RELATIONSHIP AMONG FINANCIAL MARKETS: EVIDENCE FROM DEVELOPED COUNTRIES

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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 other 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.

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PREFACE

This paper presents "The relationship among the financial markets, evidence from developed countries". It includes the determinants of each financial markets as well as the relation among the financial markets in developed countries.

Economists have stated that well developed financial markets play an important role in contributing to the health and state of an economy. Despite the abundance of extensive research on development of financial markets, this study aims to provide readers a greater insight of the interrelationship between stock market, bond market and foreign exchange market especially during the subprime crisis. The financial market development is also particularly important in reallocating capital and resources, thus to improve efficiency of financing decisions thereby favoring economic growth.

A formation of an integrated financial market is the result of globalization. Throughout the years, constant innovation and technology have made financing activities to be conducted effectively; investments are growing as well as international trade. The positive impact of globalization on financial markets is the motivation behind this research. This research may serve as a comprehensive guide for readers to evaluate each type of financial markets and its correlation in order to build a diversified portfolio. The benefits of this research can also be applied on future researchers to further enhance this topic by solving the limitations of this study.

ABSTRACT

The globalization causes the stock markets, bond markets and foreign exchange markets in the world become more integrated. It was believed that the performance of financial markets in a country will bring effect to the other financial markets. Thus we decide to carry out research to see the connection between the financial markets. Four developed countries which are United States, United Kingdom, Australia and Canada was selected as the research target. This study contains 25 sample sizes from selected countries which cover the year 1986 to 2010. The OLS model and Granger Causality Test was implemented in this thesis to study the relationship between these three financial markets. The overall result showed that these three markets have unilateral effect across the countries. Other than that, the performance of one of the financial market in a country will affect the performance of other two financial markets within same country. It means that the performance of stock market in United States will affect the bond markets and foreign exchange market in United States.

CHAPTER 1: INTRODUCTION

In this chapter, the background of the research carried out will be discussed. Other than that, the problem statements, research objectives, research questions, hypothesis of the research study and the significance of the study will be listed clearly in this chapter.

1.1 Background of Research

Despite there are many researches concerning on the financial market, there are relatively less research in relating the correlation among the each of the financial markets. The purpose of the entire research is to investigate the relationship among the financial market as it could allow the investors to figure out clearly about the flow of each market which allow them to retain their competitive advantage against the fluctuation of the economy. For instance, by knowing the relationships among the stock market, bond market and the foreign exchange market, the stockholders are able to make a wise decision when the economy is involving in a downturn, vice versa.

The behavior of the financial markets is unique as each of the market reacts inconstantly to each other despite in a similar event, for instance, the economic crisis. As the crisis spread, the equities were led to devaluation after all. Similar to the stock market, even though the exchange rate has relatively low transparency compared to the equities and the fixed income, the exchange rate was still armed with the depreciative pressure as the panic result from the crisis had led to the intent of withdrawal. The exchange rate was devalued due to the foreign exchange market was flooded with the currencies of crisis countries. Unlike the foreign exchange and the equities, bond or the fixed income securities have a relative

relationship against the crisis as the reinvestment in Treasury bonds is always considered as the essence of a crisis. Moreover, in many countries, the development of the bond market is seen as a way to avoid crisis.

According to the facts, the reaction or behavior of each market could be seen clearly when the event was taken in consideration. However, in this case it does not clearly justify the relationships among the financial markets as the reaction of each market is based according to the crisis only. In addition, changes would exist as in term of the relationship among the financial markets during the crisis due to different regions would have used different policy to overcome the impact. Eventually the result in relating the financial markets will become vague and ambiguous as it would show different results when other independent variables were taken in consideration.

Knowingly if there is a relationship among the financial markets, doubt would either arise as the correlation among the markets could be based according to unilateral causality or bilateral causality. For instance, according to Kim and Choi (2006), the direction of the causality is from stock prices to exchange rates in portfolio approach and stock price is expected to lead the exchange rates with negative correlation, however, the result is not strong enough to conclude that exchange rates will be led by the stock price as according to Harjito and McGowan (2007), there is another result showing that there is a bi-directional Granger causality between the exchange rates and the stock prices. Thus, an investigation to clarify the ambiguous is necessary in order to keep or retain the competitive advantage of the investors.

Nonetheless, despite that the developing countries have a relatively well developed, complete, deep and well regulated financial markets or do appear to offer a more attractive risk return, the financial stability in developed countries has reversed the circumstance making the developed countries a more preferable option for investigation compare to the developing countries. From the viewpoint of developed countries, the benefits by diversified the investments across markets in developed countries had been eliminate. This is due to the business cycle have

tended to converge when the rapid innovation across the markets strengthen the market relationships and lowered the financial sensitivity. Given the information on the impacts above, it has been a larger co-movement in both stock and bond markets. Likewise, it would offer a highly stabilized data for the investigation to be conducted without inaccuracy and un-ambiguity.

1.2 Problem Statement

The globalization of international financial markets is one of the focal points in the discussion about the recent globalization trend. Generally, globalizations reflect the technological advances that have made investors to complete the international transactions efficiently and effectively. In specific, it can be defined as a historical process from the result of human innovation and technological progress that can increase the integration between the economies around the world (IMF, 2000). In term of finance, globalization is often known as phenomena where the economy and the financial markets among countries become highly integrated toward a single world market. This means that the combination of improved technology, deregulation and financial innovation has stimulated the worldwide financial market.

Global financial market activity is referring to the transactions and financial flows in term of equity, bond, derivatives, and foreign exchange rate markets around the world. Traditionally, investors do not actively holding foreign financial assets due to the inherent country and foreign exchange risk. However, in this new millennium, the globalization of the financial market has more and more positive impact on the real economy especially for in developed countries. The consensus view among economy scholars and researchers on the issue of the international globalization and integration of financial markets was also very positive to global investors. This is because open capital markets and cross border capital investments help global investors in making rational and profitable decision such as portfolio diversification, resource allocation as well as discipline on policy makers internationally.

Unfortunately, in the last decade, global economy and financial markets have faced several costly and contagious financial crises. For example, an abrupt declines in asset prices such as global equity market in 1987 and global bond market in 1994; High volatility in the foreign exchange market such as European exchange rate mechanism crises in 1992 and dollar-yen market in 1995; Exchange rate crisis together with debt crisis in the emerging markets in early 1995; Asian financial crisis in 1997; and subprime loan crisis in 2008. The impact of the financial crises was traumatic to financial markets around the world. For instances, DJIA has fallen from 13043 points in October 2007 to 8776 points in December 2008. Moreover, S&P 500 has fallen from 1468 points in October 2007 to 903 points in December 2008. It was the worst year for the DJIA since 1931 and the S&P since 1937 (Cheffins, 2009).

These examples of benefits in financial market globalization and impact of financial crises show that it is important to understand the international financial markets. It is crucial to study the relationship between international financial markets so that investors can sustain their wealth in different economics condition and in different financial markets. From the previous study, many researchers and investors have dedicated their studies to the correlation between different financial markets and their results have confirmed that these financial markets are closely correlated. However, it is insufficient to have an overall clear answer on the relationship between the financial markets from existing studies as most of the past researches are on focusing on a specific market. In-addition, due to the changes of policies in individual country, this research is to re-investigate the correlation among the international financial market in developed country after the financial crisis of 1980s. The construction of a threshold model in this study to determine the correlation between international financial market, namely stock market, bond market and foreign exchange market will serve the purpose of formulating guidelines for investors in making decision in different market conditions.

The causal linkage between the financial markets was one of the concerns of the researchers. The existence of casual linkage in the financial markets reflects that

the economic performance and macroeconomic factors in a country will affect the financial markets of other countries. This is very important during the financial crisis because if the economies of a country are exposing to the negative effect of other countries, it will reduce the financial flow in and out in a particular country (Eiji F, 2004). In order to find out the causality effect among the financial markets, Granger causality test was implementing in this research. Eun and Shim (1989) found out that the United States stock market have the causal effect on other selected countries financial market. The research conduct by us is giving more concern on determining whether the financial markets have bilateral or unilateral relationship.

1.3 Research Objectives

Several objectives have been identified in the study. The first objective is to investigate what are the determinants of the three financial markets. The lending rate, gross domestic product (GDP) and foreign direct investment (FDI) were the determining factors used on the stock markets. At the same time, the bond yield, reserve requirement and gross domestic product (GDP) were the determinants used for the bond market. Besides, this study also examines how the interest rate, inflation and money supply affect the foreign exchange market. Besides, Boudoukh and Richardson (1993) demonstrated that the Fisher equation can be used to measure the relationship between inflation and stock market. In addition, the research also interested to measure whether low real return and low level of stock market is due to the high expected inflation which was a proxy for slow economic growth. Alam and Udin (2009) have studied the linkage between stock market and interest rate and the movement of stock price with the fluctuation of interest rate in 15 developed countries. To investigate whether there is a positive or negative relationship. Moreover, yield curve theory has been used to investigate the relationship between interest rate and bond market. Furthermore, according to Manazir, Noreen, Ali, Zia, Ramzan and Asif (2012) have use the monthly data within 2001 to 2007 to investigate the connection between require reserve and stock market.

The second objective in the study is to investigate how stock, bond and foreign exchange market affect each other. In other words, this study would like to investigate how does stock market affect the bond market, stock market affect the foreign exchange market and bond market affect the foreign exchange market. In this study, various methods have been carried out to investigate the relation between stock market and foreign exchange market. For example, time series analysis, month, daily date and Error Correction Model have been carried out. Besides, according Hsing (2004) has applied Vector Autoregressive Model (VAR) to study the linkage between the stock price and interest rate. Ordinary Least Square (OLS) method, Volatility Index (VIX), CCC model, multivariate generalized ARCH model and VARMA-GARCH have been carried out to determine the relationship between stock market and bond market.

The third objective is to identify whether the causal linkage exist in the financial markets among the selected countries by Granger causality test.Hamao and Masulis (1990), Kasa (1992), King and Wadhwani (1990), and Arshanapalli and Doukas (1993) have found that the stock market in the developed countries are having closed relationship while the United States was the main influence in the financial market. Chen (2002) proved the existence of causal linkage in the emerging economies. Granger model is used by Narayan (2004) to examine Granger causal effect in Indian, Sri Lanka and Bangladesh. The result of the study is positive. Besides that, Cha and Oh (2000) have the power to influence the performance of stock market in Korea, Hong Kong, Singapore and Taiwan. Wu and Su (1998) have proven the US and Japan stock market directly affecting the stock market in Asia countries. After identified the existence of casual linkage in the financial markets, the investors can easily know which country are generally affecting other countries. It can be used as a benchmark for the purpose of decision making before investments.

1.4 Research Questions:

1. What are the effects of gross domestic product (GDP), foreign direct investment (FDI) and lending rate on stock market?
2. What are the effects of gross domestic product (GDP), reserve requirement and bond yield on bond market?
3. What are the effects of interest rate, inflation and money supply on foreign exchange market?
4. How do stock, bond and foreign exchange market affect each other in a country? Is there any relationship between these three markets?
5. Do all the countries will experience the same impact from the same determinant?
6. How does the financial market of a country affect the financial market of other country?
7. Do the financial markets in selected countries have the causality effect?

1.5 Hypothesis of the Study

There are few hypothesis exist in this research. In order to understand and proved the hypothesis, it will be listed down in this section.

H_0: There is positive relationship between stock markets, bond markets and foreign exchange markets.

H_1: There is no positive relationship between stock markets, bond markets and foreign exchange markets.

The first hypothesis is the relationship of the bond market; stock market and foreign exchange market are having positive relationship. When one of the markets is experiencing positive growth, the other market will experience the

same condition. If one of the markets is experiencing downturn, the rest will have the same impact.

H_0 : There is causal relationship in the three financial markets across the countries.

H_1 : There is no causal relationship in the three financial markets across the countries.

The second hypothesis is the performances of financial markets in a country are interrelated with other countries.

1.6 Significance of the Study

There were previous research carried out to study the relationship between the markets but most of it only focuses on bond and stock markets. Connolly, Stivers, and Sun (2005) study the stock market uncertainty and the stock – bond return relation. In addition, no researches state the impact of determinants (GDP, exchange rate, inflation rate, and economy crisis) on the three markets simultaneously. Many researchers investigate the determinants separately on each of the market. George (1933) studied the bond behavior in depression period. Michael and Manuel (2005) studied the exchange rate regimes and inflation. Economic forces and stock market was studied by Nai-Fu, Richard and Stephen (1986).

The purpose of this research carry out is to show that relationship among the financial markets, namely stock, bond and foreign exchange market. After the relationship was proven, it will be able to help investors to understand how their investment in a market being affected by the other market. In other words, it enables the investors to make decision in the early stage when one of the markets was experience unexpected impact. The investors need not to wait until their

invested market experience impact only makes decision. Sometime it was too late if wait until the invested sector being affected.

The second significance of the study is able to aid the policy maker in making new polices. The GDP, economy crisis, inflation and exchange rate are the determinants which not only affect the three markets but also the economy of a country. After understand what is the impact of the determinants, the policy maker able to make new policies which able to secure the economy of the country without harming the three market. In addition, the policy maker can make early planning before any one of the factors such as economy crisis brings negative impact to the three markets.

Besides that, this study provides a new point of view in the aspect of investigating the determinants of the three markets simultaneously. Many researcher carry out research to study the factors which affect the three markets in separate way. By using three markets simultaneously, it will provide another picture. It may become the new research topic for the other researcher to continue this study.

1.7 Chapter Layout

It will be total 5 chapters in this research. The chapter 1 is the introduction. It was then followed by Chapter 2: literature review. The third chapter is methodology. The fourth chapter is empirical result. Lastly, it will be conclusion of the whole research. Content of each chapter will be listed out as below:

Chapter 1

This chapter is an introduction chapter. It will disclose the overview and the background of the relationship among the stock markets, bond markets and foreign exchange markets. Other than that, problem statements, the research questions, the primary and specific objectives of the research carried out,

hypothesis of the study, significant of the study, chapter layout and conclusion of chapter 1 will be written in this chapter.

Chapter 2

In this chapter, the relationship between the stock market, bond market and foreign exchange market will be review. The study of the past researcher will be review in this chapter. The result of their study, the ideal proposed by the past researcher, the theoretical framework they used will be shown in this chapter. The last part will be the conclusion of the chapter 2.

Chapter 3

Under this chapter, the data will be collected and shown in this chapter. The technique of data collection, the type of data being collected will be shown in detail. Other than that, the steps in process of the data, the design of the model, the construct of measurement and the test of the model will be included in this chapter. This chapter will be ended by the conclusion of the chapter 3 which contain a summarized for the chapter 3 and provide linkage to the next chapter.

Chapter 4

The data being collected and processed will be analyzed in this chapter. The idea and the conclusion that extracted from the analysis will be recorded in this section. In the end of the chapter, it will be conclusion which summarizes the result and implication of the analysis.

Chapter 5

This is the final part of the whole research. This part will highlight all the important finding of the research. Other than that, it will point out the limitation

that faced during the research carried out. In addition, they will be a part for the recommendation and discussion for the research.

1.8 Conclusion

As a nut shell, this chapter provides a brief explanation and knowledge to the reader on the topic that will be carrying out. It provide clear and simple picture which will help reader to understand this research project. In addition, the chapter acts as a guideline to allow the r research carry out in the right track.

CHAPTER 2: LITERATURE REVIEW

In the past, researchers have been investigating the factors that cause the variability in stock and bond prices and exchange rates. As investments are growing in these markets, this study aims to further explore the macroeconomic determinants of stock, bond, and foreign exchange markets suggested by previous studies. In this chapter, this study will be examining each factor (gross domestic product, inflation, interest rate and reserve requirement) that affects the dependent variables (stock indices, bond indices and exchange rate) and their relationship, either positively or negatively correlated. This study has also examined the relationships among the dependent variables as well, whether they exhibit any causal relationships.

2.1 Stock Market

2.1.1 Gross Domestic Product

GDP is used as a determinant to measure the overall economic activity as such, the stock prices will eventually be affected by the changes in future cash flows. As oil price raises so does its production costs, hence lowering the firm's future cash flows leading to a negative impact on the stock price (Andersen and Subbaraman, 1996). Lucas (1978) claimed that the stock returns, consumption and the degree of risk aversion of investors are closely related. Rising consumption lead to less savings, thus stock demand rises with positive outlook on stock price. Mcqueen and Roley (1993) found that news of high economic activity reduces stock price in an expanding economy but increases stock price during weak economy. Boyd et al. (2005) found that during contraction, unemployment news leads to lower expected

earnings hence lower stock prices. Conversely, during expansion rising unemployment cause lower expected interest rates on government bonds, demand on stock rises so does stock price. Thus it supports that stock market reacts to economic conditions rationally at various stages of business cycle.

Oil price is another component of GDP that is significant to explain the variability of stock price. Kilian and Park (2009) discover the relations between United States real stock returns and the real oil price. The researchers claimed that the reaction of United States real stock returns toward the oil price shocks mainly depends on demand or supply of the oil which drives changes in stock price. However, the volatility of stock price towards oil price differs across United States and Europe as investigated by Park and Ratti (2008), who conclude that sign of reaction on stock returns towards oil price change is not the same depending on supply and demand of oil in respective countries.

Based on Rousseau and Wachtel (2000) investigations, the development of both banking and stock market explain on the consequent growth and also reveal a positive relationship between growths, stock market and bank. One of the studies by Levine and Zervos (1998) also examined the relationship between growth and both stock markets and banks. Furthermore, they have determined stock market liquidity is positively and significantly correlated with capital accumulation, economic and productivity growth.

Another study examined by Arestis, Demetriades and Luintel (2001) to investigate the correlation between stock market and economic growth in developed countries. The result shows that stock markets and banks had made effort in enhancing output growth in Japan, Germany and France, whereas United Kingdom and United States were found to be statistically weak. Based on overall investigation this study can conclude that stock market and economic growth are positively correlated.

2.1.2 Foreign Direct Investment (FDI)

Foreign direct investment is a crucial factor that would affects the economic growth of a country. With the assumptions of FDI positively affect the economic growth, policy makers had taken many actions to attract foreign investors (Giroud, 2007).

Financial intermediaries are very important in attracting the foreign investors. Well functioning stock market function as an intermediaries which allow the entrepreneur to allocate their funds and act as the bridge connecting the domestic and foreign investors (Alfaro, Chanda and Selin, 2004). They also point out that stock market is the major factor that is considered by a foreign firm before they decide whether they will invest in an isolated domestic economy.

Anokye et al (2008) indicate that the role of FDI in the growth of stock markets is strong in developing countries. They observed that there is a triangular causal relationship between the variables. For instance, FDI stimulates economic growth, as well, the economic growth in return leaves impact on stock market development and inference is that FDI promotes stock market development. Rukhsana (2009) use the Pakistan's stock market as the study target and found out the FDI and stock market has a positive relationship. Country policies that include shareholder protection and the quality of local legal systems attract foreign investors for the ease of penetrating the market hence FDI increases in return demand of stock increases. This is further supported by Claessens, Djankov, and Klingebiel (2001) who determine the development of stock markets across regions and emphasized the role of privatization in equity market. Consequently, there is positive relationship between FDI and stock market based on findings mentioned.

2.1.3 Lending Rate

Lending rate is a percentage of principal that is paid by borrower to lender at a predetermined rate. The purpose of paying interest is to compensate the lender for deferring the use of fund and instead lending it to borrowers. However, interest rate do varies depending on type of loans. It is normally differentiated according to creditworthiness of borrowers and objectives of financing.

Central bank uses lending rate as a monetary policy tool to adjust the economy. To reduce the money supply, federal funds rate is raised and make borrowings expensive for banks. Indirectly, bank will charge higher interest rate on consumers in align with federal funds rate (Sylla and Rosseau, 2003). Consequently, the supply of loan-able funds drops; short term interest rate rise and ultimately, stock price is lowered, and hence economy slows down (Lucas, 1990).

According to Gertler and Gilchrist (1994), such policy leads to a higher lending rate which makes working capital more costly for small firms due to their limited access to credit in financial market. A reduction in borrowings drives down business growth; hence with a lowered expectation in the growth and future cash flows of the company signals lower dividend and lower value of stock making stock ownership less desirable. This is supported by Bernanke and Kuttner (2005) has stated that changes in stock dividends are a crucial factor towards the dissemination of monetary policy into stock prices. In short, this research can conclude that lending rate has an inverse relationship with stock price.

2.2 Bond Market

2.2.1 Gross Domestic Product

Goldberg and Leonard (2003) examined that the announcements of economic news will affect the movement of market yield in bond market. His findings

shows that the release of news related with economic disturbances news released will lead to higher volatility of yields in both the U.S. Treasury and German sovereign bond markets**.** In addition, they have concluded that, bond market and economic growth are certainly having a positive relationship.

Besides, another investigation examined by Borensztein and Mauro (2002) investigated whether GDP-indexed bonds could play a role in helping prevent future debt crises. They also examined whether GDP-indexed bonds reduce countries' incentives to grow rapidly. The overall result shows that when the GDP growth turns out lower, the indexation of bonds will be lowered down. Therefore, there is a positive relationship between both GDP and indexed bonds. Moreover, Hakansson (1999) has clarified the major differences with a well developed bond market and the economy of East Asia given the bank financing stands the central role. The results show the presence of well developed corporate bond market has a positive effect on economy and the plenty available securities will tend to improve economy in certain aspects

Furthermore, in another study by Andersson, Krylova and Vähämaa (2004) who have examined the effect of inflation and economic growth expectations and conceive that the stock market improbability is based on the time varying correlation between bond and stock return. Therefore, bond market has a positive relationship with the economic growth and since economic growth and GDP is positive correlated. Thus, bond market and growth domestic products (GDP) are positively correlated.

