



Graduation Exercise (EIA3005)

Title: Foreign equity flows and the volatility of Malaysian stock market

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Chapter 1

Introduction

1.1 Background of the Study

Due to the large volume of transactions of foreign portfolio investments in Bursa Malaysia in recent years, foreign investors have been in the media coverage more often than before. After their nearly half-century participation in the Malaysian stock market, there is astonishingly very few published paper assessing the costs and benefits of foreign trading in the local bourse. As a result, the Malaysian government is deprived of effective input on their financial liberalization policies.

When fund managers transferred their investment funds from developed markets to developing countries to seek for better returns, there is unexpected escalation in liquidity around the world since 2009. The 'hot money' flows to developing countries by foreign investors can be largely attributed to the loose monetary policies in developed markets especially in the U.S. More specifically, to tackle financial turmoil and recessions in response to the global financial crisis, Quantitative Easing (QE) was introduced by the central banks all over the globe which aimed to revive their economies via a policy of low interest rate. The QE in U.S. is the largest stimulus program amongst developed nations, as evidenced by the significant expansion in balance sheet of Federal Reserve from USD700 billion in 2008 to USD4.4 trillion in 2014.

However, most of the policy makers in emerging markets such as China, Brazil, Thailand, Indonesia and South Korea were aware of the adverse effect of such flows of hot money as they may be extremely vulnerable to unanticipated repatriation. Thus, they decided to introduce certain frameworks of capital controls to manage the uncertainty pertaining to the international flows of capital as mentioned in Aizenman and Pinto (2013). The Malaysian government, however, did not follow their footstep. Instead, the country continued to liberalize the regulations for foreign investors in 2009, even though this increases its vulnerability to the sudden repatriation of hot money

flows. In 2013, the then U.S. Fed chairman Ben Bernanke announced that his central bank will reduce the pace of purchasing assets. This remark, known as “taper tantrum”, triggered a global reaction in which funds managers were pulling out from emerging markets, Malaysia included. The massive sell-off of Malaysian equities by foreign funds continued for the next three years until end of 2016. Liew, Lim and Goh (2018) attribute this reversal of foreign equity flows to Malaysia to three factors, namely Malaysia’s lower growth expectation, benign international price in commodity, and the strong economic recovery in U.S.

1.2 Problem Statement

The participation of foreign investors in local stock markets has started in the late 1980s and early 1990s. The academic literature has not reached a consensus on the benefits of such foreign equity flows, especially in terms of economic growth. Some prominent economists such as Rodrik & Subramaniam (2009) and Stiglitz (2010) even argue that the free capital mobility will harm financial stability and trigger financial crisis. One good example is the 1997 Asian financial crisis. At that time, the Thailand foreign exchange reserve was assaulted by currency speculators after the initiation of Thai Baht free floating policy. This occurred because foreign investors lost confidence in the market and pulled out their funds from the country, which consequently spillover to the whole Asian region and triggered the Asian financial crisis.

Given the significant policy implications from volatile foreign equity flows, a number of studies examine its effect on the volatility of the local stock markets. The literature review in Chapter 2 shows that the volatility impact has been examined for China (Chen, Li and Wei, 2006; Han et al., 2015; He et al., 2013; Tu and Han, 2010), Egypt (Ahmed, 2017), India (Ananthanarayanan et al., 2009; Dhingra, Gandhi and Bulsara (2016)), Indonesia (Wang, 2006), Norway (Che, 2018), South Korea (Umutlu and Shackleton, 2015), Taiwan (Chia, Kuo and Cheng, 2008; Wang and Shen, 1999), Thailand (Wang, 2006), Turkey (Umutlu, Akdeniz and Salih, 2013), Vietnam (Vo, 2015).

Unfortunately, the literature survey reveals a significant gap in that the volatility impact of foreign portfolio flows has not been examined for the Malaysian stock market. This is particularly important given the huge withdrawals of foreign funds from Bursa Malaysia over the sample period of 2013-2016. The constant media coverage always put the

Malaysian government in defense of its financial liberalization policies, and the call for a return to the 1999 capital controls has always appear in the news. Thus, this study provides the first empirical analysis on the causal relationship between foreign equity flows and return volatility in Bursa Malaysia, so as to determine whether the sudden withdrawals of foreign funds is worth policy intervention.

1.3 Research Questions

Given the importance of foreign portfolio flows and the absence of existing studies, this study aims to answer the following three research questions:

1. What is the causal relationship between foreign equity flows and return volatility in the Malaysian stock market?
2. If the causal relationship runs from foreign equity flows to return volatility, do foreign equity flows increase or decrease the volatility of the Malaysian stock market?
3. Does the volatility impact come from foreign buys or foreign sales?

1.4 Research Objectives

This study addresses the above three research questions in the following ways:

1. To examine the causal relationship between foreign equity flows and return volatility in the Malaysian stock market using vector autoregression and Granger non-causality test.
2. To determine whether foreign equity flows increase or decrease the volatility of the Malaysian stock market through impulse response function and variance decomposition.
3. To determine the source of volatility impact, disaggregated data of foreign buys and foreign sales are used and subject to the same methodologies of vector autoregression, Granger non-causality test, impulse response function and variance decomposition.

1.5 Significance of Study

The findings of this research are important to policy makers, public listed firms, investors and researchers. For the Malaysian government, this research sheds light on the volatility impact of foreign equity flows, especially the sudden withdrawals of foreign funds after the “taper tantrum”. If the result shows that foreign equity flows increase the volatility of Bursa Malaysia, then Malaysian government might need to resort to specific measures to calm the market. However, if foreign equity flows decrease volatility, then policymakers do not need to intervene. For Malaysian public listed companies and stock investors, this research may help them to have a better understanding about how foreign investors behave in the Malaysian stock market so that they can predict the actions and future positions of foreign investors more precisely. For instance, they can inject their funds into the market when foreign investors follow a positive feedback trading strategy so as to maximize their profits. Finally, this research complements the limited studies on foreign investors in Malaysian stock market. As highlighted in Chapter 2, there are only three studies examining the roles of foreign investors in the local bourse, despite the fact that Bursa Malaysia has been incorporated for nearly half-century.

1.6 Scope of Research

This research utilizes secondary data provided by Bursa Malaysia and Thomson Datastream over the sample period of October 2009 to December 2016. The former provides data on buys and sells of foreign investors, whereas the latter supplies market data to compute the return volatility of Malaysian stock market. Given the aggregate nature of the data, the sample covers all stocks traded on Bursa Malaysia during the sample period.

1.7 Organization of the Study

This study is organized into five chapters, covering introduction, literature review, methodology, empirical results and conclusion. First and foremost, the introduction of the study provides a brief background, discusses the problem statement that motivates this research, outlines the three research questions and their corresponding objectives, highlights the significance of this study, and finally defines the scope of research. The second chapter then reviews the relevant previous studies with the aim of identifying the existing research gap for the Malaysian stock market. The methodology of this study is outlined in the subsequent chapter, covering the sample data and the selected econometrics methods. Chapter 4 presents the empirical results and relates the findings with relevant studies in other markets. Finally, Chapter 5 summarizes the key findings and provides recommendations for future studies.

Chapter 2

Literature Review

The objective of this chapter is to review the existing literature, and highlight the research gap on foreign investors- stock volatility relationship. The review starts with previous studies that examine the impact of foreign investors on the volatility of the local stock markets. A significant research gap from Section 2.1 is the lack of similar study for the Malaysian stock market. Section 2.2 then discusses the limited studies available for Bursa Malaysia, in which they examine the roles of foreign investors on stock price efficiency, stock liquidity, invested companies' disclosed quality and corporate governance. Section 2.3 shows that, unlike Malaysia, the participation of foreign investors has been heavily scrutinized in other neighboring Asian countries. Section 2.4 then summarizes the literature review.

2.1 Foreign Investor and Stock Volatility

There are many studies in Malaysia about domestic stock market yet there are almost no research paper regarding to foreign investor and stock volatility. Unlike other countries, they have more advanced and complex studies pertaining to foreign investor and stock volatility. This is very unfortunate of Malaysian academicians are not so active in the study of foreign investor and stock volatility.

In Istanbul, Umutlu, Akdeniz and Salih (2013) decide to use aggregated total volatility derived from local, global and idiosyncratic volatility components as its correlation is not dependent with stock market return. The data sources they used were the Standard & Poor's Emerging Markets Database (EMDB), Datastream and Istanbul Stock Exchange from January 1997 to June 2006. They also discover that aggregated stock market volatility decreases when there is an inflow in foreign equity. They also proved that the

change in local and idiosyncratic volatility affected by net equity flow will affect the aggregated total volatility.

In Taiwan, Chia, Kuo and Cheng (2008) collect data of overseas trade and stock return from January 2000 to September 2006, which derived from Taiwan Stock Exchange and consisted of 20 companies of highest foreign ownership. GJR-GARCH model was utilized to evaluate the influence of foreign equity flow on market volatility. The authors found out foreign investors improve local stock market efficiency. The high stock volatility are caused by the domestic stock price adjustments which they push the stock price back to equilibrium when the stock prices are overvalued. Wang and Shen (1999) provide the evidence for the participation of foreign investors destabilizes Taiwanese stock market and gives rise to the elevation of market volatility.

In Vietnam, Vo (2015) extracts data of public-listed non-financial companies on the Ho Chi Minh City stock exchange from year 2006 to 2012. The first-hand results display that company stock price volatility reduced when foreign investors expand in local firm ownership by restricting feasible endogeneity with heterogeneous estimation methods. As a conclusion, the stock price volatility is stabilized by participation of foreign investors. In China, Chen, Li and Wei (2006) find out that the effects of foreign ownerships are different for tradable foreign ownership will increase the return volatility for local market while non-tradable foreign ownership will not affect the return volatility for local market. The data sources they used were taken from Shenzhen Guo Tai An Information Technology Co. Database and Datastream with period from January 1994 to January 2002. According to the foreign companies exposed to the risk of global stock market which information flows from global stock market to local stock market, there were higher local market volatility related with foreign ownerships. The stock market crises is still subjected to global risk of stock market although the financial crises caused by global flows of capital still can be prevented. Han *et al.* (2015) state overseas institutional investors play a wonderful role to stabilize Chinese stock market and lead to lower market fluctuation whereas local institutional investors lead to aggravated volatility in stock market. The authors make use of delayed corporate size and form in ownership associated with the manoeuvrability for time-invariant company constant impacts as instrumental variables for the institutional investors' shareholdings.

