases are contemporaneously affected by change in global returns.

In addition, foreign net purchases and global returns have a significantly positive relationship. This implies that an increase in global returns promotes net purchases of foreign investors into local stock markets. Thus, foreigners' response to past global returns is different from their response to past local returns. Specifically, they do exhibit positive feedback trading with respect to global returns, consistent with the findings of Griffin et al.'s (2004) and Richards' (2005). Foreigners' differential response to past local and global returns at the same time in the same market shows that they treat local and global information differently. Ülkü and İkizlerli (2012) explained that the difference may be due to a belief in spill-over effects from the global economy toward the smaller economy or the specific characteristics of the local economy, (i.e., Turkish economy’s lack of sustainable domestic growth due to external deficits) which may have led foreigners to suspect the sustainability of positive domestic returns. However, positive feedback trading with respect to global returns may be driven by portfolio rebalancing, as argued by Kodres and Pritsker (2002) and Griffin et al. (2004).

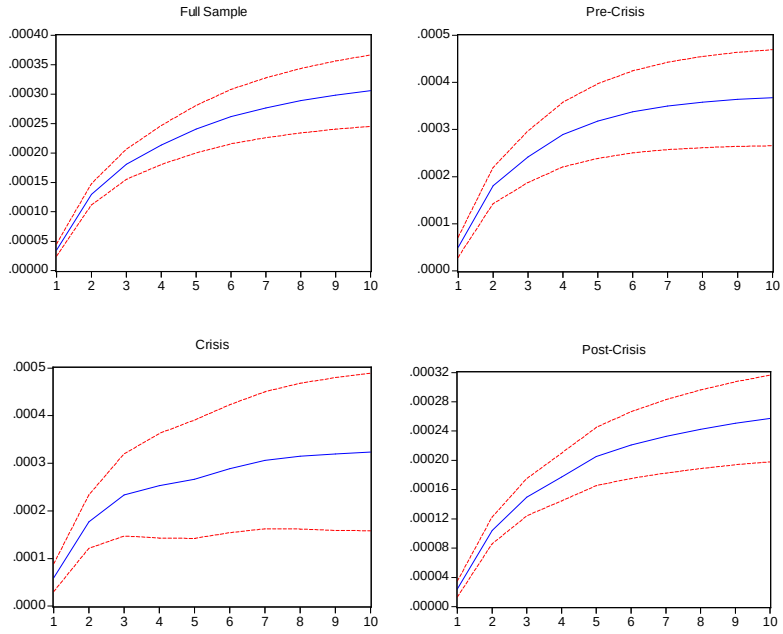

Figure 5.5 Impulse Response of Foreign Net Purchases to a shock in Global Returns (Thailand)

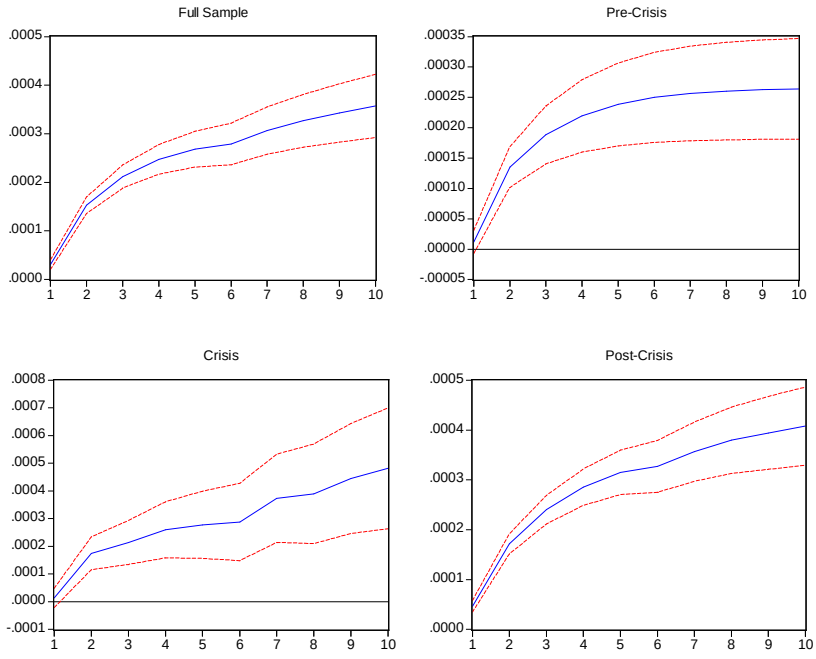

Figure 5.6 Impulse Response of Foreign Net Purchases to a shock in Global Returns (Korea)

5.1.4 Persistence in Foreign Flows

To investigate the persistence in foreign flows, the impulse response results are examined to determine the impact of one standard deviation shock from foreign net purchases on foreign net purchases. The impacts of one standard deviation innovation in foreign net purchases is a cumulative increase in foreign net purchases equivalent to 0.043% of market capitalization in the tenth day for Thailand and 0.0082% of market capitalization in the tenth day for Korea, as shown in Figures 5.7 and 5.8. These suggest that foreign net purchases respond to contemporaneous change from foreign net purchases. In other words, foreign net purchases are contemporaneously affected by change in foreign net purchases. This means a persistence in foreign flows. These results support the findings of Ülkü and İkizlerli (2012), who concluded that persistence in net foreign flows is not driven solely by post liberalization effects, which is also consistent with Albuquerque et al.'s (2007) model implication. The model of Albuquerque et al. (2007) predicts foreign investors will build and unwind positions gradually leading to persistence in net flows. Most empirical studies also confirm this prediction; in particular, Froot and Donohue (2002) report strong persistence in emerging markets funds' foreign flows.

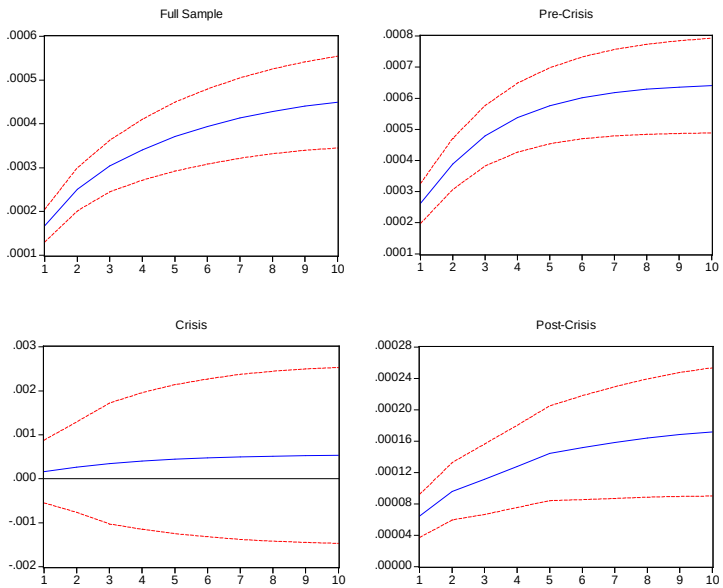

Figure 5.7 Impulse Response of Foreign Net Purchases to a shock in Foreign Net Purchases (Thailand)

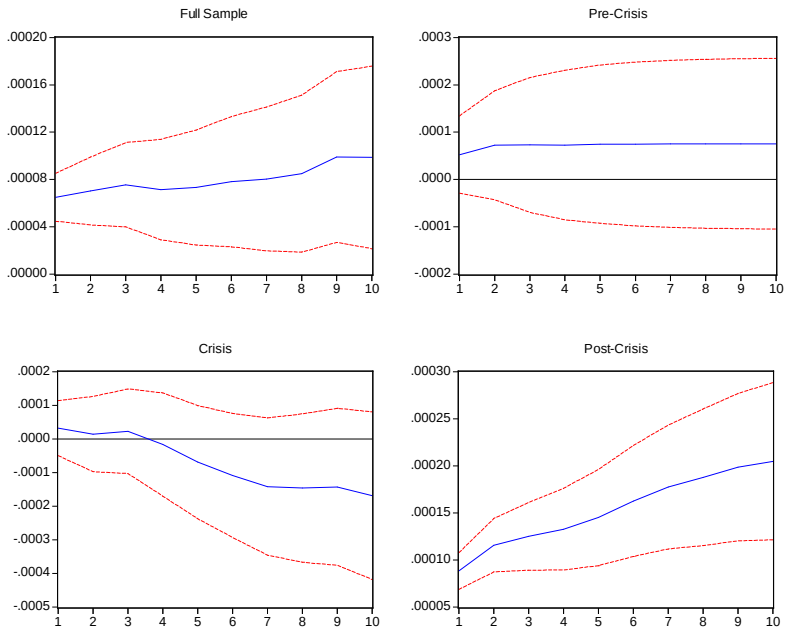

Figure 5.8 Impulse Response of Foreign Net Purchases to a shock in Foreign Net Purchases (Korea)

5.2 Impacts of Foreign Portfolio Investment

The study of impacts of foreign portfolio investment was conducted using the results of a structural VAR estimation with three endogenous variables: stock returns, currency returns and foreign net purchases and one exogenous: global returns. Granger causality tests, impulse response and variance decomposition are also used in this analysis and the results are presented below.

5.2.1 Impacts on Stock Returns

The empirical results from granger causality analysis, as shown in Table 5.10, reveal that there is a relationship between stock returns and foreign net purchases with high significance at the 5% level during the full sample period in both Thailand and Korea. Foreign net purchases indeed lead the change in stock returns. Alternative ways to assess the relative effects of stock returns and foreign net purchases are variance decomposition and impulse response of the VAR system. Variance decomposition of stock returns analysis, as shown in Tables 5.11 to 5.18, reveals that the share of shock

to stock returns comes from foreign net purchases about 3.8% in the first day and 4% in the tenth day for Thailand and about 0.18% in the first day and 1.1% in the tenth day for Korea.

As can be seen in Figures 5.9 and 5.10, impulse response results display the impact of one standard deviation shock from foreign net purchases on stock returns. The impacts of one standard deviation innovation in foreign net purchases is a cumulative increase in stock returns equivalent to 0.38% in the third day for Thailand and 0.2% in the tenth day for Korea. Therefore, these suggest that stock returns respond to contemporaneous change from foreign net purchases. In other words, stock returns are contemporaneously affected by change in foreign net purchases.

Therefore, the results of impulse responses reveal the positive correlation between foreign net purchases and stock returns. These results support the finding of Brennan and Cao (1997), Clark and Berko (1997), Froot et al. (2001), Dahlquist and Robertsson (2004), and Richards (2005), who reported a positive contemporaneous relation between foreigners' net buying and local stock market returns. In addition, to decompose foreign flows into “expected”, foreign flows on day t were constructed based on the flow regressions in the VAR systems using only variables predetermined at the end of domestic trading on day t-1, and “unexpected”, actual foreign flows on day t minus expected flows. Tables 5.19 and 5.20 show the results of the regressions explaining stock returns and this decomposition of foreign flows in Thailand and Korea, respectively. The coefficient of expected and unexpected foreign flows is positive with high significance at the 5% level for all periods in both Thailand and Korea. Thus, a predictable and unpredictable component of foreign net flows appear to be a significant driver of local stock returns. These results contradict Warther (1995), Richards (2005) and Pavabutr and Yan (2007), who suggested that only the surprise or unexpected component of foreign flows affects prices, while the expected component has little or no impact.

Moreover, the empirical results from granger causality analysis, shown in Table 5.10, also reveal that there is a relationship between stock returns and currency returns with high significance at the 5% level. Currency returns indeed lead the change in stock returns. Stock returns and currency returns have a significantly positive relationship. These results support the flow-oriented theory of Dornbusch and Fisher (1980), which

states that a depreciation of domestic currency can have a crucial impact on stock prices by increasing firms' competitiveness, while, in turn, raising their profitability. When firms are able to pay more dividends to stockholders, stock prices will increase. Thus, there should be a positive relationship between exchange rate and stock prices. In this case, exchange rate leads stock prices.

Table 5.10 Granger Causality Test between Stock Returns and Other Variables

Dependent variable:	Thailand		Korea	
Stock Returns	Chi-sq.	P-Value	Chi-sq.	P-Value
Full Sample				
Foreign Net Purchases	9.590**	0.0479	31.500**	0.0001
Currency Returns	22.227**	0.0002	30.379**	0.0002
Global Returns	207.578**	0.0000	406.381**	0.0000
Pre-Crisis				
Foreign Net Purchases	1.034	0.5963	10.679**	0.0048
Currency Returns	7.422**	0.0244	2.916	0.2326
Global Returns	73.870**	0.0000	149.286**	0.0000
Crisis				
Foreign Net Purchases	6.536**	0.0381	7.747	0.4586
Currency Returns	1.013	0.6025	18.436**	0.0182
Global Returns	25.675**	0.0000	42.815**	0.0000
Post-Crisis				
Foreign Net Purchases	23.538**	0.0001	44.767**	0.0000
Currency Returns	16.806**	0.0021	22.677**	0.0019
Global Returns	65.354**	0.0000	321.439**	0.0000

*and** denote significance at the 10% and 5% level, respectively.

