HOT MONEY AND STOCK MARKET IN CHINA: EMPIRICAL EVIDENCE FROM ARDL AND NARDL APPROACHES

BY

FAN SUI HANG
KHOR TING EN
TAN NIAN MENG
TENG XUE WEN

A research project submitted in partial fulfilment of the requirement for the degree of

BACHELOR OF ECONOMICS (HONS)
FINANCIAL ECONOMICS

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF BUSINESS AND FINANCE
DEPARTMENT OF ECONOMICS

MAY 2019

DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 16139.

Name of Student:	Student ID:	Signature:
1. Fan Sui Hang	15ABB03086	_____
2. Khor Ting En	15ABB05512	_____
3. Tan Nian Meng	15ABB01863	_____
4. Teng Xue Wen	15ABB03748	_____

Date: 22th March 2019

ACKNOWLEDGEMENT

Throughout the process of completing this undergraduate research project, we happened to gain a lot of knowledge and encountered some difficulties in collecting and analysis data. Without the cooperation among the members of the group and the guidance and support from many individual, this research project will not be successfully carried out. Therefore, we would like to extend our gratitude to all whom lend us their hands along this journey.

First and foremost, we would like to express our greatest appreciation towards our supervisors, Miss Tan Chai Thing and Dr Yii Kwang Jing, who has been guiding, supervising us throughout the completion of undergraduate research project. We also appreciation for their patient for always making their time for us in consulting our research project.

At the same time, we are very grateful to have Miss Tan Yan Teng as our examiner, who gave us a lots of valuable suggestion which allow us to improve our research project. Moreover, Miss Tan also pointed our weaknesses and giving her comments on how we can amend our research project before the final submission.

Last but not least, we would like to thanks our project coordinator, Mr Kuar Lok Sin, who provided us important information regarding how we should start our research project starting from our title. Also, he provided us the opportunity in taking part the International Seminar on Economics and Human Resource Development 2019, where we can share our information regarding our research project with Japan students.

.

TABLE OF CONTENT

Page

LIST OF TABLE

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
CUSUM	Cumulative sum
FDI	Foreign Direct Investment
FER	Foreign Exchange Reserve
GDP	Gross Domestic Product
INF	Inflation
IRF	Impulse Response Function
JB	Jarque Bera
NARDL	Non Autoregressive Distributed Lag
NHM	Hot Money
OLS	Ordinary Least Square
OP	Oil Price
PP	Philip Perron
PPI	Producer Price Index
RGDP	Real Gross Domestic Product
RMB	Renminbi
SMP	Stock Market Performance
SSE	Shanghai Stock Exchange
SZ	Shenzhen stock exchange
T&S	Trade and Services Balance
TOL	Tolerance
USD	United State Dollar
VAR	Vector Autoregressive
VDC	Variance Decomposition
VIF	Variance Inflation Factor
WTI	West Texas Intermediate

ABSTRACT

This study discusses the relationship between the stock market performance and all its independent variables which is oil price, economic growth, inflation and hot money in China. The data being used in this study is quarterly data from the period of 2000 to 2017. The main tests being used are Autoregressive Distributed Lag and Non-Autoregressive Distributed Lag which is followed by several diagnostic checking. The test is used to determine whether there exists a long run relationship between the independent variable and stock market performance and if asymmetric effect exist in hot money. The study shows that oil price, economic growth and hot money possess a long run relationship towards stock market performance in China whereas inflation does not. It also shows oil price and economic growth possess a positive relationship whereas hot money and inflation possess a negative relationship. Moreover, it is also found that hot money possesses an asymmetric effect towards stock market performance.

Chapter 1: Research Overview

1.0 Introduction

In this chapter, an overview for this study is given. Under Section 1.1 it discusses the research background, followed by the problem statement which is located in section 1.2. Whereas for Section 1.3 and Section 1.4, it represents the research questions and research objectives respectively. The significant of the study and the structure of study are discussed in section 1.5 and section 1.6. Then, summarizing the chapter with a conclusion.

1.1 Background of study

1.1.1 Stock Market Performance

Stock market, in other term called equity market, plays a significant role in nowadays worldwide economy. This is because that it is used as an indicator for their economic growth (Bebusinessed, 2015). In general, stock market is about the public place where it allows the distribution and dealing of the stocks of openly held corporation, bonds and other category of securities to take place. Such transactions are carried out either through the formal stock exchanges or through the over-the-counter (OTC) marketplaces (Investopedia, 2018). It has set itself up as a free market economy as the companies are allowed to access the capital in exchange for some money to those outsiders who want to get the ownership of the organizations (Avatrade, 2017).

Amadeo (2018) states that it was founded a hundred years ago and China's stock market is a stock exchange for Chinese companies. According to

Bebusinessed (2015) reports that China's stock market (Shanghai Stock Exchange) is listed in the top ten of stock market in the world today. Based on the 2017 annual report by the People's Bank of China, the Chinese stock market has become the largest emerging market. Therefore, the Chinese market is selected as the target to study (Li, 2018).

Amadeo (2018) mentions that China having the second largest of stock market in the global. There are two types of the exchange on China which are Shanghai stock exchange and Shenzhen exchange were established in 1990 as a form of remodeling the economy in China. They also further explains that Shanghai stock exchange is the largest stock market in the mainland due to having the most of the listed and sizable companies and many of them are state-owned. Chin (n.d.) makes out some examples of the main industries of Shanghai stock like financial services, real estate, resources and energy, as well as infrastructure. Investopedia (2017) shows that this equity indicates the overall of shares are created to the market composite to trade on the Shanghai stock exchange. Besides, they also mentioned that it can be a great indicator in getting a broad overview on the efficiency of enterprise which are listed in this stock exchange.

Furthermore, Shanghai stock exchange is generally known as Blue-chip Market of China. It has involved with three tiers which are SSE 50 index, SSE 180 index and SSE 380 index (Shanghai Stock Exchange, 2017). Firstly, for the SSE 50 index, China Securities Index (2015) reports that it consists of the fifty most biggest and most liquid shares that contained in the SSE. The purpose for this index is to express the operation of the most significant leading stock in general. Then, for the SSE 180 index, it selects most typical in 180 equities according to the sector representation, size and liquidity to prove the overall circumstances and the movement in Shanghai securities market. It also represents the performance reference point and infrastructure for financial derivatives (Shanghai Stock Exchange, 2017). China Securities Index (2015) states that SSE 380 index including 380 stocks with middle size market cap, high growth and pleasant profitability. The intention of this index is to broadly indicate the efficiency of the new Shanghai blue chips.

It is important for us to pick Shanghai stock exchange instead of Shenzhen stock exchange (SZ) is because that Shenzhen stock exchange has a smaller exchange. By comparing with Shanghai stock exchange, Shenzhen one is however made up by larger portion of the small and medium-sized of the organizations. Furthermore, most of the investors of this stock usually are individuals (Chin, n.d.).

1.1.2 Oil price

First of all, Patel (2012) reports that oil represent one of the pillars of the worldwide economy. This is very important to the operation of a globalized world. It mentioned that from manufacturing to plastic machinery, everything can be traced back to the oil or any by-products. Most of people life has been influenced by the oil, as the oil allows the ripples to go through the stock market. The impact of oil not only in single way but it is also not simple to untangling all the impacts. To be frank, it is difficult to ensure that the particular impact is because of the oil or other aspects.

Hooper (2018) also explains that based on the history of stock market performance for last few decades, the finding shows there is actually no big relationship between oil price and stock market, and the author further explains that people should not make the wrong assumption on that lower price of oil indicates that it is a good sign for stocks which this scenario giving the advice to that those countries with stock which import oil will be hurt by higher price of oil and vice versa.

Degiannakis, Filis and Arora (2017) explain that for the past decade, oil price fluctuation has been remarkable where price surges, sharp drop and volatility have coincided more and more with corresponding activity in equity market so that it can access the interconnectedness between two markets.

Watts (2018) states Dallas Federal Reserve Bank President Robert Kaplan claimed that when there is an increase in oil price, it should be indicated that there

will be more investment available and more job development that can help in boosting economic growth. China declared that boosting for different commodities like oil is likely to stimulate the economic growth with the support for infrastructure investments (Paraskova, 2018).

It is important to include oil price for the investigation on stock market in China is because that China has overtook United States as the biggest oil importer in global at year 2017. China has imported 39.46 million in April 2018 which help them to get rid of the hot situation of the past few months (Fickling, 2018). Besides, official Chinese customs data shows that China also cooperate with Iran as China imported about 718000 barrels a day on average between January and May 2018 which has been exceed a quarter of Iran's exported oil (Lavietes, 2018).

1.1.3 Economic Growth

Ken (2015) mentions that due to GDP report having the most complete list relating to the general health of the economy, the shareholders will tend to concern more on it. It is said that good economic performance will encourage the company profits, over the long term equity market practice tends to minor economic performance. On the other hand, in the short run, markets will still react in a non-stable manners yet during the stage of positive economic growth.

Whether a sector or company are performing well can be reflected through the amount of shares being held. A nation's GDP will predict a significant growth when most corporation suggest increased profit and drop in liabilities. It indicates that both business and economy are in good condition. As a result, the shareholders build a strong confidence towards the company and so they willing to believe in the equity market (Risk Reward Return, 2017).

Ding and Knight (2011) states that since 1978, the economic reforms started in China was introduced by Deng Xiao Ping, the economy has experienced a remarkable economic growth where the nominal gross domestic product (GDP) has

ranked in ninth place with total USD 214 billion; and it jumped up to second place with USD 9.2 trillion of nominal GDP. Besides, with real annual gross domestic product (GDP) growth averaging 9.5% through 2017, a pace described by the World Bank as "the fastest sustained expansion by a major economy in history. Such growth has enabled China, on average, to double its GDP every eight years and helped raise an estimated 800 million people out of poverty (Morrison, 2018; The World Bank, 2018; Ding & Knight, 2011).

Gajdka and Pietraszewski (2016) says that the condition of economy and the circumstances on capital market, especially for stock market, are decidedly connected. This sometimes prompts a conclusion that shareholders look for potential countries to make the investment in the stock should analyze their economic prospective and pick the nation where the estimations are optimistic.

Since financial global crisis in year 2008, China has become the largest single contributor to world growth. Besides, China has achieved a complete of the millennium development goals (MDGs) by 2015 and has contributed significantly to the accomplishment of the global millennium goals. China's GDP is still said to be impressive by the current global standards even though it has gradually revealed since year 2012 (The World Bank, 2018). Furthermore, Morrison (2018) states that China has become the world's largest economy (on a purchasing power parity basis), manufacturer, merchandise trader, and holder of foreign exchange reserves. Based on Focus Economics (2019) also claims that China, with 1.3 billion of population; belongs to the second largest economy in the world and it continuously taking a significant and influential role in development and in world economy. Therefore, these are the reason why we picked the economic growth in China as one of the dependent variable.

1.1.4 Inflation

Nelson (2004) states that inflation and equity price belong to the most important indicator for one nation's economy. He also further elaborates that due to

high inflation during 1970s, the economists start to evaluate the relationship between these determinants.

Sato, Miyazaki and Mawaribuchi (2011) claims that inflation refers to the economic phenomena where increase in price level and then cause a drop in purchasing power or value of money. In order to hedge the inflation uncertainty, need to invest in the asset whose value rise in the inflationary era. Stocks have always been considered one of the assets. Tripathi and Kumar (2014) also supports that inflation can bring a most crucial impact on equity returns. Because of this reason, they have found that there many articles reviewing the relationship between inflation rate and stock return.

Geetha, Mohidin, Chandran and Chong (2011) claims that the consumer price index (CPI) reflects the inflation rate in general upward price movement of goods and services. They further explain that most analysts conclude that equity market's volatility and uncertainty will be affected by the rates of inflation. He reports that although the inflation in country become more of a concern, most emerging Asian equity markets have seen a sell-off in recent weeks as foreign funds have moved money into a more mature markets.

Yuan and Chen (2010) mentions that in the end of 2006, equity price experienced a frequent increased and the real deposit interest rate switched from negative to positive sign. They also further explains that inflation rate has been experienced a large fluctuation which have a big rise and a small drop during October 2008 where Shanghai composite index had a minimum point to 1664 points as the presence of financial crisis, which risen to 3000 points in 2009 due to economic recovery.

Besides, targeting to attain the stability in price, economic growth and currency stability through aiming monetary monetary aggregates, both M1 and M2, China decided to take a different way. The Law on People's Bank of China (PBOC) imposes that the objective of monetary policy is to retain the value of Renminbi (RMB). The domestic inflation was then managed to calm down as the policy setup being created in China (Pankki, 2015 & Geiger, 2008).

1.1.5 Hot money

Lastly, for the significant variable which is speculative capital inflow or in other term will be hot money, Martin and Morrison (2008) also states that the term for hot money is most generally used in financial markets to indicate the flow of cash reserve or financial assets from one country to another so that they can obtain short-term profit on the difference in interest rate or expected currency movements. These speculative capital flows are named “hot money” as they can shift very fast in and out of markets which likely to cause instability in market.

Kim and Iwasawa (2017) and Fuertes, Phylaktis and Yan (2016) mention that nowadays the variable of hot money is considered as an interesting issue to be discussed in financial market. Hot money is able to expand around the global, particularly in emerging markets is due to the globalization. In this research will be targeted on the Chinese markets which have the largest emerging market. Guo and Huang (2010) state that the time when the inflow and outflow of the hot money become so frequent was during the government of China made the decision to reform the exchange rate after 2005. Guo and Huang (2010) also further mention that there is few papers study about the impact of hot money on the stock markets.