Moreover, Tu and Han (2010) discover the mutual fund ownership is negatively correlated to market volatility in China. The data used were derived from and

THOMSON financial database. Instead of increasing more on market volatility, the authors even found out the market liberalization will actually bring benefits for domestic stock market by reducing the risk and cost of investment on local economy. The market volatility is positively correlated with foreign investors which are not in mutual fund. Therefore, the stock market laws and regulations should be strengthened in China to prevent excessive market volatility due to market speculation committed by foreign investors.

Additionally, He *et al.* (2013) propose foreign investors able to influence stock market volatility through stronger incentive and higher proficiency in processing trading information analysis which is value-applicable. Hence, foreign investors can ameliorate stock price volatility, invested companies' declared quality and corporate governance by utilizing the fundamentals' capitalization into stock price.

In Indonesia and Thailand, Wang (2006) discovers foreign selling contributes significantly to the market volatility especially same-day market volatility in both countries although it only accounts for small size in day-to-day trading. There were 15% and 18% of daily trading value in Indonesia and Thailand respectively accounted for foreign investors in both markets. The data used for the study derived from the Jakarta Stock Exchange (JSX) starting from 2 January 1996 to 31 May 1999 and the Stock Exchange of Thailand (SET) ranging from 1 January 1996 to 30 June 1999. The emerging markets always have higher market volatility if compared to developed markets. However, the reason for high market volatility is caused by financial stability rather than the risk in economic fundamentals. Majorly previous studies which using data before 1997 conclude that market volatility in developing countries reduced or stabilized after market openness. There was even as much as USD\$2 billion of equity investment inflow to Indonesia and Thailand when Asian Financial Crisis happened, which helped to prevent the local markets to drop further by absorbing the selling forces created by local investors. As a result, foreign purchases lead to lower market volatility as they will help to salvage the net sales position created by local investors whereas foreign sales will increase market volatility due to their exits of the local market will reduce on the base of investor.

In Norway, Che (2018) finds out higher stock market volatility is caused by foreign investors. The data was explored through December 1992 to September 2007 on the Norwegian stock market. This is probably because they discovered foreign investors

are momentum traders that contribute the greatest trading volume and trade mostly in very short investment horizons. The author expresses the findings as foreign investors execute the most trading if compared to their domestic counterparts since overseas investors are momentum traders. Since foreign investors employ shortest horizon in investment, they are accountable for elevating volatility of market. Even though the findings are comparable to Cella *et al.* (2013), the stabilizing impact by foreign investors on stock return volatility is not examined in this paper. The knowledge and information assessment level of foreign investors is not inspected.

Bohl and Brzeszczynski (2006) propose foreign investors tend to use investment strategy specifically in short term which is speculative in nature and drives stock price to deviate from fundamentals. This will elevate the market volatility and instigate autocorrelation in return of equity (ROE). Umutlu and Shackleton (2015) study the relationship between stock trading and market volatility according to their respective types of investors. There is no correlation between bid and ask of the large market capitalization stocks in Korea. However, the market volatility is driven up by the participation of foreign investors.

In Egypt, Ahmed (2017) finds out foreign institutional investors' participation affects market volatility whereas foreign individual investors do not influence the market volatility in bid orders. In terms of ask orders, both foreign institutional and individual investors have a huge impact on market fluctuations. The situation of volatility is being aggravated when there are shocks in trading activity. The author also reviews that market volatility will rise among the companies that are vulnerable to political instability which is supported by Boutchkova *et al.* (2012) because foreign investors considering transition of national leader is risky for their investment in that particular market.

In India, Dhingra, Gandhi and Bulsara (2016) prove foreign investors utilizing positive feedback trading strategy in bidding of stocks while negative feedback trading strategy in asking of stocks through daily data on both dynamic and static model. The overseas institutional investors will increase in market volatility greatly in stocks shorting and turn the market becomes unstable. Hamao and Mei (2001) provide the evidence that foreign investors ameliorate the liquidity of market but there is less verification to support the contribution of overseas investors on rise in volatility of market. Ananthanarayanan *et al.* (2009) show that there are no sufficient evidence to accuse

foreign investors as one of the main culprits for rise in volatility and destabilization of stock market in India.

2.2 Foreign Investor in Malaysia

As we know foreign portfolio investments are imperative for the economic growth of a country. However, the degree of market liberalization in each country should be studied in order to evaluate a better policy for foreign equity flow. In this section, we will show how foreign investors in Malaysia play their role in domestic stock market by citing several related articles. The analysis on foreign investors can be carried out due to the technology enhancement which valuable data and information at corporate level can be collected. The raw data of foreign investor activities and behaviors are available to gather from Thomson Reuters Datastream.

Lim *et al.* (2016) find out foreign investors are very proficient in processing the public information in Bursa Malaysia which means there is information asymmetries between foreign investors and local investors. They collected data of overseas shareholding and stock price of public listed companies from year 2002 to 2009. Hence, foreign investors are main contributors of increase of stock price but the advantage of price efficiency will disappear after the foreign ownership exceeds definite threshold level.

Furthermore, Liew, Lim and Goh (2018) discover overseas investors actually dampen the Malaysia stock market liquidity through one-way causality in vector autoregression. The data derived from Thomson Reuters Database within the period from October 2009 to December 2016. The liquidity supply will be reduced by the inflow of foreign investors and the domestic market will turn to be less stable as they tend to flee out of the market when a shock happens.

Moreover, Yatim, Iskandar and Nga (2016) prove that foreign investors put commitments in domestic firms will promote good governance practices. The data extracted from 777 listed companies on Bursa Malaysia in 2008. The weaker the board financial literacy, the higher the foreign investors' shareholdings, the higher the quality of audit of a company. However, when the foreign investors' shareholdings of a firm increases, the book-to-market ratio decreases.

2.3 Foreign Investor in other Asian countries

The foreign investors have a significant role in terms of economic development between Asian countries. Thus, their responsibilities have been evaluated especially in Japan, China, Taiwan, Korea, Indonesia, Vietnam and Thailand. The participation of foreign investors has been inspected thoroughly by academicians and researchers in Asian stock markets.

For China, Chan *et al.* (2007) employ data of thirty eight companies respectively Shanghai Stock Exchange and Shenzhen Stock Exchange from January 2000 to November 2001. The author discovered that the foreign investors were less informed than local investors in China. This is because the foreign investors were not able to purchase stocks in the A-share market which they can only bought shares in B-share market before February 2001. Gul, Kim and Qiu (2010) show foreign investors are more informationally efficient than domestic investors by extracting 1142 China public-listed firms from year 1996 to 2003. This is due to foreign investors are more proficient in resources allocation and data analysis. They even discovered when the biggest shareholders is linked to government, there is higher in synchronicity. When the synchronicity is higher and lower auditor quality, the smaller the foreign ownership due to their negative association. The companies with high synchronicity will lead to lower size of earnings information exhibited in stock returns. Zou, Tang and Li (2016) emphasize about the Chinese financial market reform have been greatly benefited from the introduction and development of Qualified Foreign Institutional Investors (QF II) scheme. Due to information asymmetries, foreign institutional investors cannot outperform their domestic counterparts. Their interests towards allocations of industry are different, even though, there are numerous attributes in stock preferred by them are identical. They even hold different philosophy in models of stocks' selection and corporate governance.

For Indonesia, Rhee and Wang (2009) make use of data from Jakarta Stock Exchange from January 2002 to August 2007. They found out the relationship between foreign ownership and market liquidity in the future are negatively associated rather than improving market liquidity in developing countries. According to Granger causality,

since there will be 3 percent decrease in depth and the price sensitivity will increase by 4 percent in the following month when foreign firm-level ownership rises by 10 percent. Argawal *et al.* (2009) utilize data of 110 stocks from Jakarta Stock Exchange (JSX) from May 1995 to May 2003. There is a whopping of 42% of total trading volume contributed by foreign investors in Indonesia stock market as per their findings. The authors discovered foreign investors underperform local investors in non-initiated orders as they spend 33 basis points more than local investors for bid and they collect 40 basis points less than local investors for ask. Besides, the foreign investors trade more aggressively than local investors as they are more presumably to tender orders to commence trades, they fill the non-initiated orders with lesser time and their orders are consisting high probability to be carried out. Dvorak (2005) and Choe *et al.* (2005) express their results as foreign investors on the Jakarta Stock Exchange (JSX) spend 9 basis points more than local investors for bid and they collect 14 basis points less than local investors for ask. Dvorak explained the inferiority of foreign investors by disadvantage in information whilst Choe, Kho and Stulz emphasized on the poor timing executed by foreign investors.

For Japan, He and Shen (2014) employ data of Japanese public-listed companies from year 1976 to 2008. They discovered the relationship between foreign ownership and Japanese stock price efficiency are positively correlated by using Granger causality test. There was consistent proof being discovered via a quasi-natural experiment. Nguyen (2012) obtain data of all Japanese public-listed companies on the Tokyo Stock Exchange from year 1998 to 2007. The author displayed idea as the higher the foreign investors' ownership, the higher the performance volatility in the market. This is proved there is exceptional low risk experienced by selected companies. Japanese firms are risk-averse due to very low ROA volatility at less than 2.5%. Nevertheless, the foreign investors' involvement has grew significantly from 6.91% in 1998 to 12.94% in 2007.

The cash flow volatility of Japanese companies is 2.1% which is among the lowest if compared with 39 nations in the study of John *et al.* (2008). Ko, Kim and Cho (2007) collect all the Japanese data from Pacific-Basin Capital Markets (PACAP) database which consist all the companies in Tokyo Stock Exchange (TSE) over the period of April 1986 to December 2001. They showed that in Japanese stock market, the average return amongst portfolios of institution ownership have clearer contrast than amongst portfolios of overseas ownership. Drastically uncommon positive returns can be

displayed when that particular stocks are selected by both foreign and institutional investors at the same time in both Japan and Korea. The stocks with low market-to-book ratios and large market capitalization are more desirable for foreign investors in Japan. Kamesaka *et al.* (2003) discover that foreign investors in Japan deliver greater performance by proceeding trading strategy of positive feedback. Kang and Stulz (1997) review overseas investors propose Japanese manufacturing industries' stocks with low diversifiable risk, good performance in accounting, large market capitalization and low leverage. As per March 2002, the foreign investors owned 18.3% in Japanese stock market.