Table 5.11 Variance Decomposition of Stock Returns (Full Sample Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011247	14.41266	5.249961	76.51256	3.824823
2	0.011349	18.99182	4.956080	72.18804	3.864055
3	0.011406	19.75478	4.977388	71.38315	3.884679
4	0.011423	19.77916	4.974018	71.36231	3.884507
5	0.011425	19.74796	5.042967	71.20278	4.006286
6	0.011426	19.74634	5.046224	71.18981	4.017624
7	0.011426	19.74620	5.046334	71.18899	4.018472
8	0.011426	19.74586	5.047133	71.18740	4.019604
9	0.011426	19.74613	5.047120	71.18710	4.019655
10	0.011426	19.74607	5.047248	71.18687	4.019814

Table 5.12 Variance Decomposition of Stock Returns (Pre-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006814	7.103817	7.660093	70.57240	14.66369
2	0.006860	12.12571	8.460158	65.95279	13.46134
3	0.006875	12.27517	8.592036	65.71715	13.41564
4	0.006875	12.28515	8.600486	65.68002	13.43434
5	0.006876	12.28741	8.599671	65.67354	13.43937
6	0.006876	12.28820	8.601063	65.67106	13.43967
7	0.006876	12.28847	8.601005	65.67022	13.44031
8	0.006876	12.28859	8.600981	65.66984	13.44059
9	0.006876	12.28864	8.600990	65.66968	13.44068
10	0.006876	12.28867	8.600992	65.66962	13.44073

Table 5.13 Variance Decomposition of Stock Returns (Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.020498	31.23825	0.175897	18.84357	49.74228
2	0.021128	35.16928	0.626821	20.51710	43.68680
3	0.022150	36.54870	0.601169	19.57873	43.27140
4	0.022489	37.12385	0.593235	19.49532	42.78760
5	0.022575	37.21030	0.592114	19.44644	42.75114
6	0.022671	37.28220	0.593305	19.43277	42.69173
7	0.022673	37.39275	0.592888	19.40154	42.61282
8	0.022693	37.38430	0.592813	19.40557	42.61732
9	0.022694	37.38943	0.592717	19.40249	42.61537
10	0.022697	37.38856	0.592770	19.40242	42.61625

Table 5.14 Variance Decomposition of Stock Returns (Post-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011322	14.25889	1.986773	83.52680	0.227533
2	0.011385	17.41754	2.495989	79.08879	0.997684
3	0.011404	17.86736	2.471241	78.01282	1.648573
4	0.011416	17.87284	2.466330	77.83076	1.830071
5	0.011454	17.96701	2.498524	77.60655	1.927913
6	0.011454	18.01085	2.497338	77.56492	1.926896
7	0.011455	18.01363	2.497210	77.56126	1.927902
8	0.011455	18.01372	2.498191	77.55860	1.929486
9	0.011455	18.01332	2.500437	77.55660	1.929639
10	0.011455	18.01325	2.500773	77.55635	1.929633

Table 5.15 Variance Decomposition of Stock Returns (Full Sample Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011123	18.73045	2.416256	78.67606	0.177236
2	0.011216	27.11662	2.059997	70.66848	0.154901
3	0.011285	27.15512	2.099553	70.25646	0.488866
4	0.011321	27.19484	2.305265	69.83359	0.666310
5	0.011341	27.10652	2.323740	69.88356	0.686184
6	0.011356	26.98085	2.428718	69.59334	0.997092
7	0.011385	26.97316	2.525246	69.49832	1.003273
8	0.011404	26.93182	2.530646	69.53014	1.007394
9	0.011452	26.83013	2.612597	69.49286	1.064411
10	0.011463	26.78232	2.660142	69.37535	1.182187

Table 5.16 Variance Decomposition of Stock Returns (Pre-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006808	17.21278	0.565833	82.20229	0.019094
2	0.006851	26.50558	0.711998	72.73019	0.052233
3	0.006874	26.22822	1.158046	72.31787	0.295858
4	0.006875	26.13051	1.158033	72.41277	0.298694
5	0.006875	26.14716	1.161427	72.39162	0.299791
6	0.006876	26.14522	1.167034	72.38727	0.300473
7	0.006876	26.14468	1.167866	72.38697	0.300477
8	0.006876	26.14480	1.168081	72.38662	0.300496
9	0.006876	26.14481	1.168230	72.38646	0.300496
10	0.006876	26.14481	1.168275	72.38642	0.300496

Table 5.17 Variance Decomposition of Stock Returns (Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.018463	24.25088	2.142744	73.56980	0.036584
2	0.019361	25.43250	2.056766	69.19114	3.319593
3	0.020374	24.90597	2.001867	67.57581	5.516358
4	0.021031	25.92613	2.385516	65.91268	5.775678
5	0.021542	24.60662	2.373893	62.94438	10.07511
6	0.021559	24.59788	2.398363	62.91562	10.08814
7	0.022108	27.39808	2.301247	60.72612	9.574556
8	0.023116	27.78195	2.623593	60.44529	9.149163
9	0.023598	27.74185	2.544691	60.84006	8.873391
10	0.023883	27.19391	3.188644	59.35959	10.25786

Table 5.18 Variance Decomposition of Stock Returns (Post-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011170	17.63905	6.380883	74.63392	1.346143
2	0.011231	26.97796	5.267568	66.31817	1.436298
3	0.011279	26.93438	6.387419	65.19320	1.485007
4	0.011307	26.72958	6.575632	65.21210	1.482689
5	0.011402	26.51727	6.551638	64.70540	2.225699
6	0.011445	26.32924	6.495132	63.97287	3.202757
7	0.011477	26.42217	6.594892	63.76409	3.218848
8	0.011484	26.69267	6.544523	63.56852	3.194284
9	0.011486	26.69403	6.540550	63.56766	3.197763
10	0.011489	26.71476	6.540111	63.53964	3.205489

Table 5.19 Estimation for Stock Returns (Thailand)

Variable	Coefficient	Std. Error	t-Statistic	P-Value
Full Sample				
Expected Foreign Flows	13.20505**	0.891990	14.80404	0.0000
Unexpected Foreign Flows	21.29843**	0.910671	23.38762	0.0000
Pre-Crisis				
Expected Foreign Flows	10.35427**	1.010099	10.25074	0.0000
Unexpected Foreign Flows	23.09980**	1.029072	22.44721	0.0000
Crisis				
Expected Foreign Flows	30.78351**	4.897614	6.285409	0.0000
Unexpected Foreign Flows	41.35830**	5.881190	7.032301	0.0000
Post-Crisis				
Expected Foreign Flows	13.78527**	1.526879	9.028394	0.0000
Unexpected Foreign Flows	14.55622**	1.470494	9.898867	0.0000

*and** denote significance at the 10% and 5% level, respectively.

Table 5.20 Estimation for Stock Returns (Korea)

Variable	Coefficient	Std. Error	t-Statistic	P-Value
Full Sample				
Expected Foreign Flows	11.70640**	0.956366	12.24050	0.0000
Unexpected Foreign Flows	18.54266**	0.951572	19.48634	0.0000
Pre-Crisis				
Expected Foreign Flows	7.023031**	1.384504	5.072596	0.0000
Unexpected Foreign Flows	8.863232**	1.333634	6.645925	0.0000
Crisis				
Expected Foreign Flows	22.92586**	6.671451	3.436412	0.0007
Unexpected Foreign Flows	29.12231**	5.752586	5.062472	0.0000
Post-Crisis				
Expected Foreign Flows	14.64812**	1.147500	12.76525	0.0000
Unexpected Foreign Flows	27.30165**	1.154786	23.64216	0.0000

*and** denote significance at the 10% and 5% level, respectively.

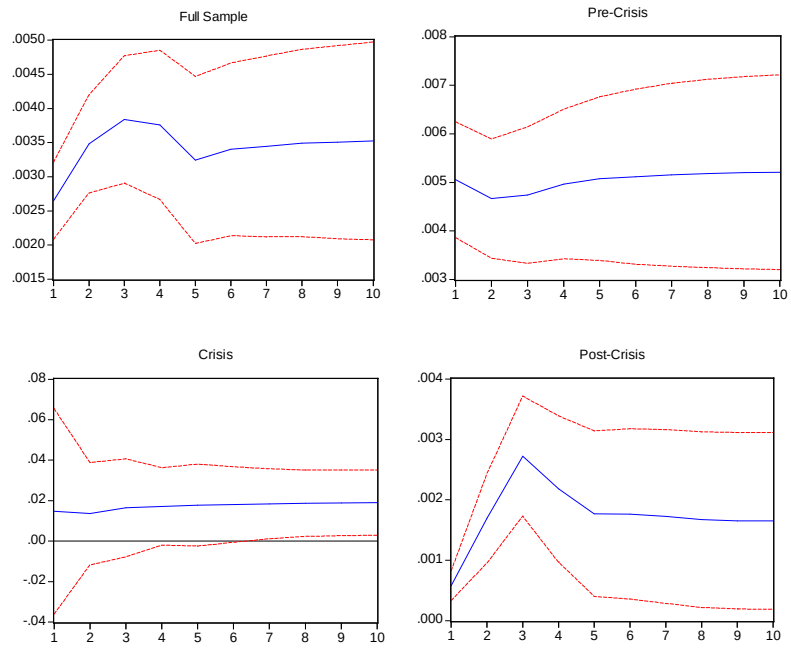

Figure 5.9 Impulse Response of Stock Returns to a shock in Foreign Net Purchases (Thailand)

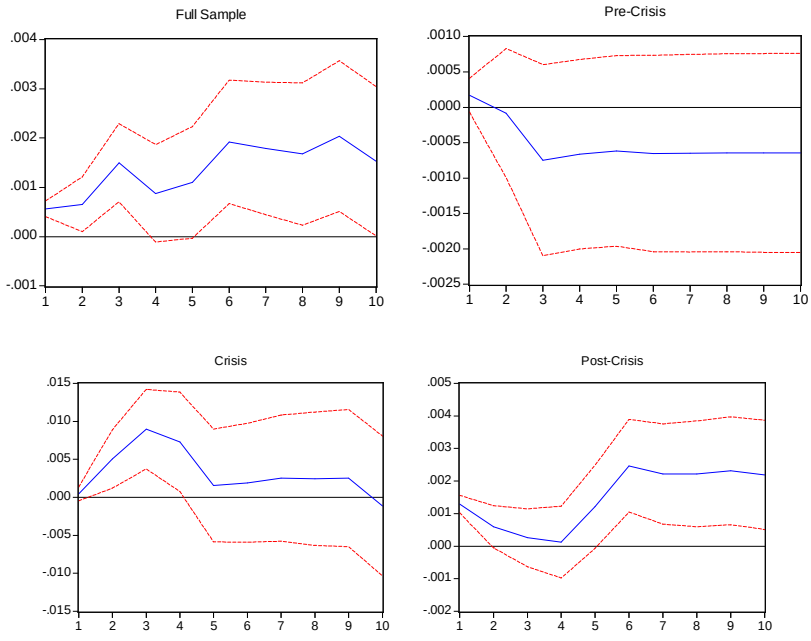

Figure 5.10 Impulse Response of Stock Returns to a shock in Foreign Net Purchases (Korea)

5.2.2 Impacts on Currency Returns

The empirical results from granger causality analysis, as shown in Table 5.21, reveal that there is a relationship between currency returns and foreign net purchases with high significance at the 5% level during the full sample period in both Thailand and Korea. Foreign net purchases indeed lead the change in currency returns. Alternative ways to assess the relative effects of currency returns and foreign net purchases are variance decomposition and impulse response of the VAR system. Variance decomposition of currency returns analysis, as shown in Tables 5.22 to 5.29, reveals that the share of shock to currency returns comes from foreign net purchases about 63% in the first day and 60.7% in the tenth day for Thailand and about 74.2% in the first day and 65.6% in the tenth day for Korea.

As can be seen in Figures 5.11 and 5.12, impulse response results display the impact of one standard deviation shock from foreign net purchases on currency returns. The impacts of one standard deviation innovation in foreign net purchases is a cumulative decrease in currency returns equivalent to 0.37% in the tenth day for Thailand and 0.68% in the eighth day for Korea. Therefore, these suggest that currency returns respond to contemporaneous change from foreign net purchases. In other words, currency returns are contemporaneously affected by change in foreign net purchases.

Thus, currency returns decrease in response to one standard deviation of a shock in foreign net purchase. This implies that the increase in foreign net purchase revalues local currency because the foreign demand for local stock should lead to an appreciation in local currency.

Table 5.21 Granger Causality Test between Currency Returns and Other Variables

Dependent variable:	Thailand		Korea	
Currency Returns	Chi-sq.	P-Value	Chi-sq.	P-Value
Full Sample				
Foreign Net Purchases	45.116**	0.0000	49.199**	0.0000
Stock Returns	4.378	0.3572	113.380**	0.0000
Global Returns	7.490	0.1121	205.39**	0.0000
Pre-Crisis				
Foreign Net Purchases	13.377**	0.0012	5.427*	0.0663
Stock Returns	3.000	0.2231	4.934*	0.0848
Global Returns	5.640*	0.0596	90.991**	0.0000
Crisis				
Foreign Net Purchases	5.311*	0.0703	15.285*	0.0538
Stock Returns	0.014	0.9930	58.570**	0.0000
Global Returns	0.616	0.7348	69.634**	0.0000
Post-Crisis				
Foreign Net Purchases	14.943**	0.0048	32.128**	0.0000
Stock Returns	8.530*	0.0740	56.011**	0.0000
Global Returns	4.167	0.3838	92.545**	0.0000

*and** denote significance at the 10% and 5% level, respectively.