With the establishment of qualified foreign institutional investors (QFII) and qualified domestic institutional investors (QDII), the limits of capital flows have been relaxed, and foreign direct investment has currently been accelerated, which has activated the inflow and outflow of capital in China. Against this backdrop, the widely accepted view is that short-term speculative capital inflows -- so-called "hot money" started in 2007, focusing capital gains from increasing in equity and property prices and the expected appreciation of the Renminbi (Tsuyuguchi, 2009).

Though the exact number of "hot money" flows into China may be uncertain, there seems to be a general consensus, which is why speculators are still transferring

funds to China. There are 2 highlighted factors which are the relative interest rate in China and United States and the assumption of the future appreciation in value of China's currency, Renminbi (RMB). The mixed effect of interest rate differences and the forecasted appreciation of the Yuan is a powerful motivator for "hot money" into China. Hot money has also been calculated that it can earn over 10% of the profit rates per year with a slight of investment risk (Martin & Morrison, 2008).

1.2 Problem Statement

Stock market plays an important role to lead a country to have a better economic growth. It helps to raise the company's funds for the purpose of expanding their business. However, it becomes a common issue that discussed by many researchers recently.

In June 2018, there was a trade dispute between China and US which US sued China that they were undergoing a "theft" business while China accused US that they were making a criminal offense. After Donald Trump imposed higher levies and tariffs to threaten China, China started to revenge and fight back US towards this kind of threatening if there was more tariff imposed. This spat brought a negative issue to China, and China's stock market had recorded a steepest drop because of this trade disputed. Shanghai Composite Index falls by 3.8% which the lowest record in these two years. Hence, in five months, China currency also dropped to its lowest stage against dollar (Rushe, 2018).

Allen (2017) explains that the decline on stock market performance in China might cause by the political infighting of China. This had affected the confidence level of Chinese investor decrease. The switching of leadership lineup also made the situation even worse and increase the chance of uncertainty on the China economic structural reform. As time goes by, the uncertainties increases and putting risk on the capital outflow of China stock market in 2017.

Furthermore, Xiao, Zhou, Wen and Wen (2018) also mention that the finding is focus on the how oil price shock will affect the changes on stock market volatility. Due to oil price shock, it brought uncertainty to financial economic and also negatively affected the asset returns. Oil price shock is easier to affect developing countries like China, due to the fact of their not fully formed policies and immature investors. Every changes in oil price shocks on China stock market volatility are mainly caused by differently response by the cash flows of firms. In addition, the behavior of investors of being heterogeneous sensitivity towards the oil price shocks will enhance the bad effect on stock returns.

People; especially investors, realize the advantages of liquidity risks and can lead to a huge beneficial effect to financial system after the world financial crisis. Developing countries which have major source of liquidity risks like China can contribute a good effect on the growth of economy. However, increase in oil price lead to a drop in trade value and price spread set by firm who are price makers during the period of 2006 to 2011 based upon US companies. The cost of trading will force to reduce due to the rising in oil prices, and directly affect a drop in market depth and depress following trade transaction. Therefore, a shock or rise in oil price will increase the China stock market volatility and also decrease the investors' confidence level (Zheng & Su, 2017).

Other than that, a downturn of economic growth in China will highly affected the stock market performance. Borzykowski (2018) mentioned that a slowdown in economic growth could bring positive effect to China's stock market. Some economist also believed that the growth in China will become even slower in the future and encourage us not to trust the official data of GDP in China. This statement had reflected the issues happened in January 2016, which the China stock market S&P 500 declined by 10.5% because of the slowing of Chinese growth. Therefore, all the investor or even the commonwealth in China fear of decreasing in growth as it may eventually affect the stock market performance.

The changes in inflation rate also will bring an adversely affect to China's stock market. When there is an increase in inflation rate, there is a decrease in profit for investors in the stock market. This is because increase in inflation rate indicates

an increase in risk of investing the stocks. The cost that they need to pay will be higher and lead to lower stock returns. Furthermore, the expectation of investors declined as the ability of the stock return decrease which also indicate by the reduced in stock yields (Bai, 2014). In addition, people are facing lack of savings as they need to spend and consume in a higher cost, so they will not choose to invest and lead to a bad performance in China's stock market (Tripathi & Kumar, 2014).

Hot money might be good to a person but it also might bring harms to stock markets and property. China will have this kind of phenomenon frequently and it will cause an upward pressure on price. Martin and Morrison (2008) also state that hot money may cause inflation to happen. This problem comes from the excessive foreign reserve which a kind of net inflow of foreign capital without making any sales of good. Surplus in foreign exchange indicates that there are overload of money to spend on few supplied good, although high demand but less supply, and lead to inflation (Wu, 2008).

Based on the above scenario, people might wrongly spend their money on the right way in terms of purchasing on the supplied good, because foreign exchange is used to buy foreign good but not local goods. At the same time, if there is more foreign exchange reserves, more foreign capital inflow and leads the stock market have more bubbles in the transaction. Due to the Trump factor which he imposed high tariff on China exports to US, this brings a consequences of a sharp decline on China's foreign exchange reserves by US$41 billion in December 2016 to US$3.01 trillion (Allen, 2017).

Guo and Huang (2010) say the changes in real estate market price in stock market is important to China's economy because it can promote and transform a better country's economy. Due to the strong effect of hot money, the housing price in China will keep on increase rapidly which happening in these few years. Not only the real estate housing prices increases, the growth of investment-oriented housing payment also having a rapid appreciation. Due to this appreciation in value, it attracts and lure more and more foreign funds to enter China's stock market and easily produce bubble in the market. In the end, financial boom occurs by the

influence of large amounts of capital inflow towards China; hence it leads to economic crisis.

In this study, we aim to study the relationship between stock market performance and the four determinants, namely oil price, economic growth, inflation and hot money.

1.3 Research Questions

1.3.1 General Question

The general question in our research is that can stock market be explained by the oil price, economic growth, inflation and hot money as a whole in China?

1.3.2 Specific Question

i. What is the relationship between oil price and the stock market in China?
ii. What is the relationship between economic growth and stock market in China?
iii. What is the relationship between inflation and stock market in China?
iv. What is the relationship between hot money and stock market in China?

1.4 Research Objectives

1.4.1 General Objective

The objective for carrying out this study is to examine the determinants of stock market performance in China. In short, this research is to analyse how the oil price, economic growth, inflation and hot money will cause the impact on the China's market performance. Hence, we are going to analyse the relationship between the selected variables and the stock market performance of China. The selected independent variables include oil price, economic growth, inflation and hot money.

1.4.2 Specific Objective

In this study, we specifically aim to:

i. Identify the long run relationship of oil price, economic growth, inflation and hot money towards stock market performance in China.
ii. Analyse the causal relationship of oil price, economic growth, inflation and hot money towards stock market performance in China.
iii. To examine the asymmetry relationship between hot money and the stock market performance in China.

1.5 Significance of study

Previously, hot money has only been used by few researches in different countries (Guo & Huang, 2010; Wei, Yu, Liu & Cao, 2018; Kim & Iwasawa, 2017), however due to the limited studies of hot money in literature review, thus the further investigation on "hot money" will be in our study. The novelty of this study is to study the importance of hot money on the stock market performance in China. This

is because hot money is known as a speculative fund which flows into the country to chase short-term profit (Wei, Yu, Liu & Cao, 2018).

Guo and Hong (2010) mention that "hot money" is referring to the flow of funds. "Hot money" tends to create bubble in the country, leading the country's domestic market into a potentially dangerous position. Wei, Yu, Liu & Cao, 2018 report that "hot money" is believed to have created some worrisome bubbles in the domestic stock market which may have contributed to the fluctuation in China stock Market.

In conclusion, this paper will be able to contribute to the policy makers, researchers and investor on what extend and how these four chosen variables will affect stock market. The policy makers and other relevant parties will be able to detect how these four variables will affect the stock market performance and be able to implement procedures accordingly. The data collected will be using past data evidence and theoretical analyses provided from the review of others researches study related to this topic.

1.6 Structure of study

The structure of this study is as follow. In Chapter 1, it will be talking about the variable that was chosen and also the significant of this study. Then in Chapter 2, it will be focusing on the literature review. Next will be Chapter 3, where the evaluation on the relationship of the variable will be done through hypothesis test. Later on in Chapter 4, it describes the method used and the result obtain. Lastly in Chapter 5, conclusion of the study is made by providing recommendation for future study.

1.7 Conclusion

Basically, in Chapter 1 the main focus in this chapter is about the major effects of the three independent variables that cause a drop in China's stock market performance. Moreover, the study explains the background of stock market in China in order to obtain a clearer picture towards China's stock market performance. This paper has also showed the motives for testing the causal relationship between all the independent variables (oil price, economic growth, inflation and hot money) against stock market performance.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In this chapter, it will examine about various point of different researcher on the relationship of the independent variables with the stock market performance in China done by past researchers. Section 2.1 will summarize the literature review regarding the relationship between dependent variables which is stock market prices and independent variables namely, oil price, economic growth, inflation rate and last but not least, hot money. Moreover, section 2.2 will discuss about the theoretical framework of each independent variable that hold or support by theory in connecting with the dependent variable.

2.1 Review of Past Studies

2.1.1 Oil Price and Stock Market Performance

Plenty of literatures study on the impacts of oil prices towards the stock market performance because oil price movement is a common determinant of Stock Market Performance as it forecast stock returns. According to Filis and Chatziantoniou (2014), different relationship between two variables, oil prices and stock market performance are found depending whether the country plays role of oil importer or oil exporter. The study adopts structural VAR model in examining the relationship between of oil price and stock market with another two variables which are consumer price index and interest rate. They also include some net oil-exporting countries as well as net oil-importing countries with monthly data from January 1991 to April 2010. The empirical result shows positive change in oil price impact negatively to oil importing stock markets whereas positive oil price changes

impact positively to oil exporting stock markets. Oil import country tend to face a higher level of cost of production due to the rise in oil price which decrease consumption level and further lead to a poor performance in stock market. On the others hand, the consumption and investment level raise due to higher oil price lead to an improvement in stock market as the result of encouraging investment environment.

Some studies also tend to support the result in the study of Filis and Chatziantoniou (2014). According to Wang, Wu and Yang (2013), the study conducts with annual data of major oil –importing and exporting countries from period January 1999 to December 2011 and adopts Vector Auto regression (VAR) framework. The empirical results show significant relationship between stock market with oil prices. Furthermore, a negative relationship is also conclude between oil supply and stock markets in oil-importing countries and there is significant effect of oil demand uncertainty on stock markets in oil-exporting countries. Also, they also found that oil price shocks lead to increase in more market co-movement in oil-exporting countries compared to oil-importing countries.

Based on the researches of Bjournland (2008), stock market react positively to the change in oil price. They choose Norway, an oil exporting country in conducting their study by using structural VAR model with monthly data from 1993 to 2005. The positive relationship between two variables is due to the reason of higher oil prices able to stimulate the economy growth in oil exporting county.

According to authors, Jones and Kaul (1996), there is a negative relationship between oil prices change and aggregate stock returns. The study conducts with standard cash-flow/dividend valuation model with post-war period. The negative relationship indicates the oil price shocks are fully accounted by the impact on cash flows in U.S. and Canada (oil exporter) but not fully accounted in U.K. and Japan (oil importer). In other words, the shocks on real cash flow by innovation in oil prices lead to a great effect in stock prices in U.K. and Japan while it is fully accounted by U.S. and Canada.

Moreover, Cunado and Gracia (2013) conducts an empirical analysis to examine the influences of oil price shocks on stock market returns in 12 oil importers of European countries. They found that the shock market return response differently to supply shocks and demand shocks. Besides, oil price increase caused by supply shocks can lead to higher negative impact to the stock market returns then oil price increase caused by demand shocks. This study conducts by using Augmented Dickey Fuller test and Philips and Perron test with monthly data from the period February 1973 to December 2011. Based on the review of previous researchers, Rapaport (2013), the empirical result is similar with the finding of the study of Cunado and Gracia. By using dynamic stochastic general equilibrium (DSGE) model, Rapaport show that the raise of oil price cause by oil-market-specific shocks are correlated to the aggregate risk premium. Adverse oil-market-specific shocks may lead to decrease in economic activities and also in aggregate dividend growth rate which eventually increase the aggregate risk premium.

Several studies conduct with the objective in studying the time-varying correlation between oil prices change and stock prices. According to Hayky and Naim (2016), they conduct an empirical testing the dynamic relationship between oil price and Kuwait's stock market index. Markov Switching Model is adopt to examine the regime shift between low and high volatility with monthly data from January 2005 to September 2015. The result indicates that the two variables react differently to different regimes which means that high volatility regime will result in positive and significant relationship between oil prices and stock market and no relationship between two variables during low volatility regime. High volatility transmission is detected from oil to all Gulf Cooperation Council (GCC) stock market except for Saudi stock market. Positive relationship between oil price and stock market in high volatility regime indicate that there is a strong volatility relationship between oil price and all GCC stock market.

Time varying conditional correlation and asset pricing models is being used by Broadstock, Cao and Zhang (2012) with weekly data from period of January 2000 to May 2011. This study shows that the relationship between oil prices change and stock returns is time-varying and fluctuate at both positive and negative values in China. There is a strong correlation between two variables after mid 2008 after

the financial tsunami in 2008 due to the higher sensitivity of China's investors regarding the price volatility in global oil market.

Olufisayo (2014) examines the effects of oil price change and stock market growth over the annual data from period of 1981 to 2011 for Nigeria economies. The empirical result done by vector error correction modelling and Granger causality test indicates that there is cointegrated and unidirectional relationship between oil price and stock market. In short, there is a temporary positive effect between two variables and oil price is highly dependent on stock market performance.