For Vietnam, Vo (2017) gathers data of public-listed non-financial companies on Ho Chi Ming City stock exchange over the period from year 2007 to 2015. The author found out foreign investors contributes a lot in enhancement of stock quote informativeness in Vietnam by using different estimation approaches. This portrays the foreign investors are doing a great job in developing countries. Vo (2015) extracts data of public-listed non-financial companies on Ho Chi Ming City stock exchange over the period from year 2006 to 2012. The author discovered foreign investors actually bring more benefits as their participation in market liberalization can stabilize the local stock market in terms of stock price volatility. However, foreign investors are restricted to have possession of not more than 49% of public listed firms according to contemporary securities law. Batten and Vo (2015) collect data of Vietnamese public listed companies on Ho Chi Minh City Stock Exchange (HOSE) from 2007 to 2012. The authors expressed their idea as a buy and hold strategy was utilized by foreign investors to maximize growth expectations, since overseas investors acquire a long term investment outlook. The foreign investors gain disadvantage over information asymmetries so they keep away from investing in companies with insecure financial management practices. Foreign investors will select the companies with large market capitalization and a low debt ratio to steer clear of information asymmetries for investing as mentioned in Kang and Stulz (1997) , Dahlquist and Robertsson (2001) and Lin and Shiu (2003). Vo (2016) states according to the stock market liberalization in Vietnam, more overseas investors allocate their fund and pump into domestic stock market and they play a major role on local corporate decisions. The author acknowledges the significance of foreign investors assist in cutting down the risk taking activities in firm level among developing countries. Due to overseas investors prefer to invest in the long run, they help to stabilize the stock market by lowering the stock market volatility. Boubakri *et al.* (2013)

comment on foreign investors influence on risk taking in firm level by transforming the contemporary incentive form of corporates followed by the risk aversion degree. As a result, the higher the possession of firms by overseas investors, the better the quality of earning of a company, the higher the efficiency of investment. Estrin *et al.* (2009) recognize that overseas investors tend to privatize and direct companies to more restructuring. This may lead to rise in the income volatility and also risk degree.

For Taiwan, Lien, Tseng and Wu (2013) obtain data from the Taiwan Stock Exchange (TWSE). The authors showed Taiwan's gradual market openness managed to attract more foreign investors and hence led to an improved corporate governance. Since foreign investors are trading with contrarian strategy with local investors, they assist in the stabilization of stock market when it experiences a market shock as they can help to stabilize the overall market liquidity. Seasholes (2000) collects data of Taiwanese market and explored whether foreign investors possess better information than their local counterparts in terms of net purchasing before posting of data on surprises in positive and negative earnings. As a result, overseas investors can even purchase and sell before announcement of earnings surprises which indicates they have more sophisticated approaches to analyse more proficient data and information on earnings surprises. Chiang *et al.* (2012) carry out a research to determine the trading behaviour of foreign, domestic individual and domestic institutional investors in Taiwan. They found out foreign investors do not gain advantage over their domestic counterparts via information asymmetries which is compatible with Choe *et al.* (2005). Nevertheless, the bids of overseas and local institutional investors manage to forecast equity prices' surge when there is huge market deviation from equilibrium. Foreign investors are even able to trade at better equity prices if compared to local traders. Yin (2016) finds the evidence for the relationship between returns in Taiwanese stock market and equity flows varied by the 1997 Asian crisis. However, the impacts and spillover of volatility are strengthened in the aftermath of crisis. The authors even discovered the disputes on feedback trading are much stronger than disputes on information. The returns gained by foreign investors are slightly weaker than local institutional investors.

For Korea, Joe and Oh (2017) collect data from the Korea Exchange (KRX) via FnGuide, TS2000 database and the Korea Fair Trade Commission (KFTC) from year 1999 to 2014. They found out foreign investors only interested to invest in firms which

are above market capitalization of 93.5 billion won. This shows that foreign investors only invest in firms which consists of highly liquid and profitable growth companies and it serves them to be successful in their investments in Korean market. Choe *et al.* (2005) notice that there is only 7% of total trading volume contributed by foreign investors in Korean stock market. The trading efficiency of foreign investors is worse than their domestic equivalents. Ko, Kim and Cho (2007) acquire data from Korea Securities Research Institute (KSRI) stock database and Korea Listed Companies Association database over the period of January 1993 to December 2002. They proved significantly unexpected positive returns was displayed when that specific stocks are chosen by both foreign and institutional investors concurrently in both Korea and Japan, whereas unusual positive returns was exhibited when that certain stocks are selected by either foreign or institutional investors merely in Korea. The stocks with high ROE, large market capitalization and low market-to-book ratios are more favourable for foreign investors in Korea. Choe *et al.* (1999) state positive feedback trading strategy of foreign investors destabilized during financial crisis in 1997 is left unproven. As per March 2002, the foreign investors possessed 36% in Korean stock market. Lee and Cho (2016) investigate the control-ownership imbalance's influence on foreign investors in Korean companies listed on Korea Stock Exchange from 2000 to 2008. The authors found out foreign strategic investors are less sensitive to control-ownership disproportion if compared to overseas portfolio investors. There are stronger adverse impacts on foreign portfolio investors investing in Chaebol companies in terms of control-ownership inequality. Kim *et al.* (2010) propose possession of foreign equity is negatively correlated with ownership concentration of companies. Nevertheless, possession of overseas equity is positively related with diligences of companies for better corporate governance. The foreign investors are more sensitive to the corporate governance issue if compared to domestic investors. So both of them portray heterogeneous structures of behaviours. Kang *et al.* (2016) acquire the result about the domestic and international market information propagation speed is boosted by the participation of overseas investors. Therefore, the foreign investors' involvement is positive to local investors' trading activities.

For Thailand, Taechapiroontong and Suecharoenkit (2011) derive data from the Thailand Stock Exchange from year 1999 to 2004. They discovered foreign investors were less informed than local investors at that period. Foreign and institutional investors tend to have intense purchasing which increases the price of stocks while individual

investors sell at peak prices which causes negative return for foreign and institutional investors. French and Li (2017) mention the returns and foreign equity flows in two stock markets in Thailand which are The Stock Exchange of Thailand (SET) and the Market for Alternative Investment (Mai) are reviewed in terms of the investor sentiment's influence. Both stock markets and foreign investment into Thailand have kept resilient and tough, although there is growing in uncertainty in political and economic instability in Thailand. There is strong positive correlation between both SET and Mai markets' returns and sentiment of investors. In SET, the greater the foreign equity levels, the greater the funds supply, the greater the downward pressure exerted on interest rates of Thailand, the lower the spread. In Mai, the higher the interest rates of Thailand, the lesser the debt capital can be obtained by small companies, the higher the investment rates of foreign investors, the more equity capital will be flowed into the market.

2.4 Conclusion

This chapter reviews a long list of articles to show the important role of foreign investors to the economic development of a country especially emerging markets. From this extensive literature review, we find that the roles of foreign investors have been heavily scrutinized by academicians for many Asian stock markets. Such study for the Malaysian stock market only emerges after 2016 mainly because of data availability, with Lim *et al.* (2016) pioneering the research. Nevertheless, the limited Malaysian studies only cover stock price efficiency, stock liquidity and corporate governance. To the best of my knowledge, there is no published study that examines the effect of foreign trading on the volatility of Malaysian stock market. Thus, it is unsure whether foreign investors affect local volatility. If yes, then it is important to find out whether the volatility impact is positive or negative. The answer to this research question will be useful for Malaysian authorities with regard to their financial liberalization policy.

Chapter 3

Research Methodology

The primary intention of this research is to evaluate the influence of overseas equity flows on aggregate market volatility of the Malaysian stock market, specifically, the causal relationship between these variables. There are three main parts in this chapter which are measurement for stock return volatility, data and methodology.

In terms of measurement for stock return volatility, we discuss about the Total Return Index (TRI) and calculation of weekly returns. The aggregate market return is calculated by using market value-weighting scheme. Exponential GARCH [EGARCH (1,1)] specification is then used to derive the aggregate return volatility for the Malaysian stock market.

In terms of data, foreign trade data are obtained from Bursa Malaysia whereas return volatility data are collected from Thomson Reuters Datastream. The foreign trade data consists of two types which are the gross purchases of Malaysian stocks by foreign investors (FTBUY) and the gross sale of Malaysian stocks by foreign investors (FTSALE). From these two trade data, we compute the net purchase of Malaysian stocks by foreign investors (FTNET) by subtracting FTSALE from FTBUY. On the other hand, data required to calculate return volatility are Total Return Index (TRI) and market capitalization.

In terms of methodology, there are five parts to be discussed, namely data stationarity, vector autoregression (VAR), Granger non-causality test, impulse response function and forecast error variance decomposition. In data stationary tests, we make use of three unit root tests, namely the Augmented Dickey-Fuller, the Phillips-Perron and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) to make sure there is no presence of unit roots and that the data tested are stationary. For vector autoregression (VAR), the most appropriate lag lengths are determined for FTNET, FTBUY and FTSALE using

the Akaike Information Criterion (AIC). Additionally, the stability of VAR models is further ensured by checking that all roots are in the unit circle and all models are free from autocorrelation problem. For Granger non-causality test, it is used to check the causal relationship among the variables. For impulse response function, it is used to examine the response of one variable to shocks from another variable in the VAR system. The Generalized impulse response function proposed by Pesaran and Shin (1998) is employed in this study as it is not sensitive to the ordering of variables. It even seizes VAR estimation outcomes within patterns that will be simply explained. The degree of contribution of one variable to variation in another variable is identified using the Forecast Error Variance Decomposition.

3.1 Measurement for Stock Returns Volatility

Individual weekly stock returns are calculated using the Wednesday-to-Wednesday approach, in line with Hameed and Ting (2000) and Martens and Poon (2001) to minimize the effects on non-synchronous trading. First, the Total Return Index (TRI) obtained from Thomson Reuters Datastream of each stock is downloaded at the daily frequency. Weekly return is then calculated as the change of the return index on Wednesday in the current week to the return index on Wednesday in the previous week. In the event that a Wednesday is a non-trading day, the return index on Thursday will be used in the calculation. The individual weekly stock returns equation is being computed as below:

$$R = \left(\frac{TRI_{week2}^{wed} - TRI_{week1}^{wed}}{TRI_{week1}^{wed}} \right) \times 100\%$$

We combine the company-level return estimates on weekly basis by utilizing the market value-weighting scheme in order to calculate the total sum of market return of companies listed on Bursa Malaysia. The gross market return using market value-weighting scheme where every single share is weighted based on its market capitalization. The market value-weighted scheme is well-known for the study of idiosyncratic volatility according to Campbell et al. (2001), Cao et al. (2008) and Bekaert

[et al. \(2012\)](#). This approach will emphasize on the stocks that are of larger market capitalization rather than the stocks with smaller market capitalization.