Table 5.22 Variance Decomposition of Currency Returns (Full Sample Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011247	2.765598	33.53751	0.686427	63.01046
2	0.011349	2.959550	34.96498	0.707556	61.36792
3	0.011406	3.091433	35.23889	0.722300	60.94737
4	0.011423	3.089432	35.27061	0.817331	60.82263
5	0.011425	3.086674	35.33451	0.816602	60.76222
6	0.011426	3.139133	35.32858	0.817163	60.71512
7	0.011426	3.154717	35.32369	0.816954	60.70464
8	0.011426	3.156079	35.32465	0.817104	60.70217
9	0.011426	3.156630	35.32528	0.817440	60.70065
10	0.011426	3.157554	35.32544	0.817413	60.69959

Table 5.23 Variance Decomposition of Currency Returns (Pre-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006814	1.460407	57.87292	0.615986	40.05069
2	0.006860	2.127244	59.02018	0.834672	38.01790
3	0.006875	2.195375	59.17103	0.837412	37.79618
4	0.006875	2.264109	59.00450	0.841297	37.89010
5	0.006876	2.284619	58.96974	0.842377	37.90326
6	0.006876	2.293351	58.96002	0.842848	37.90378
7	0.006876	2.297293	58.95308	0.842976	37.90665
8	0.006876	2.298997	58.95018	0.843059	37.90777
9	0.006876	2.299714	58.94905	0.843093	37.90815
10	0.006876	2.300025	58.94854	0.843106	37.90833

Table 5.24 Variance Decomposition of Currency Returns (Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.020498	0.002014	99.97347	0.009465	0.015054
2	0.021128	0.973853	96.68899	0.995122	1.342034
3	0.022150	1.141794	96.34856	1.125734	1.383915
4	0.022489	1.472456	96.02117	1.126456	1.379915
5	0.022575	1.517153	95.95490	1.145209	1.382736
6	0.022671	1.528153	95.94117	1.145048	1.385633
7	0.022673	1.542679	95.92678	1.144877	1.385661
8	0.022693	1.544145	95.92527	1.144859	1.385724
9	0.022694	1.548534	95.92058	1.145102	1.385783
10	0.022697	1.548635	95.92023	1.145193	1.385945

Table 5.25 Variance Decomposition of Currency Returns (Post-Crisis Period in Thailand)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011322	11.22789	4.851427	3.321198	80.59948
2	0.011385	11.15475	5.241618	3.313886	80.28974
3	0.011404	11.26679	5.637600	3.717674	79.37793
4	0.011416	11.23292	5.633664	4.001728	79.13169
5	0.011454	11.22295	5.669237	4.047742	79.06007
6	0.011454	11.25471	5.688837	4.046623	79.00983
7	0.011455	11.26270	5.692164	4.046068	78.99907
8	0.011455	11.26354	5.692160	4.046077	78.99822
9	0.011455	11.26363	5.693167	4.046063	78.99714
10	0.011455	11.26360	5.694185	4.046007	78.99621

Table 5.26 Variance Decomposition of Currency Returns (Full Sample Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011123	16.51998	2.557101	6.748935	74.17399
2	0.011216	20.38793	2.435200	8.118968	69.05790
3	0.011285	20.31013	2.508135	8.637541	68.54419
4	0.011321	20.99851	3.391067	8.663508	66.94692
5	0.011341	20.67399	3.555889	9.822858	65.94727
6	0.011356	20.69637	3.554882	9.820016	65.92873
7	0.011385	20.55156	3.634490	9.736979	66.07697
8	0.011404	20.51682	3.767992	9.781714	65.93348
9	0.011452	20.47563	3.938688	9.894057	65.69163
10	0.011463	20.41257	4.082958	9.862193	65.64228

Table 5.27 Variance Decomposition of Currency Returns (Pre-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.006808	4.836773	1.779790	1.317477	92.06596
2	0.006851	11.71869	1.927824	1.852455	84.50103
3	0.006874	11.95527	2.138568	1.840241	84.06592
4	0.006875	11.94959	2.137679	1.962491	83.95024
5	0.006875	11.96044	2.139881	1.963109	83.93657
6	0.006876	11.96044	2.141803	1.963920	83.93384
7	0.006876	11.96036	2.142051	1.964373	83.93321
8	0.006876	11.96044	2.142134	1.964376	83.93305
9	0.006876	11.96045	2.142186	1.964380	83.93298
10	0.006876	11.96046	2.142200	1.964382	83.93296

Table 5.28 Variance Decomposition of Currency Returns (Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.018463	13.32450	0.341800	9.327117	77.00659
2	0.019361	16.99793	0.313294	11.46942	71.21936
3	0.020374	15.51385	2.047056	15.95570	66.48339
4	0.021031	24.44308	4.339342	13.74397	57.47361
5	0.021542	22.22668	4.029855	19.34981	54.39366
6	0.021559	21.43868	6.439016	18.71200	53.41030
7	0.022108	21.66711	6.462714	18.77211	53.09807
8	0.023116	21.29697	6.602894	20.15926	51.94088
9	0.023598	22.37545	6.715812	20.53622	50.37252
10	0.023883	21.91285	7.836259	20.00514	50.24575

Table 5.29 Variance Decomposition of Currency Returns (Post-Crisis Period in Korea)

Period	S.E.	Global Returns	Currency Returns	Stock Returns	Foreign Net Purchases
1	0.011170	18.00003	6.414355	9.649363	65.93625
2	0.011231	19.81076	6.230582	11.57366	62.38500
3	0.011279	20.01184	6.211851	11.93186	61.84445
4	0.011307	19.80193	6.743006	11.97872	61.47634
5	0.011402	19.68611	6.891524	12.07182	61.35055
6	0.011445	19.50953	6.830677	12.24448	61.41531
7	0.011477	19.39635	6.936298	12.18215	61.48520
8	0.011484	19.36162	6.911002	12.42926	61.29812
9	0.011486	19.36065	6.913517	12.42568	61.30016
10	0.011489	19.38126	6.911687	12.42427	61.28278

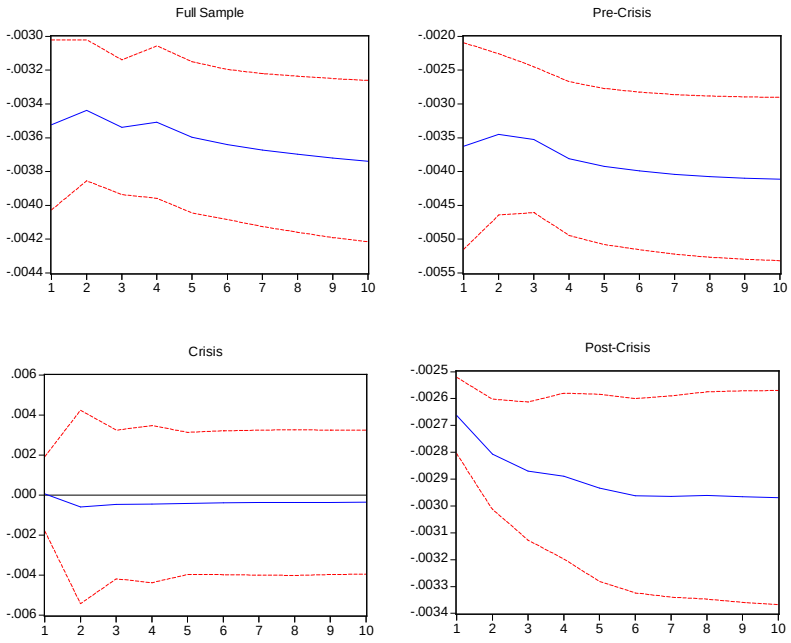

Figure 5.11 Impulse Response of Currency Returns to a shock in Foreign Net Purchases (Thailand)

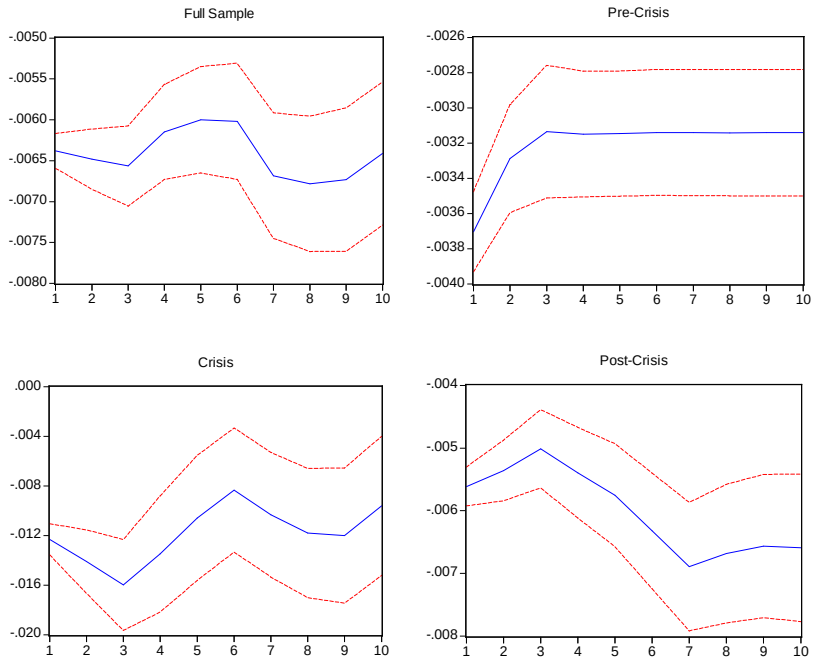

Figure 5.12 Impulse Response of Currency Returns to a shock in Foreign Net Purchases (Korea)

5.2.3 Impacts on Stock Prices and Exchange Rate Volatility

This part uses daily time-series data of three variables such as foreign net purchases, stock prices (SET index) and exchange rate (Baht/USD) to examine the relationships between foreign net purchases and the volatility of stock prices and exchange rate during the sample period by using the VAR model. The first step in this process is to construct a time-varying volatility measure for each variable. The volatility measure for each variable x is thus created, using percentage changes in each variable, according to the following formula:

$$Volatility_{t+m} = \left(\frac{1}{m} \sum_{i=1}^{m} (lnx_{t+i-1} - lnx_{t+i-2})^2 \right)^{0.5} \quad (5.1)$$

This is similar to that used by Fang and Miller (2008) and Hegerty (2011), with m equal to 8 as the orders of the moving average. The choice of the moving-average order, m = 4, 8 and 12, does not affect the results. Volatility is constructed for stock prices and exchange rate. Figure 5.13 and Figure 5.14 show stock prices volatility and

Figure 5.15 and Figure 5.16 show exchange rate volatility in Thailand and Korea, respectively.

Then, stationary of stock prices volatility and exchange rate volatility were tested using the Augmented Dickey-Fuller (ADF) Unit Root Test. The results of the unit root are presented in Table 4.5. The test found that with and without a trend assumption, stock prices volatility and exchange rate volatility rejected the hypothesis that there is a unit root process. Therefore, stock prices volatility and exchange rate volatility are stationary or I(0) process. The estimation of the VAR model firstly requires the explicit choice of lag length in the model. The appropriate lag length criteria are shown in Table 5.30, and the result of the VAR estimation is presented in Tables 5.31 to 5.38.

Table 5.30 Lag Length Criteria

Period	Lag Criteria	LR	FPE	AIC	SC	HQ
Thailand						
Full Sample	8	8	8	8	2	3
Pre-Crisis	8	8	8	8	2	2
Crisis	2	2	2	2	1	1
Post-Crisis	6	6	6	6	1	4
Korea						
Full Sample	8	8	8	8	6	6
Pre-Crisis	3	8	3	3	1	3
Crisis	6	6	6	6	1	6
Post-Crisis	8	8	8	8	1	1

As can be seen in Figures 5.17 and 5.18, impulse response results display the impact of one standard deviation shock from foreign net purchases on stock prices volatility. The impacts of one standard deviation innovation in foreign net purchases is a cumulative increase in stock prices volatility equivalent to about 0.0008 basis points in the fourth day for Thailand and 0.00035 basis points in the fourth day for Korea. Therefore, these suggest that stock prices volatility respond to contemporaneous change from foreign net purchases. In other words, stock prices volatility is contemporaneously affected by change in foreign net purchases. Stock prices volatility increases in response to one standard deviation of a shock in foreign net purchase. This implies that the

increase in net purchases by foreign investors affect the increase in volatility of local stock prices and also destabilize local stock prices. In addition, the results from granger causality analysis, as shown in Table 5.39, reveal that the relationship between stock prices volatility and foreign net purchases are significant during the pre-crisis period but insignificance during the crisis and post-crisis periods. Therefore, foreign net purchases led the change in stock prices volatility during the pre-crisis period and did not lead the change in stock prices volatility during the crisis and post-crisis periods. Thus, there was no impact of foreign portfolio investment on stock prices volatility in the Thai stock market during the crisis and post-crisis periods.

Furthermore, as can be seen in Figures 5.19 and 5.20, impulse response results display the impact of one standard deviation shock from foreign net purchases on exchange rate volatility. The impacts of one standard deviation innovation in foreign net purchases is a cumulative increase in exchange rate volatility equivalent about 0.0001 basis points in the fifth day for Thailand and about 0.00018 basis points in the sixth day for Korea. Therefore, these suggest that exchange rate volatility respond to contemporaneous change from foreign net purchases. In other words, exchange rate volatility is contemporaneously affected by change in foreign net purchases. Exchange rate volatility increases in response to one standard deviation of a shock in foreign net purchase. This implies that the increase in net purchases by foreign investors affect the increase in volatility of exchange rate and also destabilize exchange rate. Unfortunately, the results from granger causality analysis, as shown in Table 5.40, reveal that the relationship between exchange rate volatility and foreign net purchases is not significance. Therefore, foreign net purchases do not lead the change in exchange rate volatility, and there was no impact of foreign portfolio investment on exchange rate volatility during the sample period.

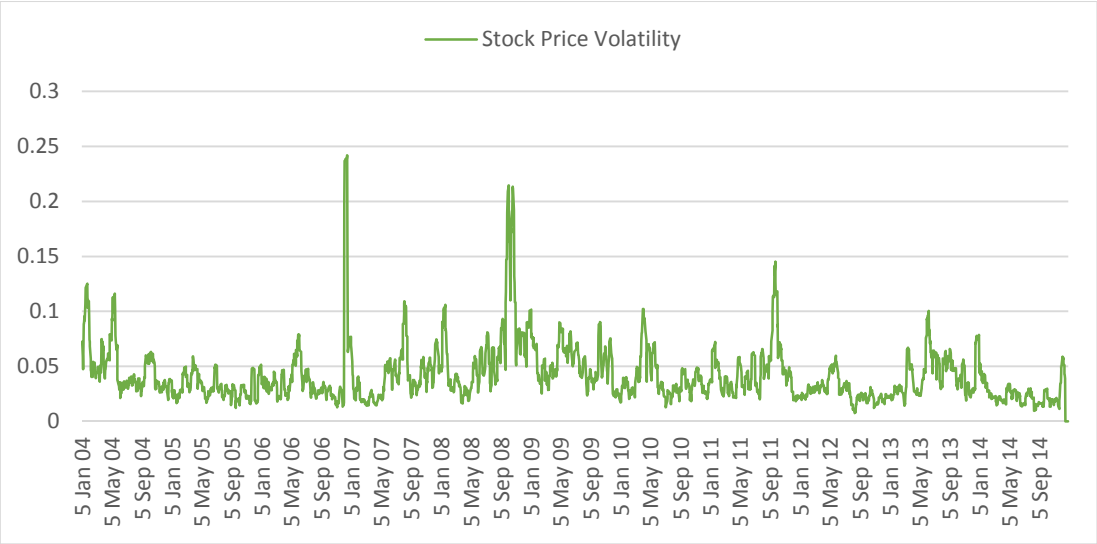

Figure 5.13 Daily Stock Prices Volatility from January 2, 2008 to December 30, 2014 (Thailand)

Figure 5.14 Daily Stock Prices Volatility from January 2, 2008 to December 30, 2014 (Korea)