The study conducts by Kang, Ratti and Yoon (2014) to determine the relationship of oil price shocks on the covariance of U.S. stock market return and stock market volatility by using structural VAR model with daily data from January 1973 to December 2013. The study shows that positive oil shocks impact stock returns negatively and volatility covariance relationships for U.S. during period 1973 to 2013.

2.1.2 Economic growth and Stock Market Performance

Economic growth plays a major factor in contributing the performance in stock market as it measures the changes of nation's GDP which representing the overall health of economic. The evidence from Pakistan demonstrates the impacts of growth rate to the stock market performance. Nazir, Nawaz and Gilani (2010) reveals that economic growth has a positive impact toward stock market performance. The analysis applies Dickey-Fuller test (ADF) with annual data from the period of year 1986 to 2008. FDI data, Stock market indicator data and HDI data are collected for this study. As the size of stock market is increase, which in turn raise the economic growth in Pakistan. The empirical result support by many researchers which also found positive relationship between the economic growth and stock market performance since the developed stock market function in a way

that they increase savings and provide opportunities to investors to do productive investments that boost economic growth.

Based on previous researcher, Carp (2012) also conclude the similar result which the study of Nazir, Nawaz and Gilani (2010) with different model. The study examines the positive relationship between stock market and economic development by adopting Granger Causality test method with annual data in Romania. The empirical result shows that the real investments in the country stimulates a higher rate of economic growth which in turn lead to positive impact on stock market performance.

There is also a study which show bi-directional relationship between two variables. Laokulrach (2014) concludes a bi-directional relationship between stock market and economic development through capital with quarterly data from 1998 to 2012. Positive bi-directional relationship is determine between stock market development and economic growth by adopting regression analysis model. This concept is that, as the stock development increase, it will in turn raise the gross capital formation which then lead to positive effect to economic growth. Moreover, stock market also acts as the alternative for the private sector to raise fund by increase their investment which then lead to the growth of economic.

Conversely, Antonios (2010) concludes that there was unidirectional causality relationship between stock market development and economic growth which is the stock market development affecting economic growth. The relationship between the variables are examine by using Johansen co-integration analysis based on the classical unit roots tests from the period from year 1965 to 2007. The unidirectional causality indicate that the economic wealth can be affected by stock price which in turn affecting the consumption and investment goods which lead to economic growth.

A similar study of unidirectional causality result between two variables also concludes by other researchers. A causality relationship study between the economic growth and stock market performance in Turkey out by Kirankabes and Basarir (2012). Granger causality tests with monthly data from year 1998 to year

2010 has been used in this study. The empirical result concluded a long run and one-way relationship between two variables which further indicates that stock market development is co-integrated with the economic growth.

However, some researchers argued that there is no relationship exists between economic growth and stock price. Senturk, Ozkan and Akbas (2014) stated that there is no long run relationship between two variables. Bootstrapped Toda Yamamoto and Frequency Domain causality tests had been adopted during this study with data from year 1998 to year 2014. A result of no causality relationship are obtained in Bootstrapped Toda Yamamoto. Frequency Domain causality tests showed that stock returns affect the economic growth in short term while economic growth have an impact on stock returns in medium term. A different result obtained is probably caused by the allocation of resources in the stock market is imbalance.

2.1.3 Inflation and Stock Market Performance

Inflation rate refers to the increase in price level of goods and services in a nation. According to Ahmed, Islam and Khan (2015), state that there is close relationship between stock prices and inflation. The study concludes that increase in inflation rate lead to an increase in stock price as they have positive short run relationship. Besides, the researchers also find that there is unidirectional causal relationship which is from inflation rate to stock prices. The method uses in identifying the relationship is ADF and PP tests with monthly data from year 2004 to year 2013. Regarding the positive relationship, researchers also explain that inflation may increase the firm's equity value which might enhance company performance which in turn lead to an increase in stock prices. The study also further shows a significant long run equilibrium between two variables through Johansen test.

Some study also concludes a consistent result with Ahmed, Islam and Khan (2015). Tiwari, Dar, Bhanja, Arouriand and Teulon (2015) claim that inflation does not decrease the stock prices in Pakistan in long run which indicate the positive

relationship. Besides, the researchers also mention that two variables are highly correlated. Under the empirical study, monthly data from year 1961 to year 2012 with Breitung and Candelon (2006) frequency based causality test is use. In short, the positive relationship indicates the consumer price index (CPI) is considered without taking producer price index (PPI) into consideration.

However, there are plenty of researchers argue that the relationship between inflation rate and stock market should be in negative sign. According to Asayesh and Gharavi (2015), the researchers state that Limer test is uses in examining the sensitivity of stock market in reacting to inflation rate with the period of year 2000 to year 2013. 10 biggest companies have been selected and the researchers conclude that there is a strong negative impact between Tehran Stock Exchange and inflation rate. The negative relationship indicates that there is a relatively lower expected real earnings growth which in turn affects the company could not cover their cost which further decrease their future profitability.

Geske and Roll (1983) provide empirical evidence which indicate a negatively relationship between stock returns and both expected and unexpected inflation. Expected inflation also known as anticipated inflation which explains the increase of prices level is expected while unexpected inflation explained that the price level changes is not expected. With quarterly data from period year 1947 to year 1980, a simple liner regression model is use in determining the relationship. The empirical result found that the raise of inflation rate will lead to a downturn of economic activity which will slow down the stock market performance.

Another similar empirical result concludes by Farooq and Ahmed (2017) which explain that high inflation will decrease the sensitivity of investment of stock price which in turn slow down the stock market performance. The empirical result indicates the negative relationship between inflation and stock market performance. The study conduct with 37 emerging markets' data from year 2009 to 2014. The researchers reveal that the response of stock price is less sensitivity to high inflation regimes as high inflation will reduces the in formativeness of stock prices which leading to a relatively low sensitivity of stock market.

Pearce and Roley (1985) study the response of stock prices movement to money supply, inflation, real economic acitivity and discount rate by using Autoregressive model with data from period year 1977 to year 1982. The inflation data is corresponding with consumer price index (CPI) and producer price index (PPI). The researchers claim that the relationship between two variables which is stock market and inflation is insignificant as there is limited evidence stating that the inflation rate have an impact on stock market.

2.1.4 Hot Money and Stock Market Performance

Guo and Huang (2010) shows that the method use to conduct the research is a multivariate vector autoregressive (VAR) model. In the research it try to determine how hot money affect two markets which is stock market and real estate. It states that hot money does contribute a large portion of volatility in the real estate market but as for the stock market it only state that it may cause disturbances such as bubbles which will have an impact on the stock market. The studies state that when encounter with a positive shock, stock price experience a positive impact but it later alternates between negative and positive territories. This proves that a speculative capital flowing into China drives up share price and accelerate a worrisome bubble in the stock market.

Furthermore, Wei, Yu, Liu and Cao (2018) found out that the method used in the researches is the nonlinear Granger causality test and a new GARCH – MIDAS modal. Base on the research model, it is able to identify that there is no linear and nonlinear causality between the China stock market and the growth rate of hot money. However, in the research it is confirmed that “hot money” possess a significant positive impact on the long-term volatility of the China stock market and the dependence between them is a time variant. It analyzes the impacts on different special periods such as 2008 subprime debt crisis, the 2010 European debt crisis, and the 2015 Chinese stock market crash, and the results states that international capital flow is not the reason for the huge volatility. This is because during the 2008 subprime mortgage crisis and the 2015 Chinese stock market crash it shows that the

totally volatility for both crisis increase while for the 2010 Europe debt crisis there was no large increase in the volatility.

2.2 Theoretical Framework

2.2.1 Hotelling's Theory

Hotelling's Theory was developed and named after Harold Hotelling in 1929. In general, the concept of this theory explains that owner of limited non-renewable resources, such as oil, coal, copper will only produce the products which able to yield more than available financial instruments in the market, such as interest bearing bonds. In another words, this theory strives to describe the conditions of supply of non-renewable resources in an efficient market. Take for example, the supply of oil will be reduced by owners if they predict the future oil price will be higher than the interest-bearing instruments and hence waiting to sell into more favorable market in the future (Hamilton, 2008). According to Hotelling's principle, oil prices should increase at the rate of market interest rate.

$$P_{t+1} - M_{t+1} = (1+i_t)(P_t - M_t) \qquad \text{(Equation 2.1)}$$

Where:

P_(t+1) - Price at time t+1

M_(t+1) - Marginal production cost at time t+1

i_t - Market interest rate

P_t - Price at time t

M_t - Marginal production cost at time t

2.2.2 Arbitrage Pricing Theory

Arbitrage pricing theory was introduced by economists Stephen Ross (1976) and it refers to the return of portfolio or assest which can be predicted through the linear effect of macroeconomic variables on market's return. Shanken (1982) makes clear that arbitrage pricing theory is a substitute for Capital Asset Pricing Asset (CAPM) in forecasting stock returns because some researchers believe that the ability CAPM is inadequate. Arbitrage Pricing Theory equation is stated below:

$$E(r) = rf + \beta 1RP1 + \beta 2RP2 + ... + \beta nRPn \qquad \text{(Equation 2.2)}$$

Where:

$E(r_j)$ - Expected return on asset

r_f - Risk-free rate

$ß_n$ - Sensitivity of the asset price to macroeconomic factor n

RP_n - Risk premium associated with factor n

Arbitrage pricing theory is determined through a combination of independent variable such as GDP, money supply, industrial production and shifts in risk premiums. Researchers found that several macroeconomics variables are significant in explaining expected stock returns.

2.2.3 Fisher's Effect Theory

Under the inflation rate, there is a few theories which is use to explain the relationship with the stock market. In this study, the theories use Fisher's Effect Theory. Irving Fisher was the one who first proposed the theory in 1930 which link the relationship between interest rate, inflation and exchange rate. In another words, the inflation rate can be taken when nominal interest rate minus the real interest rate. The Fisher effect also implying that the relationship between stock prices and inflation rate as the impact of inflation rate will affect the interest rate which further influence the stock prices. In short, stock for has an inverse relationship with interest rate. For example, higher inflation rate leads to a lower interest rate, unless the

change of nominal rate is same with the inflation rate (Cooray, 2002). Government has to implement a monetary policy to ensure the stability of the economy as a high inflation rate might cause serious economy problem.

$$r = i - \pi^e \qquad \text{(Equation 2.3)}$$

Where:

r - Real interest rate

i - Nominal interest rate

π^e- Inflation rate

Bai (2014) claims that the relationship stock market is strongly correlated with inflation in China. When the China faced a serious inflation rate, the nominal interest rate will rise which leading the stock price to be rise. In 2011, the rising price in agricultural product resulting in the hiking in China's central bank and hence shows a significant relationship between stock market and inflation rate.

2.2.4 Concept of Hot Money

Hot Money refers to the flow of speculative funds where the funds are invested into one country from another in order to earn a short-term profit on the interest rate differences or predicted exchange rate shift between two countries (Fuertes, Phylaktis and Yan, 2016). Hot money actually possesses a concept which states that a huge inflow of capital will affect the stock price and also creates worrisome bubble. When huge inflow of hot money enters the country, this will drive up the stock prices and will lead to the acceleration of worrisome bubbles occurring in the country. Hence leading to a situation where the market is instable (Wei, Yu, Liu and Cao, 2018).

2.3 Conclusion

Throughout the study of previous literature reviews, the relationship of the five determinants towards stock market performance was stated and there is sufficient evidence to prove existence of relationship between our variables. However, the empirical results are still debatable. Besides, there is limited study of the relationship of "Hot Money" as an independent variable and stock market performance. Therefore, we are going to further study by including Hot Money as our independent variable to fill in the gap.

CHAPTER 3: METHODOLOGY

3.0 Introduction

The importance of this chapter is to discuss the chosen methodologies. In general, this chapter consists of the research design, source of data, research framework, definitions from variables, model and analysis methods. Chapter 3 is regarding the research methodology, it is discussed to solve the inappropriateness in the study and misleading of result obtained. Methodology is used to help the advance usage in the following chapters. But on this chapter, only definition of the tests will be discuss. The tests we use are Unit Root Test, ARDL, Non ARDL, VECM Granger Causality, Impulse Response Function and Variance Decomposition.

3.1 Research Design

In this research, the method applied is quantitative research which uses the secondary data. Quantitative methods are helpful when researchers find to study overall behavior as they can be measured and calculated. The design of causal relationship is employed to determine the cause and effect between the variables. There are two main objectives of using causal relationship in the study. First, it can understand and differentiate which variables will be the cause and effect. Second, the phenomenon can be determined when the causal variable affects the effect that we predicted (Salkind, 2010).