The return volatility measure is then derived from the market return measure using the Exponential Generalized Autoregressive Conditional Heteroskedasticity [EGARCH (1,1)] is in line with the approach adopted by [Vagias and van Dijk \(2012\)](#), to account for the asymmetric responses of return volatility to market news. The specification (as used in Eviews) is provided below:

$$\text{Mean: } y_t = \sum \beta_i x_{it} + \varepsilon_t$$

$$\text{Variance: } \varepsilon_t = v_t \sqrt{H_t}$$

$$\log H_t = \alpha_0 + \sum_{j=1}^p \beta_j \log H_{t-j} + \sum_{i=1}^q \alpha_i \left| \frac{\varepsilon_{t-j}}{H_{t-j}^{1/2}} \right| + \sum_{k=1}^m \gamma_k \frac{\varepsilon_{t-k}}{H_{t-k}^{1/2}}$$

The leverage effect is exponential and not quadratic as in the Threshold Autoregressive Conditional Heteroskedasticity (TARCH) model because of there is presence of the log of conditional variance.

For positive market news, $\varepsilon_t > 0$. Impact of positive market news on H_t is given by $\alpha_i + \gamma_k$. For negative market news, $\varepsilon_t < 0$. Impact of negative market news on H_t is given by $\alpha_i - \gamma_k$. If $\gamma_k \neq 0$, the reaction of aggregate market return volatility is asymmetric to market news. If $\gamma_k < 0$, negative market news increases market volatility and there is a leverage effect of the k -th order. Therefore, we can obtain return volatility series for the Malaysian stock market by using the EGARCH (1,1) specification.

3.2 Data

The sample of the research we use including all public listed companies available in Bursa Malaysia from October 2009 until December 2016, yielding 379 weekly data points for each variable used in the study. We use both the foreign trade data and market return volatility data. Foreign trade data are obtained from Bursa Malaysia whereas market return volatility data are gathered from Thomson Reuters Datastream. The foreign trade data obtained are categorized as FTBUY and FTSALE. Meanwhile, the return volatility data are derived from stocks returns calculated from Total Return Index (TRI) and market capitalization, which equals to total market value of its outstanding shares.

3.2.1 Foreign Trade Data

The compilation of overseas investors' trading information which considers as one of the corporate database section via its Information Services Division was commenced by Bursa Malaysia. Different frequencies of original trading information of foreign investors are accessible at the market level which are daily, weekly and monthly or regarded as M5, M6 and M7. However, there is no collection of trading information at the firm level for the Malaysia stock exchange as it was revealed by Bursa Malaysia. In our research we only use weekly M6 data obtained from Bursa Malaysia. Although trading data are provided for both local and foreign investors, we only utilize the foreign investors' purchases and sales of local equities. We then examine the effects of foreign investors' trading on aggregate market volatility at three different levels, namely FTNET, FTBUY and FTSALE by taking the sum of foreign retail and institutional investors. FTNET is the net purchase of Malaysian stocks by foreign investors calculated as gross purchases of Malaysian stocks by foreign investors (FTBUY) deduct gross sales of Malaysian stocks by foreign investors (FTSALE).

3.2.2 Data for Volatility

The return volatility data is derived from data obtained from Thomson Reuters Datastream. We collect two types of data, there are Total Return Index (TRI) and market capitalization of all public listed firms in Bursa Malaysia over the sample period.

The Total Return Index (TRI) of each individual stock is gathered at the daily frequency. But the TRI we will calculate for weekly basis so we choose a day which can contribute to a more accurate result for TRI. As per our research, Wednesday is the most appropriate trading day in a week for stable and accurate result for our calculations. To reduce systematic error in our study, we use Thursday as our calculation for Return Index in the event that there is no trading activities available in Wednesday in that particular week.

The market capitalization of all public listed companies is collected at daily frequency since the market capitalization of a firm will change by every trading day. The market capitalization can be collected through the total number outstanding shares of a firm and also the daily market value of a stock. We consider the closing price of a stock as the accurate price to calculate as the market value of a stock in every single trading day to prevent the occurrence of systematic error in our study.

3.3 Methodology

We are organizing this part into five parts which are data stationary tests, Vector Autoregression (VAR), Granger non-casuality, impulse response function and forecast error variance decomposition. We employ non-identical unit root tests, specifically the Augmented Dickey-Fuller, the Phillips-Perron and the KPSS (Kwiatkowski- Phillips-Schmidt- Shin) to check stationarity of all variables. The casual relationship between foreign flows of equity (FTNET, FTBUY and FTSALE) and total market volatility is then examined by estimating with the vector autoregression (VAR) followed by the Granger non-causality test. Before estimating the VAR, unit root test is imperative to decide each of the variable's stationarity to steer clear of spurious regression. As per our study, foreign equity flows are separated into three categories. Firstly, the effect of net purchase of Malaysian stocks by foreign investors (FTNET) calculated as gross

purchases deduct gross sales of Malaysian stocks by foreign investors, is examined. At the disaggregated levels, the gross purchases of Malaysian stocks by foreign investors (FTBUY) and the gross sale of Malaysian stocks by foreign investors (FTSALE) are also investigated. Optimum lag length p for VAR estimation is selected using the Akaike Information Criterion (AIC) as the Schwartz Information Criterion (SIC), which tends to suggest a more parsimonious model, might give rise to autocorrelation issues in the estimation. The causation, if any, between foreign equity flows and market volatility are subsequently evaluated via Granger non-causality test. The volatility increasing or decreasing nature of foreign investors' equity flows is then determined by examining the Generalized Impulse Response Functions (GIRs) as the sensitivity of variables ordering within VAR model is low. For Forecast Error Variance Decomposition, it helps to identify the degree of contribution of a variable to variation in another variable. In overall, we use these five methods to carry out our research since they are famous in the research world and give rise to accurate results.

3.3.1 Data Stationarity

Time series data can be either stationary or non-stationary. Data is stationary if it is generated by a stochastic process which its mean and variance are fixed. Otherwise, if mean and variance are not fixed, then the data generated will not be stationary. The covariance is computed on the distance between the two periods of time. According to Schlitzter (1995), evaluating the economic time series' stationarity has turn out to be an important issue in empirical economics. Allow X_t exists a stochastic time series with

Mean: $E(x_t) = \mu$

Variance: $Var(x_t) = E(x_t - \mu)^2 = \sigma^2$

Covariance: $\gamma_k = E[(x_t - \mu)(x_{t+k} - \mu)]$

We execute the commonly used augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and also Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests to make sure there is no presence of unit roots in our research and that the data are stationary. If there is presence of unit roots and the data is not stationary, it will render the causal link

between foreign equity flows (FTNET, FTBUY and FTSALE) and aggregate market volatility spurious.

If only one unit root test is used out of these three which are ADF, PP and KPSS, the test may suffer from distortions of proportion and devoid of power. [Schlitzer \(1996\)](#) refers when heterogenous of tests are applied individually including Sargan-Bhargava test, augmented Dickey-Fuller (ADF) test, Philips-Perron (PP) test and even new procedures currently will really experience errors in size and low in power.

Furthermore, the experiments are asymptotically biased when a systemic disruption and shock presents in the moving trend. Since the hypothesis of each test are constructed and the null hypothesis will be rejected given only there is presence of an extreme value exceeds the significance level. According to [Kwiatkowski et al. \(1992\)](#), who adopted their approach to the data set of Nelson and Plosser, they evaluate the stationarity tests individually among fourteen cases and discover there are merely five cases out of fourteen do not reject their null hypothesis at 5 percent level of significance with correct parameter. The authors even propose the combine use of different unit root tests are necessary to prevent the tests afflicted from low in power and distortions in proportion.

The influence of ADF and KPSS test is very responsive to the method with the utilization of appropriate parameters is proven by paper of [Schlitzer \(1995\)](#). As per the reasons above, that is the main reason why we use 3 different unit root tests for stationary tests which are ADF, PP and KPSS.

3.3.1.1 Augmented Dickey-Fuller (ADF)

Dickey and Fuller (1979) developed a framework to evaluate the existence of unit roots, which means whether the variable is in random or stochastic movement. The null hypothesis for the augmented Dickey-Fuller (ADF) is that a unit root is present in the test variable. The ADF model has the following representation:

$$y_t = \alpha + y_{t-1} + u_t$$

where u_t is an identically and independently distributed error term with zero mean assumed. There is random walk without drift when $\alpha = 0$. There is presence of a term

with drift if α become unhindered. The original Dickey–Fuller test uses ordinary least squares (OLS) by positioning $\alpha = 0$ or $\delta = 0$ to fit the more general model:

$$y_t = \alpha + \rho y_{t-1} + \delta_t + u_t$$

However, such a regression may suffer from serial correlation. Therefore, the augmented Dickey–Fuller test alternatively suits a version of the order

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta_t + \zeta_1 \Delta y_{t-1} + \zeta_2 \Delta y_{t-2} + \dots + \zeta_k \Delta y_{t-k} + \varepsilon_t$$

where k represents lags number particularized in the option of lags in order to prevent autocorrelation. The involvement of theory combined with data visual inspection help to confirm the appropriate case we want. The suitable case can be opted according to that if a specific null hypothesis is favoured to theory of economy.

3.3.1.2 Philips-Perron (PP)

Mildly correlated and heteroscedastic errors are allowed by PP test even though there are uncorrelated errors with constant variance assumed by the ADF test. The regressions based on the PP test are as followed:

$$\Delta Y_t = \delta Y_{t-1} + u_t$$

$$\Delta Y_t = \mu + \delta Y_{t-1} + u_t$$

τ statistic, defined as the ratio of estimated δ divided by its standard error, use non-parametric correction to evaluate the hypothesis of $H_0 : \delta = 0$ against $H_a : \delta < 0$. The lag order of estimated autocorrelation function for the residuals to be comprised in the correction will have an impact on the PP test. The PP test statistic's asymptotic distribution is similar with the ADF statistic.

3.3.1.3 Kwiatkowski–Phillips–Schmidt–Shin (KPSS)

The presence of combination of random walk, stationary deviation and deterministic trend is evaluated in null hypothesis of stationarity in KPSS to assess the Lagrange Multiplier (LM) statistic. This is mentioned in the research paper of [Kwiatkowski *et al.* \(1992\)](#).

The KPSS test is according to one of these equations:

$$Y_t = \mu + pY_{t-1} + u_t$$

$$Y_t = \mu + \beta_t + pY_{t-1} + u_t$$

The KPSS tests the null hypothesis of Y_t is trend stationary within a deterministic trend against the alternative hypothesis of Y_t is not trend stationary.

The model with a time trend can be written as:

$$Y_t = \mu + \beta_t + \Phi \sum_{i=1}^t u_{t-i} + E_t$$

where ϵ_t is a stationary process and $u_t \sim \text{i.i.d.}(0,1)$. The hypotheses tested are $H_0 : \Phi = 0$ against $H_1 : \Phi \neq 0$. Note that the sum of all past errors represents a random walk and the test statistic is based on that of a LM-type test.