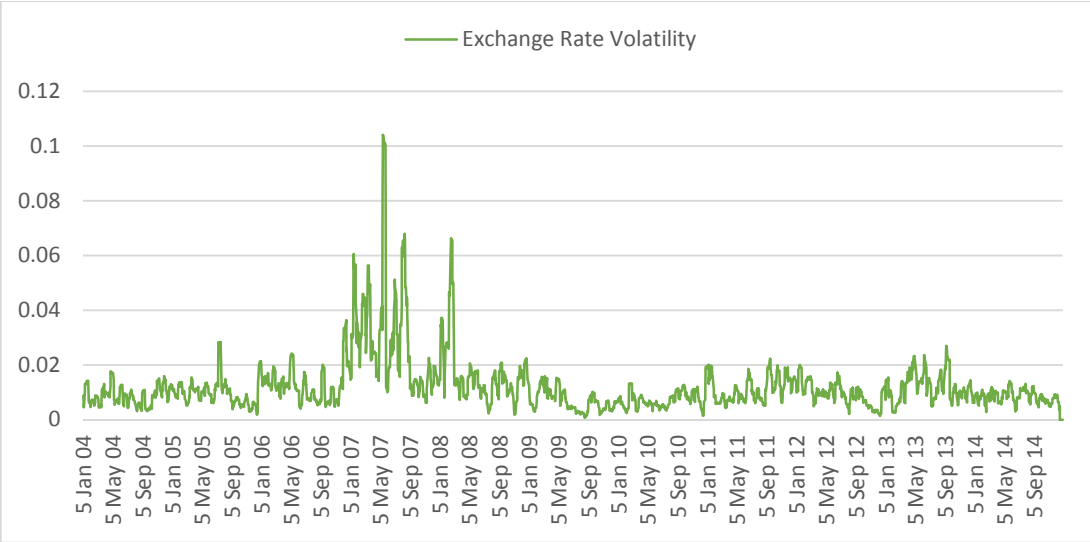

Figure 5.15 Daily Exchange Rate Volatility from January 2, 2008 to December 30, 2014 (Thailand)

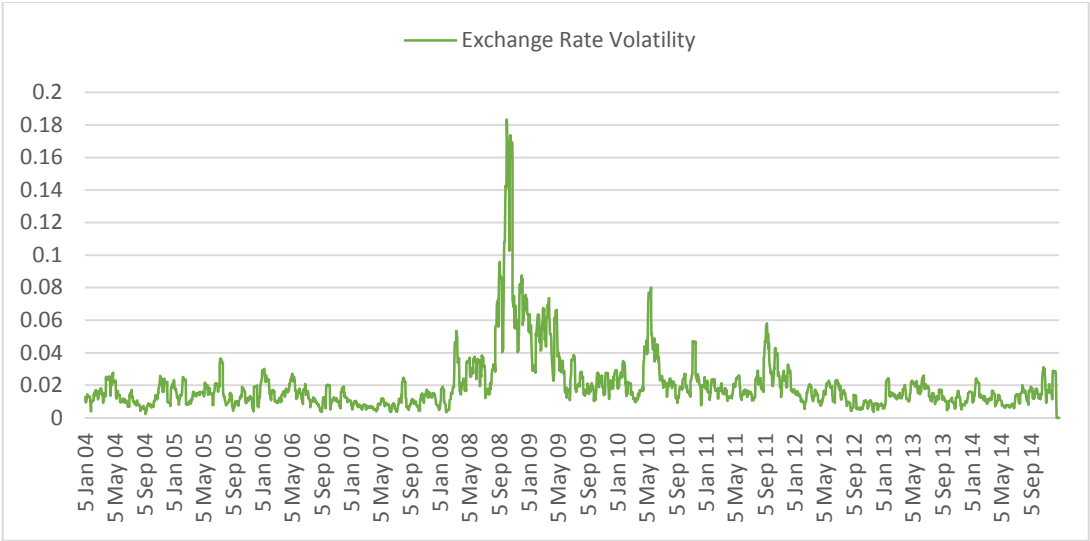

Figure 5.16 Daily Exchange Rate Volatility from January 2, 2008 to December 30, 2014 (Korea)

Table 5.31 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Full Sample Period in Thailand)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.407774	1.449829	-0.377942
t-statistic	*[20.5162]*	*[2.56858]*	*[-1.80850]*
Foreign Net Purchases (-2)	0.072916	0.633522	0.321384
t-statistic	*[3.38142]*	*[1.03452]*	*[1.41748]*
Foreign Net Purchases (-3)	0.064995	-0.357574	0.086801
t-statistic	*[3.00639]*	*[-0.58242]*	*[0.38187]*
Foreign Net Purchases (-4)	0.014677	-0.623663	0.042805
t-statistic	*[0.67820]*	*[-1.01480]*	*[0.18812]*
Foreign Net Purchases (-5)	0.011009	0.229418	-0.338070
t-statistic	*[0.50951]*	*[0.37388]*	*[-1.48807]*
Foreign Net Purchases (-6)	0.007430	-0.372527	-0.153819
t-statistic	*[0.34463]*	*[-0.60848]*	*[-0.67860]*
Foreign Net Purchases (-7)	0.014890	-0.709175	0.211095
t-statistic	*[0.69248]*	*[-1.16137]*	*[0.93370]*
Foreign Net Purchases (-8)	0.065974	-0.191401	0.150731
t-statistic	*[3.32225]*	*[-0.33940]*	*[0.72190]*
Stock Prices Volatility (-1)	-0.001625	1.065614	0.007629
t-statistic	*[-2.29030]*	*[52.8847]*	*[1.02262]*
Stock Prices Volatility (-2)	-0.000457	-0.053352	-0.007345
t-statistic	*[-0.44228]*	*[-1.81632]*	*[-0.67534]*
Stock Prices Volatility (-3)	-0.000359	-0.026495	-0.015182
t-statistic	*[-0.34663]*	*[-0.90149]*	*[-1.39521]*
Stock Prices Volatility (-4)	0.002050	-0.016701	0.012951
t-statistic	*[1.98545]*	*[-0.56958]*	*[1.19292]*
Stock Prices Volatility (-5)	-0.000586	0.019389	-0.003003
t-statistic	*[-0.56902]*	*[0.66348]*	*[-0.27756]*
Stock Prices Volatility (-6)	-0.000551	-0.039084	0.002150
t-statistic	*[-0.53574]*	*[-1.33743]*	*[0.19871]*
Stock Prices Volatility (-7)	-0.004379	-0.006589	-0.013645
t-statistic	*[-4.25842]*	*[-0.22560]*	*[-1.26197]*
Stock Prices Volatility (-8)	0.005215	-0.008121	0.014782
t-statistic	*[7.36930]*	*[-0.40412]*	*[1.98671]*
Exchange Rate Volatility (-1)	-0.001218	0.161160	1.132435
t-statistic	*[-0.63877]*	*[2.97494]*	*[56.4611]*
Exchange Rate Volatility (-2)	-0.001096	-0.082461	-0.175631
t-statistic	*[-0.38129]*	*[-1.00989]*	*[-5.80951]*
Exchange Rate Volatility (-3)	0.005235	0.007040	0.023067
t-statistic	*[1.80929]*	*[0.08568]*	*[0.75824]*
Exchange Rate Volatility (-4)	-0.000248	-0.078666	0.035812
t-statistic	*[-0.08568]*	*[-0.95754]*	*[1.17737]*

Table 5.31 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Full Sample Period in Thailand) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Exchange Rate Volatility (-5)	-0.000622	-0.015209	-0.054235
t-statistic	*[-0.21524]*	*[-0.18521]*	*[-1.78385]*
Exchange Rate Volatility (-6)	-0.004930	0.017854	0.040241
t-statistic	*[-1.70429]*	*[0.21735]*	*[1.32314]*
Exchange Rate Volatility (-7)	0.004362	-0.026247	-0.078373
t-statistic	*[1.51672]*	*[-0.32133]*	*[-2.59155]*
Exchange Rate Volatility (-8)	-0.000482	0.034154	0.013830
t-statistic	*[-0.25187]*	*[0.62873]*	*[0.68764]*
Constant	1.98E-05	0.002497	0.000824
t-statistic	*[1.50403]*	*[6.67372]*	*[5.94760]*
R-squared	0.326118	0.914282	0.921572
Adj. R-squared	0.319641	0.913459	0.920819
Sum sq. resids	0.000182	0.147134	0.020169
S.E. equation	0.000270	0.007676	0.002842
F-statistic	50.34996	1109.731	1222.554
Log likelihood	17154.69	8715.205	11221.06
Akaike AIC	-13.58421	-6.891519	-8.878719
Schwarz SC	-13.52639	-6.833699	-8.820900
Mean dependent	8.57E-06	0.041686	0.012032
S.D. dependent	0.000328	0.026094	0.010100
Determinant resid covariance (dof adj.)			3.42E-17
Determinant resid covariance			3.32E-17
Log likelihood			37110.26
Akaike information criterion			-29.36975
Schwarz criterion			-29.19629

Table 5.32 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Pre-Crisis Period in Thailand)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.407849	1.804901	-0.525450
t-statistic	*[12.5390]*	*[2.14715]*	*[-1.38425]*
Foreign Net Purchases (-2)	0.056430	1.079376	0.545789
t-statistic	*[1.59109]*	*[1.17761]*	*[1.31864]*
Foreign Net Purchases (-3)	0.084493	-1.590804	0.138688
t-statistic	*[2.37936]*	*[-1.73342]*	*[0.33466]*
Foreign Net Purchases (-4)	-0.012234	-0.491164	-0.267732
t-statistic	*[-0.34370]*	*[-0.53395]*	*[-0.64454]*
Foreign Net Purchases (-5)	0.023821	0.414447	-0.225055
t-statistic	*[0.66990]*	*[0.45099]*	*[-0.54233]*
Foreign Net Purchases (-6)	-0.005263	-1.390780	-0.295619
t-statistic	*[-0.14817]*	*[-1.51496]*	*[-0.71310]*
Foreign Net Purchases (-7)	-0.018576	-0.671256	0.232633
t-statistic	*[-0.52344]*	*[-0.73189]*	*[0.56170]*
Foreign Net Purchases (-8)	0.098979	-0.086190	0.180087
t-statistic	*[3.03162]*	*[-0.10215]*	*[0.47264]*
Stock Prices Volatility (-1)	-0.001885	1.125012	0.019813
t-statistic	*[-1.44595]*	*[33.3840]*	*[1.30198]*
Stock Prices Volatility (-2)	0.000134	-0.158658	-0.026367
t-statistic	*[0.06828]*	*[-3.13360]*	*[-1.15321]*
Stock Prices Volatility (-3)	-0.000261	-0.041462	-0.008241
t-statistic	*[-0.13274]*	*[-0.81486]*	*[-0.35865]*
Stock Prices Volatility (-4)	0.001176	0.027507	0.015911
t-statistic	*[0.60194]*	*[0.54487]*	*[0.69794]*
Stock Prices Volatility (-5)	0.000610	0.038260	-0.004381
t-statistic	*[0.31475]*	*[0.76445]*	*[-0.19383]*
Stock Prices Volatility (-6)	-0.001256	-0.068304	0.007493
t-statistic	*[-0.64875]*	*[-1.36542]*	*[0.33170]*
Stock Prices Volatility (-7)	-0.009803	0.022607	-0.037494
t-statistic	*[-5.10555]*	*[0.45562]*	*[-1.67337]*
Stock Prices Volatility (-8)	0.010401	-0.052610	0.029907
t-statistic	*[8.07988]*	*[-1.58147]*	*[1.99085]*
Exchange Rate Volatility (-1)	-0.003385	0.275113	1.167760
t-statistic	*[-1.18911]*	*[3.73946]*	*[35.1499]*
Exchange Rate Volatility (-2)	0.001431	-0.283644	-0.227898
t-statistic	*[0.32695]*	*[-2.50804]*	*[-4.46248]*
Exchange Rate Volatility (-3)	0.003282	0.075487	0.036059
t-statistic	*[0.74058]*	*[0.65903]*	*[0.69714]*
Exchange Rate Volatility (-4)	0.002384	-0.092878	0.042197
t-statistic	*[0.53819]*	*[-0.81135]*	*[0.81629]*

Table 5.32 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Pre-Crisis Period in Thailand) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Exchange Rate Volatility (-5)	-0.001621	0.072194	-0.072025
t-statistic	*[-0.36616]*	*[0.63096]*	*[-1.39399]*
Exchange Rate Volatility (-6)	-0.004629	-0.054250	0.070253
t-statistic	*[-1.04473]*	*[-0.47376]*	*[1.35862]*
Exchange Rate Volatility (-7)	0.004670	-0.046453	-0.107604
t-statistic	*[1.06419]*	*[-0.40962]*	*[-2.10122]*
Exchange Rate Volatility (-8)	-0.001134	0.074588	0.027216
t-statistic	*[-0.39524]*	*[1.00631]*	*[0.81314]*
Constant	4.08E-05	0.004008	0.001116
t-statistic	*[1.42986]*	*[5.43230]*	*[3.35069]*
R-squared	0.358325	0.891306	0.922255
Adj. R-squared	0.341290	0.888420	0.920191
Sum sq. resids	0.000102	0.067805	0.013827
S.E. equation	0.000335	0.008661	0.003911
F-statistic	21.03391	308.8713	446.8254
Log likelihood	6127.443	3106.275	3844.851
Akaike AIC	-13.13766	-6.633530	-8.223575
Schwarz SC	-13.00757	-6.503441	-8.093486
Mean dependent	5.51E-05	0.039863	0.015181
S.D. dependent	0.000413	0.025927	0.013844
Determinant resid covariance (dof adj.)			1.25E-16
Determinant resid covariance			1.16E-16
Log likelihood			13090.91
Akaike information criterion			-28.02133
Schwarz criterion			-27.63107

Table 5.33 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Crisis Period in Thailand)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.564800	0.529140	-1.370175
t-statistic	*[8.06689]*	*[0.14448]*	*[-1.24116]*
Foreign Net Purchases (-2)	0.087979	0.175665	1.422405
t-statistic	*[1.25413]*	*[0.04787]*	*[1.28597]*
Stock Prices Volatility (-1)	-0.003193	1.112873	-0.003247
t-statistic	*[-2.39149]*	*[15.9335]*	*[-0.15421]*
Stock Prices Volatility (-2)	0.002758	-0.154111	-0.004119
t-statistic	*[2.05686]*	*[-2.19695]*	*[-0.19480]*
Exchange Rate Volatility (-1)	0.007217	0.084503	1.173139
t-statistic	*[1.65330]*	*[0.37007]*	*[17.0439]*
Exchange Rate Volatility (-2)	-0.006083	-0.069081	-0.242724
t-statistic	*[-1.39890]*	*[-0.30372]*	*[-3.54027]*
Constant	-3.60E-05	0.002588	0.001607
t-statistic	*[-0.91502]*	*[1.25603]*	*[2.58725]*
R-squared	0.454746	0.928434	0.904932
Adj. R-squared	0.438551	0.926308	0.902108
Sum sq. resids	1.08E-05	0.029631	0.002692
S.E. equation	0.000232	0.012112	0.003651
F-statistic	28.07829	436.7627	320.4655
Log likelihood	1456.486	629.4428	880.0749
Akaike AIC	-13.87068	-5.956390	-8.354784
Schwarz SC	-13.75873	-5.844446	-8.242840
Mean dependent	-0.000131	0.065766	0.016005
S.D. dependent	0.000309	0.044616	0.011669
Determinant resid covariance (dof adj.)			1.03E-16
Determinant resid covariance			9.29E-17
Log likelihood			2968.000
Akaike information criterion			-28.20096
Schwarz criterion			-27.86513