2.2.2 Reserve Requirement

Bonds are often aid on bad economic news and sell off on good economic news. For instance, when the Gross Domestic Product (GDP) or employment rates decrease, Federal Reserve will tend to lower the interest rates which would lead to higher bond prices (McFarlin, 2012). In a more specific explanation, by lowering down the reserve requirement, it would increase the bankers' availability to make

more loans and thus lowering interest rates. This would encourage both the consumers and the investors to buy more.

However, in other situation, assuming that the adjustment of reserve ratio is the monetary policy in used, if the Federal Reserve goes for an expansionary monetary policy, the rise in funds could cause a higher demand on the government bonds and possible changes would appears over liquidity (Chordia,Sarkar,and Subrahmanyam, 2003). On the other hand, according to Thorbecke (1997), the expansionary or contractionary of monetary policy, as measured by the innovations in non-borrowed reserves, has large and statistically significant positive or negative effect on bond returns. Chordia (2005) stated that monetary expansions are associated with increased liquidity. Hence, when more government bond funds are available in market, bond market liquidity increases generating positive return on bond yield. As a whole, there is a negative relationship between reserve requirement and bond price.

2.2.3 Bond Yield

Bond yield has an inverse relationship with bond price, the lower the price of bond, the higher the return earned from bond. In this case, a study on factors that affect bond yields will explain better on the changes in bond price.

According to Ziebart (1992), bond return is a result of the combination of macroeconomic conditions, features of the issue and default risk. Further in this chapter, more emphasis is placed on default risk to narrow down the scope of study. Rating of bonds is often used to represent default risk in determining bond yield. Hence, better ratings will lower the default risk and result in lower bond yield, bond price will rise.

Lo, Mamaysky, and Wang (2004) have a different opinion who argue that the changes in the bond rating is not as good as the changes in liquidity when come to

the explanation on deviation in bond yields. Liquidity has significant and positive effect of regulating for changes in credit rating, macroeconomic or firm specific factors. High liquidity costs cause investors to demand higher risk premium in future by reducing bond prices. Consequently, for the stipulated cash flows, lower liquidity bond will has lower trading frequency; result in lower bond price and better bond yield (Chen, Lesmond and Wei, 2007).

The Fisher model uses accounting and other financial information to represent default risk which includes earnings variability, company's solvency, the ratio of market value of equity to book value of debt, and the market value of bonds outstanding (Merton, 1974). A risky bond yield is the result from increasing in both the variance and the debt ratio. Ogden (1987) tested option pricing variables on bond yields and founds that debt ratio and variance variables are significant in explaining bond yields. He also states that firm size is related to default risk as it is also part of Fisher's study. Greater liquidity indicates issuer has larger amount of outstanding debt, as a conclusion, size of debt and size of firm are highly correlated which explains an increase debt will lower the bond yield, thus increasing bond price. Hereby this study reinforces that bond yield has a negative relationship with bond price.

2.3 Foreign Exchange Market

2.3.1 Gross Domestic Product

Economic growth can be measured by GDP, since export and import is part of GDP component, a broad study was conducted to relate trade effects on growth (Rodriguez and Rodrik, 2000).

According to Mandel (2007), economic growth in low cost countries has resulted in tremendous increase in their imports. This resulted in overestimation of GDP gains and caused huge increase in their exchange rate. Mendoza, Razin, and Tesar

(1994) commented that a high economic growth rate is often associated with a high investment rate and export. For instance, surplus in current account as a result of rise in export may eventually follow by the appreciation of the currency. GDP growth signals good news which attracts more foreign capital. Capital inflows causes exchange rate to increase (Wolf and Gregorio, 1994). Ito, Symansky and Isard (1999) conducted study on Japan and concluded that Japan experienced vast economic development from a net importer to a self sufficient net exporter originating from industrial sector and advanced to a more sophisticated technology sector which is in line with its increasing GDP over the years, since then Yen appreciated vastly. During the 1990s, strength of U.S. dollar against Euro, Pound or Yen increases the demand for U.S dollar which is drive by its growth potential has an influence on its future exchange rate (Sinn and Westermann, 2001). Sachs (1998) stated Mexico recovered fast in terms of peso from the Tequila crisis in 1994 is attributed to the drastic increase in the country's exports to the U.S.

Looking at Asian crisis, government in Southeast Asia tried to preserve the exchange rates within expected range but exchange rates appreciated in real terms, as the capital inflow put upward pressure on the prices of non-tradable which resulted in overvaluation of the exchange rates although there was a significant growth in GDP (Radelet and Sachs, 1998). In recent years, Southeast Asia is experiencing growth in terms of export arising partly due to rising GDP especially with Thailand currently leading exporter of automobile parts in the region (Azali, Habibullah, and Baharumshah, 2001). United States has been a long time trading partner and Kobsak (2013) witnessed the appreciation of Thai baht against U.S. dollar in recent years. Hence the relationship between GDP and exchange rate is positive.

2.3.2 Interest Rate

Many financial analysts and theoretical model have suggested that interest rate plays an important position in determining the foreign exchange market and the

efficiency of foreign exchange market can be examined through the volatility of exchange rate (Engle, Ito and Lin, 1991). Besides, many economic rationales also have highlighted the important of interest rate in modeling exchange rates. Inci and Lu (2004) have constructed international quadratic term structure model to track the movement of exchange rates and currency return. Based on their empirical performance, they found that interest rates and exchanges rates are positively correlated.

Chen et al. (2004) also investigate the empirical connection between interest rate and exchange rate in Indonesia, South Korea, Philippines, Thailand, Mexico and Turkey by using Markov-switching specification. His empirical result also shows that an increase in interest rate may leads to a rise on exchange rate. Moreover, according to Kanas and Genius (2005), they also found supportive evidence to prove the relationship between real exchange rate and real interest rate in United States and United Kingdom. They found that these two variables are positively correlated. In addition, Hoffmann and MacDonald (2009) also studied the nexus between real exchange rate and real interest rates for United States and other G7 countries. They also found a significant and positive correlation between the two variables. Based on their findings, increase in interest rate will cause currency value to appreciate.

2.3.3 Inflation

Irvin Fisher proposed that nominal interest rate is related to expected inflation and showed positive relation where interest rate increases so does inflation. Campa and Goldberg (2005) suggested that countries with low inflation and low exchange rate volatility tend to experience lower exchange rate pass through. Choudri and Hakura (2006) found a relationship between pass-through and the average inflation rate and conclude that low inflation environment cause a reduction in exchange rate pass-through.

Prasertnukula, Kim and Kakinaka (2010) indicated that the usage of inflation targeting has a crucial impact on the exchange rate pass-through and volatility, implementing data from Indonesia, South Korea, the Philippines, and Thailand during 1997 financial crisis. Li (2011) finds that broadening and contraction interest rate differentials will affect the level of inflation hence lowering exchange rate correlations. Impact of a low inflation will cause appreciation of currency (Ivrendi and Guloglu, 2010). Kamin and Rogers (1996) had observed that an expansion of domestic demand in the non-tradable sector will lead to an increase in inflation rates, thus increase the real exchange rates in Mexico. From the above findings, the monetary policy of a country plays an important role to encounter inflation. Hence, low inflation rate exhibits rising exchange rate as a result of increase in purchasing power of that currency relative to other.

2.3.4 Money Supply

Amount of money flowed in the market is controlled by the central bank. Conducted through open market operations or adjusting the level of interest rates. Increase in money supply will lower the interest rate which results in capital outflow hence depreciating value of currency (Driskill and Mccafferty, 1980).

To encourage off shore borrowing, Central bank intervene to limit the money supply from increasing and prevent depreciation of exchange rate (Rogers, 1996). According to Maitra and Mukhopadhyay (2011), the stability of rupee exchange rate requires money supply in India to remain stable under the floating exchange rate regime. The other reason is to reduce excess variability of the exchange rate to avoid too much uncertainty in currency value. Edison, Gagnon, and Melick (1997) examines that the exchange rate reacts steadily to the release of announcement on money supply, non-farm employment and trade balance. Hakkio and Pearce (2007) also reports that increase in U.S dollar exchange rate as a result from reaction to money supply announcement.

On the contrary, there are previous researchers who claim that appreciation of dollar is due to unanticipated increase in money supply increases which signifies exchange market inefficiency. Engel and Frankel (1995) proved the positive increase in short term United States interest rates and appreciation of the dollar due to unexpected increases in the money supply to an expected liquidity effect. When there is unexpected large money supply announcement, it raises the real interest rate. Holding other factors constant, this leads to a huge real interest rate differential resulting in appreciation of U.S. dollar. Such scenario is also observed in United Kingdom, where Goodhart and Smith (1985) also showed that changes in the pound sterling responded to good news money supply. There were evidence of positive relationship as well as negative relationship between foreign exchange and money supply depending on the condition of the economy.

2.4 The Relationship Between Various Financial Markets

2.4.1 The Relationship Between Stock Market and Foreign Exchange Market

In recent decades, mutual association between stock markets and foreign exchange markets has attracted concern of researchers and academic scholars. This is because the linkage between stock and foreign exchange market will provides insight to individual and institutional investors in assessing the effect of exchange rates on stock market. Previous scholars have found that there is a major impact of changes in stock prices on exchange rate movements. However, the existing theories and empirical results between stock and foreign exchange market are mixed and inconclusive.

Aggarwal (1996) uses the monthly U.S stock price and currency value to assess the linkage between the changes in three indices of stock prices and value of U.S dollar. According to the empirical study, he found that stock prices and exchange rates are positively correlated. This indicates that when the U.S dollar value increase, the stock prices will also increase and vice versa. In addition, Solnik and Solnik (1997) have studied the impact of economic variables such as exchange

rates, interest rates and inflation expectation on stock prices. Based on the empirical result, the author found that stock prices and exchange rates is significant positively correlated.

Moreover, Ülkü and Demirci (2012) also studied the exchange rate effect in emerging stock market. They have included a sample of European emerging markets in their studies. Based on their findings, there is a significant positive relationship between stock markets and exchange rates which is in line with result of Phylaktis and Ravazzolo (2005).

On the other hand, Soenen and Hanniger (1988) have discovered opposite result in examining the correlation between stock market and foreign exchange market. They had indicated a powerful negative relationship between the changes in stock prices and the value of U.S currency. Besides, they also found that revaluation of currency values will have significant and inverse impact on stock prices for different time period.

Ajayi and Mougoue (2004) found the mixed results. According to the empirical result, stock prices have negative impact to domestic currency values in short term, but positive impact in long term. They also found that depreciation in currency values will have negative effect on the stock market both short and long term.

Furthermore, Tsai (2012) also examined the linkages between stock and foreign exchange markets in six Asian countries which include Thailand, South Korea, Malaysia, Philippines, Singapore, and Taiwan. The results show that there is a significantly negative relationship between stocks and foreign markets. However, the author also found that this relationship can be change depending on market condition.

However, Muhammad, Rasheed, and Husain (2002) found that there is no relationship between stock market and foreign exchange market. They have examined the stock prices and exchange rates in both short and long run in

Pakistan, India, Sri Lanka and Bangladesh. Based on Granger causality tests, result shows that there is no connection between stock prices and exchange rates either short or long run for Pakistan and India. However, there is a positive relationship between the variables in Bangladesh and Sri Lanka in long run. Thus, the authors suggest that stocks and foreign exchange markets are unrelated in South Asian countries in short term.

2.4.2 The Relationship Between Stock Market and Bond Market

The movement of stock and bond market is essential for individual and institutional investors in the management of portfolios. This is because stock-bond relations are essential in making financial decision such as risk management problems and optimal asset allocation strategy. Thus, it is not surprising that many important articles have addressed stock-bond correlations and mixed results has found as investors will shift their investments between stock and bond market according to varying predicted capital market conditions.

In addition, Stivers and Sun (2002) have studied the relationship between daily stock and Treasury bond return with unpredicted stock market According to the empirical results, they found that stock and bond market have positive relationship when the stock market uncertainty is low. However, during high uncertainty in stock market, stock and bond market showed a negative relationship. This implies that the diversification benefits will increase for portfolios of stock and bond when the stock market uncertainty is high. Moreover, Gulko (2002) has examined the stock-bond relations during the stock market crashes. The author found a positive correlation between the return of U.S stocks and Treasury bonds. However, as the stock market crashes, the stock-bond relationship becomes negatively correlated as the Treasury bonds offer an effective diversification during financial crisis.

On the other hand, Hakim and McAleer (2009) have forecast conditional correlations between stock, bond and foreign exchange in Australia and New Zealand. They found that stock and bond market is positively correlated. Shiller

and Beltratti (1992) showed a strong positive correlation between the changes in long-term bond and stock prices. The authors used daily data of stock and bond returns in United States and Germany. In empirical findings, the authors indicated that predicted inflation is positively related to the time varying correlation between bond and stock returns. They also found that bond and stock prices do move in the same trend during periods of high inflation and economic growth expectations.

Kim and In (2007) examined on the relationship between changes in stock prices and long term bond yields in the G7 countries. Based on the wavelet analysis, there is an inverse relationship between changes in stock prices and long term bond returns in most of the G7 countries except Japan. Thus, the authors have concluded that the relationship between changes in stock prices and bond yields are differing from countries and depend on the time scale. Fama and French (1989) use the Ordinary Least Square (OLS) method in determining the co-movement between the expected return on stocks and bonds in different business cycle. According to the empirical results, they found that the expected return on corporate bonds and stocks are changing according to the business condition. When the business conditions are good, expected returns on bonds and stocks will be lower, thus there is a positive relationship between stock and bond market. However, when the business activity is slow, there will be higher expected returns on stocks and bonds, thus there is an inverse relationship between stock and bond market.

On the other hand, Campell and Ammer (1993) have studied the relationship between stock and bond return by using the post war monthly U.S data. Based on their empirical result, they found that bond and stock returns are practically uncorrelated.

2.4.3 The Relationship Between Bond Market and Foreign Exchange Market

Burger and Warnock (2006) have investigated the ability of countries to attract international investors to their local bond markets. They have determined the connection between the local currency and the local bond market. According to their findings, U.S. investors unable to fully diversify and avoid the most volatile bond markets remains a challenge for emerging countries. Moreover, they also demonstrated that macroeconomic policies will positively affect the ability to issue bonds in local currency. This means that when U.S dollar depreciates, U.S investor will reduce interest to invest in local bond market, bond yield will fall. It also shows that there is a negative relationship between bond price and foreign exchange rate.

Mitra, Dime and Baluga (2011) have examined the linkage in foreign investor involvement in emerging East Asian local currency bond markets. The researchers indicate that the growths of the local bond market in emerging East Asia are actually encouraging the foreign investor to invest in the local currency bonds. In other words, foreign investor holding local currency will increase the bond yield.

Frankel and Rose (1996) studied the case of Sweden when it was pegged to Deutschemark in 1992, followed by unification of East and West Germany, German bond yield and its currency (Deutschemark) rose substantially. However, the appreciation of Deutschemark was inappropriate for slower growth in Sweden resulted in devaluation of krona. Bond yield in Sweden continued to decline due to weaker economic conditions. A sharp depreciation of currency is likely to boost export market of a country. In the long run, central bank would conduct tighter monetary policy to prevent inflation hence bond yield would raise and currency is strengthened. In short, rising bond yields reflects market fears of future inflation (Gagnon, 2009).

Volatility of exchange rate represents movement of foreign investment in a country bond and stock market. Government bond yield is an indicator of

economic condition of a country whether central bank is capable of handling inflation. Increase in government bond yield increases the demand for government bond, thus, foreign investors seek more of the local currency in exchange, and local currency appreciates (Lien, 2011). Therefore, based on study by Mitra, Dime and Baluga (2011), exchange rate of a country is directly proportional to the bond yield exhibiting a positive relationship while negative relationship with bond price.

2.5 The Relationship Among Financial Markets Across Countries

2.5.1 The Relationship Between Stock Markets Across Countries

Husain and Saidi (2000) explored the interdependence of the equity market of United States, United Kingdom, France, Japan, Germany, Singapore and Hong Kong with Pakistan. Engle and Granger co-integration technique was applied concluded there is little support of integration of the Pakistani equity market with international markets studied which made Pakistan a great country for diversification in favor of international investors.

Muhammad, Rasheed, and Husain (2002) have examined the relationships among stock market of the South Asian countries and developed countries. He concluded based on Johansen bi-variate analysis that the stock markets in South Asian were not correlated with the stock markets in developed countries which allows risk minimization by investing in these South Asian countries.

Another result revealed that absence of co-integration exists between Australia and other markets are conducted by Roca and Hatemi (2004). They studied the interdependency among equity markets of Japan, Korea, United States, United Kingdom, Singapore, Taiwan, Australia and Hong Kong by employing Granger causality test and Johansen co-integration technique. The results showed that Australia who is correlated with United States and United Kingdom but not correlated with others mentioned. Vo and Daly (2005) analyzed Asian equity

market indices using the Granger causality test. The test showed presence of interrelationship among Asian equity markets. This implies that European investors can spread risk by investing in Asian market

There are researchers who found presence of co-integration among countries. Wang and Thi (2006) tested effect of contagion between Thailand and the China economic zone (Hong Kong, Taiwan and China). Result showed there is considerable increase in terms of correlation across equity markets between the pre-crisis and post-crisis periods where effect of the economic conditions of these countries will spread to one another. Chen, Firth and Meng Rui (2002) also investigated on interdependence of equity markets covering countries in Chile, Colombia, Argentina, Brazil, Venezuela and Mexico using co-integration analysis and error correction vector auto-regressions techniques and revealed there is a presence of high dependency in stock prices among the major equity markets in Latin America.

2.5.2 The Relationship Between Bond Markets Across Countries

Previous researchers examined the impact of global factors that contribute to movement of bond price. Barr and Priestley (2004) have stated that bond returns are predictable in the long run and explained the most of variation in expected returns is due to world risk factors. Ilmanen (1996) also supported their statement who suggests that world factors are significant for forecasting international bond movements and exhibiting cross-country correlation. Driessen, Melenberg, and Nijman (2003) found positive relationship between international bond returns and the interest rates across countries by using a linear factor model.

Clare and Lekkos (2000) state that during financial crisis, interest rates are influenced by international factors which included United States, United Kingdom and German bond markets by applying a vector auto-regression (VAR) model. Sutton (2000) believed that short-term interest rates affect long term bond yield hence explaining the prediction on bond market co-movement. However, he

disregarded the possibility of inflation and real interest rates which have a significant on bond movement as well. Nieh and Yau (2004) find China's interest rate has influence on Hong Kong and Taiwan. There is a strong presence of co-integration where bond yield moves in similar direction. Click and Plummer (2005) did survey on Southeast Asia countries and it is favorable for these countries to collaborate in the development of the national bond markets in order to overcome scale inefficiencies.

To prove the independency of bond markets, Kanas (1998) examined the relationship between United States and European countries and the results show that the United States' equity market is not correlated with neither of the European markets and this recommends US investors to diversify their portfolios by investing in European markets.

Mills and Mills (1991) following a multivariate approach studied the bond market interdependence of United States, United Kingdom, West Germany and Japan. Their results showed absence of co-integration on bond yields instead it is affect by domestic factors in the long run.

2.5.3 The Relationship Between Foreign Exchange Markets Across Countries

Some past researchers applied efficient market hypothesis to explain the movement of exchange rates where the ability of currency to respond to information such as inflation, money supply, government policies and many more. Baillie and Bollerslev (1990) have stated that co-integration in exchange rates across countries and suggested that foreign exchange markets do not follow efficient market hypothesis.

Similarly, Christodoulakis and Kalyvitis (1997) find market inefficiencies in Greece where spot rate and forward rate shift in same direction in foreign exchange markets. Van de Gucht, Dekimpe, and Kwok (1996) found significant persistence movement between world currencies. A comparable study conducted

by Diebold and Rudebusch (1989) studied currencies of in United States, United Kingdom, Switzerland, Japan, Canada and Australia. She found cohesion in volatility movements across exchange rates.

Dominguez and Frankel (1993) studied on Canada where the exchange rate is stabilized at current prevailing levels as attempt on international policy coordination which was carried out successful. Such efforts proved that exchange rates tend to move together and it is co-integrated across currencies globally. Besides, Gochoco and Bautista (1999) showed a consistent relationship between exchange rates in Asia in long run by employing the error correction model. They found that the effect of currency crisis was spread to other parts of Asia including Singapore, China, and Japan. In addition, co-integration tests have carried out by Aggarwal and Mougoue (1996) to test effect of Japan's currency (yen) and United States' currency (USD) on Asian currencies. As a result, they found that Japanese Yen was co-integrated with the currency in East Asian and Southeast Asian.

However, some studies reported an opposite result. Rapp and Sharma (1999) did not detect co-integrating factor on a systematic relationship between any of the exchange rates in G-7 nations supporting efficient market hypothesis. Sander and Kleimeier (2003) employed the Granger causality method to examine causality pattern on the Asian crisis (1997) and Russian crisis (1998) they discovered the crises has no direct impact on each other. This proved that there is no correlation between currencies during the crises.