3.3.2 Vector Autoregression (VAR)

The data stationary tests are essential for correct VAR model specification as to stay away from spurious regression. More importantly, VAR can even do stability check which can make sure all units are in unit circle after checking autocorrelation problem. A VAR model which is unrestricted of p lag with i endogenous variables may be demonstrated as the following of:

$$Y_t = C + \sum_{k=1}^p \Phi_k Y_{t-k} + E_t, \quad t = 1, 2, \dots, T$$

where Y_t is an $i \times 1$ endogenous variables vector supposed to be covariance stationary, C is a $i \times 1$ intercepts vector, Φ_k is $i \times i$ coefficient matrices to be estimated and E_t is an $i \times 1$ error terms vector. Within the assessment, Y_t includes two variables, specifically, foreign equity flows (FTNET/FTBUY/FTSALE) and aggregate market volatility (VOL). The latter denotes the market return volatility of the Malaysian stock market aggregated using market-value weighting scheme.

VAR model is chosen as the estimation method for this study because of there are several major advantages for employing VAR. Firstly, VAR models are a-theoretical and there is not necessary to determine endogenous and exogenous variables at the outset. This is due to all the variables are exogenous. Besides, both the own and other variable's lags number can influence on variable's value. Moreover, provided that contemporaneous terms do not present on right hand side of the equation, each equation in VAR system can be estimated utilizing OLS. Furthermore, VAR is useful for forecasting and consists no *a priori* structural restrictions. However, forecasting are more suitable for structural models but less appropriate for structural analysis. Subsequently, VAR is appropriate in testing interdependencies amongst variables as the model encapsulates empirical regularities in the data in an unrestricted form according to [Mansor & Sulaiman \(2001\)](#).

Plus, there are more lags number and variables could be included in the VAR system. We may able to gain enlightenment on the strength and direction of shocks transmission within the system from variance decomposition and IRF produced from VAR.

The challenge in estimating a VAR model is to select a suitable lag length p . An approach which is always utilized is to use the Akaike Information Criterion (AIC) and Schwartz Information Criterion (SIC) to choose the most appropriate lag length. In this study, AIC is chosen over SIC due to the result obtained by SIC may become more parsimonious and got autocorrelation problem if compared with the results of using AIC. AIC will give us more lag in the test and this is shown as below:

$$\text{Akaike Information Criterion (AIC): } AIC = \ln(s^2) + 2K / T$$

$$\text{Bayesian/Schwartz Information Criterion (SIC): } SIC = \ln(s^2) + k(\ln n) / n$$

where s is the regression's standard error, T is the size of sample, and K is the parameter number to be calculated. The addition of extra term gives rise to the occurrence on loss of power. We will estimate for up to six lags for each VAR model and select the p value with minimum AIC.

3.3.3 Granger Non-Causality Test

The concept of causality is proposed by Clive Granger in his seminal paper [Granger \(1969\)](#). Granger non-causality is used to check whether there is causation between two variables. A variable y_{1t} is Granger caused by another variable y_{2t} , provided that lags of y_{2t} can help to enhance explanation of y_{1t} .

Consider a VAR(p) of two variables:

$$y_{1t} = a_0 + \sum_{j=1}^p a_{1j} y_{1t-j} + \sum_{j=1}^p a_{2j} y_{2t-j} + u_{1t}$$

$$y_{2t} = b_0 + \sum_{j=1}^p b_{1j} y_{1t-j} + \sum_{j=1}^p b_{2j} y_{2t-j} + u_{2t}$$

For null hypothesis H_0 , y_{2t} does not Granger cause y_{1t} in which this means every single restriction is correct. For alternative hypothesis H_1 , y_{2t} Granger causes y_{1t} in which this signifies at least one of the restrictions is not true. Given that null hypothesis H_0 is rejected, y_{2t} Granger causes y_{1t} and this may indicate unidirectional causality from y_{2t} to y_{1t} . Similarly, y_{1t} Granger causes y_{2t} and this may show unidirectional causality from y_{1t} to y_{2t} .

3.3.4 Impulse Response Function

The Impulse Response Functions (IRFs) are resulted from the estimated VAR to infer the volatility increasing or decreasing effect of foreign investors' trading activities in the Malaysian stock market. This is because IRFs provides useful information such as the magnitude of response that measures the impact of shocks, variables that are more responsive to a shock, and the time period taken for the impact to dampen off.

We employ impulse response functions as a basis for our hypotheses from the estimated VAR after we execute a VAR using variables in level on current analysis with the findings of data stationarity. The improvement in equations of VAR may be contemporaneously correlated is essential to the initiation of impulse-response function that requires to be discussed about. Due to this, the coincidental correlation with improvements in different variables may be fitted by a shock in one single variable. The variable responses about innovating on other variable's interest may not able to be properly constituted, since that unresponsive shocks to each one of variables are not able to be recognized because of contemporaneous association as mentioned in [Lutkepohl \(1991\)](#). The way of orthogonalizing the innovations utilizing the Cholesky decomposition is the usual method borrowed to solve the empirical approach introduced in the paper of [Sims \(1980\)](#). Nevertheless, the method calls for a pre-distinctive causal ordering of the variables which is the major disadvantages of this approach. More importantly, the impulse-response analyses can be sensitive to the variables ordering is its repercussions.

More recently, the generalized impulse response functions were developed to avoid the ordering troubles present in the orthogonalized impulse responses due to the papers of [Koop et al. \(1996\)](#) and [Pesaran and Shin \(1998\)](#). Ascribed to historical styles of correlations amongst exclusive shocks are fully integrated on this approach, the impulse responses was made to be accurate and then consistent to the variable orderings. We apply generalized impulse responses for our effective evaluation by regarding the fact that there is no evidence as to the causal ordering of variables.

The responses of the dependent variables in the VAR system to shocks are traced out by IRF to each of the variables within the system.

Consider a VAR(1) model:

$$y_{1t} = a_0 + a_{11}y_{1t-1} + a_{21}y_{2t-1} + u_{1t}$$

$$y_{2t} = b_0 + b_{11}y_{1t-1} + b_{21}y_{2t-1} + u_{2t}$$

A disturbance to the particular endogenous variable will affect both that particular and the rest of endogenous variables at which the shock is transmitted through the VAR lag structure. The IRF detects the impact of the shocks on the endogenous variables' future and current values for several periods into the future as the process is ongoing until the impact of the change dampens off given that the system is stable.

3.3.5 Forecast Error Variance Decomposition

Forecast Error Variance Decomposition (FEVDC) scrutinizes the variation proportion of a variable (say y_{1t}) that is because of its own shock (u_{1t}), and due to other variables' shock (u_{2t}). Thus, the details regarding each random shock's relative importance in influencing VAR variables is given by FEVDC. The part of the m-step forwards the forecast error variance of a variable (say y_{1t}) which is described by shocks to every single variable in the VAR system (u_{1t} and u_{2t}) for different values of m is listed by FEVDC. Similar to the case of IRF, the ordering affects much on VDC so that orthogonalisation of the error terms is also required. FEVDC provides information on the proportion of m-step forwards the forecast error variance that is described by shocks to each variable, which variable has a greater influence on the variation of a specified variable, and the degree of exogeneity of each variable.

In this study, we use Cholesky ordering in VDC as there is no Generalized VDC available in the estimation software, Eviews. Since it will show the contribution of foreign equity flows (FTNET, FTBUY and FTSALE) to variation in market return volatility (VOL), the results shown by Granger non-causality can help us to decide which variables are more exogenous or endogenous. This is because Granger non-causality

can help us to identify whether the causation is from foreign equity flows (FTNET, FTBUY and FTSALE) to market volatility (VOL) or otherwise.

Chapter 4

Result and Discussions

4.1 Preliminary Analysis

Table 1 illustrates the descriptive statistics of the four variables in this study which are foreign net purchases, foreign buy, foreign sale and market return volatility. The mean of foreign net purchases of Malaysian stocks with a total net inflow of MYR8.2 million averagely all over from October 2009 until December 2016. In the week from 19th to 23rd August 2013, foreign investor sold a net amount of MYR3.1 billion of local stocks, making this their largest weekly net sale observed over the sample period. On the other hand, the largest net purchase, amounting to MYR3.2 billion was happened from 5th to 10th May 2013. The standard deviation of foreign net purchases was MYR665.7 million.

Table 1: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev
Foreign Net Purchases	0.0082	0.0501	3.1681	-3.0959	0.6657
Foreign Buy	2.1707	2.1175	6.3674	0.1693	0.7507
Foreign Sale	2.1625	2.0930	7.0926	0.2247	0.8047
Market Return Volatility	2.0534	1.4434	19.7895	0.5491	1.9169

Besides, the mean of foreign sale averaged MYR2.16 billion over the period mentioned above. Their largest weekly sale of MYR7.1 billion happened in the week from 30th May to 3rd June 2016 whereas the smallest foreign sale that accounted for MYR224.7 million. The hefty selloff of Malaysian stocks by foreign investors was mainly due rising concerns on the possibility of the United Kingdom (U.K.) leaving the

European Union which might negatively affect economic growth in the U.K. Domestically, the 1Malaysia Development Bhd (1MDB) scandal scrutinized by media all over the world also resulted in foreign investors lost confidence to invest in Malaysia by selling heavily their investment assets and equities in Malaysia. Foreign investors even relocated their investments to another economies with better fundamentals and prospects. Since both 1MDB and Prime Minister of Malaysia were claimed for money laundering for self-interest. The standard deviation of foreign sale was MYR804.7 million. Looking at other variables, the mean of purchases of foreign investors averaged MYR2.2 billion over the sample period with standard deviation of MYR750.7 million. The largest weekly foreign purchases are MYR6.4 billion from 13th to 17th May 2013 whereas the smallest weekly foreign purchases are MYR169.3 million. This is according to the optimistic economic outlook of Malaysia with growth in the first quarter (Q1) of 2013 recorded an increase of 4.1 percent, as announced by Bank Negara Malaysia. Furthermore, the market volatility averaged 2.1 percent from October 2009 to December 2016. Their largest market volatility of a whopping 19.8 percent might be took place from 24th to 28th August 2015 due to unceasing depreciation of MYR associated with devaluation of Chinese Yuan. To aggravate the matters, the market sentiment drove down further as crude oil and commodity prices collapsed. The FBM KLCI dropped from 1723.73 points to 1532.14 points which is the lowest in 2015. The smallest market volatility was 0.55 percent while the standard deviation of market volatility was 1.9 percent.