Table 5.34 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Post-Crisis Period in Thailand)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.366130	0.594682	0.142446
t-statistic	*[13.5430]*	*[0.82623]*	*[0.73777]*
Foreign Net Purchases (-2)	0.098284	-0.541926	-0.080512
t-statistic	*[3.41253]*	*[-0.70676]*	*[-0.39142]*
Foreign Net Purchases (-3)	0.053310	0.472153	-0.263487
t-statistic	*[1.85094]*	*[0.61574]*	*[-1.28094]*
Foreign Net Purchases (-4)	0.062210	0.111271	0.250406
t-statistic	*[2.16010]*	*[0.14512]*	*[1.21745]*
Foreign Net Purchases (-5)	-0.007707	0.062217	-0.545228
t-statistic	*[-0.26830]*	*[0.08135]*	*[-2.65763]*
Foreign Net Purchases (-6)	0.057888	0.678079	-0.087967
t-statistic	*[2.13904]*	*[0.94113]*	*[-0.45514]*
Stock Prices Volatility (-1)	-0.000255	0.952784	-0.003242
t-statistic	*[-0.24876]*	*[34.9673]*	*[-0.44351]*
Stock Prices Volatility (-2)	-0.001995	0.070420	0.024196
t-statistic	*[-1.41118]*	*[1.87131]*	*[2.39690]*
Stock Prices Volatility (-3)	-0.000121	-0.005652	-0.014782
t-statistic	*[-0.08532]*	*[-0.14996]*	*[-1.46203]*
Stock Prices Volatility (-4)	0.002048	-0.067168	-0.009379
t-statistic	*[1.44676]*	*[-1.78264]*	*[-0.92789]*
Stock Prices Volatility (-5)	-0.001111	0.028862	-0.018385
t-statistic	*[-0.78675]*	*[0.76753]*	*[-1.82265]*
Stock Prices Volatility (-6)	0.000795	-0.034016	0.020160
t-statistic	*[0.78147]*	*[-1.25621]*	*[2.77544]*
Exchange Rate Volatility (-1)	0.001106	-0.186968	0.959559
t-statistic	*[0.29040]*	*[-1.84463]*	*[35.2914]*
Exchange Rate Volatility (-2)	-0.000757	0.377368	-0.001069
t-statistic	*[-0.14305]*	*[2.67698]*	*[-0.02828]*
Exchange Rate Volatility (-3)	0.010032	0.223395	0.077466
t-statistic	*[1.89403]*	*[1.58414]*	*[2.04779]*
Exchange Rate Volatility (-4)	-0.014857	-0.235752	-0.064837
t-statistic	*[-2.80125]*	*[-1.66959]*	*[-1.71171]*
Exchange Rate Volatility (-5)	0.001362	-0.233134	-0.009446
t-statistic	*[0.25608]*	*[-1.64611]*	*[-0.24862]*
Exchange Rate Volatility (-6)	0.003317	0.120021	-0.046755
t-statistic	*[0.87055]*	*[1.18332]*	*[-1.71842]*
Constant	2.27E-05	0.001538	0.000844
t-statistic	*[1.28771]*	*[3.27906]*	*[6.70403]*

Table 5.34 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Post-Crisis Period in Thailand) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
R-squared	0.254661	0.916428	0.883919
Adj. R-squared	0.244832	0.915326	0.882388
Sum sq. resids	6.44E-05	0.045656	0.003285
S.E. equation	0.000217	0.005783	0.001551
F-statistic	25.91001	831.5653	577.4451
Log likelihood	9719.178	5177.177	6998.277
Akaike AIC	-14.01760	-7.454013	-10.08566
Schwarz SC	-13.94576	-7.382177	-10.01382
Mean dependent	-1.55E-06	0.039273	0.009319
S.D. dependent	0.000250	0.019875	0.004524
Determinant resid covariance (dof adj.)			3.73E-18
Determinant resid covariance			3.58E-18
Log likelihood			21907.28
Akaike information criterion			-31.57554
Schwarz criterion			-31.36003

Table 5.35 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Full Sample Period in Korea)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.383194	-0.995077	0.070025
t-statistic	*[19.1773]*	*[-1.88640]*	*[0.22912]*
Foreign Net Purchases (-2)	0.047473	1.373016	0.068045
t-statistic	*[2.21922]*	*[2.43128]*	*[0.20797]*
Foreign Net Purchases (-3)	0.047977	-0.205937	-0.549049
t-statistic	*[2.23858]*	*[-0.36398]*	*[-1.67492]*
Foreign Net Purchases (-4)	0.008437	-0.752489	0.911903
t-statistic	*[0.39429]*	*[-1.33202]*	*[2.78609]*
Foreign Net Purchases (-5)	0.079192	0.674931	0.187761
t-statistic	*[3.71627]*	*[1.19976]*	*[0.57607]*
Foreign Net Purchases (-6)	-0.000898	-0.767035	-0.419051
t-statistic	*[-0.04202]*	*[-1.36025]*	*[-1.28265]*

Table 5.35 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Full Sample Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-7)	0.003361	0.380289	-0.134503
t-statistic	*[0.15765]*	*[0.67571]*	*[-0.41249]*
Foreign Net Purchases (-8)	0.060020	-0.491155	-0.234684
t-statistic	*[3.03054]*	*[-0.93941]*	*[-0.77474]*
Stock Prices Volatility (-1)	-0.001141	0.906028	-0.008391
t-statistic	*[-1.40838]*	*[42.3682]*	*[-0.67726]*
Stock Prices Volatility (-2)	-0.001947	0.100304	0.047007
t-statistic	*[-1.77626]*	*[3.46647]*	*[2.80395]*
Stock Prices Volatility (-3)	0.000421	-0.111095	-0.103295
t-statistic	*[0.38748]*	*[-3.87304]*	*[-6.21544]*
Stock Prices Volatility (-4)	0.001182	0.156702	0.181867
t-statistic	*[1.09919]*	*[5.52027]*	*[11.0580]*
Stock Prices Volatility (-5)	-0.001780	-0.054308	-0.089553
t-statistic	*[-1.61889]*	*[-1.87058]*	*[-5.32387]*
Stock Prices Volatility (-6)	0.000766	-0.017502	-0.041206
t-statistic	*[0.69232]*	*[-0.59898]*	*[-2.43404]*
Stock Prices Volatility (-7)	0.000369	-0.025665	-0.017464
t-statistic	*[0.33374]*	*[-0.87882]*	*[-1.03216]*
Stock Prices Volatility (-8)	0.000936	-0.037406	0.032751
t-statistic	*[1.14974]*	*[-1.74043]*	*[2.63013]*
Exchange Rate Volatility (-1)	0.001495	0.094456	1.008383
t-statistic	*[1.07062]*	*[2.56202]*	*[47.2078]*
Exchange Rate Volatility (-2)	-0.001020	-0.093937	-0.048649
t-statistic	*[-0.51892]*	*[-1.81074]*	*[-1.61856]*
Exchange Rate Volatility (-3)	-0.001872	0.061920	0.072933
t-statistic	*[-0.95286]*	*[1.19390]*	*[2.42715]*
Exchange Rate Volatility (-4)	0.000328	-0.186265	-0.095375
t-statistic	*[0.16781]*	*[-3.60789]*	*[-3.18856]*
Exchange Rate Volatility (-5)	0.002413	0.456334	0.073380
t-statistic	*[1.25453]*	*[8.98850]*	*[2.49472]*
Exchange Rate Volatility (-6)	-0.001442	-0.341601	-0.010213
t-statistic	*[-0.74260]*	*[-6.66568]*	*[-0.34396]*
Exchange Rate Volatility (-7)	-0.000505	-0.003074	-0.041596
t-statistic	*[-0.25809]*	*[-0.05947]*	*[-1.38889]*
Exchange Rate Volatility (-8)	0.001451	0.078327	0.009235
t-statistic	*[1.03849]*	*[2.12381]*	*[0.43218]*
Constant	3.38E-05	0.002240	0.000565
t-statistic	*[2.95369]*	*[7.42039]*	*[3.22713]*

Table 5.35 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Full Sample Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
R-squared	0.283884	0.931424	0.950853
Adj. R-squared	0.277001	0.930765	0.950380
Sum sq. resids	0.000188	0.131213	0.044046
S.E. equation	0.000275	0.007249	0.004200
F-statistic	41.24438	1413.138	2012.896
Log likelihood	17114.97	8859.612	10236.12
Akaike AIC	-13.55271	-7.006037	-8.097634
Schwarz SC	-13.49489	-6.948218	-8.039815
Mean dependent	4.18E-07	0.042916	0.020016
S.D. dependent	0.000323	0.027550	0.018855
Determinant resid covariance (dof adj.)			6.10E-17
Determinant resid covariance			5.92E-17
Log likelihood			36382.31
Akaike information criterion			-28.79248
Schwarz criterion			-28.61902

Table 5.36 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Pre-Crisis Period in Korea)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.377841	-1.417308	-0.153743
t-statistic	*[11.6231]*	*[-2.13620]*	*[-0.69208]*
Foreign Net Purchases (-2)	0.077911	0.057560	0.047619
t-statistic	*[2.24996]*	*[0.08144]*	*[0.20123]*
Foreign Net Purchases (-3)	0.065784	1.125807	0.303478
t-statistic	*[2.02926]*	*[1.70155]*	*[1.36990]*
Stock Prices Volatility (-1)	-0.000275	0.896340	0.010899
t-statistic	*[-0.16865]*	*[26.9609]*	*[0.97909]*
Stock Prices Volatility (-2)	0.000741	0.171571	0.006065
t-statistic	*[0.34278]*	*[3.88934]*	*[0.41064]*
Stock Prices Volatility (-3)	-0.002545	-0.136665	-0.019905
t-statistic	*[-1.57061]*	*[-4.13313]*	*[-1.79785]*
Exchange Rate Volatility (-1)	0.005088	-0.156588	0.953749
t-statistic	*[1.04062]*	*[-1.56913]*	*[28.5439]*

Table 5.36 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Pre-Crisis Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Exchange Rate Volatility (-2)	-0.014403	0.368520	0.057785
t-statistic	*[-2.11456]*	*[2.65080]*	*[1.24140]*
Exchange Rate Volatility (-3)	0.011571	-0.164090	-0.094072
t-statistic	*[2.36435]*	*[-1.64285]*	*[-2.81292]*
Constant	4.78E-05	0.002323	0.001188
t-statistic	*(3.2E-05)*	*(0.00065)*	*(0.00022)*
R-squared	0.241367	0.888473	0.863555
Adj. R-squared	0.233978	0.887387	0.862226
Sum sq. resids	9.10E-05	0.037894	0.004248
S.E. equation	0.000314	0.006404	0.002144
F-statistic	32.66443	817.8906	649.7740
Log likelihood	6214.177	3397.223	4419.151
Akaike AIC	-13.28518	-7.253154	-9.441436
Schwarz SC	-13.23336	-7.201340	-9.389622
Mean dependent	-2.32E-05	0.042750	0.012856
S.D. dependent	0.000359	0.019083	0.005777
Determinant resid covariance (dof adj.)			1.78E-17
Determinant resid covariance			1.72E-17
Log likelihood			14050.83
Akaike information criterion			-30.02320
Schwarz criterion			-29.86775

Table 5.37 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Crisis Period in Korea)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.191033	-6.167282	0.684443
t-statistic	*[2.63029]*	*[-1.84628]*	*[0.31061]*
Foreign Net Purchases (-2)	-0.000684	3.864477	0.546454
t-statistic	*[-0.00917]*	*[1.12601]*	*[0.24137]*
Foreign Net Purchases (-3)	0.099858	-6.391720	-2.814461
t-statistic	*[1.35717]*	*[-1.88878]*	*[-1.26077]*
Foreign Net Purchases (-4)	-0.096250	4.243114	5.877763
t-statistic	*[-1.30093]*	*[1.24694]*	*[2.61849]*
Foreign Net Purchases (-5)	0.116545	2.191114	2.328612
t-statistic	*[1.56160]*	*[0.63834]*	*[1.02840]*
Foreign Net Purchases (-6)	0.036071	-4.140366	-2.738693
t-statistic	*[0.49547]*	*[-1.23653]*	*[-1.23991]*
Stock Prices Volatility (-1)	-0.001374	0.921136	-0.041972
t-statistic	*[-0.86927]*	*[12.6678]*	*[-0.87503]*
Stock Prices Volatility (-2)	-0.004467	0.041175	0.049400
t-statistic	*[-2.20975]*	*[0.44287]*	*[0.80547]*
Stock Prices Volatility (-3)	0.001477	-0.115217	-0.154710
t-statistic	*[0.72614]*	*[-1.23198]*	*[-2.50777]*
Stock Prices Volatility (-4)	0.000180	0.384600	0.534144
t-statistic	*[0.08766]*	*[4.07080]*	*[8.57053]*
Stock Prices Volatility (-5)	0.001191	-0.384562	-0.352231
t-statistic	*[0.49463]*	*[-3.47304]*	*[-4.82225]*
Stock Prices Volatility (-6)	0.000782	-0.008452	-0.056037
t-statistic	*[0.42048]*	*[-0.09878]*	*[-0.99281]*
Exchange Rate Volatility (-1)	0.001472	0.101117	1.067369
t-statistic	*[0.56608]*	*[0.84523]*	*[13.5252]*
Exchange Rate Volatility (-2)	0.001031	-0.071710	-0.090976
t-statistic	*[0.28509]*	*[-0.43097]*	*[-0.82885]*
Exchange Rate Volatility (-3)	-0.001471	0.035699	0.120247
t-statistic	*[-0.46218]*	*[0.24379]*	*[1.24485]*
Exchange Rate Volatility (-4)	0.000737	-0.465435	-0.321692
t-statistic	*[0.23761]*	*[-3.26050]*	*[-3.41620]*
Exchange Rate Volatility (-5)	0.000719	1.114876	0.278275
t-statistic	*[0.22497]*	*[7.58191]*	*[2.86883]*
Exchange Rate Volatility (-6)	-0.000542	-0.569829	-0.066255
t-statistic	*[-0.22138]*	*[-5.06363]*	*[-0.89252]*
Constant	-5.41E-05	0.004335	0.003015
t-statistic	*[-1.47193]*	*[2.56477]*	*[2.70459]*