2.6 Review of Relevant Theoretical Model

$$YS = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3$$

Y= Stock market

X1=Gross domestic product

X2=Foreign Direct Investment

X3=Lending rate

$$YB = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3$$

Y= Bond market

X1= Gross domestic product

X2= Reserve requirements

X3=Bond yield

$$YF = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4$$

Y= Foreign exchange market

X1=Gross domestic product

X2=Inflation

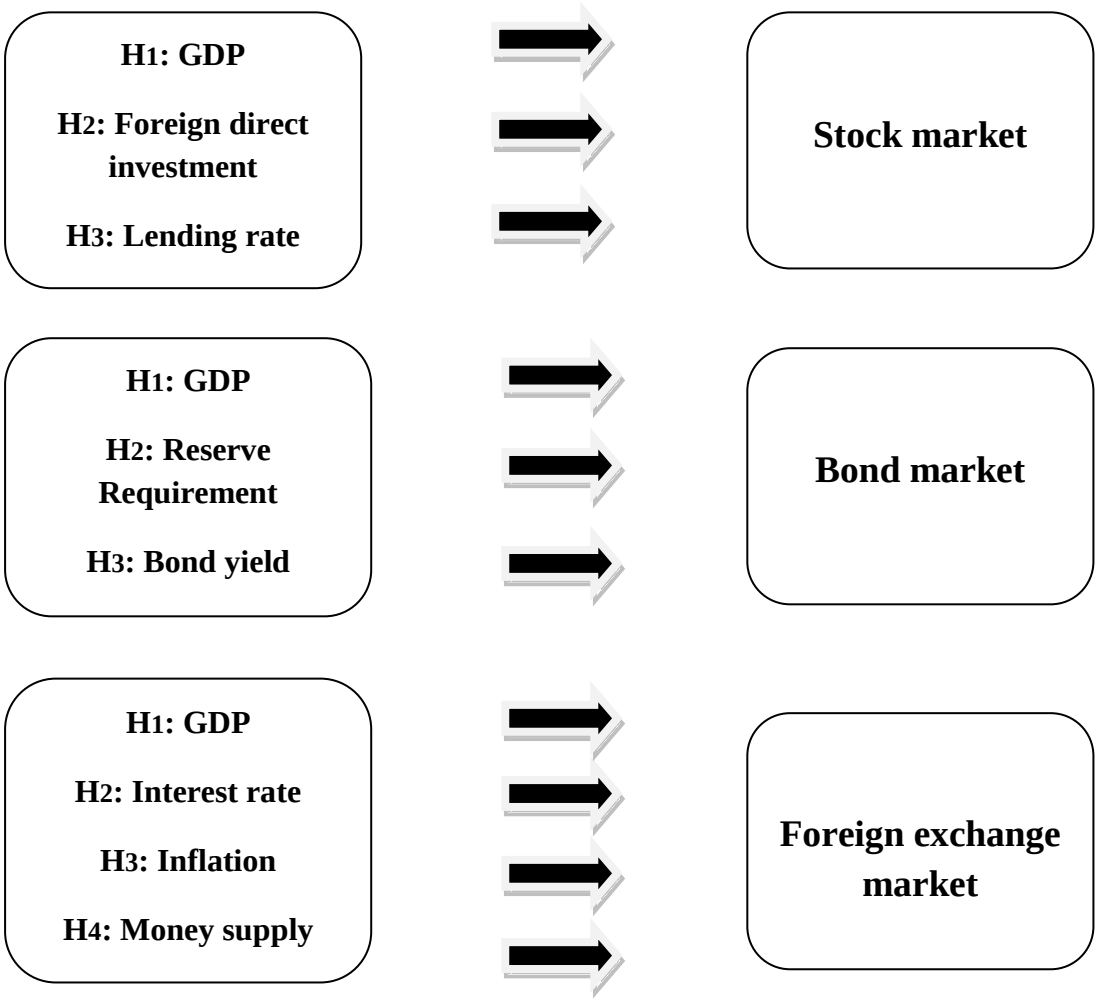
X3=Interest rate

X4=Money supply

2.7 Actual Conceptual Framework

Proposed Theoretical / Conceptual Framework

Independent variables: **Dependent variables:**



2.8 Reviews on the Causal Relationship Between Financial Markets and Macroeconomics Variables

2.8.1 Stock Market

a) H0: GDP will not affect the stock market

H1: GDP will affect the stock market

b) H0: Foreign direct investment will affect the stock market

H1: Foreign direct investment will not affect the stock market

c) H0: Lending rate will affect the stock market

H1: Lending rate will not affect the stock market

2.8.2 Bond Market

a) H0: GDP will not affect the bond market

H1: GDP will affect the bond market

b) H0: Reserve requirements will affect the bond market

H1: Reserve requirements will not affect the bond market

c) H0: Bond yield will affect the bond market

H1: Bond yield will not affect the bond market

2.8.3 Foreign Exchange Market

a) H0: GDP will not affect the foreign exchange market

H1: GDP will affect the foreign exchange market

b) H0: Interest rate will affect the foreign exchange market

H1: Interest rate will not affect the foreign exchange market

c) H0: Inflation will affect the stock/bond/foreign exchange market

H1: Inflation will not affect the foreign exchange market

d) H0: Money supply will affect the foreign exchange market

H1: Money supply will not affect the foreign exchange market

2.9 Conclusion

Based on previous literature reviews, all the evidence provided was strong to confirm the direction of this study. The effects of independent variables on dependent variables were evident as some are proven to have significant relationship while others don't. Therefore, the objective of this paper is to confirm the significance of these variables across countries which will be elaborated further in the next chapter.

CHAPTER 3: METHODOLOGY

The major methodology that will be used in this study to meet the research objectives will be discussed in this chapter. The data collection method, sampling technique, data processing, data treatment and data analysis will be further discussed in this study. In addition, the analysis of the variables, as such, the descriptive analysis, the scale measurement, and the inferential analysis will be discussed in this study.

3.1 Research Design

This study has adopted the quantitative research design as it would be able to verify the hypotheses and examine the causal effect between the variables to fit the objective of this study. Moreover, the advantage of looking at only specific variables instead of the overall study is preferable compared to qualitative method. This method will generate statistical reports which show correlations and allow comparisons across groups. Countries such as United States, United Kingdom, Canada, and Australia will be covered as the sample for this study. Descriptive research is one of the quantitative researches working on the hypothesis testing. It would reflect the result without making changes on the subject. Therefore, it is suitable for time series as the variables of interest in a sample of subjects will be assayed and the relationships between them will be determined. Besides, co-relational research is also another type of quantitative research that is used to discover the relationships between two variables. Such approach is appropriate especially to determine the correlation among the dependent variables (share price index in stock exchange, J.P. Morgan government bond index, and effective exchange rate).

3.2 Data Collection Method

Based on the above research design which consist of time series and co-relational designs, data collection methods may include observations and secondary data. The sample of this study comprised of the data from the United States, United Kingdom, Canada, and Australia. After data are collected, the charts and graph will be formed to observe the trends in each dependent variable.

3.2.1 Secondary Data

In this study, secondary data is favorable. The secondary data are described as data that were recorded or collected at an earlier period by different researchers and often different purposes. Mainly, it consists of official documents such as journals, newspaper, financial records and census data. The independent variables and the dependent variables in this study are likely the data that were collected by the previous researchers or any other institutions that may be concerned about the data.

3.3 Sampling Design

3.3.1 Sampling Technique

The sampling technique that will be practiced in this study is the random sampling technique. The random sampling technique allows us to randomly select the targeting sample from a large population. In this research, the random sampling technique will be applied to randomly select four countries among the developed countries for the research purpose. The random sampling technique enables the selection and conclusion to be drawn in a shorter time without affecting the

accuracy. The conclusion that drawn from the research may not be able to precisely determine but it will not deviate too far from the actual result.

3.3.2 Sample Size

Four developed countries had been selected for the study. The selection of the United State, United Kingdom, Australia and Canada is mainly due upon the financial markets of these countries are considered well developed. Each of the country will have 25 sample sizes. The range of year that would be covered in the research is from 1986 to 2010 as the period has chronically recorded the growth and development of the three financial markets in these selected countries. This will aid in a better understanding on the trend of these three financial markets.

3.4 Data Processing

Data processing is one of the important components in the methodology's section. In this section, the method of preparing data will be revealed. Meanwhile, the way of collecting data, editing and coding will be revealed in this section.

3.4.1 Data Collection

The data adopted for this research are secondary data. The data will be acquired through the Datastream database, an external database system sponsored by Universiti Tunku Abdul Raman. The Datastream contain of the historical and worldwide coverage data from many other sources. The following table shows the variables and the sources of the data:

Variables	Sources
Share Price Index in Stock Exchange	• Main economic indicator, Copyright of OECD
J.P. Morgan Government Bond Price Index	• J.P Morgan
Effective Exchange rate	• Oxford Economic
Gross Domestic Product	• U.S Bureau of Economic Analysis, Office for National Statistic (ONS) • UK Bureau of Statistic • Australia Bureau of Statistic • Statistic Canada (CANISM)
Bond yield – 10 year common government bond	• Main economic indicator, Copyright of OECD
Central bank reserve money	• International financial statistic (IMF)
Foreign Direct Investment, inward % of investment	• Oxford Economics
Lending rate (Prime rate)	• International financial statistic (IMF)
Inflation rate, GDP deflator (Annual %)	• International financial statistic (IMF)
Money aggregate M1	• International financial statistic (IMF)
Interest rate	• World Bank WDI

Table 3.1: Sources of Data

3.4.2 Data Recording

After the required data were collected, it will then be transferred and recorded in the Microsoft Excel for the analysis purpose to study the relationships among the stock market, bond market, and foreign exchange market. The data are recorded according to the selected countries and selected years.

3.4.3 Data Treatment

Tests will be carried out in order to find out the best fitting model for this research. The program that will be employed is the E-view 6.0. The E-view 6.0 is a program which enables researchers to carry out testing such as Jarque-Bera test, Ramsey Reset test, ARCH test, Breusch-Godfrey Serial Correlation Lagrange Multiplier test, and etc. All tests being mentioned will be used to ensure that there is no error in the regression model. The result of the tests will be then recorded and analyzed in the next chapter.

3.5 Data Analysis

The major computer program that will be used to analyze the data will be the E-view 6.0. Moreover, the major statistical techniques applied would be discussed in this section.

3.5.1 Descriptive Analysis

Descriptive analysis can be defined as a set of descriptive statistics that summarizes a given set of data from the entire population or a sample. It will be used to measure the central tendency of the data such as the mean, median and mode. Meanwhile, it also determines the variability of the data, as such, the standard deviation, variance, kurtosis and skewness. This analysis provides an

informative summary of investment returns in empirical and analytical analysis. Descriptive analysis can be either quantitative or qualitative. The data used in the study will be the quantitative data which can be tabulated along a continuum in numerical form, such as the indices in stock and bond market or exchange rates in different developed countries. In addition, descriptive analysis is unique in term of the variables employed as it would be able to include a single or multiple variables for analysis purposes. For instance, descriptive analysis can be used as a method to analyze the relationships among multiple variables by using econometric testing such as Ordinary Least Square (OLS) regression analysis. This study will use the descriptive analysis to study the relationship among the stock, bond and foreign exchange market in different developed countries.

The arithmetic mean can be defined as the arithmetic average of a set of values or distribution. The means in this study will be used to compare the average stock indices, bond indices and exchange rates among the countries chosen. In addition, median can be referred as the middle number of a series data. The median will be used in this study to ensure that the mean values do not influence by the extreme value.

The maximum and minimum in descriptive analysis also refer to the largest and smallest observation in a sample data. Maximum and minimum will provide a crude quantification of location and variability as all the data values will lie between them. However, maximum and minimum alone in descriptive analysis tell nothing about how the data values are distributed within this interval. They have to be combined with mean, median and mode in order to provide a better measure of the center of a distribution. The results will be used to compare the center of distribution between the financial markets and the countries chosen.

The standard deviation can be defined as a statistical measurement of how far a variable quantity moves above or below its average value. The purpose of using standard deviation is to study and evaluate the performance in each financial market from different countries chosen. The study will compare the risk in stock,

bond and foreign exchange markets from different developed countries and study the relationship among the markets in a single country.

In descriptive analysis, skewness can be referred as an averaged cubed deviation from the mean divided by the standard deviation cubed. Positively skewed shows that the computation is greater than zero, which implies that the mean is greater than the median, and the median is greater than mode in a data set. Negatively skewed refer to the result that the computation is less than zero, which also indicate that the mode is greater than the median, and the median is greater than the mean in a data set. On the other hand, Kurtosis refers to the degree of peak in a distribution. A fat-tailed distribution indicates that there are lesser chances of extreme outcomes compared to a normal distribution. Skewness and kurtosis results of this study will be used by Jacque-Bera test to determine whether the probability based on the sample is normally distributed (Dubauskas and Teresiene, 2005).

The Jacque Bera is presented as:

$$JB = \frac{n}{6}[S^2 + \frac{(K-3)^2}{4}]$$

Where:

n= Sample size

S= Skewness

K= Kurtosis

3.5.2 Scale Measurement

In order to further into the inferential analysis, the scale measurements must first be conducted to determine the existence of econometric problems. For instance, these issues are the normality problem, model specification error, heteroscedasticity problem, autocorrelation problem and multicollinearity problem.

Normality of residuals or errors testing is important; the assumption is that the error term is normally distributed so that the specification model is correct. According to Park (2008), when the assumption is violated, the interpretation and inference may not be valid or reliable. As per mentioned earlier, in order to ensure the normality of residuals, the Jacque-Bera test, will be used as the diagnostic testing to check whether the error term is normally distributed.

The assumption for model specification error is referring to the incident when the observation or the independent variable and error term is correlated. The issue often occurs due to several reasons, for example, it could either be an incorrect functional form, the omission of important variable, addition of unrelated variable, or the measurement errors. When the model specification error is presented, inaccurate interpretations and inferences are likely to present (Pereira and Cribari-Neto, 2010). This issue can be detected by the applying the Ramsey RESET tests.

Heteroscedasticity occurs when the variance of the disturbance is not constant across the independent variables. Nonetheless, it is a problem common in a series of cross sectional data (Awe and Omoniyi, 2012). Suppose, heteroscedasticity does not result in biased parameter estimates, however, the OLS estimates are no longer the best estimation as the existing of heteroscedasticity will lead the variance of the estimated parameters to bias. Moreover, with the nature of heteroscedasticity, the significance test could result to be too high or too low. Nonetheless, this problem could be detected by using the ARCH test.

The autocorrelation is defined as a problem exists when the random variable, ordered over time that show nonzero covariance (Clarke and Granato, 2005). Autocorrelation always refers to the correlation of a time series with its own past and future values. For instance, it generally refers to the correlation of error term at one date to the error terms in the previous period. As if the autocorrelation problem occurs in the particular model, the OLS estimator is no longer the best estimation method as the true variance would be underestimated and the t values would be overestimated in which eventually the variance of error term would not be able to achieve in optimal level. This problem can be determined by applying the Breusch-Godfrey Serial Correlation Lagrange Multiplier test.

Multicollinearity refers to the case or a statistical event in which the independent variables in the empirical model are highly correlated. This phenomenon eventually would make it difficult to isolate the individual effects of the independent variables on the dependent variable. With the existence of multicollinearity problem, the estimated OLS coefficients may be statistically insignificant. According to Cropper (1984), omitting the seriousness of the multicollinearity problem in the regression analysis will likely result in the consequences such as loss of precision in the estimates, overly sensitive estimates toward the data set and incorrect rejection of the variables. This particular issue can be detected by comparing the degree of the VIF.

3.5.3 Inferential Analysis

The inferential analysis in this research will be further discussed in this section in order to study a better understanding to determine the objectives of this project.

3.5.3.1 Ordinary Least Squares

The ordinary least squares (OLS) regression, is considered as a common linear model analysis that may be applied to estimate the relationship between the

dependent variable over a set of independent variables in a linear regression model. According to Foss (2001), the OLS regression has been commonly adopted for the convenience of computation due to the usefulness of the technique. For example, the OLS regression is generally considered as a common basis of many other techniques, for instance, the OLS regression are able to turn into a log-transformed OLS model or a generalized linear model (Hutcheson, 2011). Meanwhile, the OLS regression model is particularly easy for the determination of assumptions which include of the linearity, the independence, the exogeneity, the identifability, and the error structure (Schmidheiny, 2012).

The OLS regression model will be employed in this study for further determination. For instance, the OLS regression model will be employed for the Jarque-Bera test and the Ramsey Reset test for the determination of normality and model specification. Meanwhile, to determine the other economic problems such as the heteroscedasticity, autocorrelation, and multicollinearity problems, the regression model will be tested with techniques such as the ARCH test, Breush-Godfrey Serial test, and correlation analysis to determine the presents of the economic problems. Given the inferential analysis, the OLS regression will be used to determine the link between the dependent variable over a set of independent. Given below is the OLS regression model for the stock market:

$$Log\ Y_t = \beta_0 + \beta_1 GDP + \beta_2 FDI + \beta_3 LR + \varepsilon_t$$

In the this equation, Y_t would be referring to the share price in stock exchange, while t is the time trend and given GDP refers to gross domestic product, FDI refers to foreign direct investment with an inward percentage of investment, and LR refers to the prime lending rate. Meanwhile, the following is the OLS regression for the bond market:

$$Log\ Y_t = \beta_0 + \beta_1 GDP + \beta_2 BY + \beta_3 CBR + \varepsilon_t$$

Given this equation, Y_t representing the J.P. Morgan government bond price index, where BY is referring to bond yield in 10 year common government bond and CBR is referring to the central bank reserve money. While the equation for foreign exchange market will be shown as below:

$$Log\ Y_t = \beta_0 + \beta_1 GDP + \beta_2 IR + \beta_3 IF + \beta_4 MS + \varepsilon_t$$

Likewise, in the equation for foreign exchange market, Y_t is referring to the effective exchange rate, IR is the interest rate, IF is the inflation rate in GDP deflator (Annual, %), and MS is representing the money aggregate M1.

Since, the null hypothesis, H_0, there is no relationship between the dependent and independent variable, as well, the alternative hypothesis, H_1, there is a relationship between dependent and independent variable as stated below:

H_0: There is no relationship between the dependent variable and the independent Variable.

H_1: There is a relationship between the dependent variable and the independent variable.

The null hypothesis will be rejected given the independent variable is significant to the dependent variable if the p-value > the significance level of 1%, 5%, 10%.

3.5.3.2 Unit Root

The unit root test is generally used to determine the stationary property of the time series data, to avoid from obtaining spurious results. In this study, the unit root test will be employed to determine the stationarity of the variables. It is important to be informed that the regression with non-stationary variables is biased and unreliable as such the regression with non-stationary variables will show relatively high t-statistics and high coefficient of determination, R Squares, yet relatively low Durbin Watson statistics (Baumohl and Lyocsa, 2009). While, the absence of unit root indicates that the mean, variance, and autocorrelation structure do not fluctuate or remain constant over time (Glynn, Perera and Verma, 2007). Thus, it is an essential to determine whether the variables used contain unit root in order to warrant the further interpretation (Elder and Kennedy, 2001). In this study, determining the variables whether stationary or non-stationary is relatively important as well the presence of the unit root may affect or influence the validity of the hypothesis testing about the parameters. To indicate the presence of unit root, the unit root test will be proceeding with the Augmented Dickey-Fuller (ADF) test, the Phillips-Peron (PP) test, and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test.

(A) Augmented Dickey-Fuller Test

The Augmented Dickey-Fuller (ADF) test is one of the unit root tests to determine the stationarity of variables in a regression. The ADF test is defined as a semi-parametric approach in determining the presence of unit root over large and complicated time series setting (Xiao and Phillips, 2005). For instance, the ADF test is employed in this study to include sufficient lagged dependent variables to discard the residuals of serial correlation (Mahadewa and Robinson, 2004). Given following is the regression for the ADF testing:

$$\Delta Y_t = \beta_0 + \beta_{1t} + \gamma Y_{t-1} + ai \Sigma \Delta Y_{t-1} + \varepsilon_t$$

While in this equation, β_{1t} is the trend variable, γY_{t-1} is the lagged level, and $ai \Sigma \Delta Y_{t-1}$ is the total lagged changes in variables. Likewise, the null hypothesis, H_0, will be that there is a unit root, while the alternative hypothesis, H_1, will be that the there is no unit root as per given below:

H_0: There is a unit root (Non-stationary)

H_1: There is no unit root (Stationary)

The decision rule for the ADF test, the null hypothesis will be rejected given there is no unit root if the p-value > the significance level of 1%, 5%, 10%.

(B) Phillips-Perron Test

The Phillips-Perron (PP) test differing from the ADF test particularly in the way to deal with the serial correlation and the heteroscedasticity in the errors (Cheong and Lai, 1997). For example, the Phillips-Peron unit root test is differing from the Augmented Dickey-Fuller unit root test particularly in term of the finite-sample behavior even though both of these tests share the same asymptotic distribution. The advantage of the Phillips-Perron test across the Augmented Dickey-Fuller test, said, the user does not require to specify a lag length for the test (Argyro, 2010). Following is the regression for the PP test:

$$\Delta Y_t = \beta' D_t + \rho Y_{t-1} + \varepsilon_t$$

While the hypothesis in the Phillips-Perron test is the same to the hypothesis in the ADF test given:

H_0: There is a unit root (Non-stationary)

H_1: There is no unit root (Stationary)

Provided that the null hypothesis will be rejected given there is no unit root if the p-value > the significance level of 1%, 5%, 10%.