4.2 Foreign net purchases and volatility

Figure 1: Foreign net purchases and aggregate return volatility

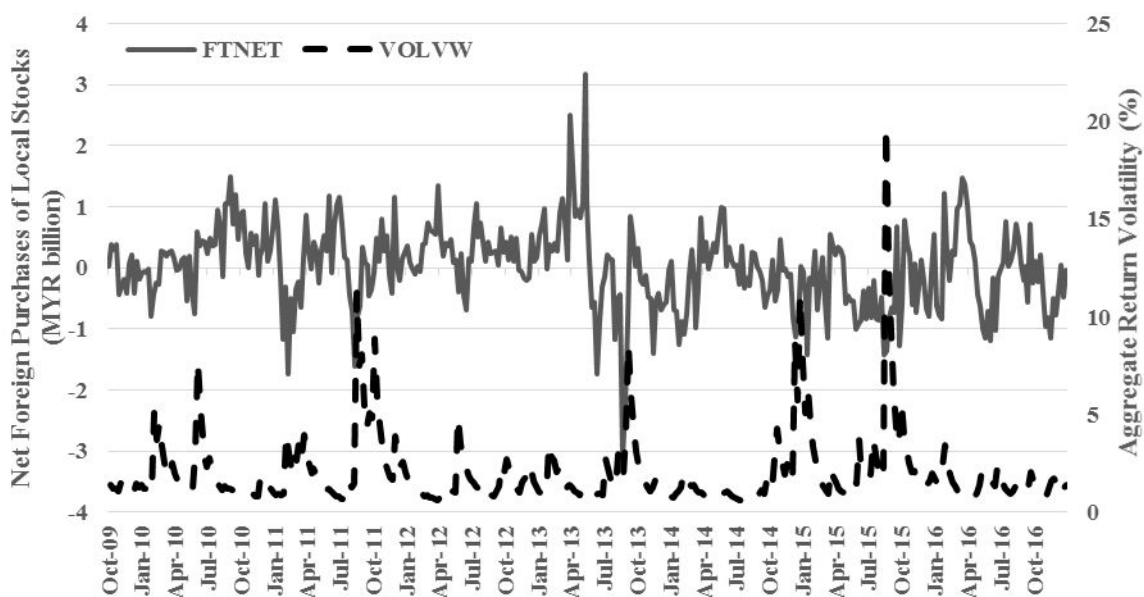


Figure 1 displays the charts of foreign net purchases and market return volatility of the Malaysian stock market in which the latter is aggregated by their respective market capitalization. The weekly data on foreign net purchases are obtained from Bursa Malaysia from the period of October 2009 until December 2016 whereas Thomson Reuters Datastream is the data source for the construction of the market return volatility indicator. The maximum amount for net purchase of local stocks by foreign investors along the stipulated period mentioned was MYR3.2 billion and this happened in the week from 5th to 10th May 2013. This is probably because this was exactly the particular week just after 13th General Election of Malaysia with FBM KLCI index shot up all the way to 1776.73 points which was its all-time-high after two days of the election held. The huge sum of foreign net purchase may be sparked by the factor of the conquest of ruling coalition which is Barisan Nasional against oppositions over the polls. This gave rise to increase confidence of foreign investors in optimistic local stock market prospect in the future. Meanwhile, the largest foreign investor's net sell of MYR3.1 billion

occurred in the week ending 23rd August 2013, likely regarding to the speculation that the US Federal Reserve able to scale back its asset acquisition programme, in addition to increased geopolitical issues over a potential U.S.-led military strike on Syria which had influenced FBM KLCI on lower trend.

However, the market volatility in the week from 24th to 28th August 2013 are not the largest among all the weekly data we evaluated, even though the information shown for there is the largest foreign sale happened within this particular period. The largest market volatility of a tremendous 19.8% was happened from 17th to 21th August 2015 due to unceasing depreciation of MYR associated with devaluation of Chinese Yuan. To aggravate the matters, the market sentiment drove down further as crude oil and commodity prices collapsed. The FBM KLCI dropped from 1723.73 points to 1532.14 points which is the lowest in 2015.

As per Figure 1, we discover there are numerous significant surges in market volatility over our research. There are six significant spikes which distribute evenly for one in 2010, another two in 2011, one more presented in 2013, another one towards the end of 2014 and the last spike, which is also the sharpest, occurred in 2015. Looking at the volatility spike in the week ending 4th June 2010, this may be driven by the negative international economic outlook in both United States (U.S.) and European Union (E.U.). Foreign investors executed for short-selling since Consumer Confidence Index for June in U.S. plunged from 62.7 to 52.9 if compared to May 2010. At the same period, European debt problems arose especially in Greek there were major protests leaded by Greek civilians to complain the uprising national debt compilation due to ineffective and corrupted governance structure. Besides, there are one enormous surge presented from 8th and 9th August 2011 and one extra spike displayed from 19th to 26th September 2011. There is a plunge of FBM KLCI of 1.8 percent and 1.7 percent respectively happened in former date mentioned, which along with substantial regional drops after the credit rating in the United States (U.S.) downgraded by Standard and Poor's from AAA to AA+. In the latter date, there is aggravating debt crisis in Eurozone with high selling pressure intensified by a warning from the U.S. Federal Reserve of great downside risks to the economy. To make things worse, the credit ratings of three major banks in US were downgraded as well.

Furthermore, there is one extra spike in the week from 9th to 13th September 2013. This crash is because of another wave of concern on the prospects of the U.S. Federal Reserve scaling back its Quantitative Easing program. Moreover, there is another volatility surge which lasted for two week from 12th to 26th December 2014. This is based on the price of crude oil continued to sink, weakening of MYR against USD and concerns over weighing down of fiscal position in Malaysian stock market.

As a result, we realize the presence of spikes will cause excessive volatility in local stock market which are driven by negative rather positive market sentiments. Foreign investors may give rise to elevation of volatility of Malaysian stock market rather than stabilizing it. Although the market fluctuation is not the largest when both the foreign net purchases and sales appeared as the greatest from 5th to 10th May 2013 and in the week ending 23rd August 2013 respectively, the indications of net selling by foreign investors may contribute to surges in the market volatility as we mentioned above, which is significant enough to drive up market volatility by that much.

4.3 Data Stationarity Test Results

Table 2: Unit Root and Stationary Test Results

Variables	ADF	PP	KPSS	I(d)	Presence of Unit Root
FTNET	-10.1827***	-10.6758***	0.0744	I(0)	No
FTBUY	-9.2554***	-15.7098***	0.0891	I(0)	No
FTSALE	-9.4604***	-14.1841***	0.1195	I(0)	No
VOL	-8.2355***	-8.2810***	0.0551	I(0)	No

Notes: ADF and PP refer to the Augmented Dickey-Fuller and Phillips-Perron unit root test, respectively. KPSS denotes the stationarity test by Kwiatkowski–Phillips–Schmidt–Shin. d denotes the order of integration. The 1%, 5% and 10% level of significance is denoted by ***, **, and *.

It is very imperative to decide the stationarity of FTNET, FTBUY, FTSALE and VOL to avoid from spurious regression in unit root tests. Table 2 summarizes the stationarity test results of all the variables used in this study. A total of three data stationarity tests are employed in this study, namely the unit root tests of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) as well as the stationarity test introduced by Kwiatkowski-Phillips-Schmidt-Shin (KPSS). Recall that the null hypothesis of the two unit root tests is that there is a unit root appeared within the series (i.e. not stationary) whereas the null hypothesis of the KPSS test is that stationarity present in the series. Therefore, rejection of the null hypothesis in the ADF and PP tests renders a series stationary while rejection of the KPSS test's null hypothesis renders a series non-stationary. According to [Schlitzer \(1995\)](#), it is imperative to evaluate the economic time series' stationarity in empirical economics. Due to [Kwiatkowski et al. \(1992\)](#), the collaboration of the application of different common tests of unit root are required as every individual of it will afflict from distortions and lack of power in proportion. The ADF and KPSS experiment's power is exceptionally quick to react to the measure one narrates every method by the appropriate parameter application is verified by research of [Schlitzer \(1995\)](#). If there is merely one test of unit root is applied out of these three, the experiments may suffer from distortions of size and low power as suggested by [Schlitzer \(1996\)](#).

For the foreign net purchases (FTNET), it rejects level of significance at 1 percent for both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests with test statistics of -10.1827 and -10.6758 respectively. For the KPSS stationarity test, the result is 0.07441 and it does not reject from H_0 . Since both the unit root and stationary tests are consistent for FTNET in the study, FTNET does not consist of unit roots and it is stationary.

For the foreign retail investors' purchases (FTBUY), it rejects level of significance at 1 percent for both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests with test statistics of -9.2554 and -15.7098 respectively. Therefore, it does not have unit roots. For Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root test, the result is 0.08905 and it does not reject from H_0 , thus, FTBUY is stationary.

For the foreign retail investors' sales (FTSALE), it rejects level of significance at 1 percent for both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests with test statistics of -9.4604 and -14.1841 respectively. Hence, it does not have unit roots. For Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root test, the result is 0.1195 and it does not reject from H_0 , therefore, FTSALE is stationary.

For the market volatility (VOL), it rejects level of significance at 1 percent for both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests with test statistics of -8.2355 and -8.2810 respectively. As a result, it does not have unit roots. For KPSS test, the result is 0.05514 and it does not reject from H_0 , therefore, VOL is stationary.

In a nutshell, both the unit root and stationary tests are consistent for all variables in the study. Therefore, the VAR models in the following section can be estimated with all variables in level form.

4.4 Net Foreign Purchases and Market Return Volatility

Table 3: Granger Non-Causality Test Results for FTNET

Granger Causality	Chi-sq	lag	p-value
VOL does not Granger cause FTNET	6.8616	5	0.2311
FTNET does not Granger cause VOL	55.6607	5	0.0000

Notes: FTNET denotes the net purchase of Malaysian stocks by foreign investors, computed as gross purchase deduct gross sale. VOL denotes the market return volatility of the Malaysian stock market aggregated employing market-value weighting scheme. Length of lag is opted using the Akaike Information Criterion.