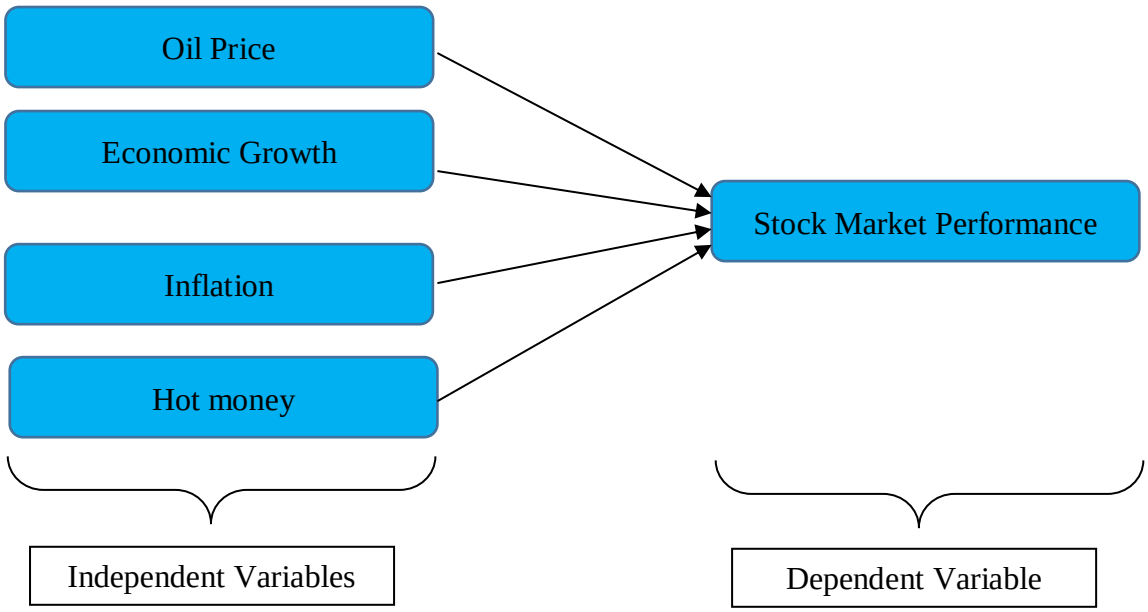
3.2 Sources of Data

Secondary data is used to run this research. The reasons we chose secondary data is to reduce time usage and decrease the costs of doing research; therefore, we can collect data which published for free and available from many sources.

To study the relationship between stock market performances in China with all the independent variables chosen, all the variables' data we collect from Bloomberg and CEIC. This study uses time series data which is based on quarterly basis from year 2000 to 2017, a period of 18 years with a total of 72 observations.

3.3 Research Framework

Figure 3.1 Conceptual Framework



3.4 Definition of Variables

This study obtains observations for every variable. Additional information from journals, news, textbooks and articles to make the unit measurement of each variable more accurate and more consistent with the theory. The details of data are listed below:

3.4.1 Stock Market Performance

Stock market is where the earnings of corporations is traded, investor will invest into the stock market with the objective of earning a small income from the transactions. Stock markets of various countries are normally following the American economy (Masoud, 2013).

The stock market performance is measure by the stock market index. The stock market index is a combination of the top 30 largest companies which possess the most influence in the country. Each countries stock market index will vary from one another around the world; it normally indicates how a country's economy is performing. Hence for this study the proxy use for the stock market variable will be the Shanghai composite index.

3.4.2 Oil Price

Oil price is referred as the spot price of a barrel of crude oil in the oil market. West Texas Intermediate (WTI) is commonly understand as the benchmark for oil price in the world. The oil price is not only determines by its supply and demand but also other important factors such as geopolitical events, economic activity and financial factors (Bai & Koong, 2018). The measurement unit for oil price is in the percentage form. The proxy for oil price is WTI.

3.4.3 Inflation

Inflation is the percentage that indicates by the increase or decrease in the price level that happened in specified period, like monthly and yearly. The percentage shows how fast the price increase or decrease is during the specified period. The inflation is measure in billion in USD, and it will be compare with the stock market to determine whether an increase in inflation will affect the stock market performance. Hence, in this study the proxy use for this variable will be producer price index (PPI).

3.4.4 Economic Growth

Economic growth is indicated by enhancing in capability of producing goods and services in an economy which compared between periods. The economic growth is measure in percentage, and it will be compare with the stock market to determine whether an increase in economic growth will affect the stock market performance. Hence, in this study the proxy use for this variable will be real gross domestic product (RGDP).

3.4.5 Hot Money

"Hot money" is referring as the flow of speculative funds or capital funds from one country to another. The objective of the flow of funds is mainly to gain a short-term profit on the difference in interest rate or anticipated shifts in the exchange rate (Chari & Kehoe, 2003). Hot Money is measure by USD. Due to the fact that hot money flow is poorly monitor, there isn't a well-define method to estimate the sum of hot money inflow into a country. However, by following Guo and Huang (2010), the figure is able to be obtaining through having foreign exchange reserve subtracting two different indicators which is foreign direct investment, and trade and services.

Formula is as below,

$$FER - FDI - T\&S \quad \text{(Equation 3.1)}$$

FER = Foreign Exchange Reserve

FDI = Foreign Direct Investment

T&S = Trade and Services Balance

The data for these indicators can be obtained directly from Bloomberg except for trade and service. The data for trade and service is obtainable from subtracting the data of import from the data of export. Hence in this study the proxy of Hot money is foreign exchange reserve minus foreign direct investment minus trade balance.

3.5 Model Specification

The model initially with dependent variable (stock market performance) and independent variables (oil price, economic growth, inflation and hot money) is specified as follow.

SMP = f (OP, EG, INF, NHM) (Equation 3.2)

$SMP_t = \beta_0 + \beta_1 OP_t + \beta_2 EG_t + \beta_3 INF_t + \beta_4 NHM_t + \varepsilon t$ (Equation 3.3)

SMP = Stock Market Performance

OP = Oil Price

EG = Economic growth

INF = Inflation

NHM = Hot money

β_0 = Intercept

ε = Error term

t = Time trend

3.6 Data Analysis Methods

3.6.1 Descriptive Analysis

Descriptive statistic refers to a descriptive analysis of data collected from data instruments. The information evaluates descriptively in terms of measures of main tendency and measures of variability. Measure of main tendency consists of mean, median, mode maximum and minimum. Besides, for the measures of variability consists of standard deviation. Descriptive analysis of data is necessary as it can help to decide the normality of distribution.

3.7 Empirical Testing Procedure

3.7.1 Unit Root Test

Unit root tests are also known as “Stationary test” is a stochastic trend. It uses to figure out whether the times series variable is stationary or non-stationary. Stationary time series data have fixed and constant of mean and variance through the periods while non-stationary time series data do not have constant mean and variance. Non-stationary time series data does not have a long run mean which the series return and the variance is dependent upon time goes to infinity as the sample period approaches infinity.

The most well-known unit root tests are the Augmented Dickey-Fuller (ADF) test and Philips-Perron (PP) unit root test. ADF test is the extension of Dickey-Fuller (DF) is used to handle more complex models with unknown orders. ADF test can be used to overcome the impact of serial correlation problem in the error term by adding lagged dependent variable in a model (Davtyan, 2013). On the

other hands, Philips-Perron (PP) unit root test is developed by Philips and Perron in year 1998. PP test is developed to address the autocorrelation and heteroscedasticity problem in the model by modifying DF test statistics. There is an advantage of PP test compare to ADF is that PP test are more perfect to the general forms of heteroscedasticity and let researchers no need to recognize a suitable lag length for the unit roots checking. However, PP ADF test and PP test have the same null hypothesis.

Hypothesis of the tests are as followed:

H0 : There is non-stationary.

H1 : There is stationary.

Decision Rule : Reject null hypothesis if p-value is smaller than significant level. Otherwise, do not reject.

3.7.2 Autoregressive distributed lag

The autoregressive distributed lag (ARDL) is used to verify the long term relationship the all the different order of integration series, which also means non-stationary series. It also reparameterizing the result to the Error Correction Model (ECM) and implement the short term dynamics and long-run relationship of the selected variables. However, there is still many researchers not accepting this method but adapt to the conventional way when doing estimation because of the flexibility of cointegration method. This is one of the reasons of why many researchers are not necessary applying the cointegration test; therefore, it will lead to misleading inferences. In addition, it can prevent ARDL model run into the presence of stochastic trend that with integrated of I (2), although ARDL does not make a pre-testing on unit roots (Nkoro & Uko, 2016).

The ARDL model consists of thrifty infinite lag distributed model. The meaning of “autoregressive” understands along with its own lag other than explained by the variables. ARDL equation can be shown as:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \dots + \beta p y_{t-m} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \dots + \alpha_q x_{t-n} + \varepsilon_t$$ (Equation 3.4)

In the equation, m and n represent year for lags, while ε is the error term and β is the short run coefficient and α is long run coefficients (Chetty, 2018).

There are few advantages in using ADRL approach. Firstly, the problem of endogeneity is small as there is a free residual correlation in the model and each of the variables supports one equation only. Secondly, ARDL approach can differentiate which is the dependent and independent variables when it is a long-run relationship. This is because this model assumed single reduced form equation occurs between the endogenous variable and exogenous variables. Thirdly, the main advantage of ARDL model is able to identify the multiple cointegrating vectors. Lastly, ARDL model can derive ECM through transformation, by integrating the short term relationship with long term relationship without losing the information data (Nkoro & Uko, 2016).

3.7.3 Non-Linear Autoregressive distributed lag

Non autoregressive distributed lag model is made up for creating a simultaneously asymmetric non-linear autoregressive and creating a cointegration of the chosen variables in a single equation model. NARDL also give few advantages when doing a standard cointegration method, such as Engle Granger Causality and Johansen model. NARDL is also called as a dynamic error-correction representation, it develop vigorous empirical results, even though the sample size is small. In addition, the other advantage of using NARDL is all the variables will not have a same number of integration and this shows the model's flexibility. This flexibility also shows that it does not involve the same order of integration of variables, at the same time, there will be consist of integrated and not integrated variables (Rocher, 2017).

3.7.4 VECM Granger Causality

Lu and Xin (2010) states that granger causality test refers to an approach for deciding whether one time series is helpful in estimating another. There are two tests being implemented which are F-type granger causality test and another one is Wald-type test which indicates to test for non-zero correlation between error processes of cause and effect variables. If every variables are integrated at order one, I(1), it indicates that co-integration test will take place to figure out if there is co-integrating relationship between the variables; If it does, then the granger causality test need to be conducted according to VECM (Li, 2016). Suharsono, Aziza and Pramesti (2017) states that Vector Error Correction Model (VECM) refers to the form of restricted Vector Autoregressive. Because of the presence of non-stationary which is in co-integrated data forms, therefore, the extra restriction must be given. VECM after that apply the co-integration restriction data into the specifications. This explained why that VECM is usually named as VAR design for non-stationary series, which contains of co-integration relationships. After the co-integration is recognized, error correction method will take place for the test processing. When there shows differences in the degrees of integration between the variables that been tested, the test will be completed in jointly between long term equations with the error correction equation, after the recognition of the availability of the co-integration variables. The degree of integration for co-integrated variables is named as multi co-integration. Nevertheless, if no come across with co-integration situation, then the test will be continued in taking the first difference of the variable. The steps which perform in VECM are determining the length for the lags then test for the granger causality. After that, do for the degree test of the co-integration then estimates the VECM, and lastly de-composite the variance.

3.7.5 Impulse Response Function

Haan (2011) states that impulse response function states a j-period response when one system is shocked by a one-standard-deviation shock. Lütkepohl (2016) also says that this response is useful in identifying the interaction between the

variables in vector autoregressive model. Besides, when a variable has an impulse reaction to another variable then it can also be called as latter causal for the former (Rossi, 2010). Haan (2011) further explains that the IRF can be defined as IRF(j) = $\bar{Y}\tau$-1+j-$\bar{Y}\tau$-1+j. In linear processes, impulse response function is independent of particular draws for $\bar{\varepsilon}t$. Therefore it can be began at a steady states where $\bar{\varepsilon}t$ has been zero for a very long time. The equation of IRF in linear process is IRF(t) = $\sigma\rho^{t-1}$. Impulse response function in this process belongs to non-stochastic one. However in theoretical models, it is not important to obtain the impulse response function by giving one standard deviation shock to the system when the policy function has been settled. The shocks included in model are structural shocks such as productivity shocks, preference shock, and monetary policy shock. The reduced form vector autoregressive models (VARs) is a useful forecasting model and structural VAR is used to back out the structural shocks. Lu and Xin (2010) highlight that VAR is expressed in vector MA(∞) form as yt = μ + εt + Ψ1 εt−1 + Ψ2 εt−2 + ···. Therefore, matrix of Ψs contains interpretation of ∂yt +s $\partial\varepsilon'$ t =Ψs, which indicates that the row I and column j elements of Ψs analyses the result of raising in one unit in j-th variable's innovation at time t (εjt) for the number of i-th variable at date t+s(yit+s), holding all other innovations at all times constant.

3.7.6 Variance Decomposition

Variance decomposition is a method in classical statistical which can function in a large number of variables which also called multivariate analysis, in order to show out the simplified structure. This method is advocated by Sims in year 1980 and had been used by few economists and econometricians as their alternatives when they used classical simultaneous equations model. This method can precisely be called as "forecast error variance decomposition" used in the vector autoregressive models (VAR) when interpreting the relationship between the variables. It is to measure the proportion of the movements of variable due to shock to itself and to shock to other variables. VAR models are form as shown below:

$$Yt = A\iota Yt - \iota + \ldots + A\rho Yt - \rho + \mu t \qquad \text{(Equation 3.5)}$$

In this Equation 3.5, the variables are mainly endogenous, so it is hardly to untie the relationship between them from the coefficient matrices. Hence, this is reason why using this method as it helps to interpret the VAR models. In the recursive orders, all the one period forecast-error variance of Y is due to μ. At longer horizons the explanatory variables to μ will diminish. It means the variance of the forecast error increases with the horizon (Lütkepohl, 2010).

3.8 Diagnostic Checking

3.8.1 Multicollinearity

Multicollinearity occurs when the two independent variables are collinear when they are correlated with each other. In the multiple regression study, it assumes that the variables are independent of each other. A multiple regression model is when there is more than one regressor involved in the model. Multicollinearity can be caused by few reasons. Firstly, data collection method may cause a multicollinearity problem as some analyst will only collect small sector of data and omit other data. Secondly, model that been constraints or being sampled also will lead to multicollinearity. Thirdly, model that is over defined has greater regressor variable than the sample size, it usually happened when the model is about medical or behavior research.