(C) Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) Test

Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test is the third unit root test to be employed in the study. The KPSS test is differing from the unit root tests mentioned earlier as the KPSS test has a null of stationarity against the alternative assuming a series is non-stationary (Syczewska, 2010). Meanwhile, by employing the KPSS test in this study, it is an alternative to the ADF and PP tests with the null of stationarity (Herlemont, 2004). Likewise, the matching of the tests would reflect and show that the results are consistent. Given below is the regression for KPSS test:

$$Y_t = \beta + \sigma t + \varepsilon_t$$

As per mentioned earlier, the null hypothesis, H_0, the series is stationary, as well, the alternative hypothesis, H_1, the series contains a unit root:

H_0: The series is stationary

H_1: The series contains a unit root

Given the null hypothesis will be rejected when the T-statistic is more than the critical value at 1%, 5%, and 10% significant level. Otherwise, the null hypothesis shall not be rejected.

3.5.3.3 Granger-Causality Analysis

The Granger causality analysis will be employed in this study to determine the causal relationships among the financial markets in the selected countries, as such, the United States, the United Kingdom, the Australia, and the Canada. In general, the Granger causality is known as a technique to quantify the causal effect among the time series observation (Liu and Bahadori, 2012). In order to meet the objectives, it is important to employ the Granger causality analysis in the study to determine the causal relationship of the financial markets, as such:

i) Unidirectional causal relationship
ii) Bidirectional causal relationship
iii) No causal relationship

According to Ekanayake (1999), the Granger causality analysis requires the series to be stationary in order to prevent from spurious causality. Given following is the example of causality detection. An event A is a cause to event B, if:

i) A occurs before B
ii) The possibilities of A is non-zero
iii) The possibilities of occurring B given A is greater than the possibilities of occurring B alone

Below given the null and alternative hypothesis:

H_0 = No causal relationship

H_{1a} = Y_t affect X_t

H_{1b} = X_t affect Y_t

The decision rule for the Granger causality test, the null hypothesis will be rejected given there is a causal relationship between the two variables if the p-value > the significance level of 1%, 5% or 10%.

3.6 Conclusion

Overall, this chapter majorly discusses on how the research will be carried out under certain specific activities. For instance, these activities can be in terms of the research design, the data collection method, the sampling design, the data processing and the data analysis. Eventually, to further discuss the econometric treatment of this research, the following chapter will explain in details regarding on the tests, measurements, and result.

CHAPTER 4: DATA ANALYSIS

This chapter is to interpret and analyze the empirical results from the methodology in Chapter 3. Chapter 4 is separated into three different parts. In the first part, descriptive analysis is performed to summarize all the data collected and presented to show the movement of financial markets in four developed countries. Next, scale measurement is employed to ensure the empirical models obtain unbiased, efficient and consistent results. In the last section, several empirical tests such as Ordinary Least Square (OLS) regression, Unit Root Test, and Granger Causality Test are utilized. OLS is being used to study the connection between financial markets and macroeconomic variables. Unit Root Test is being used to examine the stationarity of financial markets and Granger Causality Test is being used to measure relationship of financial markets among and across four developed countries.

4.1 Descriptive Analysis

4.1.1 Stock Market

Table 4.1 displays the stock price among the four countries, namely United States, United Kingdom, Canada and Australia from the year of 1986 to 2010. United Kingdom has obtained the highest mean value of 79.68666, follow by Canada 68.3792 and Australia obtained 67.07960. The lowest mean value is obtained by United States 65.38680. It shows that the stock market in United States was unstable compared to United Kingdom. In the measure of market volatility, United States has become the most volatility country, with the standard deviation of 33.91095 follow by, Australia, Canada and United Kingdom have the lowest standard deviation. In addition, the stock prices in all countries have a positive

skewness except United Kingdom has a negative skewness. This indicates that the deviations from the mean were going to be positive. Besides, the measurement of kurtosis within the four developed countries stock price exhibited less than three, meaning that the distribution is flatter with a wider peak relative to the normal with the indication that the probability for extreme values is less than the one of normal distribution, and the values of indices are wider spread around the mean. The small P-values from table 4.3 indicated that the null hypothesis of normal distribution was rejected.

Stock Market				
Details	**Australia**	**Canada**	**UK**	**US**
Mean	67.07960	68.3792	79.68666	65.38680
Median	60.57000	67.2300	87.67500	74.14000
Maximum	144.02000	134.8200	124.20830	131.2700
Minimum	28.40000	29.690	30.80830	19.5800
Std. dev	31.64434	33.28199	30.55558	33.91095
Skewness	0.753791	0.527036	-0.103587	0.119265
Kurtosis	2.641092	1.998268	1.648009	1.731163
Jarque-Bera	2.501683	2.202642	1.948750	1.736296

Table 4.1 Descriptive Statistic for Stock Market

4.1.2 Bond Market

Table 4.2 displays the descriptive statistics of the four countries, namely United States, United Kingdom, Canada and Australia government bond prices over the year of 1986 to 2010. Canada has achieved the highest mean of 117.1072 compared to other countries. Follow by United Kingdom which has the mean of 112.1196, then Australia with an average of 111.82440, while United States has the lowest mean which is 111.4704 among the four developed countries. Canada and United Kingdom have obtained higher in mean value as they are two of the

largest markets in the world, judging by their high volume and level of market efficiency. The volatility of the markets, measured by the standard deviation, had shown the same pattern as the mean value in which Canada has the largest standard deviation compared to others and followed by United Kingdom, Australia and United States. On the other hand, skewness refers to a measure of asymmetry of the distribution of the series around its mean. According to the government bond indices, it is clear to see that Australia, Canada and United Kingdom have positive skewness where United States has negative skewness. Besides, kurtosis measures the peakness or flatness of the distribution of the series. The series are considered normally distributed if kurtosis equals to three. If kurtosis is more than three, the distribution is known as leptokurtic distribution, while for kurtosis of less than three, the distribution is known as platykurtic distribution. In this case, the kurtosis of bond prices in four developed countries exhibited less than three, meaning that the distribution is flatter with a wider peak relative to the normal with the indication that the probability for extreme values is less than the one of normal distribution, and the values of indices are wider spread around the mean. The large P-values from Table 4.1 indicated that the null hypothesis of normal distribution was not rejected in Jacque-Bera test statistic.

Bond Market				
Details	**Australia**	**Canada**	**UK**	**US**
Mean	111.82440	117.1072	112.1196	111.4704
Median	113.75000	119.000	115.8900	111.6300
Maximum	126.29000	136.7800	129.0800	129.1800
Minimum	95.52000	98.2800	92.7100	97.9000
Std. dev	8.65731	11.33198	10.9649	7.728839
Skewness	-0.356830	-0.234903	-0.471246	0.200150
Kurtosis	2.231234	1.947941	1.861803	2.599692
Jarque-Bera	1.146160	1.382859	2.274775	0.333782
Probability	0.563756	0.500859	0.320656	0.846292

Table 4.2 Descriptive Statistic for Bond Market

4.1.3 Foreign Exchange Market

Table 4.3 displays the descriptive statistics of the four countries namely, United States, United Kingdom, Canada and Australia foreign exchange rate over the year of 1986 to 2010. United Kingdom recorded the highest mean value (104.2628) follow by Australia (95.38312) and United States (90.15484). In foreign exchange rate, Canada has the lowest mean value of 89.78055. It shows that the foreign exchange rates in Canada are much lower compared to others. The volatility of the markets, measured by the standard deviation, the highest standard deviation is Australia (11.84279) follow by United Kingdom (10.42126), Canada (9.759098) and United States (9.552256). This results show that Australia is the most volatility country with their flexible foreign exchange rate. The foreign exchange rate in four countries have achieved a positive skewness. Besides, the kurtosis in United States and Australia are more than three, thus the distributions are known as leptokurtic distribution. However, the kurtosis in United Kingdom and Canada are less than three. The small P-values from Table 4.2 indicated that the null hypothesis of normal distribution was rejected.

	Foreign Exchange Rate			
Details	**Australia**	**Canada**	**UK**	**US**
Mean	95.38312	89.78055	104.2628	90.15484
Median	93.59720	89.55080	102.4609	88.94230
Maximum	126.80810	106.53410	121.4536	116.4369
Minimum	79.35400	77.17290	87.74630	76.44900
Std. dev	11.84279	9.759098	10.42126	9.552256
Skewness	0.805280	0.129329	0.002882	0.779940
Kurtosis	3.083114	1.582615	1.590304	3.391681
Jarque-Bera	2.709177	2.162378	2.052494	2.694419
Probability	0.258053	0.339192	0.358349	0.259965

Table 4.3 Descriptive Statistic for Foreign Exchange Market

4.1.4 Relationship Among Financial Market in Four Developed Countries

Based on the figures below, this study can compare the trend and determine the relationship among the financial markets in United States, United Kingdom, Canada and Australia. In accordance with Figure 4.1, it is clear to see that stock markets in four developed countries have the same directions which are increasing all along from year 1986 to 2010. However, there is a decline in stock prices along the time frame. It is believed that the downturn of stock prices is due to Asian financial crisis and Subprime mortgage crisis.

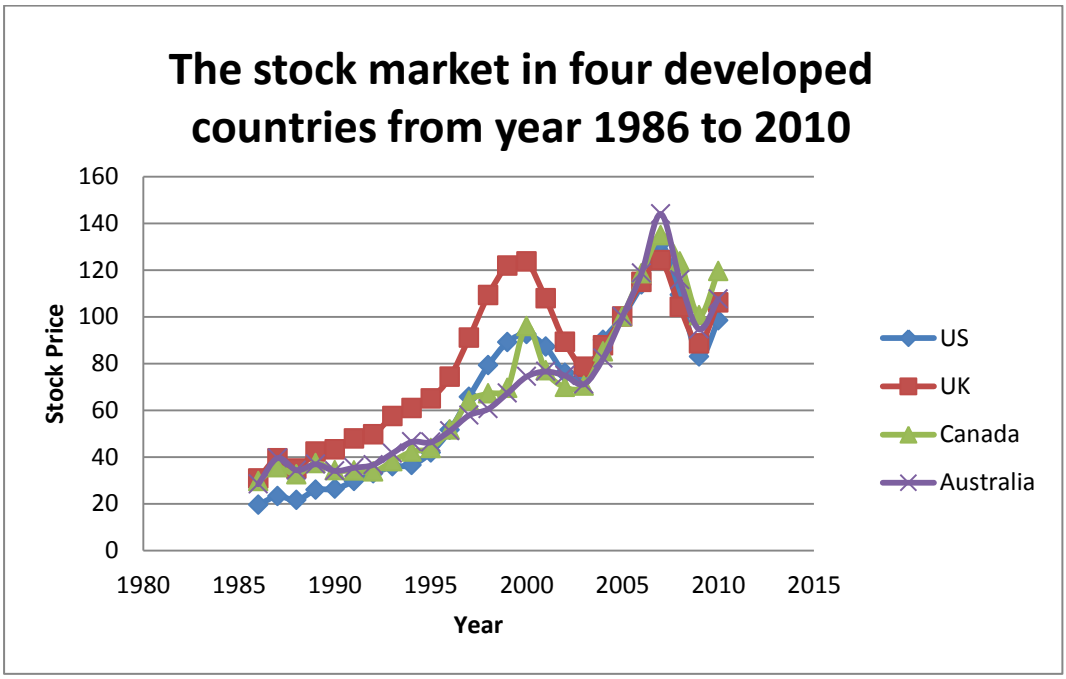


Figure 4.1: The Stock Markets in Four Developed Countries

Besides, Figure 4.2 has presented the movement of bond market in four developed countries. Based on the figure, the movement of bond markets is stable along from year 1986 to 2010 as the volatility of bond prices in the time frame is small. This is because government bonds are safe assets used by investors in their portfolios to diversify the unsystematic risk (Jorion, 1989).

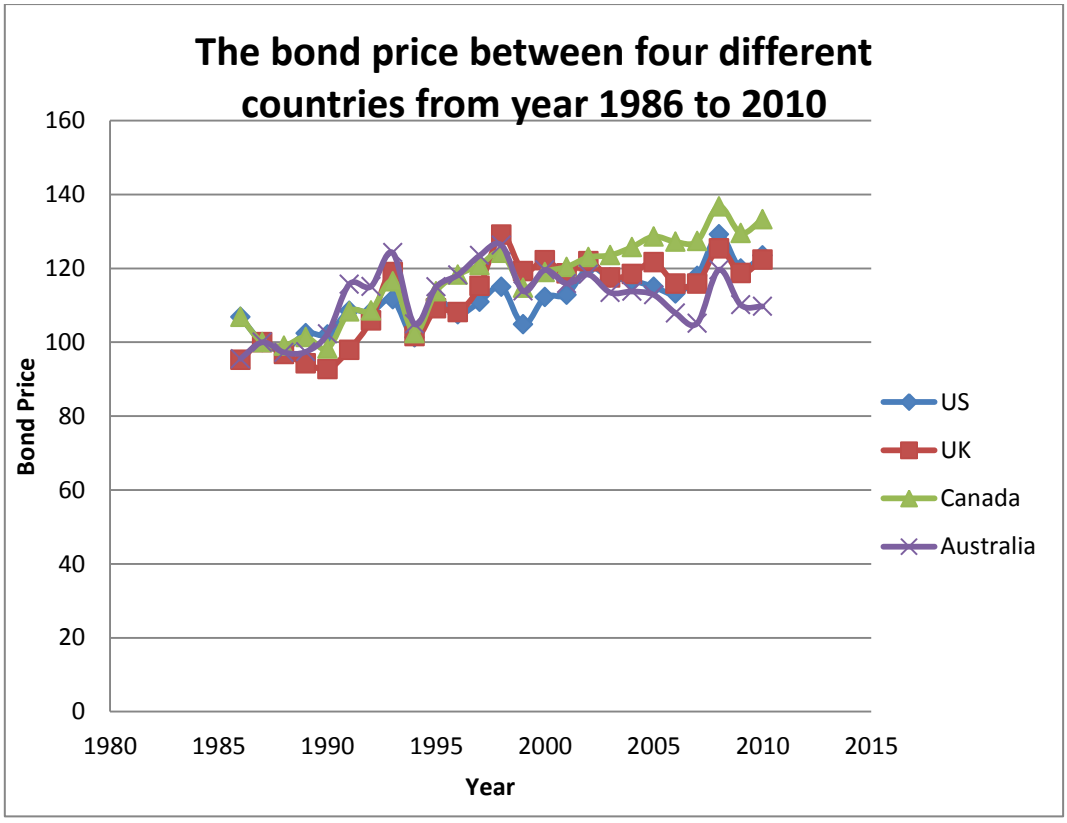


Figure 4.2: The Bond Market in Four Developed Countries

In addition, Figure 4.3 shows different results from stock and bond markets among the four countries. The exchange rate in United States is decreasing all along the year 1986 to 2010. However, there is a slightly increase during the year 2000 to 2005. In United Kingdom, the exchange rate inconsistent as it keeps fluctuating along the year. There is a decrease in exchange rate from year 1986 to 1998, and it started to increase from 1999 to 2007. From the year 2008 to 2010 the exchange rates decrease again. The decline of exchange rate in United Kingdom during the year 1998 and 2008 due to impact of economic crises occurred during the year. On the other hand, Canada and Australia are moving in the same direction. For instance, when the exchange rate in Canada is increase, the exchange rate in Australia is increase as well. A positive relationship in both countries is found. However, there is a negative relationship of exchange rate between United States, United Kingdom and Canada, Australia.

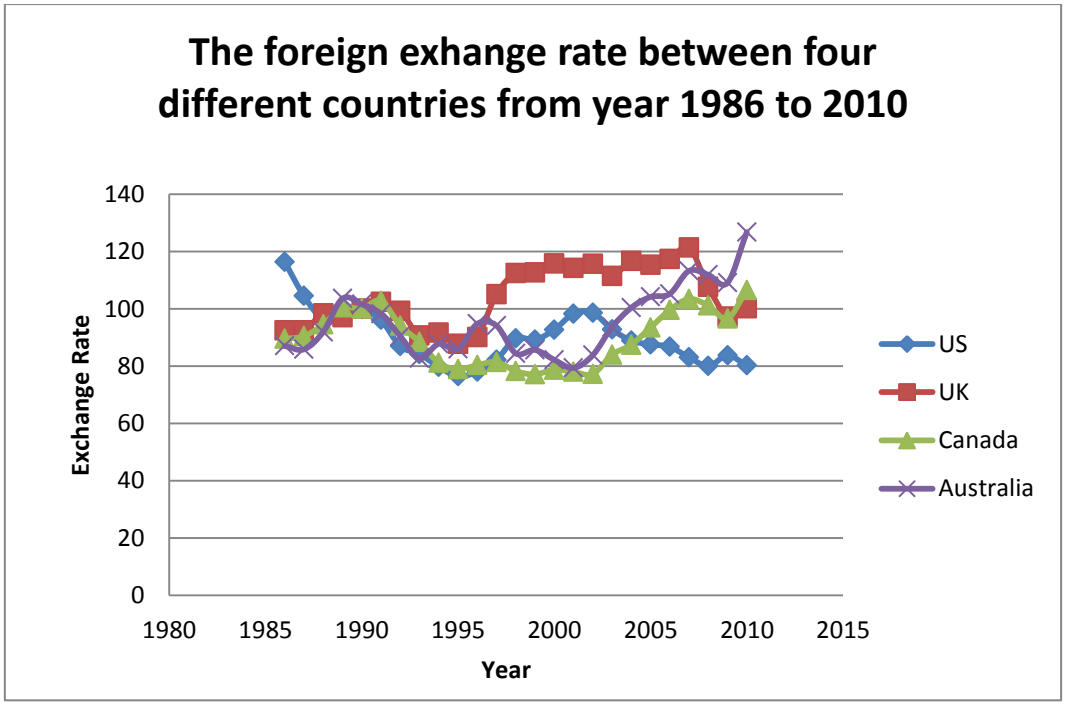


Figure 4.3: The Foreign Exchange Market in Four Developed Countries

4.1.5 Relationship Among Financial Market in a Single Developed Country

Figures below will show the movements among financial markets in a single developed country from year 1986 to 2010. According to Figure 4.4, 4.5 and 4.6, a similar movement among stock market and foreign exchange market in United Kingdom, United States and Canada which is an inverse relationship between stock price and foreign exchange rate is determined. Our result is consistent with existing studies. Soenen and Hanniger (1988) have discovered an opposite result between the linkages between stock prices and exchange rates. Based on their result, changes in stock prices have a strong positive impact to the United States currency (USD). Furthermore, Ajayi and Mougoue (1996) also found the mixed results. According to their empirical results, stock prices have negative impact to domestic currency values in short term, but positive impact in long term. They also found that depreciation in currency values will have negative effect on the stock market in short and long term.

However, the stock and bond markets in United Kingdom, United States and Canada are positively correlated. This means that when stock prices increase, the bond prices will tend to increase as well. Moreover, Hakim and McAleer (2009) have forecast conditional correlations between stock, bond and foreign exchange in Australia and New Zealand. They found that stock and bond markets are positively correlated. Stivers and Sun (2002) also achieve the similar result that stock and bond markets have positive relationship when the stock markets uncertainty is low.

Furthermore, bond and foreign exchange markets are negatively correlated. This indicates that when the bond prices increase, the exchange rates decrease. The result is consistent with the researchers Burger and Warnock (2006). They have proved that there is a negative relationship between bond price and foreign exchange rate. When U.S dollar depreciates, investors in United States will reduce interest to invest in local bond markets, bond yield will fall. Therefore, this study can conclude that, the financial markets in United States, United Kingdom and Canada have similar trends.

In the case of Australia, the relationships among the financial markets are inconsistent over year 1986 to 2010. The result is presented in Figure 4.7. This study cannot detect any consistent direction between the financial markets within the time period. From the year 1986 to 2000, there is a positive relationship between stock and bond markets. When the bond prices increases, the stock prices also increases, but in year 2001 to 2010, there is a negative relationship between bond prices and stock prices. On the other hand, the relationship between stock and foreign exchange markets in Australia are also inconsistent along the time frame. From the year 1986 to 2000, there is a negative relationship between stock prices and exchange rates. However, during the year 2000 onwards to 2010, it shows that the stock prices and exchange rates have a position relationship.