Table 3 shows the Granger causality between net purchase of Malaysian stocks by foreign investors (FTNET) and market return volatility of the Malaysian stock market (VOL) aggregated using market-value weighting scheme. The Akaike Information Criterion (AIC) is applied to decide which length of lag suits the most for the VAR

estimation. VAR is fit in assessing interdependencies among variables as the model sums up empirical normalities within data in an unhindered structure commensurate with [Mansor & Sulaiman \(2001\)](#). According to Akaike Information Criterion (AIC), lag length of two is being recommended. However, we make use of the model with lag length of 5 instead of lag length of two due to it has a better stability check which we can make sure all the roots are in the unit circle. Furthermore, lag length of two also gives rise to autocorrelation problem in the VAR model. Since the p-value for *FTNET* does not Granger cause *VOL* is 0.0000 in which smaller than 0.01. Thus, H_0 is rejected and this means there is causation from *FTNET* to *VOL*.

Figure 2: Response of VOL to FTNET

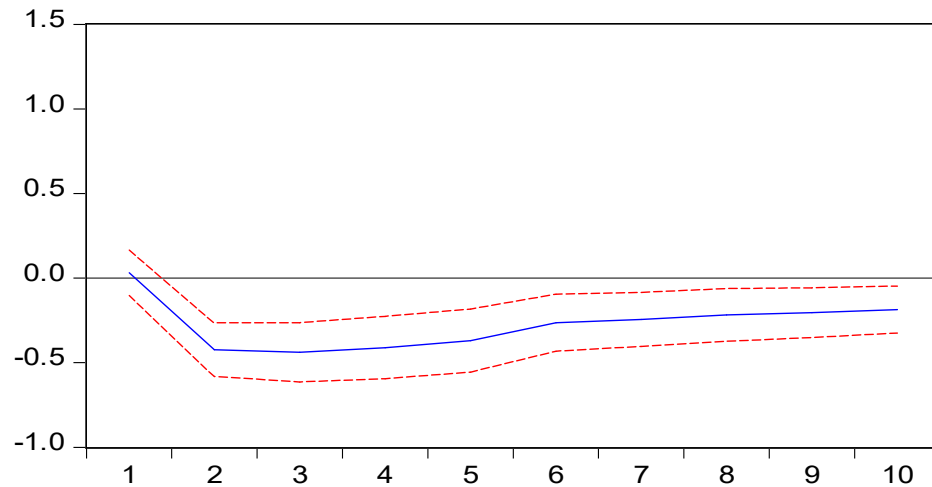


Table 4: Variance Decomposition of VOL

Period	1	2	3	4	5	6	7	8	9	10
FTNET	0.06	7.57	12.76	16.94	20.21	21.66	22.85	23.72	24.49	25.14
VOL	99.94	92.43	87.24	83.06	79.79	78.34	77.15	76.28	75.51	74.86

Note: FTNET denotes the net purchase of Malaysian stocks by foreign investors, computed as gross buy deduct gross sale. VOL denotes the market return volatility of the stock market in Malaysia aggregated employing market-value weighting scheme. The Cholesky ordering of this decomposition is FTNET VOL.

Figure 2 plots the Generalized Impulse Response function (GIRs) of *VOL* to *FTNET*. It is shown that aggregate market return volatility responds negatively to a positive one standard deviation shock in *FTNET*, implying that market return volatility in the Malaysian stock market decreases when foreign investors' net purchases increase. From Table 4 which tables the FEVDC of *VOL*, *FTNET* contributes only 0.06% to variation in market return volatility in the first week. In the second week, however, its contribution rose to 7.6% and more than doubled after one month to 16.9%. The contribution of *FTNET* to variability in market return volatility in Malaysia somewhat stabilizes to 23%-25% after two months. From the variance decomposition, it is shown that while net purchases of local equities by foreign investors appeared economically insignificant in explaining the variability of market return volatility in the first week, the significance of its contribution increases over time, underscoring the role played by foreign investors in influencing market return volatility of the local bourse. As there is no previous study examining the causal relationship between foreign equity flows and aggregate return volatility in the form of net purchases, we are unable to draw comparison of the findings here with other studies.

4.5 Foreign Buys and Volatility

Table 5: Granger Non-Causality Test Results for FTBUY

Granger Causality	Chi-sq	lag	p-value
VOL does not Granger cause FTBUY	11.5760	7	0.1154
FTBUY does not Granger cause VOL	7.4384	7	0.3847

Notes: FTBUY denotes the gross purchases of Malaysian stocks by foreign investors. VOL denotes the market return volatility of the stock market in Malaysia aggregated using market-value weighting strategy. Length of lag is determined applying the Akaike Information Criterion. We use a lag length of 7 despite AIC suggesting a lag length of 2 to overcome the autocorrelation problem in the estimation.

Table 5 shows the Granger causality between gross purchases of Malaysian stocks by foreign investors (FTBUY) and market return volatility of the stock market in Malaysia aggregated employing market-value weighting scheme (VOL). The Akaike

Information Criterion (AIC) is applied to decide which length of lag suits the most for the VAR estimation. According to AIC, lag length of two is being recommended. However, we hire the model with lag length of seven instead of lag length of two due to as the model with two lags suffers autocorrelation problem. Since the p-value for FTBUY does not Granger cause VOL is 0.3847 in which larger than 0.01. Therefore, H_0 is not rejected and this means there is no causation from FTBUY to VOL.

Figure 3: Response of VOL to FTBUY

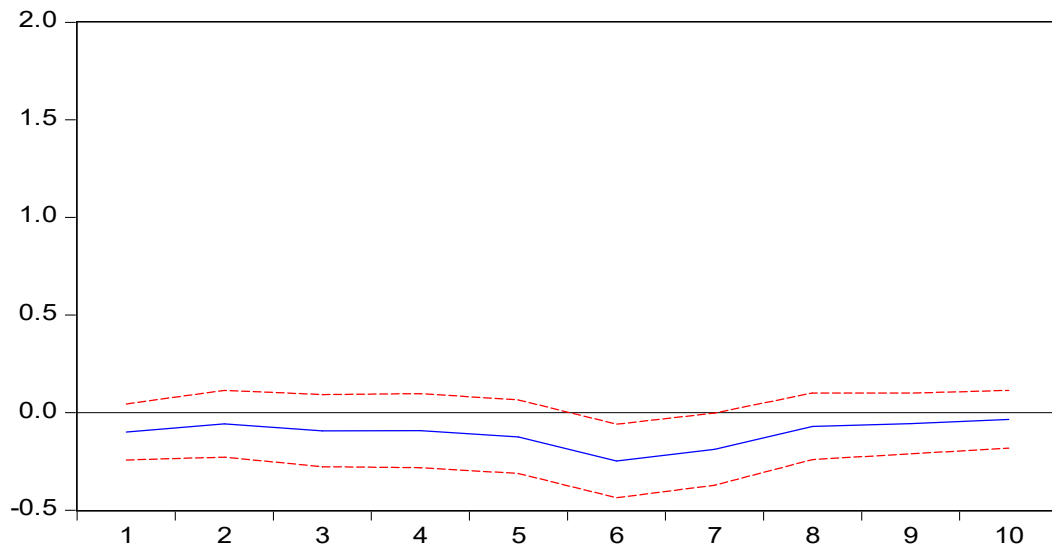


Table 6: Variance Decomposition of VOL

Period	1	2	3	4	5	6	7	8	9	10
FTBUY	0.52	0.50	0.69	0.90	1.32	2.96	3.82	3.90	3.96	3.98
VOL	99.48	99.50	99.31	99.10	98.68	97.04	96.18	96.10	96.04	96.02

Note: FTBUY denotes the gross buy of Malaysian stocks by foreign investors, computed as gross purchase. VOL denotes the market return volatility of the Malaysian stock market aggregated using market-value weighting scheme. The Cholesky ordering of this decomposition is FTBUY VOL.

Figure 3 plots the impulse response function of *VOL* to *FTBUY*. It is shown that aggregate market return volatility responds negatively to a positive one standard deviation shock in *FTBUY*, indicating that when foreign investors purchase more Malaysian stocks, market return volatility in the Malaysian stock market declines. This finding, however, is insignificant given that the zero line falls in the 95% significance band. According to Table 6, *FTBUY* contributes only 0.52% to variation in market return volatility in the first week. In the second week, however, its contribution reduces to 0.50% and more than less than a fold after one month to 0.9%. The contribution of *FTBUY* to variability in market return volatility in Malaysia somewhat stabilizes to 3.9%-4.0% after two months. From the variance decomposition, it is shown that while gross buy of local equities by foreign investors appeared economically insignificant in explaining the variability of market return volatility in the first week, the significance of its contribution increases over time, underscoring the role played by foreign investors in influencing market return volatility of the local bourse. The finding that *FTBUY* has no significant impact on market volatility is not surprising because the effect of large gross purchases is muted on market volatility as depicted in numerous literatures and research papers.

To support our findings, we utilize different studies previously and prove it is tallied and correct. [Ahmed \(2017\)](#) discovers foreign individual investors do not affect the volatility of market in long positions. [Wang \(2006\)](#) notices foreign purchases reduce market volatility because of they will assist to cancel out the impact of the net sales position created by local investors. During Asian Financial Crisis, there was even as much as USD\$2 billion of foreign equity investment flow into Indonesia and Thailand, it buffered the market plunge by absorbing the selling forces created by their local counterparts. [Han et al. \(2015\)](#) mention overseas institutional investors carry out a fabulous job to stabilize Chinese stock market and lower down fluctuation in market.

4.6 Foreign Sales and Volatility

Table 7: Granger Non-Causality Test Results for FTSALE

Granger Causality	Chi-sq	lag	p-value
VOL does not Granger cause FTSALE	3.5106	3	0.3194
FTSALE does not Granger cause VOL	34.5623	3	0.0000

Notes: FTSALE denotes the gross sale of Malaysian stocks by foreign investors. VOL denotes the market return volatility of the Malaysian stock market aggregated using market-value weighting scheme. Length of lag is decided applying the Akaike Information Criterion.

Table 7 shows the Granger causality between entire sale of Malaysian stocks by foreign investors (FTSALE) and market return volatility of the stock market domestically aggregated employing market-value weighting scheme (VOL). Again, the Akaike Information Criterion (AIC) is applied to decide which length of lag is the most suitable in the VAR estimation. According to Akaike Information Criterion (AIC), lag length of two is being recommended. However, as with the estimations using FTNET and FTBUY, the suggested lag length is not sufficient to address autocorrelation problem in the estimation. Therefore, we hire the model with lag length of three instead of lag length of two for the VAR with FTSALE. Since the p-value for FTSALE does not Granger cause VOL is 0.0000 in which smaller than 0.01. Hence, H_0 is rejected and this means there is causation from FTSALE to VOL.