Table 5.37 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Crisis Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
R-squared	0.191033	-6.167282	0.684443
Adj. R-squared	[2.63029]	[-1.84628]	[0.31061]
Sum sq. resids	-0.000684	3.864477	0.546454
S.E. equation	[-0.00917]	[1.12601]	[0.24137]
F-statistic	0.099858	-6.391720	-2.814461
Log likelihood	[1.35717]	[-1.88878]	[-1.26077]
Akaike AIC	-0.096250	4.243114	5.877763
Schwarz SC	[-1.30093]	[1.24694]	[2.61849]
Mean dependent	0.116545	2.191114	2.328612
S.D. dependent	[1.56160]	[0.63834]	[1.02840]
Determinant resid covariance (dof adj.)			9.93E-16
Determinant resid covariance			7.46E-16
Log likelihood			2750.279
Akaike information criterion			-25.77300
Schwarz criterion			-24.86146

Table 5.38 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Post-Crisis Period in Korea)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-1)	0.439811	-0.236843	0.200421
t-statistic	*[16.1913]*	*[-0.36096]*	*[0.49877]*
Foreign Net Purchases (-2)	0.008857	2.042133	0.493701
t-statistic	*[0.29901]*	*[2.85409]*	*[1.12668]*
Foreign Net Purchases (-3)	0.043018	-0.699495	-0.921690
t-statistic	*[1.44786]*	*[-0.97464]*	*[-2.09699]*
Foreign Net Purchases (-4)	0.029416	-1.115699	0.419941
t-statistic	*[0.98935]*	*[-1.55346]*	*[0.95476]*
Foreign Net Purchases (-5)	0.073078	0.811613	0.527315
t-statistic	*[2.45713]*	*[1.12974]*	*[1.19854]*
Foreign Net Purchases (-6)	-0.004220	0.067250	-0.354623
t-statistic	*[-0.14148]*	*[0.09335]*	*[-0.80375]*
Foreign Net Purchases (-7)	0.011829	0.638797	0.580243
t-statistic	*[0.39614]*	*[0.88565]*	*[1.31360]*

Table 5.38 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Post-Crisis Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
Foreign Net Purchases (-8)	0.042287	-0.648468	-0.789598
t-statistic	*[1.55665]*	*[-0.98823]*	*[-1.96483]*
Stock Prices Volatility (-1)	-0.002484	0.918182	0.007677
t-statistic	*[-2.10322]*	*[32.1874]*	*[0.43942]*
Stock Prices Volatility (-2)	-0.000750	0.071063	0.072012
t-statistic	*[-0.47000]*	*[1.84433]*	*[3.05179]*
Stock Prices Volatility (-3)	0.002559	-0.088048	-0.100128
t-statistic	*[1.60308]*	*[-2.28375]*	*[-4.24067]*
Stock Prices Volatility (-4)	-0.000736	0.060345	-0.000842
t-statistic	*[-0.45822]*	*[1.55496]*	*[-0.03543]*
Stock Prices Volatility (-5)	-0.000434	0.086268	0.047155
t-statistic	*[-0.26991]*	*[2.22126]*	*[1.98257]*
Stock Prices Volatility (-6)	-0.001753	-0.032361	-0.024075
t-statistic	*[-1.08626]*	*[-0.83036]*	*[-1.00871]*
Stock Prices Volatility (-7)	0.001936	-0.082041	-0.042462
t-statistic	*[1.20516]*	*[-2.11464]*	*[-1.78713]*
Stock Prices Volatility (-8)	0.001352	0.005421	0.071274
t-statistic	*[1.14363]*	*[0.18988]*	*[4.07669]*
Exchange Rate Volatility (-1)	-0.002299	0.181778	0.989550
t-statistic	*[-1.19716]*	*[3.91816]*	*[34.8282]*
Exchange Rate Volatility (-2)	0.003617	-0.162947	-0.052934
t-statistic	*[1.35966]*	*[-2.53595]*	*[-1.34518]*
Exchange Rate Volatility (-3)	-0.006130	0.024696	0.029825
t-statistic	*[-2.30407]*	*[0.38426]*	*[0.75776]*
Exchange Rate Volatility (-4)	0.003845	0.011617	0.018175
t-statistic	*[1.44561]*	*[0.18081]*	*[0.46187]*
Exchange Rate Volatility (-5)	-0.000436	-0.083261	-0.049877
t-statistic	*[-0.16396]*	*[-1.29550]*	*[-1.26720]*
Exchange Rate Volatility (-6)	0.001272	-0.070107	0.029668
t-statistic	*[0.48069]*	*[-1.09681]*	*[0.75790]*
Exchange Rate Volatility (-7)	-0.001712	0.225024	0.071751
t-statistic	*[-0.64996]*	*[3.53599]*	*[1.84104]*
Exchange Rate Volatility (-8)	0.001768	-0.089797	-0.111217
t-statistic	*[0.92783]*	*[-1.95064]*	*[-3.94492]*
Constant	3.03E-05	0.001462	0.000367
t-statistic	*[2.06928]*	*[4.13293]*	*[1.69409]*

Table 5.38 VAR Estimation of Impacts on Stock Prices and Exchange Rate Volatility (Post-Crisis Period in Korea) (Continued)

Variable	Foreign Net Purchases	Stock Prices Volatility	Exchange Rate Volatility
R-squared	0.295314	0.927333	0.936439
Adj. R-squared	0.282869	0.926049	0.935317
Sum sq. resids	8.07E-05	0.047063	0.017651
S.E. equation	0.000244	0.005885	0.003604
F-statistic	23.72996	722.6101	834.2514
Log likelihood	9563.540	5156.184	5834.816
Akaike AIC	-13.78402	-7.415006	-8.395688
Schwarz SC	-13.68950	-7.320485	-8.301167
Mean dependent	5.14E-05	0.037849	0.020824
S.D. dependent	0.000288	0.021640	0.014170
Determinant resid covariance (dof adj.)			2.39E-17
Determinant resid covariance			2.26E-17
Log likelihood			20630.53
Akaike information criterion			-29.70453
Schwarz criterion			-29.42096

Table 5.39 Granger Causality Test between Stock prices volatility and Other Variables

Dependent variable:	Thailand		Korea	
Stock Prices Volatility	Chi-sq.	P-Value	Chi-sq.	P-Value
Full Sample				
Foreign Net Purchases	15.274*	0.0540	12.688	0.1230
Exchange Rate Volatility	15.301*	0.0535	128.972**	0.0000
Pre-Crisis				
Foreign Net Purchases	16.485**	0.0359	6.728*	0.0811
Exchange Rate Volatility	15.941**	0.0432	8.563**	0.0357
Crisis				
Foreign Net Purchases	0.052	0.9743	11.033*	0.0873
Exchange Rate Volatility	0.156	0.9245	70.455**	0.0000
Post-Crisis				
Foreign Net Purchases	3.224	0.7802	14.087*	0.0795
Exchange Rate Volatility	27.934**	0.0001	33.076**	0.0001

*and** denote significance at the 10% and 5% level, respectively.

Table 5.40 Granger Causality Test between Exchange rate volatility and Other Variables

Dependent variable:	Thailand		Korea	
Exchange Rate Volatility	Chi-sq.	P-Value	Chi-sq.	P-Value
Full Sample				
Foreign Net Purchases	8.684	0.3696	12.792	0.1192
Stock Prices Volatility	10.894	0.2077	157.727**	0.0000
Pre-Crisis				
Foreign Net Purchases	5.178	0.7384	2.490	0.4770
Stock Prices Volatility	8.333	0.4016	4.372	0.2239
Crisis				
Foreign Net Purchases	1.968	0.3737	11.328*	0.0787
Stock Prices Volatility	1.504	0.4714	88.781**	0.0000
Post-Crisis				
Foreign Net Purchases	13.597**	0.0345	11.735	0.1634
Stock Prices Volatility	18.088**	0.0060	53.981**	0.0000

*and** denote significance at the 10% and 5% level, respectively.

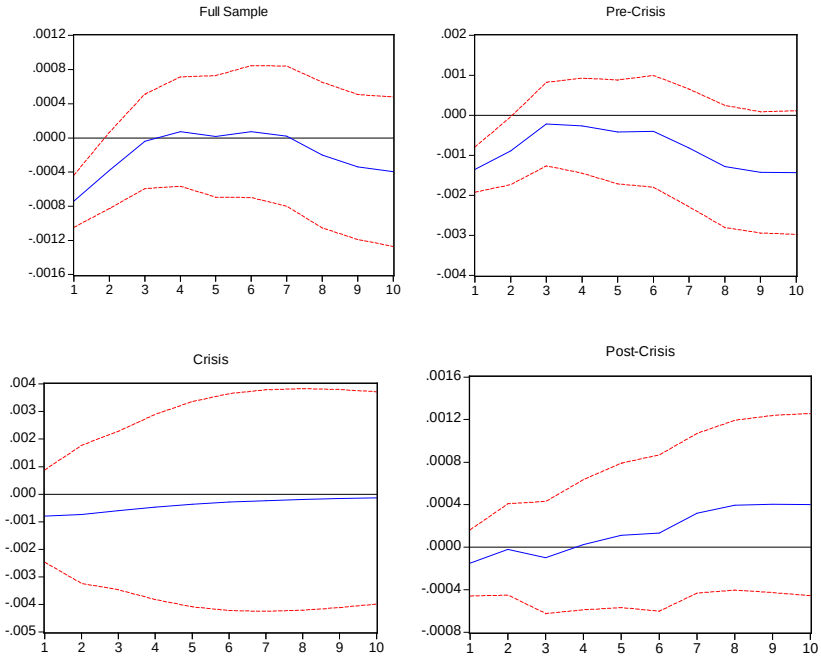

Figure 5.17 Impulse Response of Stock Prices Volatility to a shock in Foreign Net Purchases (Thailand)

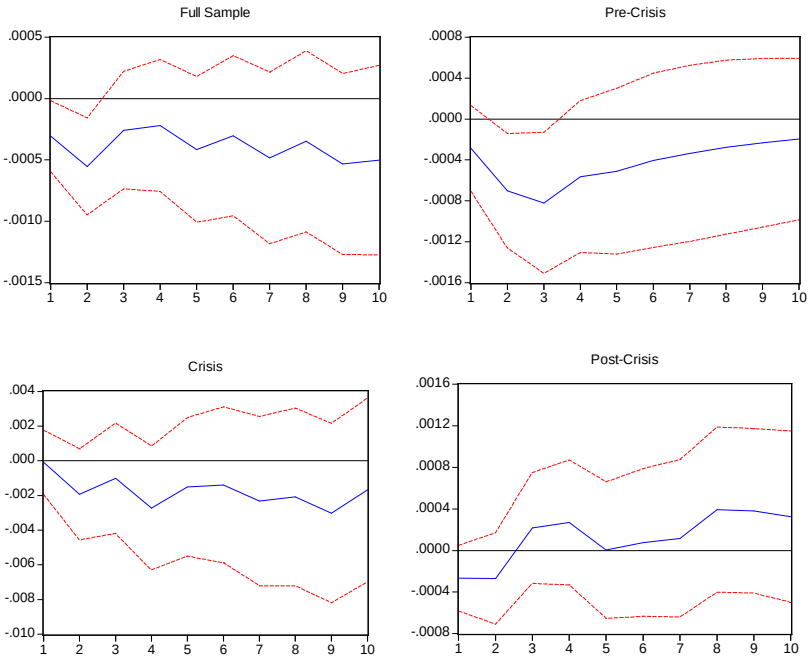

Figure 5.18 Impulse Response of Stock Prices Volatility to a shock in Foreign Net Purchases (Korea)

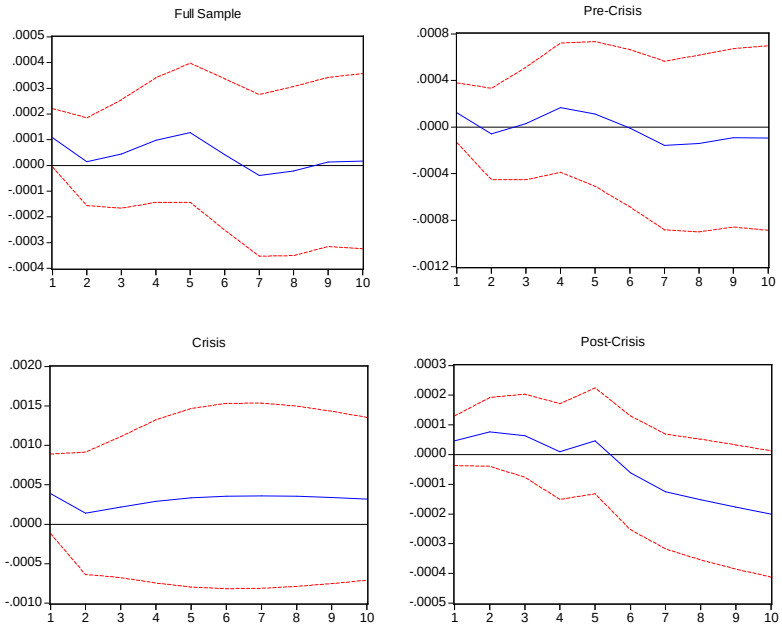

Figure 5.19 Impulse Response of Exchange Rate Volatility to a shock in Foreign Net Purchases (Thailand)

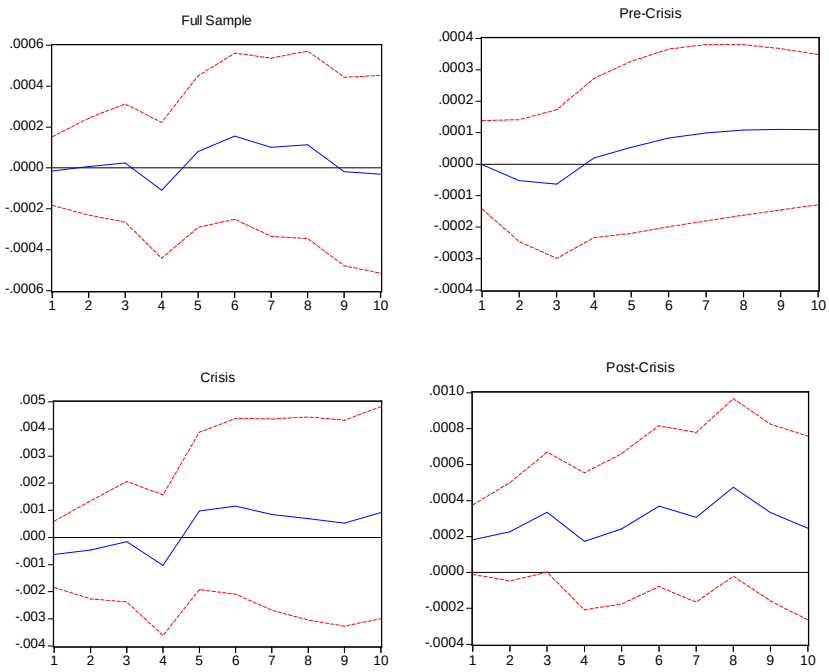

Figure 5.20 Impulse Response of Exchange Rate Volatility to a shock in Foreign Net Purchases (Korea)

5.2.4 Impacts on Local Investors

This part uses daily time-series data of three variables such as foreign net purchases, net purchases of local institutes and net purchases of local investors to examine the relationships between foreign net purchases and net purchases of local institutes and net purchases of local investors during the sample period by using the VAR model.