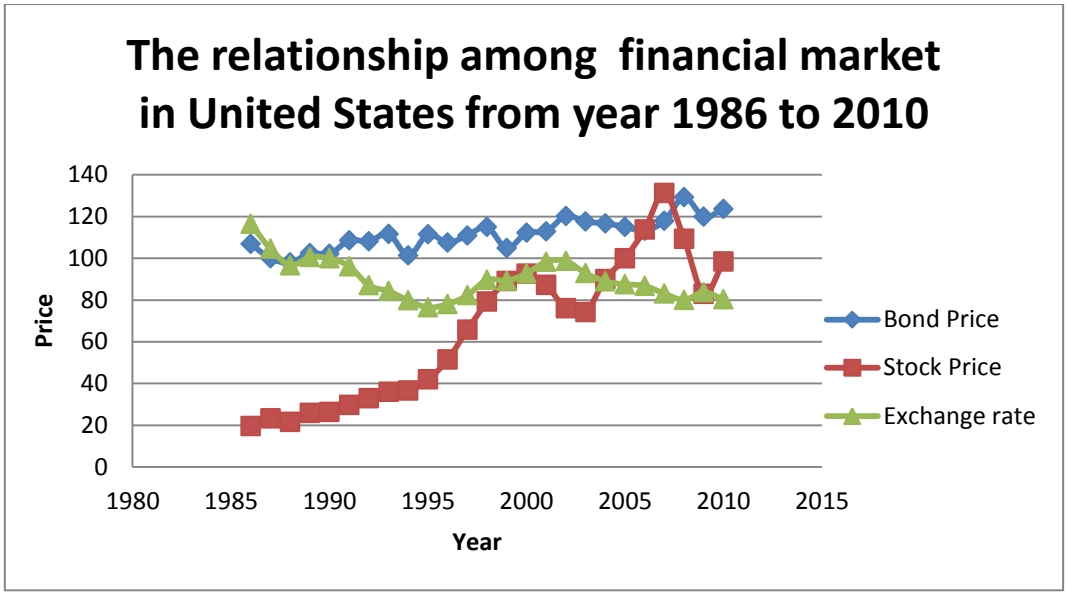


Figure 4.4: Relationship among Financial Market in United States

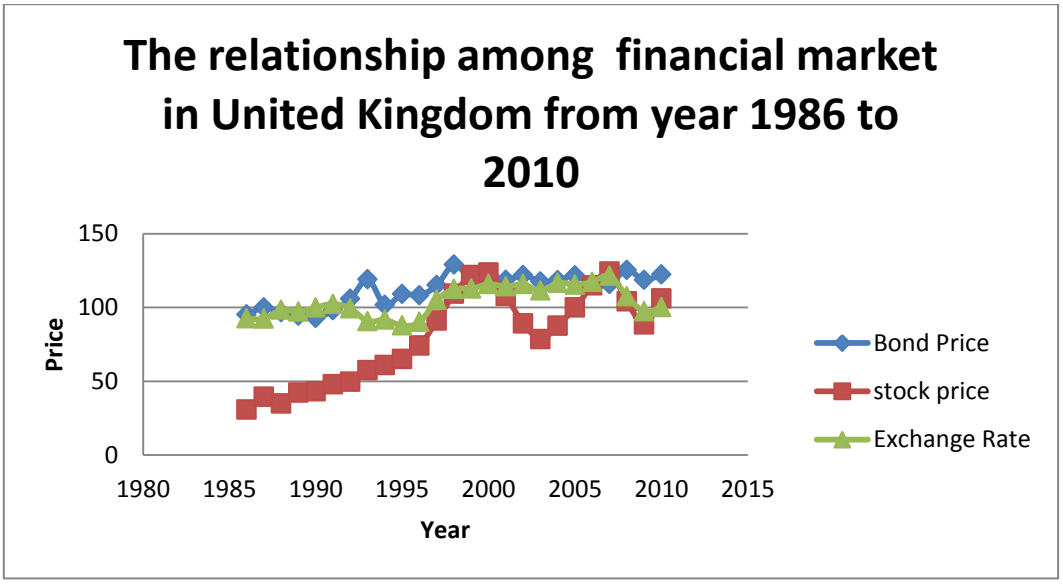


Figure 4.5: Relationship among Financial Market in United Kingdom

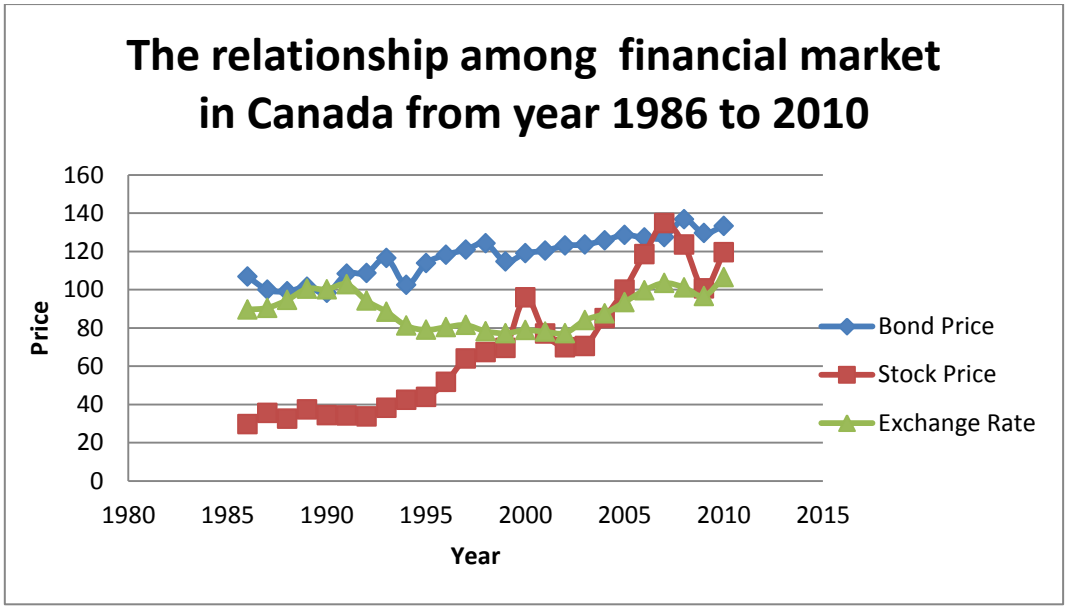


Figure 4.6: Relationship among Financial Market in Canada

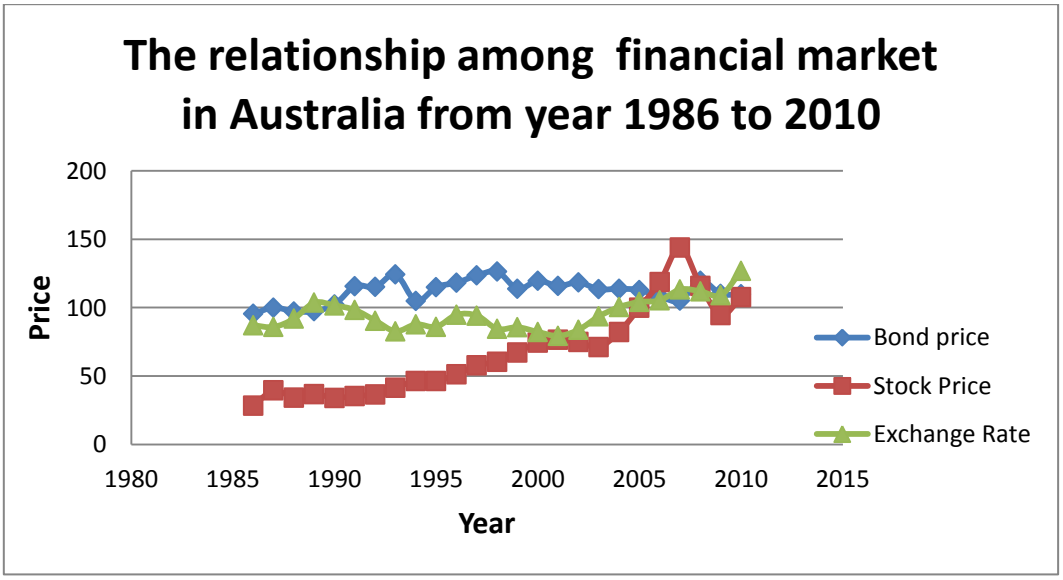


Figure 4.7: Relationship among Financial Market in Australia

4.2 Scale Measurement

Diagnostic checking has been done in different empirical models to ensure unbiased, efficient and consistent results (Kramer, Sonnberger, Maurer, and Havlik, 1985). First, normality test has performed to investigate whether the error term in the estimation model is normally distributed. According to Central Limit Theorem, the residual in the sampling distribution will be normally or closely distributed if the sample size of the empirical model is large enough (Ivo, Nicolas, and Jauna). The p-value of Jarque-Bera statistic is used to determine the result of the normality test. When the p-value is greater than the significant level of 1%, 5% or 10%, null hypothesis will not be rejected which indicate that the error term in the empirical model is normally distributed.

Next, Ramsey RESET test has performed to ensure the empirical models are correctly specified. This is because specification errors such as omitted relevance variables, inclusion of unrelated variables or incorrect functional form may arise in the empirical models (Ramsey, 1969). The p-value of the Ramsey RESET test is used to determine whether the models are free from the specification error. When the p-value is greater than significant level of 1%, 5% or 10%, null hypothesis will not be rejected which indicate that the empirical model is correctly specified.

Meanwhile, Covariance Analysis and Variance Inflation Factor (VIF) also performed to ensure that the macroeconomic variables in the empirical models do not inter-relate among each other. This is because multicollinearity problems can drive up the variance among the macroeconomic variables in the regression model and resulted incorrect conclusion about the relationships between dependant variable and independent variables (Robinson and Schumacker, 2009). The value of VIF is used to detect the degree of multicollinearity in the regression models. When the VIF is less than 10, there is no serious multicollinearity in the model.

Lastly, previous researches have proposed that there is high probability that heteroscedasticity and autocorrelation problems may arise in time series data (Chabot –Halle and Duchesne, 2008). Therefore, the autoregressive conditional heteroscedasticity (ARCH) test and Breusch-Godfrey Serial Correlation LM test are performed to investigate the existences of these problems in the regression models. This is because neglecting the effect of heteroscedasticity and autocorrelation problems may result to the loss of asymptotic efficiency and consistency to the empirical results (Engle, 1982 and Godfrey, 2006). The p-value of these two tests is used to determine that the models are free from that heteroscedasticity and autocorrelation problems. When the p-value is greater than significant level of 1%, 5% or 10%, null hypothesis will not be rejected which indicate that the empirical model is do not encounter with these problems.

4.2.1 Diagnostic Test for Stock Market

	Normality	Model Specification	Heteroscedasticity	Autocorrelation
United States	0.255875***	0.0673**	0.0409*	0.0020 0.3551***
United Kingdom	0.751441***	0.1072***	0.8874***	0.0063 0.2536***
Canada	0.676591***	0.0647**	0.7499***	0.0308*
Australia	0.698718***	0.0146*	0.1191***	0.2280***

Note: * Probability significant at significance level 1%, ** Probability significant at significance level 1% and 5 %, *** Probability significant at significance level 1%, 5% and 10%. Figure in red: Probability with the implementation of Cochrane-Orcutt Procedure and Breusch-Godfrey Serial Correlation Lagrange Multiplier test.

Table 4.4: Diagnostic Checking for Stock Market

According to Breiman (2001) who claims that it is crucial to assess the goodness of fit of the data models. In order to explain the empirical model correctly, the estimation of the structural coefficients and the standard errors must be consistent. Table 4.4 is constructed to explain the significance level for each diagnostic test.

Jarque-Bera test is used to test normality of error term as it is simple to compute. The probabilities for normality test on all samples are greater than 10%, the null hypothesis cannot be rejected, meaning that the error terms in the estimation model are normally distributed.

To ensure correctness functional form, the empirical models must be correctly specified. Ramsey Reset test is applied to provide simple indicator of nonlinearity which can be approximated by the inclusion of powers of the variables in the original model. The probability of F-statistic for Australia is significant at 1% level of significance while Canada and United States are significant at 5% level of significance. Lastly, United Kingdom is significant at 10% level of significance. As a result, the null hypothesis in the Ramsey Reset test cannot be rejected and concludes that all models are correctly specified.

ARCH test is useful to forecast the variance over time and can be predicted by past forecast errors (Mcnees, 1988). Based on probability of Chi square, all samples are significant at 10% level of significance. Therefore, there is no enough evidence to reject the null hypothesis which indicated constant variance and there is no heteroscedasticity problem.

To test for autocorrelation, serial correlation Lag-range Multiplier test is carried as it able to test serial correlation for higher orders and larger sample size as well. Referring to probability of Chi square for Australia, it is significant at 10% while Canada is significant at 1% level of significance, both countries showed no autocorrelation problem, hence null hypothesis is not rejected. However, for United States and United Kingdom, there were autocorrelation problem since the p-value < 0.01, 0.05 and 0.1. To treat the serial correlation, Cochrane procedure is

applied to transform the regression model into a form in which the OLS procedure is applicable. As a result, probability of Chi square for United States and United Kingdom are significant at 10% significance level. The null hypothesis is rejected and autocorrelation is solved.

To test multicollinearity problem, VIF is tested and the result showed no presence of serious multicollinearity as VIF is less than 10. This concludes that variables in this model are not highly correlated as shown in Appendix 1.0.

4.2.2 Diagnostic Test for Bond Market

	Normality	Model Specification	Heteroscedasticity	Autocorrelation
United States	0.389356***	0.2946***	0.238***	0.9956***
United Kingdom	0.462074***	0.488***	0.9422***	0.6216***
Canada	0.849538***	0.5208***	0.5268***	0.6146***
Australia	0.68937***	0.8555***	0.4979***	0.2704***

Note: * Probability significant at significance level 1%, ** Probability significant at significance level 1% and 5 %, *** Probability significant at significance level 1%, 5% and 10%.

Table 4.5: Diagnostic Checking for Bond Market

Based on the Table 4.5, United States, United Kingdom, Canada and Australia are significant at all significance level. The model used is applicable in all the selected countries because the error terms are normally distributed among the countries. Model misspecification was the other problem needed to take into account. In the

case of Ramsey RESET test, Table 4.5 shows that none of the countries are experiencing the model specification problem. All the selected countries are having a consistent significant result in significance level of 1%, 5% and 10%. Meanwhile, using the ARCH test, it reflects that among all the selected countries, the p-values are all greater than the significance level 1%, 5% and 10%. This implied that there is no heteroscedasticity problem present among the selected countries.

Autocorrelation problem was one of the problem frequently exist in time series data. By using Breusch-Godfrey Serial Correlation LM Test, this problem can be detected easily. P-value of Australia is 0.2704 which is lower than all significance level. No autocorrelation problem exists for this country. While the P- value of Canada is 0.6146, United Kingdom is 0.6216 and United States is 0.9956. All of these implied that the selected countries are not experiencing autocorrelation problem. Based upon the results shown in Appendix 1.0, a consistent result in the absence of serious multicollinearity was observed. When the VIF value is greater than 10, it implies present of serious multicollinearity problem. However none of the countries show the degree of VIF greater than 10.

4.2.3 Diagnostic Test for Foreign Exchange Market

	Normality	Model Specification	Heteroscedasticity	Autocorrelation
United States	0.776719***	0.0627**	0.2544***	0.0283*
United Kingdom	0.217194***	0.1147***	0.0237*	0.0010 0.5488***
Australia	0.836768***	0.4457***	0.9373***	0.8282***
Canada	0.697590***	0.6760***	0.0520**	0.0011 0.9668***

Note: * Probability significant at significance level 1%, ** Probability significant at significance level 1% and 5 %, *** Probability significant at significance level 1%, 5% and 10%. Figure in red: Probability with the implementation of Cochrane-Orcutt Procedure and Breusch-Godfrey Serial Correlation Lagrange Multiplier test.

Table 4.6: Diagnostic Checking for Foreign Exchange Market

These results in Table 4.6 had shown that there are no economic problems in various aspects, given that the selected countries were taken into account. The diagnosis checking for normality of residuals has shown a unanimous result indicating that the error terms were normally distributed. Referring to Table 4.6 it provides the evidence showing that the error terms were normally distributed at the significance level of 1%, 5%, and 10% in every country. Meanwhile, the diagnostic testing for model specification has shown that the United Kingdom, Australia, and Canada are not experiencing model specification errors at the significance level of 10%. Given the result above in Table 4.6, it has shown that the model specification error is absent and consistently significant at the significance level of 1% and 5% which warrant the further interpretation.

The Arch test has shown that there is no heteroscedasticity problem presented at the significance level of 1% among all the selected countries which indicates that the variance of the errors is constant at the significance level. Specifically, only the United States and Australia are completely significant at the significance level of 1%, 5%, and 10%. Given the probability above, autocorrelation error has shown initially in the United Kingdom and Canada. The error was corrected for by applying the Cochrane-Orcutt Procedure and further with the Breusch-Godfrey Serial Correlation Lagrange Multiplier test as the diagnostic testing of autocorrelation problem for all these countries. Referring to Table 4.6, autocorrelation error was corrected and the probability was all significant at the significance level of 1%. Likewise, the United Kingdom, Australia, and Canada have shown a consistent significant at the significance level of 1%, 5%, and 10%.
There showed consistent results indicating that there are no serious multicollinearity problems among the independent variables in all the countries. Referring to the Appendix 1.0 every selected country has shown a similar issue on the correlation between GDP and Money Supply in which the correlation between these variables was slightly higher compared to the others. The VIF testing was taken and the results showed that the VIF degrees between GDP and Money Supply of every country did not achieve by for more than 10 which it implies that there does not have any serious multicollinearity issue.

4.3 Inferential Analysis

4.3.1 Impact of Macroeconomic Variables on Three Financial Markets

The relationships between stock markets in United States, United Kingdom, Canada, and Australia and macroeconomic variables have been analyzed by using Ordinary Least Square (OLS) method. The results of the OLS estimation are presented in Table 4.7, Table 4.8 and Table 4.9.

4.3.2 Stock Market

Table 4.7 has shown the OLS regression results for four countries in stock markets. The R square presented in each models implies that the stock price in each countries are well explained by the macroeconomic variables which includes, GDP, FDI and Lending rate. Besides, the F statistic in each models also shows zero probability (P-value = 0) which indicate that the regression model are significant at 1%, 5% and 10%. Moreover, according to the result indicated, the coefficient in all models shows zero p-value which implies that stock prices have great sensitivity on the macroeconomic variables.

As noted in table, GDP is positively and significantly affects the stock prices in all countries at 1% significance level except United Kingdom at 10% significance level. The results conducted are in line with the expected sign which stated that GDP will positively affect the stock prices. This result also consistence with the previous studies. For instance, Rousseau and Wachtel (2000) and Arestis, Demetriades, and Luintel (2001) also stated that GDP is found to be the most significant factor and positively influence the stock prices.

In addition, the regression result for FDI shows that FDI is positively and significantly affects the stock prices in all countries at 1% significance level except Australia at 10% significance level. Again, the result is same with the expectation that stock prices and FDI have positive relationship as FDI is vital factor in examining the volatility of stock prices. The finding is in line with the past researches such as Giroud (2007), Adam and Anokye et al (2008) and Rukhsana (2009).

In contrast, lending rate is negatively and significantly affects the stock prices in all countries at different significant level. For instance, United States is significant at 1%; United Kingdom and Australia are significant at 5% while Canada is significant at 10%. The adverse relationship shown is consistent with the expectation that lending rate will negatively affect the stock prices and in line with studies done by Gertler and Gilchrist (1994) and Bernanke and Kuttner (2005).

4.3.3 Bond Market

Table 4.8 has shown the OLS regression result for four countries in bond market. The R square presented in each models implies that the government bond indices in each countries are well explained by the macroeconomic variables (Gross Domestic Product, Bond Yield, and Central Bank Reserve). Besides, the F statistic in each models also shows zero probability (P-value = 0) which indicate that the regression model are significant at 1%, 5% and 10%. Moreover, from according to the result indicated, the coefficient in all models shows zero p-value which implies that government bond indices have great sensitivity on the macroeconomic variables.

Based on the Table 4.8, GDP is negatively affecting the government bond indices in all countries except Canada at different significant level. The adverse effect is inconsistent with the expectation as that bond prices and GDP are positive correlated. This result is contradictory with the existing studies such as Borensztein and Mauro (2002), Hakansson (1999), and Andersson, Krylova, and Vähämaa (2004) which validate that GDP is positively and significantly affects bond market. However, the results of United States, United Kingdom and Australia are in line with the research from Harvey (1989). He found that economic growth and bond prices have significantly and negatively affects on bond prices. Demand of government bonds as a secure investment in economic recession will increase and resulted an increase of bond prices. On the other hand, the regression conducted has shown that the government bond indices in United States and United Kingdom are insignificant with GDP. This result is consistent with (Soh and Cheng, 2013) as they found that GDP has no impact and insignificantly on five year, ten year and twenty year government bond yields spread in United Kingdom as well as United States. Besides, Braun and Briones (2006) and Thumrongvit, Kim, and Pyun (2013) have found an insignificant results between government bond prices and GDP are because of the existence of "crowding out" effect when the government bonds diminished the shares of private bond in the overall bond market.

In addition, according the empirical results, it is clear to see that bond yield is negatively and significantly affect the government bond indices in all the countries at all significant level. The counter impact between bond yield and bond market is constant with the expectation. Besides, the results also in line with the existing studies such as Chen, Lesmond and Wei, (2007), Ogden (1987) and Mamaysky and Wang (2004) have demonstrates that bond yield have significant and inverse relationship toward bond prices.