Furthermore, there are few methods of detection of multicollinearity. High R squared but few significant t ratios. When perform the overall test of goodness of fit of the model, the F statistic reject null hypothesis that the model is not significant. But when investigating the individual t test statistic, if showing none or few predictors, then is statistically different from zero. High pair wise correlation among regressors is the most common rule of thumb for detecting multicollinearity. If the pair wise correlation coefficient between the regressors takes high values, for instance in excess of 0.8, then multicollinearity is a serious problem. Variance Inflation Factor (VIF) is a detection method that the higher the VIF more certain

multicollinearity presented. If VIF is greater than 10, the variables are considered highly collinear. Some statisticians also use the Tolerence (TOL) to detect multicollinearity (Paul, n.d.).

$$VIF = \frac{1}{R^2} \quad \text{(Equation 3.6)}$$

$$TOL = \frac{1}{VIF} \quad \text{(Equation 3.7)}$$

3.8.2 Heteroscedasticity

Heteroscedasticity is an econometric problem which causes by the inconsistent of the variances of error term across the observations number. Heteroscedasticity influenced by model misspecifications, error in measurement and the nature of data (Williams, 2015) .Based on Frost (2017), heteroscedasticity also known as residuals or error term in regression analysis. Heteroscedasticity consider a problem because ordinary least squares (OLS) regression assumes that the model is homoscedasticity which means that errors terms have the same scatter regardless of the value of X. According to Williams (2015), heteroscedasticity can be very problematic by violating OLS assumption which lead to several consequences which are the OLS estimator no longer BLUE, does not result in biased parameter estimates and standards errors are biased with the presence of heteroscedasticity. It is important to detect heteroscedasticity as we need to check whether the model is inefficient and unstable due to the effects of residuals in a linear regression model. The Breush-Pagan test is designed to detect heteroscedasticity issues in the model. When p-value obtained is less than significance level, reject hull hypothesis, which indicates that there is free from heteroscedasticity issue in the model, vice versa (Prabhakaran, 2016).

The hypothesis for this test is stated as below:

H0 : There is no heteroscedasticity problem.

H1 : There is heteroscedasticity problem.

Decision Making: Reject null hypothesis if p-value is less than the significant level. Otherwise, do not reject.

3.8.3 Autocorrelation

Stephanie (2016) states that autocorrelation refers to the error term in time series move from one time to another time. It is sometimes called "serial correlation" which indicates the correlation between characters of a series of numbers organized in period. It is to detect the non-randomness in data and to determine an appropriate time series model if the data are not random. For instance, an overestimates for one quarter's earning can lead to an overestimation in earning for following quarters. This phenomena can cause a countless of troubles like inefficient ordinary least squares estimates and other estimation depends on those estimates, overestimated goodness of fit, extremely small of standard deviation, too large of test statistic and wrong positives for significant regression coefficients. Under autocorrelation, there are two types which are first-order serial correlation and second-order serial correlation. For the first order correlation, it can be either positive or negative. Next, for the second-order serial correlation, it refers to the error that influences the data two time period later. It occurs if the data obtained has seasonality. Muhammad (2013) mentions that there are some causes of autocorrelation. The main cause of these problem in regression is failure to include one or more significant regressors in model. Another cause refers to the incorrect functional form in model. To test for autocorrelation, there are some approaches to be used which are Durbin-Watson test and Ljung-Box statistic.

The formula for autocorrelation is as below:

$$r_k = \frac{\sum_{i=1}^{N-k}(Y_i - \bar{Y})(Y_{i+k} - \bar{Y})}{\sum_{i=1}^{N}(Y_i - \bar{Y})^2} \qquad \text{(Equation 3.8)}$$

Where $r_k$is the autocorrelation for lag k,

The hypothesis statement is as follow:

H_0: There has no autocorrelation problem

H_1: There has autocorrelation problem

$\propto$: 0.05

Decision Rule: Reject the null hypothesis if the p-value is smaller than the alpha, otherwise do not reject the null hypotheses.

3.8.4 Normality test

Normality test refers to a statistical process used to decide whether a sample or any group of data matches a standard normal distribution. It can be performed in both mathematically and graphically. Jarque-Bera test is the most common test to be used as it is the easiest test to run and straightforward. It refers to a goodness-of-fit test of whether the sample data consists of the skewness and kurtois matching a normal distribution. If the JB statistic is large enough, it indicates that the data is more likely to deviate from the normal.

The hypothesis testing is as below:
H_0: The error term is normally distributed
H_1: the error term is not normally distributed
Critical value: Chi square test
Decision Rule: Reject null hypothesis if the test statistic is greater than critical value, otherwise do not reject null hypothesis.

Test statistic: $JB = n\left[\frac{S^2}{6} + \frac{(k-3)^2}{24}\right]$ (Equation 3.9)

3.8.5 CUSUM and CUSUMSQ test

Tuner (2010) states that the power of CUSUM and CUSUMSQ are used to analyse the stability of the framework and determines that it depends on the nature of structural change taking place. CUSUM test is basically test to detect the instability in intercept independently and it only as power when there is in direction of the mean regressors. On the other hand, CUSUMSQ has larger power when there is involvement of the slope coefficient or the variance of error term in the structural change. It has the power in changing the variance.

The CUSUM statistic is as below

$CUSUM_t = \sum_{i=k+1}^{t} \frac{\widehat{w}_j}{\widehat{\sigma}_w}$ (Equation 3.10)

Under the null hypothesis that β is constant, CUSUMt has zero mean and variance that is proportional to t-k-1.

The CUSUMSQ statistic is as below

$$CUSUMSQ_t = \frac{\sum_{j=k+1}^{t} \widehat{w}_j^2}{\sum_{j=k+1}^{n} \widehat{w}_j^2} \quad \text{(Equation 3.11)}$$

Under the null hypothesis that β is constant, CUSUMSQt acts like $x^2(t)$ and confidence bounds can be freely derived.

3.8.6 Model Specification

Model specification is a process of determining which independent variables should be included or exclude from a regression equation. In order to choose the best regression model, researchers must first mathematically define the relationship between dependent variable and independent variables. Researchers need to exclude independent variables that are not related to the dependent variable but only include those independent variables which have strong relationship with dependent variable. Researchers should try different combinations of independent variables and different model to explain the relationship between the variables. Furthermore, researcher should include correct number of independent variables in the regression equation in order to prevent biased and less precise results (Frost, 2017) .Moreover, based on Gujarati and Porter (2009), specification error arises when key features or assumption are incorrect which in turn will lead to a misleading results. Main reasons which causes specification error are omitting any relevant variables, including irrelevant variables and the model is expressed in an incorrect functional. In order to detect omitted variables and incorrect functional form, Regression Specification Error Test (RESET) is developed by Ramsey in year 1969 (Sapra, 2005). This test can be used to examine omitted variables which are important and incorrect functional form.

The hypothesis for this test is stated as below:

H0 : The model specification is correct.

H1 : The model specification is incorrect.

Decision Rule: Reject null hypothesis if p-value is less than significant level. Otherwise, do not reject.

3.9 Conclusion

This chapter provides the discussion of the research design, sources of data, research framework, and definitions of variables, model specification, empirical testing procedures and the diagnosis checking. The empirical testing procedures examined are formed up by unit root test, autoregressive distributed lag, and non-autoregressive distributed lag, VECM granger causality and impulse response function. This test can be applied to find out the impact of monetary policy, hot money, exchange rate and oil price onto stock market performance. The diagnosis checking also consists of several tests which are multicollinearity, autocorrelation, normality test and CUSUM and CUSUMSQ test. The results from the mentioned test will be presented and interpreted clearly in the following chapter.

CHAPTER 4: RESULTS

4.0 Introduction

This chapter focuses on interpreting the results and discuss the research methodology generating from E-views software. The data range is from 2000 to 2017. Section 4.1 is a descriptive analysis interpretation. Section 4.2, examines empirical testing procedure such as Unit Root Test, Autoregressive Distributed Lag, Non-Autoregressive Distributed Lag, VECM Granger Causality and Impulse Response Function.

4.1 Descriptive Analysis

Table 4.1: Descriptive Statistic

	Stock Market (Shanghai composite index, billion in USD)	Hot Money (Billion in USD)	Oil Price (West Texas Intermediate (WTI), (Billion in USD)	Economic Growth (Real GDP in percentage)	Inflation (Producer Price Index, billion in USD)
Mean	7.795	28.080	6.114	9.421	0.797
Standard Deviation	0.378	0.941	0.462	2.309	0.665
Maximum	8.670	28.998	6.746	15.00	2.116
Minimum	7.035	25.724	5.270	6.700	-1.204

Table 4.1 shows the descriptive statistic of the variables; the mean of hot money is amounted to 28.080 billion with standard deviation of 0.941 billion in USD in fourth quarter of year 2016. The hot money also achieves as high as 28.998 billion in fourth quarter of year 2016. This is because the speculative capital flows

shift very fast in and out of China markets which likely to cause instability in China stock market. According to Allen (2017), the foreign exchange reserves in China declined to USD 3.01 trillion due to the Trump factor, which implemented a higher tariff on China. Besides, the average of stock market is recorded as 7.795 billion in USD with the standard deviation of 0.378 billion of Shanghai composite index. For the economic growth in China, the maximum and minimum values are amounted to 15.00 and 6.70 percentage in real GDP respectively. Moreover, oil price and inflation deliver the mean of 6.114 billion of WTI and 0.797 billion of PPI respectively. The standard deviation is amounted to 0.462 billion of WTI and 0.665 billion of PPI respectively.

4.2 Empirical Testing Procedure

4.2.1 Unit Root Test

Table 4.2: Unit Root Test

ADF	Level		1st Difference	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
LNSM	-2.1327	-2.9138	-6.6647***	-6.6245***
LNNHM	-3.7833***	1.9970	-1.2755	-6.2659***
RGDP	-1.7943	-2.3611	-7.9822***	-7.9578***
LNOP	-1.7739	-1.5750	-7.1247***	-7.1295***
LNINF	-4.5966***	-4.4443***	-3.6544***	-3.5548**

PP	Intercept	Intercept and Trend	Intercept	Intercept and Trend
LNSM	-2.0676	-2.7119	-6.7148***	-6.6743***
LNNHM	-3.5343***	1.4870	-3.4692**	-6.2385***
RGDP	-1.9250	-2.4851	-7.9985***	-8.0255***

LNOP	-1.7993	-1.6465	-7.0188***	-7.0299***
LNINF	-3.1470**	-3.0806	-7.7924***	-7.8934***

Note: ***, ** and * denote significance level at 1%, 5% and 10% respectively.

Based on Table 4.2, LNSM stands for stock market, LNINF stands for Inflation Rate, LNOP stands for Oil Price, RGDP stands for Real GDP and LNNHM stands for Hot Money, all of these variables are logged except for RGDP.

Table 4.2 presents the results of the ADF and PP unit root tests for the five variables both at level and first difference in two types of modal which is the intercept modal and intercept and trend modal of the natural log values.

Interestingly, both ADF test and PP test shows that all the variables are non-stationary in their intercept modal at level form except for hot money and inflation. Whereas under the intercept and trend modal all the variables under PP test are non-stationary while the variables under ADF test are also non-stationary except for inflation which is stationary at 1% significance.

Under the first difference form all the variable were stationary at 1% significance except for hot money which was non-stationary in the intercept modal. However, in the intercept and trend modal all of the variable were stationary at a significance of 1% excluding inflation which was significant at 5%. On the other hand, under the PP test, under its first difference form both modal, intercept and intercept and trend, all of its variables were stationary at 1% significance except for hot money which is significant at 5% in the intercept modal. As all the variables are found to have the order of I(0) and I(1), we choose to employ ARDL bound test in order to determine the long-run cointegration between stock market, hot money, oil price, RGDP and inflation in China.

4.2.2 Autoregressive Distributed Lag

Table 4.3: ARDL Bound Test

Panel A: Cointegration		
Model	F-statistic	Conclusion
LNSM=f(LNNHM, LNOP, RGDP, LNINF)	5.5829	
Optimal Lag	[1,0,0,0,3]	
Critical Value	I(0)	I(1)
1% significance level	4.168	5.548
5% significance level	3.042	4.244
10% significance level	2.558	3.654
Panel B: Long Run Relationship		
Variable	Coefficient	Probability
LNNHM	1.1159	0.0000***
LNOP	-0.5756	0.0804*
RGDP	0.2261	0.0042***
LNINF	-0.4759	0.1903
Panel C: Diagnostic Checking	F-Statistic	Probability
LM test	0.024785	(0.8757)
ARCH Test	0.096392	(0.7576)
Ramsey RESET	0.249232	(0.6203)
Jarque-Bera Test	2.0848	(0.3526)

Notes: Critical values: case III: unrestricted intercept and no trend (k=4, T=75). ( ) refers to p-values, ***, ** *and* * *denote significance at 1%, 5% and 10%, respectively*

Table 4.3 presents the results of the bounds test based on stock market and its determinants. The ARDL (1, 0, 0, 0, 3) model is selected to fit the data of value added per capita in-service sector. At table 4.3 panel A, the optimal lag is selected based on AIC tests. The computed F-statistic of 5.5829 in ARDL bound test is greater than the upper critical bound value of 5.548 at 1% significance level based on Narayan (2005). The rejection of null hypothesis of no cointegration suggests that the existence of steady- state long-run relationship among Hot Money, Oil Price, Inflation, RGDP and Stock Market in China. This is in-line with several findings

such as Ahmed, Islam and Khan (2015), Kirankabes and Basarir (2012) and Wei, Yu, Liu and Cao (2018).