Figure 4: Response of VOL to FTSALE

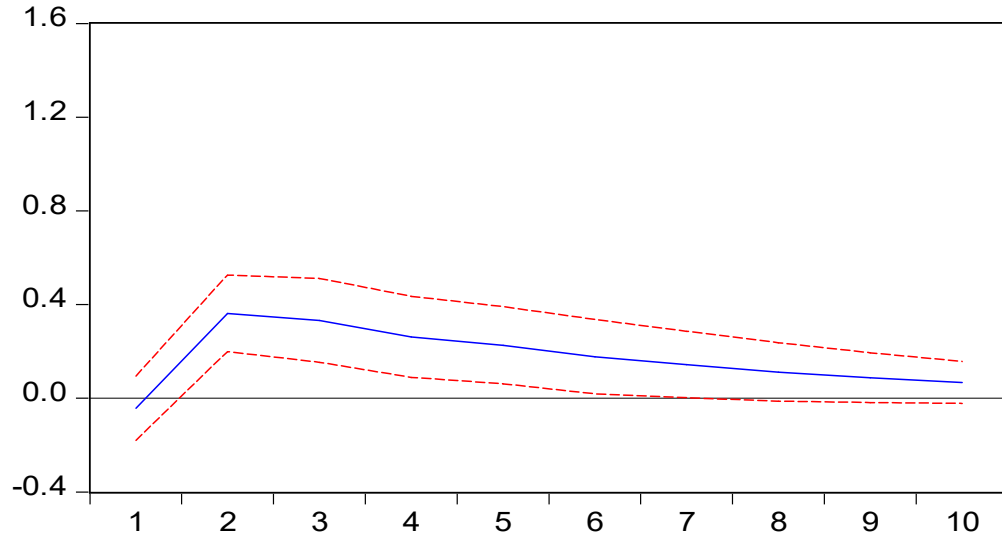


Table 8: Variance Decomposition of VOL

Period	1	2	3	4	5	6	7	8	9	10
FTSALE	0.10	5.23	7.79	9.18	10.19	10.80	11.21	11.46	11.61	11.71
VOL	99.90	94.77	92.21	90.82	89.81	89.20	88.79	88.54	88.39	88.29

Note: FTSALE denotes the gross sale of Malaysian stocks by foreign investors, computed as gross sale. VOL denotes the market return volatility of the stock market in Malaysia aggregated utilizing market-value weighting scheme. The Cholesky ordering of this decomposition is FTSALE VOL.

Figure 4 plots the impulse response function of *VOL* to *FTSALE*. It is shown that aggregate market return volatility responds positively to a positive one standard deviation shock in *FTSALE*, suggesting that greater gross sale of Malaysian stocks by foreign investors aggravate market volatility in the Malaysian stock market. Looking at Table 8, *FTSALE* contributes only 0.10% to variation in market return volatility in the first week. In the second week, however, its contribution rose to 5.2% and increases by approximately halved after one month to 7.8% if compared to second week. The contribution of *FTSALE* to variability in market return volatility in Malaysia somewhat

stabilizes to 11.5%-11.7% after two months. From the variance decomposition, it is shown that while gross sale of local equities by foreign investors appeared economically insignificant in explaining the variability of market return volatility in the first week, the significance of its contribution increases over time, underscoring the role played by foreign investors in influencing market return volatility of the local bourse.

Our finding is in line with [Wang \(2006\)](#) as the author suggests the results of gross sales by overseas investors contributes significantly to the market volatility on the same day even though it merely adds up to a rather small proportion in day-to-day trading. Apart from that, our findings are also consistent with several findings available in academic world. [Wang and Shen \(1999\)](#) give the verification for the engagement of foreign investors destabilizes Taiwanese stock market and results in soaring of market volatility. In the Norwegian stock market, [Che \(2011\)](#) acknowledges greater volatility of domestic stock market is originated by foreign investors. This is due to the author discovers foreign investors are momentum traders that give rise to the greatest volume in trading cum buy and sell mostly in exceptionally short horizons of investment, contrasting that of local investors. Since overseas investors employ the shortest horizon in investment, they are responsible for rising volatility of Norwegian stock market.

Moreover, [Bohl and Brzeszczynski \(2006\)](#) propose foreign investors are inclined to apply strategy of investment specifically in short term which the characteristic is highly speculative and brings price of stock to deviate from fundamentals. This will lift the volatility of market up and initiate autocorrelation in return of equity (ROE). [Umutlu and Shackleton \(2015\)](#) examine the relationship between stock trading and market volatility according to their corresponding kinds of investors. They conclude the market volatility is expanded by the involvement of foreign investors. [Ahmed \(2017\)](#) explores that volatility of market will ascend amongst the corporates that are vulnerable to political instability which is aided by [Boutchkova et al. \(2012\)](#) due to foreign investors are of the opinion that national leader's transition is dangerous for their investment. Last but not least, [Dhingra, Gandhi and Bulsara \(2016\)](#) manifest foreign investors applying positive feedback trading scheme in stocks purchasing while negative feedback trading scheme in stocks selling through day-to-day data on both dynamic and static model. The

overseas institutional investors will elevate volatility of market substantially in stocks selling and cause the market becomes unstable.

In compliance with there are abundant sources of research papers validate that gross foreign sales of local equities will give rise to expansion of market volatility. Thus, *FTSALE* has significant impact on volatility of Malaysian stock market.

Chapter 5

Conclusion

Motivated by the heavy withdrawals of foreign investors from Bursa Malaysia, this study examines whether such equity flows will exert any impact on the volatility of the local stock market. In the end of September 2017, foreign investors discharged RM967.3 million of Malaysian stocks due to U.S. Fed's proposal of interest rate hike and U.S. President Donald Trump's major tax reform. Even though the media always emphasize the negative impact of such volatile foreign equity flows, yet there is no study pertaining to this topic in Malaysia. Given this research gap, there are three objectives to be achieved here. First and foremost, this study examines the causal relationship between foreign equity flows and return volatility in the Malaysian stock market using vector autoregression and Granger non-causality test. Subsequently, impulse response function and variance decomposition are used to determine whether the volatility impact is positive or negative. Finally, the above methodologies are employed on disaggregated data of foreign buys and foreign sales in order to identify the sources of the volatility impact.

In terms of data, foreign trade data are acquired from Bursa Malaysia whereas return volatility data are collected from Thomson Reuters Datastream. The foreign trade data compose of two categories which are the gross purchases of Malaysian stocks by foreign investors (FTBUY) and the gross sale of Malaysian stocks by foreign investors (FTSALE). From these two trade data, we enumerate the net purchase of Malaysian stocks by foreign investors (FTNET) by deducting FTSALE from FTBUY. On the other hand, data required to calculate return volatility are Total Return Index (TRI) and market capitalization.

In terms of methodology, there are five parts to be considered, specifically data stationarity, vector autoregression (VAR), Granger non-causality test, impulse response function and forecast error variance decomposition. In data stationary tests, three unit

root tests are utilized, namely the Augmented Dickey-Fuller, the Phillips-Perron and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) to make certain there is no existence of unit roots and that the data tested are stationary. For vector autoregression (VAR), the best fitting lag lengths are determined for FTNET, FTBUY and FTSALE using the Akaike Information Criterion (AIC). The stability of VAR models is further fortified by examining that all roots are in the unit circle and all models are unimpeded from autocorrelation problem. For Granger non-causality test, it is used to validate the causal relationship among the variables. For impulse response function, it is used to examine the response of one variable to shocks from another variable in the VAR system.

As per findings from descriptive statistics, the largest weekly total foreign sale of local equities was MYR7.1 billion from 3rd to 9th June 2016 whereas the smallest gross foreign sale accounted for MYR3.2 billion. The largest weekly gross foreign purchase was MYR6.4 billion over the period of 10th until 16th May 2013 whereas the smallest weekly total foreign purchase was MYR169.3 million. The largest market volatility of an astounding 19.8 percent occurred during the week from 21st to 27th August 2015, largely due to the continuous depreciation of MYR linked with the devaluation of Chinese Yuan.

The maximum amount for net purchase of local stocks by foreign investors along the stipulated period disclosed was MYR3.2 billion and this occurred within the week of 5th until 10th May 2013. Concurrently, the largest foreign investor's net sales of MYR3.1 billion occurred in the week ending 23rd August 2013. It is found that foreign investors contribute notably to soaring market volatility especially when overseas investors execute selling orders. However, the foreign investors' purchase does not expand the market volatility. Hence, it can be inferred that foreign investors may give rise to the elevation of volatility of Malaysian stock market rather than stabilizing it.

From the results in Chapter 4, it is shown that while both the net purchases and gross buys of local equities by foreign investors appear economically insignificant in explaining the variability of market return volatility in the first week, the significance of its contribution increases over time, underscoring the role played by foreign investors in influencing market return volatility of the local bourse. As there is no previous study examining the causal relationship between foreign equity flows and aggregate return volatility in the form of net purchases, there is no comparison to be drawn here with other studies. Nevertheless, the finding that FTBUY has no significant impact on market volatility is not surprising because the effect of large gross purchase is muted on market

volatility as depicted in numerous literatures and research papers. There are plentiful sources of research papers verify that gross foreign sales of domestic equities will result in the elevation of market volatility. Thus, FTSALE has significant negative impact on volatility of Malaysian stock market.

Despite the negative volatility impact of foreign sales, it is not sufficient to justify the imposition of capital controls. Instead, there is a need for the government to calm the market and re-establish market confidence when large withdrawals occur as the result shows that foreign sales increase volatility. For instance, [Choe, Kho, & Stulz \(1999\)](#) and [Karolyi \(2002\)](#) indicate foreign investors' trading behaviour was not the culprit for the stock market crash during Asian Financial crisis. [Su, Yip, & Wong \(2002: 278\)](#) argue that the direct government intervention in the Hong Kong stock market in order to soothe the market and bring back faith of foreign investors may not be a sound solution. Instead, the authors propose the government to study how stock investors respond to different proclamations in order to churn out effective policies for managing the financial crisis. [Ganapolsky and Schmukler \(2001\)](#) demonstrate Argentina government had managed to alleviate the infection impacts from financial crisis in Mexico. This is according to the policy makers remedy the stock markets by practicing a dynamic strategy.

In a nutshell, this study shows that foreign investors do affect negatively the volatility of the Malaysian stock market, mainly through the selling activities. However, the proper policy responses should be on calming the market instead of imposing capital controls. This is because the government should look into the overall costs and benefits before deciding to reverse its financial liberalization policy. Given the limited studies on foreign investors in Malaysia, there is a need for more research to document the costs and benefits of financial liberalization. On the other hand, future studies can look into how other investors such as local institutions, local individual, domestic nominees, domestic Proprietary Day Traders (PDT) and stockists influences the volatility. This is because the dataset provided by Bursa Malaysia is rich in that it covers the buy and sales for different types of investors.