Moreover, as stated in Table 4.8, the relationship between government bond indices and central bank reserve are varying among the four countries. As illustrated, the bond market and reserve in United States and Australia are significantly and positively correlated, bond market and reserve in Canada is significantly and negatively correlated while bond market and reserve in United Kingdom is uncorrelated. The negative impact is in line with the expectation that a decrease in central bank reserve requirement will increase the bond price. This result is also consistent with existence research from Bernanke and Blinder (1988). They have determined that a decrease in central bank reserve will increase the money supply to the market and lead to the decrease of interest on bond. As aforementioned, when interest rates decline, bond price will increase. In contrast, the positive impact is contradictory with our expectation. The positive impact however, is consistent with previous research that when central bank increase the reserve requirement to tighten the monetary policy, Treasury bond price will increase as the demand of the Treasury bond has increased. This is because investors tend to buy bond to preserve their assets (Greenspan, 2005). Last but not least, Hanes (2006) reveal that changes in reserve quantities will negatively affect the bond yield but only specifically to non-borrowed reserve. However, the changes in reserve requirement rate were insignificant to bond yield.

4.3.4 Foreign Exchange Market

Table 4.9 has shown the OLS regression result for four countries in foreign exchange markets. The R square presented in each models implies that the

effective exchange rate in each countries are well explained by the macroeconomic variables (Gross Domestic Product, Interest rate, Inflation rate and Money supply). Besides, the F statistic in each models also show very low probability which indicate that the regression model are significant at 1%, 5% and 10%. Moreover, according to the result indicated, the coefficient in all models shows zero p-value which implies that effective exchange rates have great sensitivity on the macroeconomic variables.

As stated in Table 4.9, the effective exchange rate and GDP are positively and significantly correlated in all countries at 10% significant level except Canada shows negative relationship. The positive linkage between effective exchange rate and economic growth is consistent with our anticipation and in line with former studies. Ito, Isard, and Symansky (1999) have found that there is a positive and significant relationship between economic growth and exchange rate. By implementing the Balassa-Samuelson hypothesis, they have concluded a positive correlation between economic growth and currency appreciation in Japan, Hong Kong and Singapore. Besides, Lommatzsch and Tober (2004) have validated that an increase in economic productivity (GDP) will result to the real appreciation of an country‘s currencies and exchange rate. On the other hand, the result of negative impact between exchange rate and GDP in Canada can be explained by Reinhart (2000). He has found that economic productivity and exchange rate are negatively and significantly correlated. This is because when the economy productivity is favorable, many emerging market such as Canada and Japan are reluctant to increase the exchange rate to remain competitiveness in export market.

On the other hand, according to the Table 4.9 the effective exchange rate and interest rate are positively and significantly correlated in all countries at 10% significant level except United States shows negative relationship. The positive influence is constant with our expectation as higher interest rate implies that investors could get higher return compared to other countries. Thus, it can attract foreign capital and cause the exchange rate to increase. This result is consistent with the present researches such as Inci and Lu (2004), Chen (2004), Kanas (2005), and Hoffmann and MacDonald (2009). They have demonstrated the

positive relationship between exchange rate and interest rate by applying different estimation and framework. However, the negative impact is inconsistent with our expectation that interest rate will negatively affect exchange rate. Liu (2007) have found that the interest rate in different market and regime will influence the exchange rate separately due to the discrepancy of policy orientation. Moreover, Engel (1986) also has validated that interest rate and exchange rate are negatively correlated when the inflation rates rises more than the interest rate.

Furthermore, the regression result in Table 4.9 has shown that effective exchange rate and inflation rate all countries are positively correlated except United States shows negative relationship. The positive effect is inconsistent with our expectation. This is because when inflation rate increase, a country's import will exceed the export and demand more foreign currency. As a result, the exchange rate of the country will decrease. Our expectation is in line with the previous studies. Yang (1997) has performed a model to validate that inflation has negative impact to exchange rate. When inflation is higher, the import market in a country will decline and result a decrease of currency value or exchange rate. However, his result also reveals that inflation and exchange rate is statistically insignificant across the industries in United States which had also explained the insignificant impact in our results. In addition, McCarthy (2000) has validated that changes in inflation is negative but statistically insignificant to exchange rate changes in developed countries such as Sweden, Switzerland and States. However, for the positive impact, our result is consistent with finding from Arize, Malindretos, and Nippani (2004). They have found that inflation variability and exchange rate variability is positively correlated and statistically significant. In addition, Sek, Ooi, and Ismail (2012) have found a mix correlation between inflation rate and exchange rate in developed countries prior and after the IT-period. Besides, Kara and Nelson (2002) found that inflation rate and exchange rate have a positive and statistically insignificant relationship in United Kingdom.

Lastly, the empirical result shown that money supply is negatively and statistically significant to exchange rates at 5% significant level in all countries. These negative findings are consistent with our expectation that money supply is

negatively correlated with exchange rates. This is because increase in money supply indicates that a country is supplying money to foreign by importing goods or selling the domestic bond, as a result, it may lead to a decrease in exchange rate. Furthermore, our result is consistent will the existences studies. Levin (1997) has examined the relationship between money supply growth and exchange rates by using the Dornbusch model. He validated that when money supply growth increase, domestic currency will decrease. Besides, Arabi (2012) has found that money supply and exchange rate is negatively correlated in long run. This is because when money supply increases, the export market will decline due to the increase in domestic price which in turn cause the exchange rate to depreciate. In addition, as expected theoretically, Kia (2013) also found that the growth of money supply and exchange rate have negative and significant relationship in Canada.

OLS Result

Stock Market

	Coefficient	GDP	FDI	LR	R-square	F-Statistic
United States	3.379171***	0.000104***	0.033416***	-0.051451***	0.933962	99.00027***
	(0.0000)	(0.0000)	(0.0031)	(0.0013)		(0.0000)
United Kingdom	3.957868***	0.000412*	0.014164***	-0.047196	0.831527	34.54973***
	(0.0000)	(0.0890)	(0.013)	(0.0276)**		(0.0000)
Canada	2.988636***	0.001095***	0.012244***	-0.018042*	0.973033	252.5734***
	(0.0000)	(0.0000)	(0.0000)	(0.0671)		(0.0000)
Australia	3.571516***	0.00000101***	0.015816*	-0.03071**	0.910294	71.03251***
	(0.0000)	(0.0000)	(0.0615)	(0.0165)		(0.0000)

Note: *** Probability significant at significance level 1%, 5% and 10 %, ** Probability significant at significance level 5% and 10 %, * Probability significant at significance level 10%.

Table 4.7: Estimation of OLS Regression for Stock Market

Bond Market

	Coefficient	GDP	BY	CBR	R-square	F-Statistic
United States	5.044155***	-0.00000915	-0.046273***	0.0000765**	0.854508	41.1127***
	(0.0000)	(0.1664)	(0.0009)	(0.0306)		(0.0000)
United Kingdom	5.133807***	-0.000084	-0.049361***	-0.000147	0.862585	43.94052***
	(0.0000)	(0.2585)	(0.0000)	(0.6482)		(0.0000)
Canada	5.141897***	0.00023**	-0.046869***	-0.008487**	0.940032	109.7284***
	(0.0000)	(0.0266)	(0.0000)	(0.0162)		(0.0000)
Australia	5.109664***	-0.000000341***	-0.03334***	0.00000297**	0.754368	21.4979***
	(0.0000)	(0.0002)	(0.0000)	(0.0193)		(0.0001)

Note: *** Probability significant at significance level 1%, 5% and 10 %, ** Probability significant at significance level 5% and 10 %, * Probability significant at significance level 10%.

Table 4.8: Estimation of OLS Regression for Bond Market

Foreign Exchange Market

	Coefficient	GDP	IR	IF	MS	R-square	F-Statistic
United States	5.342414*** (0.0000)	0.0000435*** (0.0010)	-0.031014*** (0.0031)	-0.027751 (0.1511)	-0.000914*** (0.0000)	0.741669	14.35503*** (0.000011)
United Kingdom	3.982605*** (0.0000)	0.000929*** (0.0003)	0.020188* (0.0682)	0.014846 (0.1524)	-0.000000675*** (0.004)	0.645734	9.113673*** (0.000232)
Canada	4.22054*** (0.0000)	-0.00036* (0.0802)	0.028019*** (0.0087)	0.042828*** (0.0003)	-0.00168*** (0.0024)	0.636749	8.764574 (0.000295)
Australia	3.955464*** (0.0000)	0.00000123*** (0.0010)	0.021543** (0.0240)	0.014268** (0.0173)	-0.00000362** (0.0115)	0.84443	27.13981 (0.000000)

Note: *** Probability significant at significance level 1%, 5% and 10 %, ** Probability significant at significance level 5% and 10 %, * Probability significant at significance level 10%.

Table 4.9: Estimation of OLS Regression for Foreign Exchange Market

4.4 Unit Root Test

ADF, PP and KPPS are utilized in this chapter. The result of the unit root tests have presented in Table 4.10. For ADF test, the interpret results shows that the stock indices at 1st difference are no stationary in both intercept and intercept and trend. However, the PP and KPSS test shows consistent results as all the stock indices at 1st difference are stationary at 1% and 5% significant level in intercept and intercept and trend. This indicates that the p value in ADF test cannot reject the null hypothesis whereas the p-value in PP test can reject the null hypotheses and T-statistic in KPSS test is less than its critical value. Overall, stock exchange indices in our model are stationary which all countries are set as I=0.

Country		ADF	PP	KPSS
United States	Intercept	0.7896	0.0135**	0.210973***
	Intercept and trend	0.7024	0.0578*	0.064208***
United Kingdom	Intercept	0.0891*	0.0098***	0.224071**
	Intercept and trend	0.1558	0.0499**	0.058837***
Canada	Intercept	0.0008***	0.0008***	0.069881***
	Intercept and trend	0.0055***	0.0055***	0.068825***
Australia	Intercept	0.0065***	0.0005***	0.073063***
	Intercept and trend	0.0320**	0.0040***	0.057509***

***Significant at 1%, 5% and 10% **Significant at 1% and 5% *Significant at 10%

Table 4.10: Stationary Test on Stock Exchange Indices in Developed Countries

For bond market, Table 4.11 shows that all government bond indices are stationary at 1% and 5% significant level in both intercept and intercept and trend. This indicates that the p value in ADF and PP test can reject the null hypothesis while the T statistics in KPSS test are less than its critical value. Overall, government bond indices in our model are stationary which all countries are set as I=0.

Country		ADF	PP	KPSS
United States	Intercept	0.0009***	0.0000***	0.184463***
	Intercept and trend	0.0353**	0.0000***	0.120449**
United Kingdom	Intercept	0.0000***	0.0000***	0.177190***
	Intercept and trend	0.0029***	0.0000***	0.129077**
Canada	Intercept	0.0000***	0.0000***	0.081085***
	Intercept and trend	0.0013***	0.0000***	0.071878***
Australia	Intercept	0.0000***	0.0000***	0.218158***
	Intercept and trend	0.0000***	0.0000***	0.133708**

***Significant at 1%, 5% and 10% **Significant at 1% and 5% *Significant at 10%

Table 4.11: Stationary Test on Government Bond Indices in Developed Countries

In the case of foreign exchange rates, stationary test (ADF and PP) in Table 4.12 shows that the foreign exchange rates in all countries except United Kingdom have unit root problem which is non stationary. This indicates that the p value in both tests cannot reject the null hypothesis at 1%, 5% and 10% significant level in both intercept and intercept and trend. However, according to result from KPSS test, foreign exchange rates in all countries show stationary results. The T-statistics of KPSS are less than its critical value at 1%, 5% and 10% significant

level. Overall, foreign exchange rate in our model are stationary which all countries are set as I=0.

Country		ADF	PP	KPSS
United States	Intercept	0.0196**	0.0197**	0.211998***
	Intercept and trend	0.1048	0.1053	0.137057**
United Kingdom	Intercept	0.0112**	0.0119**	0.174900***
	Intercept and trend	0.0389**	0.0412**	0.098844***
Canada	Intercept	0.0844*	0.0844*	0.237674***
	Intercept and trend	0.1761	0.1789	0.100136***
Australia	Intercept	0.0150**	0.0150**	0.226348***
	Intercept and trend	0.0487**	0.0487**	0.076256***

***Significant at 1%, 5% and 10% **Significant at 1% and 5% *Significant at 10%

Table 4.12: Stationary Test on Foreign Exchange Rates in Developed Countries

4.5 Granger Causality Test

As aforementioned in chapter 3, granger causality test is used to examine the short term relationship among financial markets in the four developed countries. The results of the test has presented in Table 4.13, Table 4.14 and Table 4.15. These tables provide a better understanding about the causal effect among the financial markets in Unite States, United Kingdom, Canada and Australia. The null hypothesis in granger causality test shows no granger causality among the financial markets whereas the rejection of null hypothesis indicates that there is short run relationship among the financial markets. P-value has been used to determine the results. If p-value less than the significant level 1%, 5%, or 10%, there is enough evidence to reject the null hypothesis.

4.5.1 Cross Countries Granger Causality Test on Stock Market

Based on table 4.13, there is no bi-directional causal effect among the four countries. This is result is consistent with earlier studies. Zhang, In, and Farley (2004) have examine the relationship among international stock markets by applying the wavelet multicasting method. They found that the stock market in United States, United Kingdom and Japan has bi-directional causal effect in daily and weekly basis. However, they also reveal that the causality effect is inconsistent in monthly and annually basis. In addition, there is unidirectional causal relationship from United States to United Kingdom at 10% significant level. The results are consistent with Hatemi, Roca, and Buncic (2011) have investigated the casual effect among the global stock market by using leveraged bootstrap approach. According to their results, there was a bidirectional effect causal effect between United States and Germany and between United States and Japan. Besides, they also found a unidirectional causal effect between the United States, Canada and United Kingdom and United States. The unidirectional causal effect indicates that the international stock market is more efficient in responding to the spillover of information from each other. In addition, Arshanapalli and Doukas (1993) have determined the linkage and dynamic relationships among the

international stock market movement by implementing the bi-variate co-integration and granger causality approach. They have validated that after the international stock market crash in 1987, United States has unidirectional causal effect to France, German and United Kingdom stock markets due to financial deregulation. Roca (1999) has studied the stock prices in Australia and international. He found that Australia are not interlinked with other markets which are in line with our findings that stock market in Australia does not granger cause stock market in Canada. However, based on the Granger causality test, he has revealed that the stock market in Australia is significantly correlated with the stock market in United States and UK. Our result also explains that there are unidirectional causality effect on Australia to United States and United Kingdom at 1%, 5%, and 10% significant level.

	United States	United Kingdom	Canada	Australia
United States	-	0.2374	0.4933	0.0032***
United Kingdom	0.0587*	-	0.3451	0.0034***
Canada	0.9850	0.9976	-	0.8991
Australia	0.7311	0.3848	0.5158	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.13: Granger Causality Test for Stock Market

4.5.2 Cross Countries Granger Causality Test on Bond Market

Based on the result presented in Table 4.14, a bi-directional causal effect is found between United Kingdom and Australia and unidirectional causal relationship from United States to United Kingdom and Canada to United Kingdom. Ciner (2007) has examined the relationship among the international government bond market applying the co-integration and granger causality analyses. Based on his findings, there is no co-integration among the government bonds in four countries. However, he reveals that the granger causality results show that United States has unidirectional casual relationship to United Kingdom, Japan and Germany. The unidirectional casual effect suggests that the government bond market in United States is more significant to information transmission especially the monetary policy innovations. Besides, Vo (2009) has investigated the causality relationship between Asian and United States bond market. The results presented in table 4.14 are consistent with his studies as United States does not granger cause Australia and Australia does not granger cause United States. Laopodis (2010) has studies the dynamic causal relationship among the government bond yield in United States, United Kingdom, German and Japan by employing the bi-variate and multivariate approach. He found that a significant short term casual effect among the bond yields. This indicate that the there are causality relationship among all the bond markets. Moreover, Clare, Maras and Thomas (1995) have examined the international bond market using government bond indices in United States, United Kingdom, German and Japan over 5 year maturity by employing univariate approach. They have discovered that international bond market have very low causality relationship. This indicates that the bond market in United States, German and Japan offer long run diversification benefit to investor in United Kingdom.

	United States	United Kingdom	Canada	Australia
United States	-	0.4718	0.4738	0.5565
United Kingdom	0.0139**	-	0.0000***	0.0008***
Canada	0.3623	0.2228	-	0.2025
Australia	0.3320	0.0196**	0.1166	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.14: Granger Causality Test for Bond Market

4.5.3 Cross Countries Granger Causality Test on Foreign Exchange Market

As noted in Table 4.15, there is no bidirectional causality relationship among the effective exchange rate in four countries. The results are consistent with past researches. Bekiros and Diks (2008) have examined the causality relationship among six currencies and found that the foreign exchange market become more internationally integrated after the Asian financial crisis. Evidence from their findings suggests that, during the pre crisis period, there are two bidirectional linkages between GDP and EUR and CAD and JPY and unidirectional linkages from CHF to EUR and CAD to GBP. Kuhl (2009) has investigated the co-movement between the exchange rates in United States and United Kingdom. Based on the findings, there is no bidirectional causality relationship between the exchanges rates in short run, but he reveals that they are correlated in the long run. This result is in line with our result in the sense that there is no directional causal effect among the exchange rates in all countries except United Kingdom. A unidirectional causality effect is found in United Kingdom to the remaining

countries at 1%, 5%, and 10% significant level. This indicates that United Kingdom is granger cause United States, Canada and Australia. However, our results are inconsistent with Partheniadis (2011) and Yuvaraj, Jayapal, and Sathya (2012). They has validated that United Kingdom does not granger because United States, Canada and Australia. However, their studies also suggest that there is no causality relationship among the exchange rates in United States, Canada and Australia. This result is consistent with our findings that there is no evidence to reject the null hypothesis in United States, Canada and Australia. In short, this research can conclude that over all the time scales, there is no global causality relation prevailing in the foreign exchange market due to different time horizon and form of market efficiency.

	United States	United Kingdom	Canada	Australia
United States	-	0.0005***	0.3321	0.8081
United Kingdom	0.5265	-	0.2576	0.2934
Canada	0.9583	0.0000***	-	0.5952
Australia	0.9768	0.0000***	0.9036	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.15: Granger Causality Test for Foreign Exchange Market

4.5.4 Granger Causality Test on Financial Markets in Single Country

4.5.4.1 United States

Based on Table 4.16, there is no bidirectional causality relationship between financial markets in United States. Results also show that the financial markets in United States do not granger causes each other as p-values in the granger causality test do not have enough evidence to reject the null hypothesis. However, a unidirectional causality relationship is determined in stock market to bond market at 1%, 5%, and 10%, significant level. This indicates that stock market granger cause the bond market in United States. Our result is consistent with existing studies from Zhou and Sornette (2004). They have investigated the correlation and causality between S&P 500 and bond yields in United States and found that changes stock market will have direct impact to federal fund rate, and result the changes in short term yield and long term yield. Stavarek (2004) has examined the relationship between stock price and exchange rate in United States and found that the stock price and exchange rate do not granger cause each other.

	Stock Market	Bond Market	Foreign Exchange Market
Stock Market	-	0.1022	0.3188
Bond Market	0.0008***	-	0.5273
Foreign Exchange Market	0.3690	0.1393	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.16: Granger Causality Test for Financial Market in United State

4.5.4.2 United Kingdom

Moreover, according to the result presented in Table 4.17, there is no bidirectional and unidirectional among the financial markets in United Kingdom as the p-values in the result do not have enough evidence to reject the null hypothesis at all the significant level. This indicates that the stock, bond and foreign exchange market do not have causal effect to each other in short run. Our result is consistent with previous studies such as Stavarek (2004) and Rezaee and Le Bris (2012). Stavarek (2004) has examined the relationship between stock price and exchange rate in United Kingdom and found that the stock price and exchange rate do not granger cause each other. Rezaee and Le Bris (2012) have found that the stock market does not granger causes government bond in United Kingdom

	Stock Market	Bond Market	Foreign Exchange Market
Stock Market	-	0.1794	0.2516
Bond Market	0.6412	-	0.6658
Foreign Exchange Market	0.2677	0.0581*	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.17: Granger Causality Test for Financial Market in United Kingdom

4.5.4.3 Canada

Moreover, as stated in Table 4.18, there is no bidirectional causal relationship among the financial markets in Canada. Results also show that the financial markets in Canada do not granger causes each other as p-values in the granger causality test do not have enough evidence to reject the null hypothesis. However, a unidirectional causality relationship is found in stock market to bond market at 1%, 5%, and 10%, significant level and stock to foreign exchange market at 5%, and 10%, significant level. This indicates that stock market granger causes the bond and foreign exchange market in Canada. Our result is consistent with Ajayi and Mougou é (2006). They found a significant short run and long run relationship from stock market to foreign exchange market. For instance, an increase in stock prices will negatively influence the foreign exchange. Aburachis and Kish (1999) also found that a significant unidirectional causal relationship from stock return to bond yield in Canada.

	Stock Market	Bond Market	Foreign Exchange Market
Stock Market	-	0.8516	0.3331
Bond Market	0.0001***	-	0.2557
Foreign Exchange Market	0.0251**	0.9529	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.18: Granger Causality Test for Financial Market in Canada

4.5.4.4 Australia

Lastly, the result presented in table 4.15 also shows that there is no bidirectional and unidirectional among the financial markets in Australia as the p-values in the result do not have enough evidence to reject the null hypothesis at all the significant level. This indicates that the stock, bond and foreign exchange market do not have causal effect to each other in short run. This result is consistent with past researches. Tudor and Popescu-Dutaa (2012) has found that no causal relationship between stock returns and exchange rates in Australia. Besides, Baur (2007) has determined the stock-bond correlation on cross country and cross assets in eight developed countries and found that the stock and bond market in Australia do not influence each other either in short run and long run. The stock and bond market in Australia are likely to influence by the cross countries financial markets.