Panel B shows the long run relationship between the variables and Stock Market. As shown, hot money, oil price and RGDP possess a long run relationship towards stock market whereas for inflation did not possess a long run relationship. This is in line with Kirankabes and Basarir (2012) as they also found that economic growth does possess a long run relationship.

The robustness of the model is confirmed by a few diagnostic tests as shown in panel C, such as autoregressive conditional heteroskedasticity (ARCH), Breusch-Godfrey serial correlation Lagrange multiplier (LM) Jarque-Bera test and Ramsey RESET. In addition, (CUSUM) and CUSUM of squares tests and multicollinearity test is also included in our diagnostic test. The Breusch-Godfrey serial correlation LM test indicates that there is no serial correlation problem in the modal while Jarque-Bera test shows that the data in our model is normally distributed. Moreover, heteroscedasticity test also showed that there is no heteroskedasticity problem found.

In addition, Ramsey RESET test and cumulative sum (CUSUM) and CUSUM of squares tests also help support the result of these test. Ramsey RESET test indicates that the modal did not have any functional form misspecification. Furthermore, plots of cumulative sum (CUSUM) and CUSUM of squares tests in Figure 1 also did point out that there were no structural instability of long-run and short-run estimated parameters appeared in the sample period. This implies that the estimated parameters of the model produce a reliable estimation.

Multicollinearity exists when there are highly correlated between all the independent variables with one another in the model.

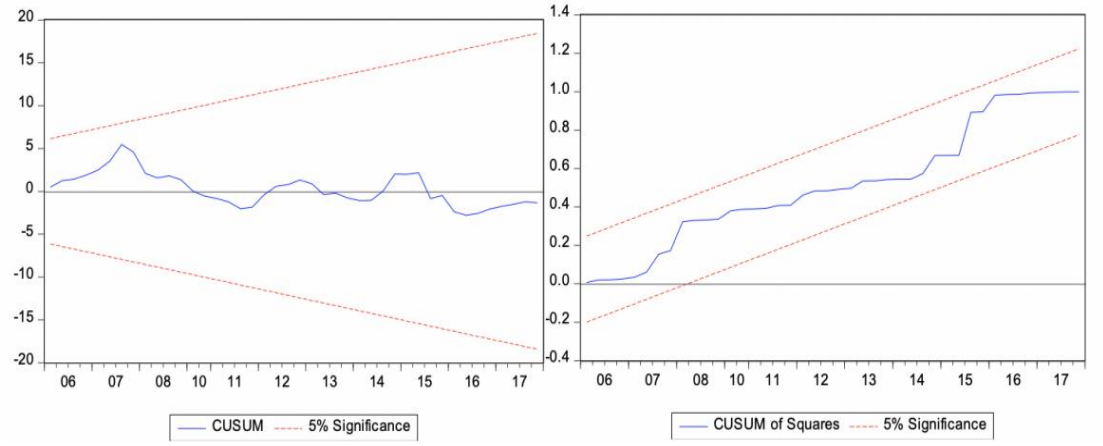
Table 4.4: Correlation matrix

	LNNHM	LNOP	RGDP	LNINF
LNNHM	1.000000	0	0	0
LNOP	0.739129	1.000000	0	0
RGDP	-0.375659	-0.000954	1.000000	0

LNINF	0.350163	0.530934	0.300091	1.000000

Table 4.4 shows that all the explanatory variables do not have any multicollinearity problem in the model where the correlation coefficient are found to be less than 0.80 in absolute value. The correlation coefficients are ranged from 0.000954 to 1.000000.

Figure 4.1: Plot of cumulative sum (CUSUM) and CUSUM of squares tests for the equation of stock market performance.



In addition, Ramsey RESET test indicates that there is no functional form misspecification. Furthermore, cumulative sum (CUSUM) and CUSUM of squares tests were also done in order to obtain additional confirmation. The graphs shown in Figure 4.1 are the results obtain from the test, it points out that there was no structural instability for both long-run and short-run estimated parameters appeared in the sample period. This implies that the estimated parameters of the model produce a reliable estimation.

4.2.3 Impulse Response Function

Figure 4.2: Impulse Response Function

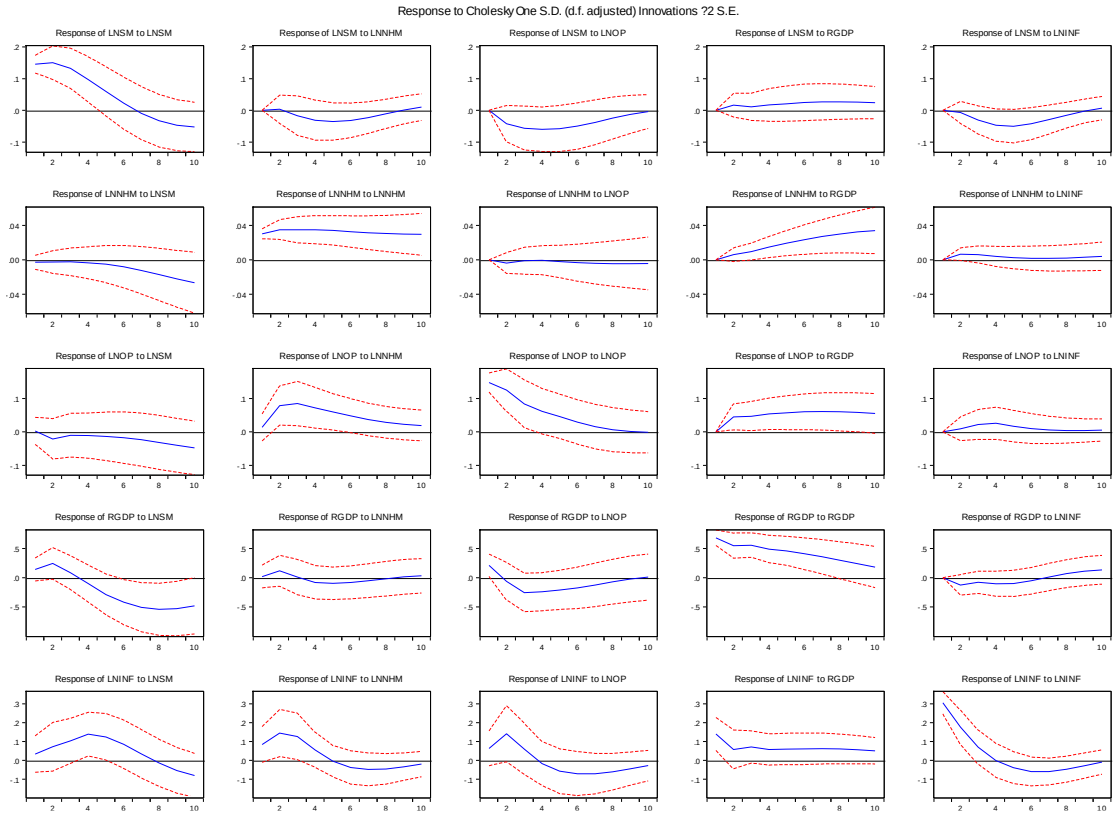


Figure 4.2 indicates the results of impulse response function that visualize the destabilization experienced by the endogenous variables (LNSM, LNNHM, LNOP, RGDP and LNINF) in response to one external standard deviation (SD) shock within other variables. Stock Market is found to be significantly responsive to its own shock, in the 1st quarter it experience a slight increase but then it continued with a downward trend. Besides, the response of LNSM to one standard deviation shock of NHM reveals that there was a cyclical component as a long-term wave like pattern occurred. Moreover, the SM experience a slow and consistent increase when there is one SD shock given to RGDP.

In addition, the response of SM is found to be negative when there is one SD shock given to OP. Similarly, the response of SM from the shock of RGDP

indicates a slow and steady decrease for SM but after the 4th quarter it indicate an increase which maintain for till the 10th quarter. Furthermore, the shocks of all the variables (NHM, OP, RGDP & INF) on the response of SM are found to have experience different types of changes. OP experienced a decrease in the 1st quarter but slowly increase later whereas for NHM experience a long-term wave like pattern. INF also experience a trend which was similar to NHM.

On the other hand, the response of NHM to its own shocks is significant and remain positive throughout the 10 quarter. Whereas the response on RGDP also shows that it was significant and positive with an upward trend. OP possesses the significant and negative response to its own shocks it was experiencing a steady decline in trend. However, NHM was seen to show a significant and increase during the first three quarter but later experience a steady negative respond till the 10th quarter. For the response of RGDP, it is significant and negative to its own shock in the ninth period and tenth period in the shock of GDP. Last but not least, the significant and negative responses to INF are found from the shocks of RGDP and SM.

4.2.4 Variance Decomposition

Table 4.5: Variance decomposition analysis of Stock Market Performance

Variance Decomposition of LNSM:						
Period	**S.E.**	**LNSM**	**LNNHM**	**LNOP**	**RGDP**	**LNINF**
1	0.1457	100.00	0.0000	0.0000	0.0000	0.0000
5	0.3089	77.8153	2.6293	12.4118	1.1677	5.9759
10	0.3387	70.5138	3.7233	14.4268	3.8256	7.5105

Table 4.6: Variance decomposition analysis of Hot Money

Variance Decomposition of LNNHM:						
Period	**S.E.**	**LNSM**	**LNNHM**	**LNOP**	**RGDP**	**LNINF**

1	0.0303	0.8981	99.1020	0.0000	0.0000	0.0000
5	0.0814	0.8839	86.4733	0.3060	10.8213	1.5156
10	0.1327	10.0559	59.5928	0.6242	28.9632	0.7639

Table 4.7: Variance decomposition analysis of Oil Price

Variance Decomposition of LNOP:						
Period	**S.E.**	**LNSM**	**LNNHM**	**LNOP**	**RGDP**	**LNINF**
1	0.1482	0.0426	0.8316	99.1258	0.0000	0.0000
5	0.2925	0.9943	26.0640	58.9705	12.1705	1.8007
10	0.3397	5.7098	24.0076	44.7210	24.0587	1.5029

Table 4.8: Variance decomposition analysis of Economic Growth

Variance Decomposition of RGDP:						
Period	**S.E.**	**LNSM**	**LNNHM**	**LNOP**	**RGDP**	**LNINF**
1	0.7298	3.7294	0.0765	8.5552	87.6389	0.0000
5	1.4156	8.9938	1.4790	10.8034	76.6332	2.0939
10	1.9546	37.0669	1.0525	6.9927	52.7806	2.1073

Table 4.9: Variance decomposition analysis of Inflation

Variance Decomposition of LNINF:						
Period	**S.E.**	**LNSM**	**LNNHM**	**LNOP**	**RGDP**	**LNINF**
1	0.3548	0.8926	5.6798	3.2214	15.7359	74.4703
5	0.5457	17.5049	15.9652	10.5001	11.8180	44.2118
10	0.6054	19.0904	14.9609	12.9838	14.2911	38.6738

Table 4.5 shows the results of variance decomposition analysis (VDC) that separate the variation for each endogenous variable into the component shocks to the VECM. The shocks to SM in response to a standard deviation of one shows that Oil Price and Inflation are highly range from 0% to 14.43% and 0% to 7.51% respectively. On the other hand, the shocks of Hot Money (3.72%) and RGDP (3.83%) are found to have contribute the minor effects on the shocks toward Stock Market in the discrete time periods.

Moreover, the VDC of Hot Money indicates that the most significant shocks effects comes from RGDP which consist the highest range of (28.96%) compared Oil Price (0.62%), Inflation (0.76%) and Stock Market (10.06%) respectively. This is in line with the finding in granger-causality where RGDP granger-cause Hot Money. Furthermore, the VDC of Oil Price finds that the shocks effect of Hot Money and RGDP highly responds to the one standard deviation in Oil Price. This is in line with the finding in VECM Granger causality that Hot Money Granger-cause Oil Price. In addition, in the VDC of RGDP, Inflation shocks effect highly responded to the one standard deviation of Stock Market by 37.07%%. Whereas for the VDC for Inflation, the changes in Inflation are explain by one standard deviation shock in SM, NHM, OP and RGDP with the percentage of 19.09%, 14.96%, 12.98% and 14.29% respectively.

4.2.5 VECM Granger Causality Test

Figure 4.3: Granger Causality

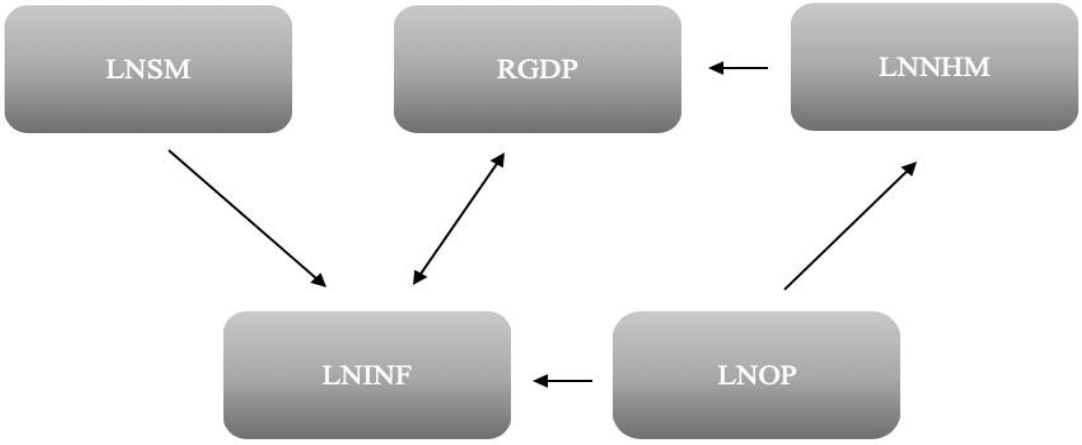


Table 4.10: VECM Granger Causality

Dependent Variable	D(LNSM) Chi-Square	D(LNNHM) Chi-Square	D(RGDP) Chi-Square	D(LNOP) Chi-Square	D(LNINF) Chi-Square	ECT (-1) T-Statistic
D(LNSM)	-	1.4948	1.7047	2.6142	1.8905	-0.1011
D(LNNHM)	0.3256	-	0.4581	5.2061*	2.7504	-0.0048

D(RGDP)	2.2012	4.6931*	-	2.9689	9.5579***	0.0170
D(LNOP)	2.2635	4.5805	2.2241	-	1.2535	-0.6999
D(LNINF)	11.4463***	0.0998	7.5673**	7.3676**	-	-0.3003

*Notes: ***, ** and * denote significance at 1%, 5% and 10%, respectively*

The results of Granger causality as shown in Table 4.10 indicates that out significant variable, hot money, does not granger cause stock market at 10% significance level but does granger cause oil price at a 10% significance level. This result was actually in accordance with the findings obtained by Wei, Yu, Liu and Cao (2018).