Next, stationary of stock prices volatility and exchange rate volatility are tested for using the Augmented Dickey-Fuller (ADF) Unit Root Test. The results of the unit root are displayed in Table 4.5. The test found that with and without a trend assumption, foreign net purchases, net purchases of local institutes and net purchases of local investors rejected the hypothesis that there is a unit root process. Therefore, foreign net purchases, net purchases of local institutes and net purchases of local investors are stationary or I(0) process. The estimation of the VAR model firstly requires the explicit choice of lag length in the model. The appropriate lag length criteria are shown in Table 5.41 and the result of the VAR estimation is shown in Tables 5.42 to 5.45.

Table 5.41 Lag Length Criteria

Period	Lag Criteria	LR	FPE	AIC	SC	HQ
Full Sample	4	4	4	4	2	3
Pre-Crisis	2	2	2	2	2	2
Crisis	2	6	2	2	1	1
Post-Crisis	4	4	4	4	2	3

The results from granger causality analysis, as shown in Table 5.46, reveal that there is a relationship between net purchases of local institutes and foreign net purchases with high significance at the level 5%. Foreign net purchases indeed lead the change in net purchases of local institutes. As can be seen in Figure 5.21, impulse response results display the impact of one standard deviation shock from foreign net purchases on net purchases of local institutes. The impacts of one standard deviation innovation in foreign net purchases lead to a cumulative decrease in net purchases of local institutes equivalent to about 0.018% of market capitalization in the tenth day. Therefore, this suggests that net purchases of local institutes respond to contemporaneous change from foreign net purchases. In other words, net purchases of local institutes are contemporaneously affected by change in foreign net purchases. Thus, net purchases of local institutes decrease in response to one standard deviation of a shock in foreign net purchase. This reveals the opposite trading behaviors between local institutes and foreign investors during sample period. Unfortunately, the results are not consistent in all periods. The results are significant during the pre-crisis and post-crisis periods but insignificant during the crisis period.

For local investors, the results from granger causality analysis, as shown in Table 5.47, reveal that there is a relationship between net purchases of local investors and foreign net purchases with high significance at the 5% level. Foreign net purchases indeed lead the change in net purchases of local investors. As can be seen in Figure 5.22, impulse response results display the impact of one standard deviation shock from foreign net purchases on net purchases of local investors. The impacts of one standard deviation innovation in foreign net purchases is a cumulative decrease in net purchases of local investors equivalent to about 0.025% of market capitalization in the tenth day. Therefore, these suggest that net purchases of local investors respond to

contemporaneous change from foreign net purchases. In other words, net purchases of local investors are contemporaneously affected by change in foreign net purchases. Thus, net purchases of local investors decrease in response to one standard deviation of a shock in foreign net purchase. This reveals the opposite trading behaviors between local investors and foreign investors during the sample period. Unfortunately, the results are not consistent in all periods. The results are significant during the pre-crisis and post-crisis periods but insignificant during the crisis period.

According to the above results, the behavior of both local institutes and local investors is to trade against foreign investors that have a positive feedback trading behavior with respect to local stock returns. Therefore, local institutes and local investors have a negative feedback trading behavior with respect to local stock returns during the sample period. In addition, the result of local investors is consistent with the research in various markets, while the result of local institutes is contrary with previous research. For example, Grinblatt and Keloharju (2000) found that foreign investors and domestic institutional investors tended to be momentum investors in the Finnish market, whereas households tended to be contrarians. For Australia, Jackson (2003) showed that individual investor flows demonstrate negative feedback trading with respect to recent returns. For the U.S. market, Griffin, Harris, and Topaloglu (2003) found that institutions tend to be net buyers of Nasdaq stocks that rose the previous day and that individuals tend to be net sellers of these stocks. Richards (2005) suggested that it is individual investors as a group who tend to be more often on the other side of the trading of foreign investors.

Table 5.42 VAR Estimation of Impacts on Local Investors (Full Sample Period)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Foreign Net Purchases (-1)	-0.172065	-0.212842	0.363480
t-statistic	*[-2.05592]*	*[-5.41369]*	*[3.86320]*
Foreign Net Purchases (-2)	0.029323	0.026994	-0.054940
t-statistic	*[0.34785]*	*[0.68168]*	*[-0.57975]*
Foreign Net Purchases (-3)	0.053053	-0.010415	-0.055922
t-statistic	*[0.63023]*	*[-0.26339]*	*[-0.59093]*
Foreign Net Purchases (-4)	-0.046246	0.022963	0.060651
t-statistic	*[-0.55165]*	*[0.58310]*	*[0.64355]*
Local Institutes (-1)	-0.540931	0.104272	0.378142
t-statistic	*[-5.76614]*	*[2.36611]*	*[3.58552]*
Local Institutes (-2)	-0.086129	0.110168	-0.030191
t-statistic	*[-0.91083]*	*[2.48007]*	*[-0.28400]*
Local Institutes (-3)	-0.071053	0.019214	0.031865
t-statistic	*[-0.75267]*	*[0.43328]*	*[0.30025]*
Local Institutes (-4)	-0.172482	0.076850	0.136236
t-statistic	*[-1.85402]*	*[1.75850]*	*[1.30263]*
Local Investors (-1)	-0.611409	-0.087278	0.679593
t-statistic	*[-7.45898]*	*[-2.26660]*	*[7.37480]*
Local Investors (-2)	-0.056375	0.053526	0.015211
t-statistic	*[-0.67937]*	*[1.37314]*	*[0.16305]*
Local Investors (-3)	-0.013855	0.022373	-0.020078
t-statistic	*[-0.16717]*	*[0.57464]*	*[-0.21549]*
Local Investors (-4)	-0.074098	0.039031	0.071559
t-statistic	*[-0.89709]*	*[1.00592]*	*[0.77064]*
Constant	3.31E-06	2.44E-06	-5.62E-06
t-statistic	*[0.60977]*	*[0.95482]*	*[-0.92023]*
R-squared	0.307588	0.254919	0.148723
Adj. R-squared	0.304292	0.251372	0.144671
Sum sq. resids	0.000188	4.16E-05	0.000238
S.E. equation	0.000273	0.000128	0.000307
F-statistic	93.32471	71.87707	36.70270
Log likelihood	17201.96	19116.48	16905.29
Akaike AIC	-13.56667	-15.07773	-13.33251
Schwarz SC	-13.53672	-15.04778	-13.30256
Mean dependent	8.11E-06	1.18E-06	-9.33E-06
S.D. dependent	0.000328	0.000148	0.000332

Table 5.42 VAR Estimation of Impacts on Local Investors (Full Sample Period) (Continued)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Determinant resid covariance (dof adj.)			5.43E-24
Determinant resid covariance			5.34E-24
Log likelihood			57106.85
Akaike information criterion			-45.04171
Schwarz criterion			-44.95187

Table 5.43 VAR Estimation of Impacts on Local Investors (Pre-Crisis Period)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Foreign Net Purchases (-1)	-0.478313	-0.225904	0.743978
t-statistic	*[-1.43977]*	*[-2.12761]*	*[2.15747]*
Foreign Net Purchases (-2)	-0.147297	-0.142644	0.199989
t-statistic	*[-0.44327]*	*[-1.34313]*	*[0.57981]*
Local Institutes (-1)	-0.940512	0.061079	0.897653
t-statistic	*[-2.71120]*	*[0.55090]*	*[2.49292]*
Local Institutes (-2)	-0.442484	0.032129	0.322927
t-statistic	*[-1.27661]*	*[0.29003]*	*[0.89757]*
Local Investors (-1)	-0.932640	-0.041429	1.006894
t-statistic	*[-2.82851]*	*[-0.39313]*	*[2.94191]*
Local Investors (-2)	-0.230742	-0.123940	0.271145
t-statistic	*[-0.69809]*	*[-1.17322]*	*[0.79029]*
Constant	2.28E-05	1.55E-06	-2.39E-05
t-statistic	*[1.96604]*	*[0.41964]*	*[-1.98667]*
R-squared	0.287665	0.437103	0.109395
Adj. R-squared	0.283064	0.433467	0.103643
Sum sq. resids	0.000114	1.17E-05	0.000123
S.E. equation	0.000351	0.000112	0.000364
F-statistic	62.52686	120.2317	19.01850
Log likelihood	6122.037	7189.703	6087.128
Akaike AIC	-13.06632	-15.34766	-12.99173
Schwarz SC	-13.03011	-15.31145	-12.95552
Mean dependent	5.25E-05	-1.22E-05	-3.96E-05
S.D. dependent	0.000414	0.000149	0.000384

Table 5.43 VAR Estimation of Impacts on Local Investors (Pre-Crisis Period) (Continued)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Determinant resid covariance (dof adj.)			1.85E-24
Determinant resid covariance			1.81E-24
Log likelihood			21601.14
Akaike information criterion			-46.11141
Schwarz criterion			-46.00279

Table 5.44 VAR Estimation of Impacts on Local Investors (Crisis Period)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Foreign Net Purchases (-1)	-0.209233	-0.091519	0.114362
t-statistic	*[-0.75695]*	*[-0.67052]*	*[0.36521]*
Foreign Net Purchases (-2)	0.119618	-0.172468	0.174628
t-statistic	*[0.43802]*	*[-1.27900]*	*[0.56446]*
Local Institutes (-1)	-0.637036	0.087468	0.362409
t-statistic	*[-2.03975]*	*[0.56719]*	*[1.02432]*
Local Institutes (-2)	-0.135552	0.003199	0.236445
t-statistic	*[-0.42023]*	*[0.02009]*	*[0.64704]*
Local Investors (-1)	-0.832032	-0.016237	0.641716
t-statistic	*[-3.14449]*	*[-0.12428]*	*[2.14080]*
Local Investors (-2)	0.021991	-0.055877	0.132479
t-statistic	*[0.07957]*	*[-0.40947]*	*[0.42315]*
Constant	-3.99E-05	-3.91E-07	4.41E-05
t-statistic	*[-2.27114]*	*[-0.04505]*	*[2.21847]*
R-squared	0.468608	0.248830	0.264532
Adj. R-squared	0.452824	0.226518	0.242686
Sum sq. resids	1.06E-05	2.57E-06	1.35E-05
S.E. equation	0.000229	0.000113	0.000259
F-statistic	29.68891	11.15228	12.10916
Log likelihood	1459.181	1606.664	1433.109
Akaike AIC	-13.89647	-15.30779	-13.64697
Schwarz SC	-13.78452	-15.19585	-13.53503
Mean dependent	-0.000131	2.94E-05	0.000101
S.D. dependent	0.000309	0.000128	0.000298

Table 5.44 VAR Estimation of Impacts on Local Investors (Crisis Period) (Continued)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Determinant resid covariance (dof adj.)			2.44E-24
Determinant resid covariance			2.20E-24
Log likelihood			4802.669
Akaike information criterion			-45.75760
Schwarz criterion			-45.42176

Table 5.45 VAR Estimation of Impacts on Local Investors (Post-Crisis Period)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
Foreign Net Purchases (-1)	-0.167462	-0.160684	0.293288
t-statistic	*[-2.26465]*	*[-3.36628]*	*[3.14247]*
Foreign Net Purchases (-2)	0.046429	0.063915	-0.125096
t-statistic	*[0.62600]*	*[1.33500]*	*[-1.33636]*
Foreign Net Purchases (-3)	0.079479	-0.078842	-0.018301
t-statistic	*[1.07223]*	*[-1.64773]*	*[-0.19561]*
Foreign Net Purchases (-4)	0.013663	0.025549	0.015669
t-statistic	*[0.18514]*	*[0.53629]*	*[0.16822]*
Local Institutes (-1)	-0.471879	0.110862	0.302672
t-statistic	*[-5.65640]*	*[2.05865]*	*[2.87458]*
Local Institutes (-2)	-0.037230	0.139658	-0.117833
t-statistic	*[-0.44268]*	*[2.57255]*	*[-1.11011]*
Local Institutes (-3)	-0.028342	-0.012913	-0.002716
t-statistic	*[-0.33797]*	*[-0.23854]*	*[-0.02566]*
Local Institutes (-4)	-0.132772	0.106066	0.081633
t-statistic	*[-1.59896]*	*[1.97878]*	*[0.77891]*
Local Investors (-1)	-0.546246	-0.127060	0.663307
t-statistic	*[-7.71315]*	*[-2.77935]*	*[7.42079]*
Local Investors (-2)	-0.047134	0.124716	-0.074216
t-statistic	*[-0.65228]*	*[2.67368]*	*[-0.81374]*
Local Investors (-3)	0.026786	-0.009618	-0.038452
t-statistic	*[0.37048]*	*[-0.20608]*	*[-0.42137]*
Local Investors (-4)	-0.066369	0.054861	0.060377
t-statistic	*[-0.92523]*	*[1.18479]*	*[0.66688]*
Constant	-4.19E-07	3.65E-06	-3.19E-06
t-statistic	*[-0.07324]*	*[0.98716]*	*[-0.44192]*

Table 5.45 VAR Estimation of Impacts on Local Investors (Post-Crisis Period) (Continued)

Variable	Foreign Net Purchases	Local Institutes	Local Investors
R-squared	0.275909	0.167046	0.173672
Adj. R-squared	0.269603	0.159792	0.166476
Sum sq. resids	6.26E-05	2.61E-05	9.97E-05
S.E. equation	0.000213	0.000138	0.000269
F-statistic	43.75625	23.02934	24.13492
Log likelihood	9791.881	10400.73	9468.046
Akaike AIC	-14.06022	-14.93562	-13.59460
Schwarz SC	-14.01127	-14.88667	-13.54565
Mean dependent	-1.60E-06	5.77E-06	-4.55E-06
S.D. dependent	0.000249	0.000150	0.000295
Determinant resid covariance (dof adj.)			5.61E-24
Determinant resid covariance			5.46E-24
Log likelihood			31333.37
Akaike information criterion			-44.99549
Schwarz criterion			-44.84864

Table 5.46 Granger Causality Test between Local Institutes and Other Variables

Dependent variable: Local Institutes	Chi-sq.	P-Value
Full Sample		
Foreign Net Purchases	30.58863**	0.0000
Exchange Rate Volatility	8.503557*	0.0748
Pre-Crisis		
Foreign Net Purchases	6.472315**	0.0393
Exchange Rate Volatility	1.552948	0.4600
Crisis		
Foreign Net Purchases	1.844231	0.3977
Exchange Rate Volatility	0.169801	0.9186
Post-Crisis		
Foreign Net Purchases	16.86718**	0.0021
Exchange Rate Volatility	16.58561**	0.0023

*and** denote significance at the 10% and 5% level, respectively.