	Stock Market	Bond Market	Foreign Exchange Market
Stock Market	-	0.9914	0.0890
Bond Market	0.1093	-	0.6174
Foreign Exchange Market	0.3779	0.3259	-

***Significant at 1%, 5%, and 10%, **Significant at 5% and 10%, *Significant at 10%.

Table 4.19: Granger Causality Test for Financial Market in Australia

4.6 Conclusion

Chapter 4 basically has analyzed the relationship among the financial markets in four developed countries. All the empirical results which include descriptive analysis, scale measurement and inferential analysis have been shown clearly in the tables and figures with precise and clear explanation. Besides, the results in this chapter have achieved the objective of the research. The summary for the whole research will be presented in Chapter 5.

CHAPTER 5: CONCLUSION

In our studies, the purpose of the entire research is to investigate the relationship among the financial market as it could allow the investors to figure out clearly about the flow of each market which allow them to retain their competitive advantage against the fluctuation of the economy. The study focus on four developed countries namely, United States, United Kingdom, Canada and Australia to compare the relationship between stock market, bond market and the foreign exchange market from the year 1986 to 2010. Stockholders are able to make a wise decision when the economy is involving in a downturn, vice versa. Besides, this study also investigate the effect of each market on how it interrelated by each other and the effect, and also the flow of each market in different country.

Chapter five presents the conclusion of our findings on the relationship between the bond price, stock price and foreign exchange rate within four different countries. This research has included managerial implications that provide practical implications for policy makers and practitioners in this chapter and discussed our major findings that listed in chapter 4 with those points of view from previous researchers. In addition, several limitations have encountered during the progress of the research were presented in this chapter as well as the recommendations for future researchers. At last, the overall conclusion for the whole research was stated as ending for this project.

5.1 Summary of Statistical Analyses

5.1.1 Descriptive Analysis

Descriptive analysis is a tool for interpreting and analyzing the statistical data. It commonly used to describe the basic feature of the data in a study. Descriptive analysis has applied in the study to summarize all the securities return in the financial markets. This method has supported us to describe the central tendency of study which includes mean, median and mode. Besides, it also provides us the measure of variability which includes maximum and minimum variables, standard deviation, kurtosis and skewness. By employing the descriptive analysis in the study, different graphs have formulated to present the movement of financial markets in four different countries. These allow us to determine the relationship of financial markets within four countries and ascertain the linkage among the financial markets.

5.1.2 Diagnostic Checking

Diagnostic checking has employed to ensure that our econometric models achieve the Best Linear Unbiased Estimator. Table 5 has presented the result on the diagnostic checking and shows that the regression models are unbiased, efficient and consistent.

Econometric Problem	Description on results
Normality	Passed. All regression models are normally distributed.
Model Specification	Passed. All regression models are correctly specified.
Heteroscedasticity	Passed. All regression models are free from heteroscedasticity problem.
Autocorrelation	Passed. All regression models are free from autocorrelation problem.
Multicollinearity	Passed. All the independent variables in the regression model do not have serious multicollinearity.

Table 5.1: Summary of Diagnostic Checking

5.1.3 Inferential Analysis

Inferential analysis is a tool to make inferences about a population from observation and analyses of sample. It is commonly used in studies to describe the real meaning of the data. Ordinary Least Square (OLS) test is employed to measure the relationship between financial markets (stock, bond and foreign exchange market) and macroeconomic variables. Based on our empirical results, we can determine the value of estimator and thus allow us to measure the value of dependent variables per unit changes in each independent variable which presented in Table 5.2.

Financial Market	Macroeconomic Variables	Relationship
Stock Market	Gross Domestic Product	+
	Foreign Direct Investment	+
	Lending Rate	-
Bond Market	Gross Domestic Product	-
	Bond Yield	-
	Central Bank Reserve	Ambiguous
Foreign Exchange Market	Gross Domestic Product	+
	Interest Rate	+
	Inflation	+
	Money Supply	-

Table 5.2: Summary of OLS Test Result

On the other hand, Unit Root test is a statistical test to investigate the proposition in an autoregressive statistical model in a time series data. Unit root test will shows us the stationarity of our variable across the time. Not stationary of variables in the regression model implies that the standard assumption for asymptotic analysis will not be valid. As a result, our result will become biased. We have employed three different unit root test (ADF, PP and KPSS) in our study and the result of KPSS test shows that the stock, bond and foreign exchange market are stationary.

In order to examine the relationship among financial market, granger causality test is utilized. Granger causality is statistical hypothesis test to determine whether a variable is useful in forecasting another. The test is employed to examine the relationship among financial markets in four develop countries. Based on the empirical results, the causality relationship among the financial markets in a single

country or cross country is determined. The summary of our empirical results are presented in Table 5.3, 5.4 and 5.6.

Stock Market	Causality Relationship
US granger cause UK **UK does not granger cause US**	Unidirectional
US does not granger cause Canada **Canada do not granger cause US**	No directional
US does not granger cause Australia **Australia granger cause US**	Unidirectional
UK does not granger cause Canada **Canada does not granger cause UK**	No directional
UK does not granger cause Australia **Australia granger cause UK**	Unidirectional
Canada does not granger cause Australia **Australia does not granger cause Canada**	No directional

Table 5.3: Cross Country Causality Relationship in Stock Market

Bond Market	Causality Relationship
US granger cause UK **UK does not granger cause US**	Unidirectional
US does not granger cause Canada **Canada do not granger cause US**	No directional
US does not granger cause Australia **Australia does not granger cause US**	No directional
UK does not granger cause Canada **Canada granger cause UK**	Unidirectional
UK granger cause Australia **Australia granger cause UK**	Bidirectional
Canada does not granger cause Australia **Australia does not granger cause Canada**	No directional

Table 5.4: Cross Country Causality Relationship in Bond Market

Foreign Exchange Market	Causality Relationship
US does not granger cause UK **UK granger cause US**	Unidirectional
US does not granger cause Canada **Canada do not granger cause US**	No directional
US does not granger cause Australia **Australia does not granger cause US**	No directional
UK granger cause Canada **Canada does not granger cause UK**	Unidirectional
UK granger cause Australia **Australia does not granger cause UK**	Bidirectional
Canada does not granger cause Australia **Australia does not granger cause Canada**	No directional

Table 5.5: Cross Country Causality Relationship in Foreign Exchange Market

Single Country	Causality Relationship
United States	
Stock market granger cause bond market **Bond market does not granger cause stock market**	Unidirectional
Stock market does not granger cause foreign exchange market **Foreign exchange market does not granger cause stock market**	No directional
Bond market does not granger cause foreign exchange market **Foreign exchange market does not granger cause bond market**	No directional
United Kingdom	
Stock market does not granger cause bond market **Bond market does not granger cause stock market**	No directional
Stock market does not granger cause foreign exchange market **Foreign exchange market does not granger cause stock market**	No directional
Bond market granger cause foreign exchange market **Foreign exchange market does not granger cause bond market**	Unidirectional
Canada	
Stock market granger cause bond market **Bond market does not granger cause stock market**	Unidirectional
Stock market granger cause foreign exchange market **Foreign exchange market does not granger cause stock market**	No directional
Bond market does not granger cause foreign exchange market **Foreign exchange market does not granger cause bond market**	No directional

Australia	
Stock market does not granger cause bond market **Bond market does not granger cause stock market**	No directional
Stock market does not granger cause foreign exchange market **Foreign exchange market does not granger cause stock market**	No directional
Bond market does not granger cause foreign exchange market **Foreign exchange market does not granger cause bond market**	No directional

Table 5.6: Relationship among Financial Markets in a Single Country

5.2 Discussion on Major Findings

Referring to results presented in Chapter 4, there were presence of ambiguous relationships between independent variables and dependent variable.

5.2.1 Stock Market

First, relationship between GDP and stock markets is positive and significant in most of countries studied except United Kingdom (Mcqueen and Roley, 1993; Boyd et al., 2005; Levine and Zervos, 1998). Increase in GDP signals good news to a country therefore demand on stocks will raise stock price. However, the case for United Kingdom is supported by Inman (2013) who reported that FTSE 100 has gained more than 1,000 points in a six-month period despite the stagnant GDP growth and affected by Euro-zone crisis.

FDI also reported a significant and positive relationship on stock price in most of countries studied except Australia. Stock market is stimulated when there is enhancement of FDI which indirectly boosts the economic growth which promotes the development of stock market (Anokye et al (2008), Claessens, Djankov, and Klingebiel, (2001).

Lastly, the lending rate is found to have negative and significant relationship in all of countries studied. Rise in lending rate discourage borrowings hence reducing the demand for stock which lowers the stock price (Sylla and Rosseau (2003), Bernanke and Kuttner (2005)).

5.2.2 Bond Market

Our results on GDP are inconsistent with previous findings which showed negative but significant relationship in most of countries studied except for Canada. To support the empirical results, Harvey (1989) found that during recession when GDP is low, there is a demand for treasury bonds due to its security hence increases the bond price. For the positive relationship, increase in GDP will enhance the development of bond market. (Goldberg and Leonard, (2003), Andersson, Krylova and Vähämaa (2004), Borensztein and Mauro (2002)).

For bond yield, increase in bond yield will lower the bond price indicating constant inverse and negative relationship. This is consistent with most of the previous studies (Ziebart, (1992), Lesmond and Wei (2007) and Ogden (1987)).

However, reserve requirement has varying relationships on countries studied. Negative relationship can be observed on reserve requirement and bond price in Canada. This can be explained by central bank effort in increasing money supply which leads to declining interest on bond (Thorbecke (1997), Chordia,Sarkar,and Subrahmanyam, (2003)).

5.2.3 Foreign Exchange Market

Relationship between GDP and exchange rate are positive and significant for most of countries studied Mendoza (1994), Ito, Symansky and Isard, (1999) and Sachs (1998) except for Canada. When productivity of a country increases, export increases which leads to appreciation of a currency. The negative relationship on Canada can be explained by the behavior of a country to remain competitive in export market by refusing to raise its currency value.

Interest rates and exchange rates exhibited a significant and positive relationship for most of countries studied. Increase in interest rate attracts more foreign investment to earn a better return than their domestic country hence result in demand for the currency leading to its appreciation (Inci and Lu (2004), Hoffmann and MacDonald (2009)). Discrepancy of policy orientation which is a country specific factor can explain the on the negative relationship

Another significant and positive relationship is observed on inflation and exchange rate for most of countries studied except for United States. This is inconsistent with our expectations. According to Sek, Ooi, and Ismail (2012) who found a mix correlation between inflation rate and exchange rate in developed countries is subject to market trends and demand on type of goods. The negative relationship is described as high inflation will reduce import market resulting decrease in currency value.

Lastly, money supply has a negative and significant relationship on exchange rate on all of countries studied. This is due to increase in money supply causes a decline in export market in return depreciating the currency value (Rogers (1996), Maitra, (2011), Engel and Frankel (1982)).

5.2.4 Stock Market and Bond Market

Referring to Chapter 4 results, stock and bond price move in same direction indicating positive relationship. The results apply on all of sample countries. When the stock market uncertainty is high, there is an increase in diversification benefits for portfolios of stock and bond (Stivers and Sun (2002) and Gulko (2002)).

5.2.5 Bond Market and Foreign Exchange Market

Bond price and foreign exchange rate have a negative relationship. The results apply on all of sample countries. Burger and Warnock (2006), Rose (1996), Mitra, Dime and Baluga (2011) showed that low bond yield results in lower return for investors hence less investment in the country pushed down value of the currency.

5.2.6 Stock Market and Foreign Exchange Market

There were mix results on stock price and exchange rate which is comparable with Chapter 2 literature review. Our study located inverse relationship between stock price and foreign exchange rate in United Kingdom, United States and Canada. To support the estimation results, Soenen and Hanniger (1988) and Tsai (2012) also found negative impact between stock price and exchange rate due to revaluation of currency on stock prices in United States. in different periods. Australia on the other hand produced positive relationship between stock price and exchange rate. For evidence, Aggarwal (1981) and Solnik (1997) discovered rising stock price attracts foreign capital in return rises the value of currency.

5.2.7 Stock Market and Stock Market

Relating to Granger Causality conducted, a long run relationships are found among the four countries equity market. In addition, short run relation existed between Australia and Canada. The presence of dynamic and interlink affairs signaled constant trade among the countries result to high dependency (Wang and Nguyen Thi (2006) and Firth and Rui, (2002). There were one directional causal relationship from United States to United Kingdom and Australia to United States and United Kingdom due to the international stock market is more efficient in responding to the spillover of information from each other. However, there is absence of two directional causal effects between the countries.

5.2.8 Bond Market and Bond Market

Long run relations are exhibited among the four countries bond market. Short run relation only appeared between United States and Australia. Interest rate is influenced by international factors therefore bond return is driven different level of term structures across countries (Clare and Lekkos (2001), Barr and Priestley (2004) and Ilmanen (1995)).

There were two directional causal effects between United Kingdom and Australia. There were one directional causal relationship from United States to United Kingdom and Canada to United Kingdom. It suggests that government bond market of a country has ability to react to information transmission faster than the other.

5.2.9 Foreign Exchange Market and Foreign Exchange Market

In line with the findings above, long run relationships among the four countries foreign exchange market are detected. Exchange rate reflects economy of a nation as it absorbs the effect of government policies, trade and many more. It is

exceptional for United Kingdom who presented short relation with United States, Canada and Australia. Therefore a directional causal relationship from United Kingdom to remaining three countries can be observed. Time horizon and market efficiency can be accountable for the reason behind (Rapp and Sharma (1999) and Sander and Kleimeier (2003)).

5.3 Implication of the Study

Based on the result of the test, it was proven that the gross domestic product (GDP) and foreign direct investment (FDI) have positive relationship with the performance of stock market whereas the lending rate shows negative relationship with the performance of stock market. For all the selected countries, they exhibit the same result from the three determinants. When the gross domestic product (GDP) and foreign direct investment (FDI) bring positive impact to United States, the United Kingdom, Canada and Australia were showing the same positive result as well. The policy makers can improve the performance of stock market in their country by implement policy which able attract more foreign direct investment and stimulate the growth of gross domestic product.

In the bond market, the Gross Domestic Product (GDP) only show significant result in Canada and Australia but the effect is unclear. In Canada, it exhibits the positive relationship but for Australia it shows negative relationship. Generally all the selected countries show negative relationship between the bond yield and the bond market performance. As the bond yield increase, the bond price will decrease. The central bank reserve only shows the significant impact in United States, Canada and Australia. It was not possible to change the bond yield set by the issuer, the policy maker can only adjust the central bank reserve rate to stimulate the performance of the bond market.

The foreign exchange market in selected countries generally shows positive relationship with gross domestic product (GDP). The increase of gross domestic product (GDP) indicates the increase in productivity of a country. The export of

the country might increase; this will result in the increase in demand of the country currency. As a result, the exchange rate will increase Money supply shows negative relationship between the foreign exchange rates. The respective government department can try to implement suitable monetary policy to reduce the money supply or increase the demand of own currency in order to promote the growth in foreign exchange market.

The interest rate and the inflation rate are the major determinants for the exchange rate. When the interest rate increases, it will draw the investment from foreign countries. The exchange rate will increase as the demand of the home country currency increase. The inflation had the inverse effect when compare with the inflation rate. However the result shows that the inflation has positive relationship with the foreign exchange. This might due to the increase in the interest rate are greater than the inflation. The central bank could try to make adjustment in the interest rate to control the inflation rate in the country. It will aid in promoting the growth of foreign exchange market.

According to the date being collected, the stock markets and bond markets among the selected countries are interrelated. They were showing the same trend in the movement of stock value and bond value. When the stock price and bond price of a selected country increases, the remaining stock markets and bond markets were showing the same pattern of movement. This characteristic was unable to observe in the foreign exchange market. This might due to the strength of the currency of each selected countries are not same. At the same time, the performance of the economy in respective countries are not same, this will result in different direction movement of foreign exchange market. The investors can try to avoid the downturn of stock and bond market by observing the early signal from the other countries. Besides that, the investors can make decision based on the performance of other countries financial markets.

5.4 Limitation of the Study

Along the study to determine the relationships among the financial markets, several limitations were found. Foremost, the source of secondary data was a pullback for the overall study. For instance, the data obtained are insufficient to conduct a better conclusion. The time series obtained was data with 25 year sample size from 1986 – 2010, due upon to certain data that are not available in certain time range, as well, it happens to become a limit for us to determine the subjects with a larger time series.

Likewise, to support the results of the study with the existing studies are likely a challenge. The studies of the relationship between financial markets, as such, the relationship between two different financial markets, are relatively lesser. The insufficient information on previous researches has become a pullback in the study as it does not manage to obtain any much supporting from the previous research.

Moreover, the results in this study may be a biased if applied in developing countries. The study of the relationship between the financial markets in developed market is generally focused only on developed country. This implies that the study may not be applicable in developing countries, as such, the Asian countries. In addition, with only four of those developed countries, it is not sufficient enough to conclude result that the same event may happen in other developed countries.

According to Bunting (2002), time series bias is inherent in the time series data. Although time series data is usually ignored, but the presence of time series bias indicates that the estimation of the time series parameters is redundant. To perfectly determine the subject, time series data are not sufficient to perform instead.

5.5 Recommendation for Future Research

The sample size used in our study (from year 1989 to 2010) is insufficient. These studies are likely to recommend for future researcher to focus on monthly or daily data to determine the relationship among financial marker in different time horizon as the results will be more precise and accurate for investors. This is because larger sample size will have a higher probability of detecting a statistically significant result whereas a smaller sample size may be misleading and susceptible to error. In addition, the relationship among financial markets in pre-crisis and post crisis also an important information to investors.

On the other hand, besides developed countries, future studies should put their attention on Asian countries as Asian are becoming more advance and innovative. Furthermore, others developed countries like Germany or Italy as well as other developing countries in Europe also need to be focused. In order to achieve more significant results about the relationship among international financial markets, comparison between movements in financial market are vital.

Moreover, future researchers are suggest to include others econometric test such as simultaneous equation model in the research in order to achieve more significant results. Simultaneous equation model is a form of statistical model in the form of a set of linear simultaneous equations. By employing the test, researchers can determine the relationship among the financial markets in term of negative or positive relationship which is more precise and significant.

Lastly, others macroeconomic variables that affect the financial markets also need to take into consideration in future studies. For example, trade flows, politics or others economic variables can be included in the future studies. This is because the financial markets can be affected by the monetary flows. When the imports in a country exceed its exports, this indicates that the balance of trade of that country is negative and would lead to the depreciation of currency value, vice versa.

Likewise, political instability is also a vital determinant that would affect the growth of the financial markets.

5.6 Conclusion

In this research, the main objective is to determine the relationship among the financial markets, namely, stock, bond and foreign exchange markets. The study has conducted using 25 years data from year 1986 to 2010. Ordinary Least Square (OLS) and Granger Causality test are utilized in the research. Besides, factor analysis statistical method was applied in processing and grouping of data and E-view statistical method was utilized to analysis the relationship between the financial market and economic factors. In conclusion, the research objectives in this study had been reasonably achieved as the relationships among stock, bond and foreign exchange market in four different countries were examined. Some issues that affected the empirical results are beyond the scope of this study and solutions of the issues have been provided. Therefore, future researchers are suggested to refer the recommendations section for further understanding about the research.