In addition, RGDP also indicates that it does granger cause hot money at a 10% significance level while also granger-cause inflation at a 1% significance level. The result obtain from our test was not in line with the research done by Laokulrach (2014). Conversely, Antonios (2010) who concluded that there was a bi-directional and unidirectional relationship between RGDP and stock market respectively.

In our finding it is showed that inflation does granger cause stock market at a 1% significance level while also granger cause RGDP and oil price at a 5% significance level. A unidirectional causal relationship was obtain from our testing. Hence, the result obtain from our test was consistent with the result obtain by Ahmed, Islam and Khan (2015).

Last but not least, with the expected negative sign, the speed of adjustment on the lagged ECT for stock market represents a significant long-run causal effect which is consistent with the results of ARDL. With the highest ECT indicator on the variable oil price at 0.6999 and the lowest on hot money at 0.0048.

4.2.6 Non-Autoregressive Distributed Lag

Table 4.11: NARDL Estimation Result

Variable	Coefficient	Standard Error
C	-2.567885*	1.265263
LNSM (-1)	-0.339560***	0.105584
LNNHM_P (-1)	-0.109343	0.141650
LNNHM_N (-1)	-2.132690**	0.782778
LNOP (-1)	0.744678***	0.237681
RGDP (-1)	0.078663***	0.018729
LNINF (-1)	-0.111484	0.072614
Diagnostic Checking	**F-Statistic**	**Probability**
LM test	1.874514	0.1565
ARCH Test	2.316025	0.1338
Ramsey RESET	0.186472	0.6701
Jarque-Bera Test	2.316025	0.3141

Note: ***, ** and * denote significance level at 1%, 5% and 10% respectively.

Long run equation:

$$SM = -0.3220NHM_P - 6.2807NHM_N - 0.3283INF + 0.2317RGDP + 2.1931OP$$
$$(0.4483) \quad (2.4611***) \quad (0.2717) \quad (0.0686***) \quad (0.8904**)$$
$$-2.5679$$

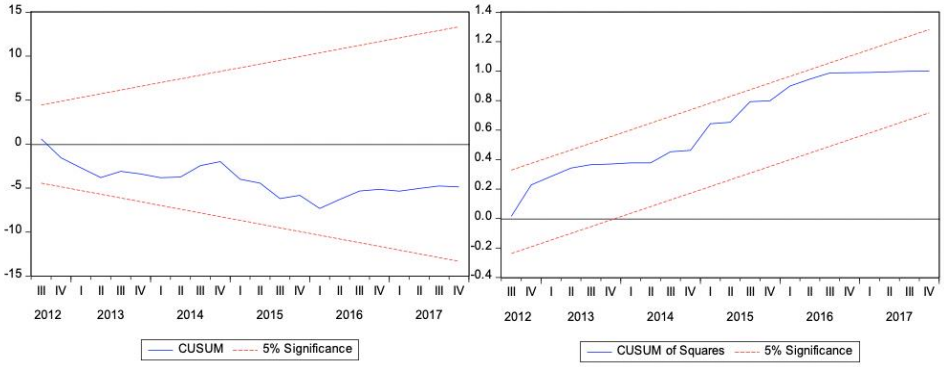
(Equation 4.1)

Based on table 4.11 and equation 4.1, table 4.X shows that the variable SM OP and RGDP are significant at a 1% significance level while NHM_N is significant at a 5% significance level. Whereas for INF and NHM_P both were insignificant. The equation 4.1 shows that when there is an increase in 1% in NHM_P it leads to a 0.322% decrease in the SM of China. While a 1% decrease in NHM_N leads to a 6.28% increase in the SM of China. On the other hand, when inflation increase by 1% the SM in China experience a decrease of 0.3283%. SM in China also

experience an increase of 0.2317% when economic growth increase by 1%. Lastly, when oil price increase by 1%, SM in China will increase by 2.1931%.

The robustness of the model is confirmed by a few diagnostic tests which can be found in Table 4.11, such as autoregressive conditional heteroskedasticity (ARCH), Breusch-Godfrey serial correlation Lagrange multiplier (LM) and Ramsey RESET. The Breusch-Godfrey serial correlation LM test indicates that there is no serial correlation problem in the modal. Moreover, heteroscedasticity test also showed that there is no heteroskedasticity problem found. Ramsey RESET test indicates that the modal did not have any functional form misspecification and the data in our model is normally distributed which found from the JB test.

Figure 4.4: Plot of cumulative sum (CUSUM) and CUSUM of squares tests for the equation of stock market performance.



In addition, cumulative sum (CUSUM) and CUSUM of squares tests were also done in order to obtain additional confirmation. The graphs shown in Figure 4.4 are the results obtain from the test, it points out that there was no structural instability in NARDL for both long-run and short-run estimated parameters appeared in the sample period. This implies that the estimated parameters of the model produce a reliable estimation.

4.2.7 Wald Test

Table 4.12: Wald Test (Cointegration)

Wald-Test	F-Statistic	Chi-Square
C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=0	7.6163***	45.6980***

Note: ***, ** and * denote significance level at 1%, 5% and 10% respectively.

Based on the result obtain from Table 4.12, since the P-value of the F-statistic, 0.0001, is smaller than 0.01, it states that there is a strong evidence of cointegration at a 1% significance level.

Table 4.13: Wald Test (Asymmetric)

Wald Test	F-Statistic	T-Statistic	Chi-Square
-C(3)/C(2)=-C(4)/ C(2)	8.367378***	2.892642***	8.367378***

Note: ***, ** and * denote significance level at 1%, 5% and 10% respectively.

Based on the result obtain from the Table 4.13, the P-value for f-test shows that it is lesser then the significance level of 1%. Hence it clearly states that there exists an asymmetry effect in the long run of stock market in China. This is in line with the findings of Guo and Huang (2010) which states that hot money will alternate between negative and positive.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter discusses the major findings of our results from Chapter 4, which included in Chapter 5.1. Besides, we also discuss some policy implication based on the major findings in Chapter 5.2. Chapter 5.3 lists out the limitation of our researches and Chapter 5.4 study about the recommendations based on the limitation.

5.1 Discussion of Major Finding

Identifying the determinants for stock market performance is important for China to design appropriate policies and strategies that can help stabilize and also strengthen the country's stock market. In this study, we analyse the drivers that will influence the stock market performance in China using the quarterly data from 2000 to 2017. To be more exact, our study intends to examine the long-run relationship between oil price, economic growth, inflation, hot money and stock market performance using autoregressive distributed lag (ARDL), non-autoregressive distributed lag (NARDL), granger causality, impulse response function and variance decomposition analysis.

The results obtain from ARDL bounds testing cointegration approach reveals that there is a long run relationship between oil price, economic growth, inflation, hot money and stock market performance. Whereas for inflations it shows that there was no long run relationship towards stock market performance. By obtaining a long run relationship in autoregressive distributed lag (ARDL) test we were to continue with our main testing which is non-autoregressive distributed lag

(NARDL). Under non-autoregressive distributed lag (NARDL), the results show that our significant variable, hot money, does indeed causes the fluctuation in the China's stock market performance. This is because hot money possess a negatively relationship with stock market performance. Moreover, with the result obtain from the Wald-test, it shows that hot money indeed possesses an asymmetric effect with stock market performance. Meaning that an increase in hot money in China will cause the stock market performance to decrease, vice versa. This supports the finding that stock market performance possesses a negative relationship with hot money. Moreover, under the result of non-autoregressive distributed lag (NARDL), economic growth and oil price both possesses a positive relationship with stock market performance. This shows that an increase in these two variables will cause and increase in the stock market performance. Whereas for inflations, it possesses a negative relationship with stock market performance indicating that an increase in inflation will result a decrease in stock market performance.

Now this finding was supported with the results obtain from granger causality, impulse response function and variance decomposition analysis. The result obtain from granger causality shows that economic growth does affect Hot Money this result was also in line with the impulse response function and also variance decomposition. The result in variance decomposition and impulse response function showed that they affect stock market performance. Hence, this implies that stock market performance is affected by hot money but through affecting economic growth. In other words, hot money directly affects economic growth and indirectly affects stock market performance.

5.2 Policy Implications of the study

This study investigates the relationship between stock market performance with other variable such as oil prices, economic growth, inflation rate and hot money. Based on our findings, the result will benefit various individual in different ways as there are several important policy implications that can be drawn based on the results obtained. In relation to this, policy makers will be able to

implement suitable policies to affect the stock market performance and investors will be able to consider better decision making based on the effect of the affected variables.

Based on our first finding is that investors might need to more emphasize towards the relationship between the prices of oil and performance of stock market so that it improves their investment decision. For instance, oil price possessed to have a positive impact to the stock market performance in this study. This means that stock market performance in China might increase when the oil price raise. According to Du, He and Wei (2010), international oil price has an impact on China's economy and inflation rate. Therefore, investors and shareholders are advised to be more attentive to the sensitivity of oil price changes.

Moreover, findings of Autoregressive distributed lag (ARDL) model shows the insignificant long run relationship of inflation towards stock market performance in China. The insignificant long run relationship indicates that there is relatively limited effect towards stock market in long run. However, government and policy makers still have the obligation in constructing a policy to control the inflation rate. It is important as the increases in inflation rate will lead the increase in citizens' purchasing power and eventually causing the poor performance in stock market. In short, inflation rate will bring large negative impact to the country.

Throughout on this research study, economic growth found to be positively significant to stock market performance. The positively significant relationship indicates that GDP would tend to influence the stock market performance in a positive way in long run. According to Tachiwou (2010), stock market is an indicator in determining economy financial wealth. Hence, policy makers are suggested to implement suitable policy and also strengthen their current policy in ensuring the continuous increasing in economic growth is sustain.

Based on the findings obtained, it is proven that hot money possesses an asymmetric relationship against stock market. This indicates that hot money tends to fluctuated. Our finding is in line with the finding of Guo and Huang (2010) which states that hot money will alternate between negative and positive territories. Hence the recommendation that we would like to provide to the policies makers and

government officers will be to either form a better policy or a better monitoring system in controlling the inflow and outflow of hot money. This is because hot money is the definition of inflow of foreign cash reserve. By having a better control over the inflow or outflow of this foreign cash reserve will help in strengthening the confidence of investors and also avoid unwanted bubbles to occur in the stock market which will affect the stock market performance.

By going through all the past study, there is different results obtained by past researchers regarding the determinants of stock market performance. Hot money as independent variable is hardly can find in the past research. Therefore, this study provide the different prospective result as hot money can be substitute with other common macroeconomic variable. Furthermore, model of this study with the combination of oil price, economic growth, inflation rate and hot money can be a guidance for future researchers.

5.3 Limitations of the study

Similar with other research where we also face some difficulties and hardship during our studies process. The main limitation of our research is data constraint. Due to unavailability of data for longer period, we need to narrow down the sample size of data for our research. We initially planned to conduct our studies for monthly data from the year 1980 to year 2017. However, there was some data we could not get for the monthly one especially the variable of foreign direct investment as the website only provided for quarterly data for it. That data was important for us as without it we will not able to construct the accurate number for our significant variable which is hot money. Then, we decided to cut down the sample size from year 2000 to year 2017 with quarterly data.

Next, in this studies, we pick hot money as our significant variable. We faced difficulties in not able to capture the data source for this variable. There are too many ways and proxies used by the past researchers to replace with this variable. In order to make our result to be less likely inaccurate, we did a lot of

researches and studies, and finally we decided to pick one of alternatives used by Guo and Huang (2010) the formula forms to construct for the data of this hot money to run for the test.

5.4 Recommendations for future research

Based on our research, we had recommended some of the advice to prevent the mistakes and reduce limitation. In order to have a better result in the future research. The important study for this recommendations is also to confirm the result we make is accurate and reliable. We encourage the future researchers to make more researches on the data finding on the independent variables, in terms of daily, monthly, yearly and also quarterly. The data found must be tally with all of the findings from other researchers. Therefore, we can have broader range of data to run the results and have more accurate result from what we had found from the data of the variables.

Lastly, we also recommended the future researchers to find more information on hot money. This is because the formula that calculated out the data for hot money is not tally among all the researches from the researchers. One of the formula is the differences of foreign exchange reserve, trade and service balance and foreign direct investment. But it resulted an inaccurate and not tally result from other researches. Therefore, we recommend the future researchers to decide a single formula or an accurate proxy that can be used to define the hot money.