Table 5.47 Granger Causality Test between Local Investors and Other Variables

Dependent variable: Local Institutes	Chi-sq.	P-Value
Full Sample		
Foreign Net Purchases	16.11849**	0.0029
Exchange Rate Volatility	14.71040**	0.0053
Pre-Crisis		
Foreign Net Purchases	5.054117*	0.0799
Exchange Rate Volatility	7.129138**	0.0283
Crisis		
Foreign Net Purchases	0.392497	0.8218
Exchange Rate Volatility	1.341336	0.5114
Post-Crisis		
Foreign Net Purchases	12.18323**	0.0160
Exchange Rate Volatility	9.959720**	0.0411

*and** denote significance at the 10% and 5% level, respectively.

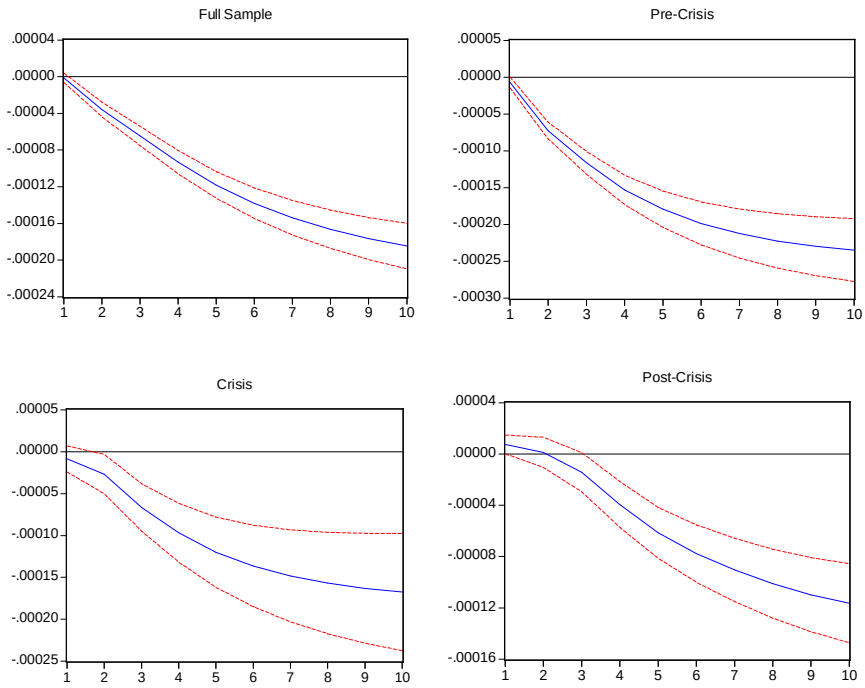

Figure 5.21 Impulse Response of Local Institutes to a shock in Foreign Net Purchases

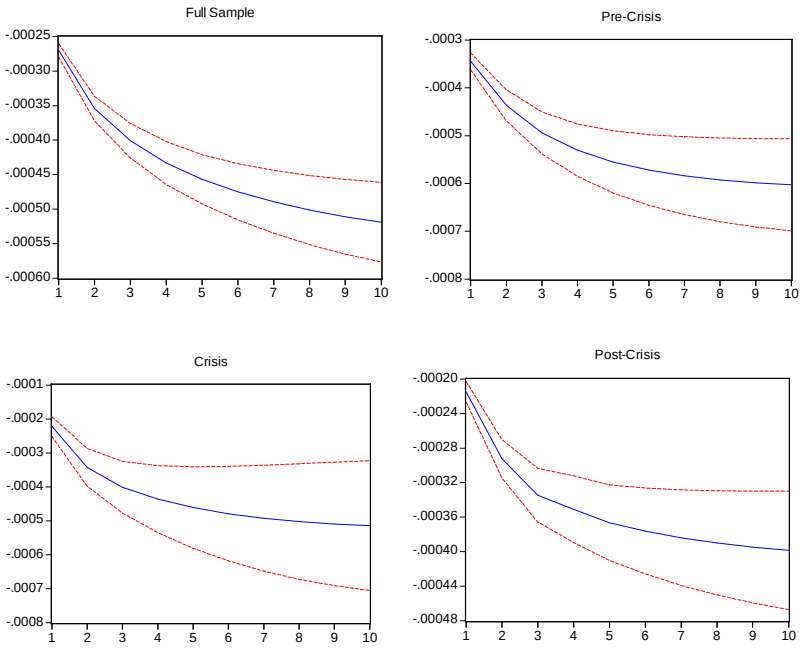

Figure 5.22 Impulse Response of Local Investors to a shock in Foreign Net Purchases

CHAPTER 6

CONCLUSION

This study demonstrates the behavior of foreign flows and their impacts on the Thai stock market, especially on stock prices and exchange rate. Foreign flows had an impact on capital markets in relation to stock prices and the SET index as we as on the money market in relation to exchange rate. This may cause fluctuation in both stock prices and exchange rate, thus affecting the stability of both markets as well as the stability of Thailand's economy. This research investigated the behavior of foreign flows and their impacts on the Thai stock market from January 5, 2004 to December 30, 2014 to cover the effects of the global financial crisis in 2008 and the liquidities from the quantitative easing measures after the crisis. This research investigates and compares the results from two Asian countries, Thailand and Korea, through analysis of three separate periods: pre-global financial crisis from Jan 5, 2004 to Dec 28, 2007; global financial crisis from Jan 2, 2008 to Nov 24, 2008 and post-global financial crisis from Nov 25, 2008 to Dec 30, 2014. This study employs a structural VAR model with three endogenous variables: stock returns, currency returns and foreign normalized net purchases, by dividing net purchases transactions by the contemporaneous market capitalization with the exogenous global returns. The summary of these behaviors and their impacts are shown in Figure 6.1. The significant relationships between foreign flows and other factors are shown in Table 6.1.

According to the results of foreign investment behavior, the results of impulse responses reveal the positive correlation between stock returns and foreign net purchases during the full sample period in both Thailand and Korea. This implies that with positive feedback trading behavior with respect to local stock returns, net purchases of foreign investors are determined by past returns. Unfortunately, the results are not consistent in all periods. The results are significant during the pre-crisis period but insignificant during the crisis and post-crisis periods. This may be because of the conditions in mature markets (push factors) on average affect foreign flows more than

conditions in domestic markets (pull factors). Foreign net purchases also continuously increase in response to one standard deviation of a shock in depreciation. This implies that a local currency depreciation, increasing in currency returns, lowers stock prices in terms of foreign currency and promotes net purchases of foreign investors. Moreover, foreign net purchases and global returns have a significant positive relationship. This implies that an increase in global returns promotes net purchases of foreign investors into a local stock market in all periods. Therefore, from these results it can be concluded that the positive feedback trading behavior with respect to local stock returns and currency returns does not exist in the crisis period. Foreign investors will consider only global returns. In other words, the condition in mature markets only affects the direction of foreign flows in all periods.

For this study of impacts of foreign portfolio investment, the results of impulse responses reveal the positive correlation between foreign net purchases and stock returns. In addition, this paper decomposes foreign flows into “expected” and “unexpected”. The coefficient of expected and unexpected foreign flows is positive with high significance for all periods in both Thailand and Korea. Thus, the predictable and unpredictable component of foreign net flows appears to be a significant driver of local stock returns. Currency returns decrease in response to one standard deviation of a shock in foreign net purchase. This implies that the increase in foreign net purchase revalues local currency because the foreign demand for local stock should lead to an appreciation in local currency. Moreover, the increase in net purchases by foreign investors affects the increase in volatility of local stock prices and also destabilizes local stock prices. The results from granger causality analysis reveal that the relationship between stock prices volatility and foreign net purchases is significant during the pre-crisis period but insignificance during the crisis and post-crisis periods. Therefore, foreign net purchases lead to a change in stock prices volatility during the pre-crisis period but not during the crisis and post-crisis periods. The increase in net purchases by foreign investors also affects the increase in volatility of exchange rate and destabilizes exchange rate. Unfortunately, the results from granger causality analysis reveal that the relationship between exchange rate volatility and foreign net purchases is not significance. Therefore, foreign net purchases do not lead to change in exchange rate volatility. In addition, the behavior of both local institutes and local investors is to

trade against foreign investors that have a positive feedback trading behavior with respect to local stock returns. Therefore, local institutes and local investors have a negative feedback trading behavior with respect to local stock returns during the sample period. The results of the comparison between the Thai stock market and Korean stock market present that the impacts of foreign flows in the Thai market, which has a relatively smaller economy and market capitalization, are stronger than in the Korean market. In other words, the same proportion of foreign flows, as a percentage of total market capitalization, in the Thai market will cause higher increases in stock prices than in the Korean market.

In addition, the variance decomposition results show that currency returns have the most impact on foreign net purchases compared with stock returns and global returns. Thus, currency returns were the most important factor for foreign investment decision making during the sample periods in both Thailand and Korea. Therefore, the policies employed to control the fluctuation in exchange rate will also help reduce the fluctuation in a stock market. Policy implication of exchange rate stabilization may be an appropriate choice to prevent fluctuation in both exchange rate and the stock market. McKinnon and Schnabl (2004) provide the rationale for exchange rate stabilization in small open economies with underdeveloped capital markets. They argue that emerging markets and developing countries cannot choose their monetary framework exogenously based on specific targets of economic policy making. Rather, the regime choice is interpreted as endogenous, determined by several inherent and interdependent factors such as macroeconomic stabilization, invoicing of international trade and the currency denomination of international capital flows.

The results of this research demonstrate the behavior of foreign flows such as market returns, currency returns and global returns. These factors can be employed as leading indicators for the decision of foreign investors' inflows and outflows, being very useful for tendency prediction of foreign flows in the future. Moreover, these results of the impacts of foreign flows in a stock market from the analysis can be employed to help trading decision making in order to get the benefits from a foreign buying period and to avoid the negative impacts of a foreign selling period as well. For further study on other markets, sector indices and individual stocks as well as the VAR model can be used to assess the impacts from foreign investment flows.

Table 6.1 Significant Relationships between Foreign Flows and Other Factors

	Thailand	Comparison	**Korea**
Foreign Investment Behavior			
Stock Returns → Foreign Flows			
Full Sample	+**	>	+**
Pre-Crisis	+**		+**
Crisis	-		-
Post-Crisis	+**		+
Currency Returns → Foreign Flows			
Full Sample	+**	<	+**
Pre-Crisis	+**		+
Crisis	-		+**
Post-Crisis	+		+
Global Returns → Foreign Flows			
Full Sample	+**	=	+**
Pre-Crisis	+**		+**
Crisis	+**		+**
Post-Crisis	+**		+**
Impacts of Foreign Flows			
Foreign Flows → Stock Returns			
Full Sample	+**	>	+**
Pre-Crisis	+		-**
Crisis	+**		+
Post-Crisis	+**		+**
Foreign Flows → Currency Returns			
Full Sample	-**	<	-**
Pre-Crisis	-**		+
Crisis	-		-
Post-Crisis	-**		-**
Foreign Flows → Stock Prices Volatility			
Full Sample	+		-
Pre-Crisis	+**		-
Crisis	+		-
Post-Crisis	+		+
Foreign Flows → Exchange Rate Volatility			
Full Sample	-		+
Pre-Crisis	-		+
Crisis	-		+
Post-Crisis	+**		+

** denote significance at the 5% level, + is the positive relationship, - is the negative relationship

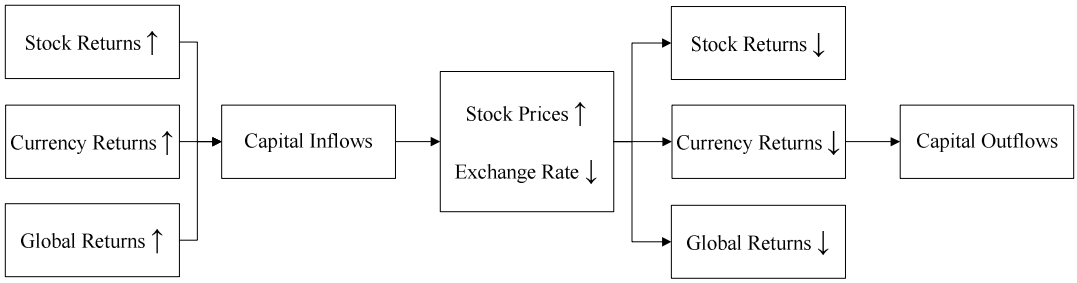

Figure 6.1 Behaviors and Impacts of Foreign Flows

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