REFERENCES

Allen, F. (2017). *China in 2017: Why Stability – not Growth – Is the Goal*. Retrieved from http://knowledge.wharton.upenn.edu/article/china-2017-stability-not- growth-goal/

Amedeo, K. (2018). *The balance.* Retrieved from https://www.thebalance.com/china-stock-market-shanghai-shenzhen-hong-kong-3305480

Avatrade. (2017). Retrieved from https://www.avatrade.com/cfd-trading/stocks/stock- market

Bai, S., & Koong, K. S. (2018). Oil prices, stock returns, and exchange rates: Empirical evidence from China and the United States. *The North American Journal of Economics and Finance*, *44*, 12-33.

Bai, Z. (2014). Study on the Impact of Inflation on the Stock Market in China. *International Journal of Business and Social Science*, *5*(7).

BeBusinessed. (2015). Retrieved from https://bebusinessed.com/history/history- of-t-stock-market/

Bjornland, C. H. (2008). Oil price shocks and stock market booms in an oil exporting country. *Norwegian School of Management (BI) and Norges Bank.*

Borzykowski, B. (2018). *China is still the wildcard in the stock market's wild ride—here's why*. Retrieved from https://www.cnbc.com/2018/10/17/china-is-still-the-wildcard-in-the-stock-markets-wild-ride.html

Breitung, J., & Candelon, B. (2006). Testing for short- and long-run causality: A frequency-domain approach. *Journal of Econometrics*, *132*(2), 363-378.

Broadstock, D. C., Cao, H., & Zhang, D. (2012). Oil shocks and their impact on energy related stocks in China. *Energy Economics*, *34*(6), 1888-1895.

Chari, V. V., & Kehoe, P. J. (2003). Hot money. *Journal of Political Economy*, *111*(6), 1262-1292.

Chetty, P. (2018). *Auto regressive distributed lag model (ARDL) and its advantages*. Retrieved from

https://www.projectguru.in/publications/auto-regressive-distributed-lag-model-ardl/

Chin. (n.d.). *The Chin family*. Retrieved from https://www.thechinfamily.hk/web/en/financial-products/investment/stock/stockconnect/all-about-the-shanghai-and-shenzhen-stock-markets.html

China securities index. (2015). Retrieved from http://www.csindex.com.cn/en/indices/index-detail/000016

Cunado, J., & De Gracia, F. P. (2013). Oil price shocks and stock market returns: Evidence for some European countries. *Energy Economics*, *42*, 365-377.

Davtyan, A. (2013). WEAK EFFICIENCY AND LINEAR REGRESSION OF CENTRAL AND EASTERN EUROPEAN MARKETS. *THE ANNALS OF THE UNIVERSITY OF ORADEA*, 28.

Degiannakis, S., Filis, G., & Arora, V. (2017). Oil price and stock markets. *Independent statistics & Analysis.*

Ding, S., & Knight, J. (2011). *Why has China grown so fast? The role of physical and human capital formation. Oxford Bulletin of Economics and Statistics*, *73*(2), 141-174.

Fickling, D. (2018). *Bloomberg opinion.* Retrieved from https://www.bloomberg.com/view/articles/2018-05-09/forget-iran-the-real-oil-action-is-in-china

Filis, G., & Chatziantoniou, I. (2014). Financial and monetary policy responses to oil price shocks: Evidence from oil-importing and oil-exporting countries. *Review of Quantitative Finance and Accounting*, *42*(4), 709-729.

Focus Economics. (2019). Retrieved from https://www.focus-economics.com/countries/china

Frost, J (2017). *"Model Specification: Choosing the Correct Regression Model." Statistics By Jim*. Retrieved from http://statisticsbyjim.com/regression/model-specification-variable-selection/

Frost, J. (2017). *"Heteroscedasticity in Regression Analysis." Statistics By Jim*. Retrieved from http://statisticsbyjim.com/regression/heteroscedasticity-regression/

GaJdka, J., & PietraSzewSki, P. (2016). Economic growth and stock prices: Evidence from Central and Eastern European countries. *Studia Prawno-Ekonomiczne,* (XCVIII), 179-196.

Geetha, C., Mohidin, R., Chandran, V. V., & Chong, V. (2011). The relationship between inflation and stock market: Evidence from Malaysia, United States and China. *International journal of economics and management sciences, 1*(2), 1-16.

Geiger, M. (2008). Instruments of monetary policy in China and their effectiveness: 1994-2006.

Geske, R., & Roll, R. (1983). The Fiscal and Monetary Linkage between Stock Returns and Inflation. *The Journal of Finance, 38*(1), 1-33.

Gujarati, D. N., & Porter, D. C. (2009). Basic Econometrics. (5th ed.). McGraw. Hill International Edition. Retrieved from https://www.academia.edu/15273562/Basic_Econometrics_5th_Edition_by_Damodar_N._Gujarati_and_Dawn_C._Porter_

Guo, F., & Huang, Y., S. (2010) Does "hot money" drive China's real estate and stock markets? *International Review of Economics & Finance, 19*(3), 452-466.

Haan, W. J. D. (2011). *Impulse Response Function*. Retrived from http://econ.lse.ac.uk/staff/wdenhaan/teach/slidesIRF.pdf

Habibi, R. (2010). Distribution Approximations for Cusum and Cusumsq Statistics. *Statistics in Transition new series, 11*(3), 158-168.

Hayky, A. A. & Naim, N. (2016). The Relationship between Oil Price and Stock Market Index: An Empirical Study from Kuwait. *Ahlia University, Kingdom of Bahrain.*

Hooper, K. (2018). *Invesco.* Retrieved from https://www.blog.invesco.us.com/what -do-higher-oil-prices-mean-for-stock-market

Investopedia. (2017). *SSE Composite.* Retrieved from https://www.investopedia.com/terms/s/sse-composite.asp

Investopedia. (2018). *Stock Market*. Retrieved from https://www.investopedia.com/terms/s/stockmarket.asp

Jones, C.M., Kaul, G. (1996). Oil and the stock markets. *The Journal of Finance*, 51, 463-491.

Kang, W., Ratti, R.A., & Yoon, K. H. (2015). The impact of oil price shocks on the stock market return and volatility relationship. *Journal of International Financial Markets, Institutions & Money, 34*, 41-54.

Ken. (2015). *How does GDP affect stock prices?*. Retrieved from http://mahoneygps.com/gdp-affect-stock-prices/

Kim, D., & Iwasawa, S. (2017). Hot money and cross-section of stock returns during the global financial crisis. *International Review of Economics & Finance, 50*, 8-22.

Lavietes, M. (2018). *CNBC.* Retrieved from https://www.cnbc.com/2018/07/23/how-china-can-use-iran-oil-sanctions-to-gain-concessions-in-trade-war.html

Li, K. (2018). Reaction to news in the Chinese stock market: A study on Xiong'an New Area Strategy. *Journal of Behavioral and Experimental Finance.*

Li, R. Y. M., & Ng, C. Y. (2012). VECM and Impulse Response Functions Analysis on Wealth and Balance Sheet Effect in Czech Republic and South Africa Housing Market. *In Global Chinese Real Estate Congress, Macau.*

Lu, C., & Xin, Z. (2010). Impulse-Response function Analysis: An application to macroeconomy data of China. *D-Level Essay in Statistics for MS Degree, School of Economics and Social Sciences, Hoskolan Dalarna*.

Lütkepohl, H. (2008). Impulse Response Function. *In: Palgrave Macmillan (eds) The New Palgrave Dictionary of Economics.*

Lutkepohl, H. (2017). *Variance Decomposition*. Retrieved from https://link.springer.com/chapter/10.1057%2F9780230280830_38#citeas

Martin, M. F., & Morrison, W. M. (2008). China's "Hot Money" problems. *Congressional Research Service.*

Masoud, N. M. (2013). The impact of stock market performance upon economic growth. *International Journal of Economics and Financial Issues, 3*(4), 788-798.

Morrison, W. M. (2018). *China's Economic Rise: History, Trends, Challenges, and Implications for the United States*. Retrieved from https://fas.org/sgp/crs/row/RL33534.pdf

Muhammad, A. (2014). *Autocorrelation.* Retrieved from https://www.slideshare.net/mohammadali101/autocorrelation-33236990

Nelson, E. (2004). The Great Inflation of the seventies: what really happened?. *Advances in Macroeconomics, 5*(1).

Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods, 5*(4), 63-91.

Olufisayo, A. O. (2014). Oil Price and Stock Market: Empirical Evidence from Nigeria. *European Journal of Sustainable Development, 3*(2), 33-40.

Oracle. (2017). Retrieved from https://docs.oracle.com/cd/E57185_01/CBREG/ch06s03s03s03.html

Pankki, S., 2015. Contemporary Monetary Policy in China: a Move towards Price -based Policy?. Helsinki, Bank of Finland

Paraskova, T. (2018). *Oil price.* Retrieved from https://oilprice.com/Energy/Energy-General/Chinas-Economic-Growth-Stimulus-Could-Boost-Oil-Demand.html

Patel, N. (2012). *Effect of Rising Oil Prices on the Stock Market.* Retrieved from https://finance.zacks.com/effect-rising-oil-prices-stock-market-5479.html

Paul, R. K. (2006). Multicollinearity: Causes, effects and remedies. *IASRI, New Delhi*.

Prabhakaran, S. (2016). *"How to Detect Heteroscedasticity and Rectify It?".* Retrieved from https://datascienceplus.com/how-to-detect-heteroscedasticity-and-rectify-it/

Rapaport, A. (2013). Supply and Demand Shocks in the Oil Market and Their Predictive Power. *The University of Chicago Booth School of Business and Department of Economics.*

Risk Reward Return. (2017). Retrieved from https://www.riskrewardreturn.com/how-does-the-gdp-affect-the-stock-prices/

Rocher, C. L. (2017). *Linear and nonlinear relationships between interest rate changes and stock returns: International evidence*. Retrieved from https://www.uv.es/bfc/TFM2017/16%20Carlos%20Lopez%20Rocher.pdf

Rossi, E. (2010). *Impulse response functions.* Retrieved from http://economia.unipv.it/pagp/pagine_personali/erossi/dottorato_svar.pdf

Rushe, D. (2018). *Stock markets roiled as US-China trade dispute escalates*. Retrieved from https://www.theguardian.com/business/2018/jun/19/stock-markets- latest -fall-trump-c hina -trade-war-tariffs

Salkind, N. J. (2010). *Causal-Comparative Design*. Retrieved from http://methods.sagepub.com/reference/encyc-of-research-design/n42.xml

Sapra, S. (2005). *A regression error specification test (RESET) for generalized linear models*. Retrieved from https://ideas.repec.org/a/ebl/ecbull/eb-04c50033.html.

Sato, K., Miyazaki, K., & Mawaribuchi, J. (2011). Simple Portfolio Strategies Utilizing Inflation Factor in Japanese Equity Market. *Procedia Computer Science, 4,* 1716-1725.

Schmidt, P. J., Emelko, M. B., & Thompson, M. E. (2014). Variance decomposition: A tool enabling strategic improvement of the precision of analytical recovery and concentration estimates associated with microorganism enumeration methods. *Water Research, 55*, 203-214.

Shanghai Stock Exchange. (2017). Retrieved from http://english.sse.com.cn/overseasinvestors/introduction/briefintro/

Stephanie. (2016). *Statistics how to.* Retrieved from http://www.statisticshowto.com/assumption-of-normality-test/

Stephanie. (2016). *Statistics how to.* Retrieved from http://www.statisticshowto.com/serial- correlation-autocorrelation/

Suharsono, A., Aziza, A., & Pramesti, W. (2017). Comparison of vector autoregressive (VAR) and vector error correction models (VECM) for index of ASEAN stock price. *In AIP Conference Proceedings, 1913*(1).

The World Bank. (2018). Retrieved from https://www.worldbank.org/en/country/china/overview

Tripathi, V., & Kumar, A. (2014). Relationship between Inflation and Stock Returns –Evidence from BRICS markets using Panel Co integration Test. *International Journal of Accounting and Financial Reporting, 4*(2).

Tsuyuguchi, Y. (2009). The recent flow of "hot money" in China. *Bank of Japan Review,* 1-7.

Turner, P. (2010). Power properties of the CUSUM and CUSUMSQ tests for parameter instability. *Taylor and Francis Journals, 17*(11), 1049-1053.

Unit Root Tests. (2005). Retrieved from https://faculty.washington.edu/ezivot/econ584/notes/unitroot.pdf

Wang, Y., Wu, C., & Yang, L. (2013). Oil price shocks and stock market activities: Evidence from oil-importing and oil-exporting countries. *Journal of Comparative Economics, 41*(4), 1220-1239.

Watts, W. (2018). *Market watch.* Retrieved from https://www.marketwatch.com/story/heres-what-surging-oil-prices-mean-for- the-stock-market-2018-05-18

Wei, Y., Yu, Q., W., Liu, J., & Cao, Y. (2018) Hot money and China's stock market volatility: Further evidence using the GARCH-MIDAS model. *Physica A: Statistical Mechanical and its Applications, 498*, 923-930.

Williams, R. (2015). *Heteroskedasticity. University of Notre Dame*. Retrieved from https://www3.nd.edu/~rwilliam/stats2/l25.pdf

Wu, H. (2008). *'Hot Money' Causes Serious Problems in China*. Retrieved from https://www.theepochtimes.com/hot-money-china_1529694.html

Xiao, J., Zhou, M., Wen, F., & Wen, F. (2018). Asymmetric impacts of oil price uncertainty on Chinese stock returns under different market conditions: Evidence from oil volatility index. *Energy Economics*.

Yuan, L., & Chen, L. (2010). The Relationship of Stock Returns and Inflation in China. In *2010 International Conference on E-Business and E-Government*, 5319-5322.

Zheng, X., & Su, D. (2017). Impacts of oil price shocks on Chinese stock market liquidity. *International Review of Economics & Finance, 50,* 136-174