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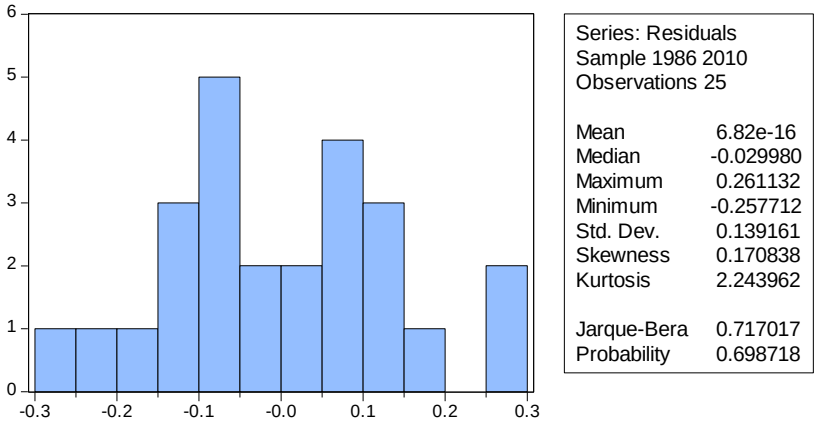
Appendices

1.0 Scale Measurement

1.1 Stock Market

Australia

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	7.721522	Prob. F(1,20)	0.0146
Log likelihood ratio	8.161920	Prob. Chi-Square(1)	0.0143

Multicollinearlity

Correlation between independent variables

	GDP	FDI	LR
GDP	1.000000	0.455818	-0.696878
FDI	0.455818	1.000000	-0.143930
LR	-0.696878	-0.143930	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-FDI	0.207770	1.26226
GDP-LR	0.485640	1.944164
FDI-LR	0.020716	1.021154

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	2.477966	Prob. F(1,22)	0.1297
Obs*R-squared	2.429581	Prob. Chi-Square(1)	0.1191

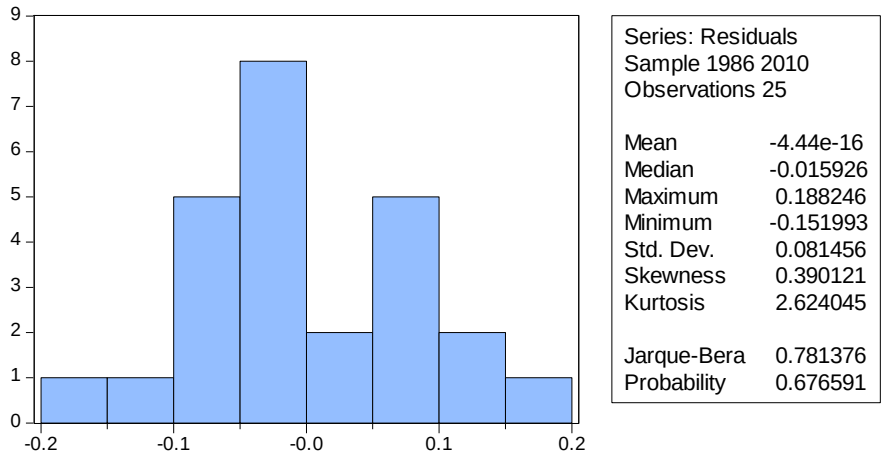
Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.408502	Prob. F(2,21)	0.2667
Obs*R-squared	2.956926	Prob. Chi-Square(2)	0.2280

Canada

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	3.821556	Prob. F(1,20)	0.0647
Log likelihood ratio	4.371466	Prob. Chi-Square(1)	0.0665

Multicollinearlity

Correlation between independent variables

	GDP	FDI	LR
GDP	1.000000	0.358686	-0.767006
FDI	0.358686	1.000000	-0.155856
LR	-0.767006	-0.155856	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-FDI	0.128655	1.147651
GDP-LR	0.588298	2.428941
FDI-LR	0.024291	1.024896

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.093548	Prob. F(1,22)	0.7626
Obs*R-squared	0.101620	Prob. Chi-Square(1)	0.7499

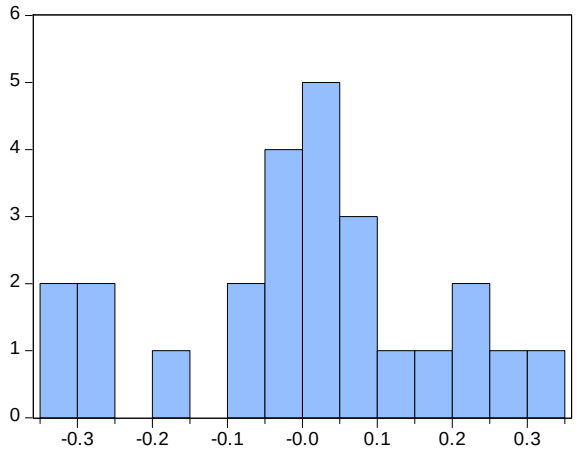
Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.666678	Prob. F(2,19)	0.0450
Obs*R-squared	6.962041	Prob. Chi-Square(2)	0.0308

United Kingdom

Normality- JB test



Series: Residuals
Sample 1986 2010
Observations 25

Mean	-8.20e-16
Median	0.008210
Maximum	0.306390
Minimum	-0.329706
Std. Dev.	0.178593
Skewness	-0.288157
Kurtosis	2.534675
Jarque-Bera	0.571525
Probability	0.751441

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	52.81632	Prob. F(1,20)	0.1072
Log likelihood ratio	32.30520	Prob. Chi-Square(1)	0.1240

Multicollinearlity

Correlation between independent variables

	GDP	FDI	LR
GDP	1.000000	0.498198	-0.816399
FDI	0.498198	1.000000	-0.248687
LR	-0.816399	-0.248687	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-FDI	0.248201	1.330143
GDP-LR	0.666507	2.998564
FDI-LR	0.061845	1.065922

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.018397	Prob. F(1,22)	0.8933
Obs*R-squared	0.020053	Prob. Chi-Square(1)	0.8874

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.466567	Prob. F(2,19)	0.0072
Obs*R-squared	10.12517	Prob. Chi-Square(2)	0.0063

Solution of Autocorrelation Problem

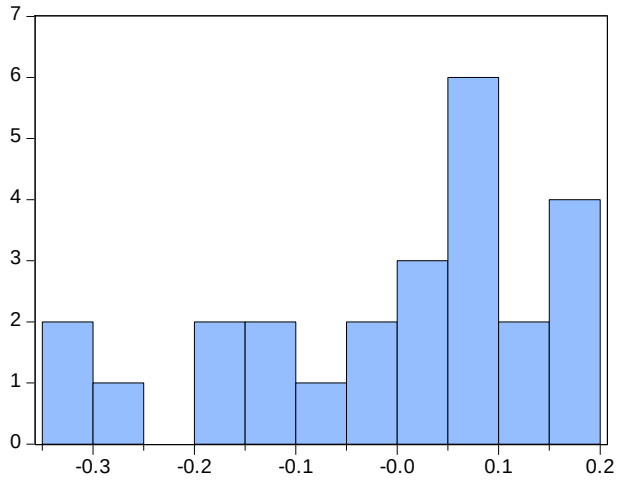
Cochrane-Orcutt Procedure

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.109806	Prob. F(2,18)	0.3512
Obs*R-squared	2.744381	Prob. Chi-Square(2)	0.2536

United States

Normality- JB test



Series: Residuals	
Sample 1986 2010	
Observations 25	
Mean	-4.44e-17
Median	0.046682
Maximum	0.198652
Minimum	-0.334267
Std. Dev.	0.155483
Skewness	-0.784889
Kurtosis	2.609002
Jarque-Bera	2.726130
Probability	0.255875

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	33.91757	Prob. F(1,20)	0.0673
Log likelihood ratio	24.79310	Prob. Chi-Square(1)	0.0680

Multicollinearlity

Correlation between independent variables

	GDP	FDI	LR
GDP	1.000000	0.533767	-0.757060
FDI	0.533767	1.000000	-0.372259
LR	-0.757060	-0.372259	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-FDI	0.284907	1.39842
GDP-LR	0.573140	2.342688
FDI-LR	0.138577	1.16087

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	4.640685	Prob. F(1,22)	0.0424
Obs*R-squared	4.180690	Prob. Chi-Square(1)	0.0409

Autocorrelation

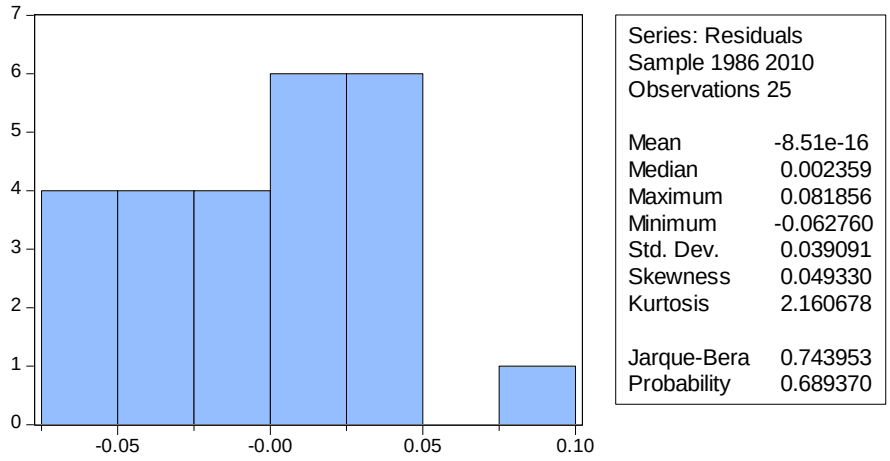
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	9.441793	Prob. F(2,19)	0.0014
Obs*R-squared	12.46159	Prob. Chi-Square(2)	0.0020

1.2 Bond Market

Australia

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	0.034022	Prob. F(1,20)	0.8555
Log likelihood ratio	0.042492	Prob. Chi-Square(1)	0.8367

Multicollinearlity

Correlation between independent variables

	GDP	CBR	BY
GDP	1.000000	0.919123	-0.777182
CBR	0.919123	1.000000	-0.704123
BY	-0.777182	-0.704123	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-CBR	0.844786	6.442718
GDP-BY	0.604012	2.525329
CBR-BY	0.495789	1.983297

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.429358	Prob. F(1,22)	0.5191
Obs*R-squared	0.459425	Prob. Chi-Square(1)	0.4979

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.110001	Prob. F(2,19)	0.3500
Obs*R-squared	2.615460	Prob. Chi-Square(2)	0.2704

Solution of Autocorrelation Problem

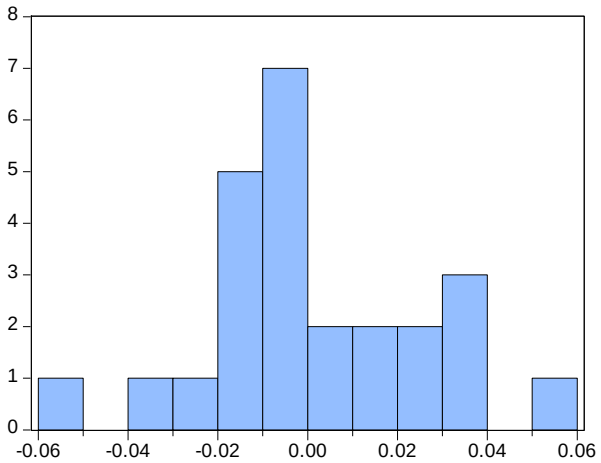
Cochrane-Orcutt Procedure

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.812881	Prob. F(2,18)	0.4592
Obs*R-squared	2.070955	Prob. Chi-Square(2)	0.3551

Canada

Normality- JB test



Series: Residuals
Sample 1986 2010
Observations 25

Mean	-7.81e-16
Median	-0.007798
Maximum	0.051398
Minimum	-0.052056
Std. Dev.	0.024128
Skewness	0.251708
Kurtosis	2.755761
Jarque-Bera	0.326125
Probability	0.849538

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	0.387289	Prob. F(1,20)	0.5408
Log likelihood ratio	0.479484	Prob. Chi-Square(1)	0.4887

Multicollinearlity

Correlation between independent variables

	GDP	CBR	BY
GDP	1.000000	0.888073	-0.829653
CBR	0.888073	1.000000	-0.840509
BY	-0.829653	-0.840509	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-CBR	0.876287	8.083225
GDP-BY	0.864254	7.3667
CBR-BY	0.884558	8.662359

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.355352	Prob. F(1,22)	0.5572
Obs*R-squared	0.381494	Prob. Chi-Square(1)	0.5368

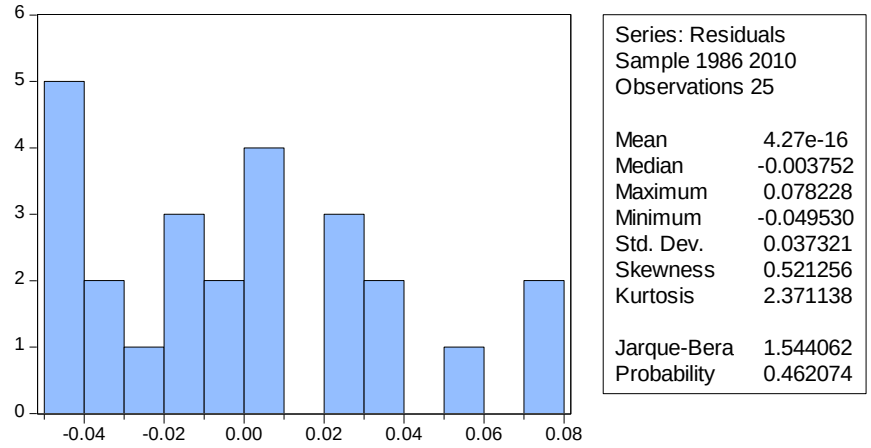
Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.384882	Prob. F(2,19)	0.6857
Obs*R-squared	0.973411	Prob. Chi-Square(2)	0.6146

United Kingdom

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	0.499311	Prob. F(1,20)	0.4880
Log likelihood ratio	0.616475	Prob. Chi-Square(1)	0.4324

Multicollinearlity

Correlation between independent variables

	GDP	CBR	BY
GDP	1.000000	0.719393	-0.915353
CBR	0.719393	1.000000	-0.576759
BY	-0.915353	-0.576759	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-CBR	0.517527	2.072655
GDP-BY	0.837871	6.167928
CBR-BY	0.332651	1.498466

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.004827	Prob. F(1,22)	0.9452
Obs*R-squared	0.005265	Prob. Chi-Square(1)	0.9422

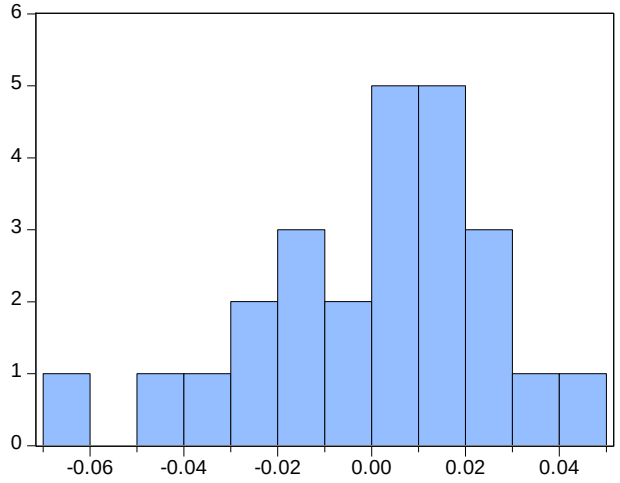
Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.375628	Prob. F(2,19)	0.6918
Obs*R-squared	0.950897	Prob. Chi-Square(2)	0.6216

United States

Normality- JB test



Series: Residuals	
Sample 1986 2010	
Observations 25	
Mean	7.27e-17
Median	0.005965
Maximum	0.047703
Minimum	-0.068259
Std. Dev.	0.026393
Skewness	-0.652677
Kurtosis	3.327277
Jarque-Bera	1.886520
Probability	0.389356

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	1.158654	Prob. F(1,20)	0.2946
Log likelihood ratio	1.407918	Prob. Chi-Square(1)	0.2354

Multicollinearlity

Correlation between independent variables

	GDP	CBR	BY
GDP	1.000000	0.812699	-0.853215
CBR	0.812699	1.000000	-0.763257
BY	-0.853215	-0.763257	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-CBR	0.660479	2.945326
GDP-BY	0.808618	5.225152
CBR-BY	0.582561	2.39556

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	1.354761	Prob. F(1,22)	0.2569
Obs*R-squared	1.392190	Prob. Chi-Square(1)	0.2380

Autocorrelation

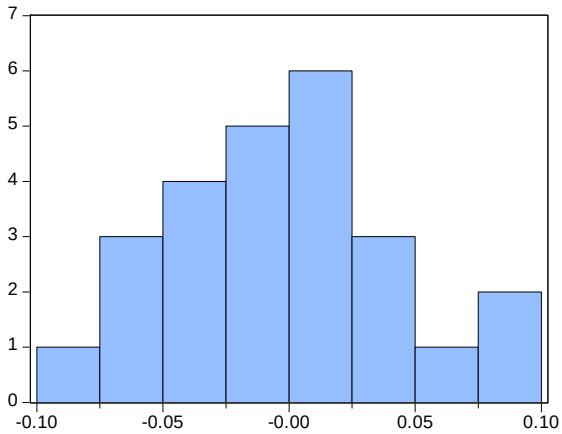
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.003363	Prob. F(2,19)	0.9966
Obs*R-squared	0.008848	Prob. Chi-Square(2)	0.9956

1.3 Foreign Exchange Market

Australia

Normality- JB test



Series: Residuals
Sample 1986 2010
Observations 25

Mean	2.48e-16
Median	-0.000174
Maximum	0.099863
Minimum	-0.087932
Std. Dev.	0.047319
Skewness	0.271584
Kurtosis	2.782909
Jarque-Bera	0.356416
Probability	0.836768

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	0.606436	Prob. F(1,19)	0.4457
Log likelihood ratio	0.785472	Prob. Chi-Square(1)	0.3755

Multicollinearlity

Correlation between independent variables

	GDP	IR	IF	MS
GDP	1.000000	-0.792084	-0.142350	0.888245
IR	-0.792084	1.000000	-0.019821	-0.831744
IF	-0.142350	-0.019821	1.000000	-0.187631
MS	0.888245	-0.831744	-0.187631	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-IR	0.627398	2.683829
GDP-IF	0.020263	1.020682
GDP-MS	0.876628	8.105567
IR-IF	0.000393	1.000393
IR-MS	0.691798	3.244625
IF-MS	0.035205	1.03649

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	0.005679	Prob. F(1,22)	0.9406
Obs*R-squared	0.006194	Prob. Chi-Square(1)	0.9373

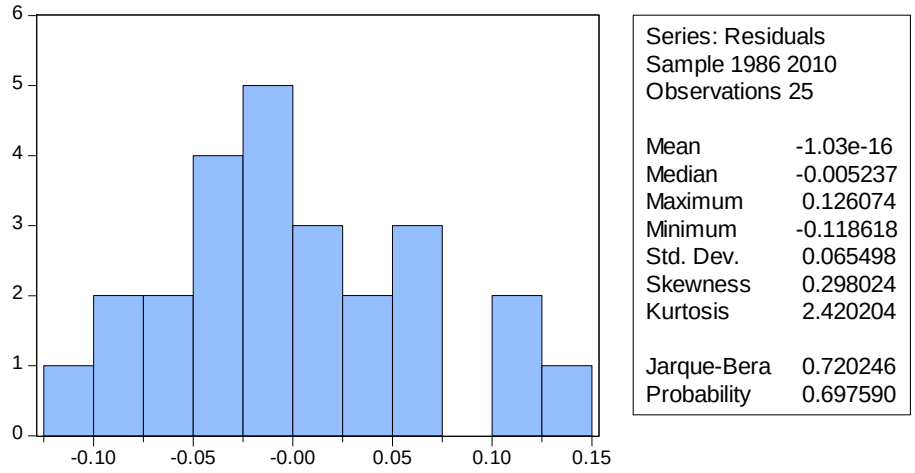
Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.137777	Prob. F(2,18)	0.8722
Obs*R-squared	0.376944	Prob. Chi-Square(2)	0.8282

Canada

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	0.180115	Prob. F(1,19)	0.6760
Log likelihood ratio	0.235877	Prob. Chi-Square(1)	0.6272

Multicollinearlity

Correlation between independent variables

	GDP	IR	IF	MS
GDP	1.000000	-0.779606	-0.122634	0.873177
IR	-0.779606	1.000000	-0.099387	-0.738152
IF	-0.122634	-0.099387	1.000000	-0.159526
MS	0.873177	-0.738152	-0.159526	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-IR	0.607786	2.549629
GDP-IF	0.015039	1.015269
GDP-MS	0.847073	6.539068
IR-IF	0.009878	1.009977
IR-MS	0.544869	2.19717
IF-MS	0.025449	1.026114

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	4.108526	Prob. F(1,22)	0.0550
Obs*R-squared	3.776721	Prob. Chi-Square(1)	0.0520

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	10.82947	Prob. F(2,18)	0.0008
Obs*R-squared	13.65325	Prob. Chi-Square(2)	0.0011

Solution of Autocorrelation Problem

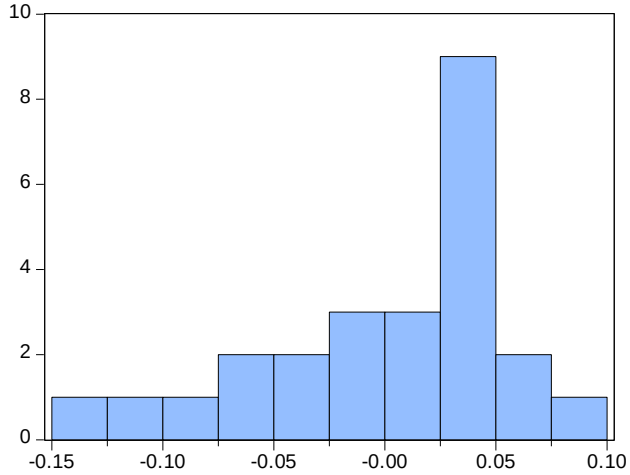
Cochrane-Orcutt Procedure

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.023031	Prob. F(2,17)	0.9773
Obs*R-squared	0.067554	Prob. Chi-Square(2)	0.9668

United Kingdom

Normality- JB test



Series: Residuals
Sample 1986 2010
Observations 25

Mean	1.03e-16
Median	0.022431
Maximum	0.078797
Minimum	-0.139956
Std. Dev.	0.059835
Skewness	-0.851721
Kurtosis	2.826634
Jarque-Bera	3.053928
Probability	0.217194

Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	7.201208	Prob. F(1,19)	0.1147
Log likelihood ratio	8.034163	Prob. Chi-Square(1)	0.1046

Multicollinearlity

Correlation between independent variables

	GDP	IR	IF	MS
GDP	1.000000	-0.722218	-0.601330	0.874905
IR	-0.722218	1.000000	0.450257	-0.699345
IF	-0.601330	0.450257	1.000000	-0.507253
MS	0.874905	-0.699345	-0.507253	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-IR	0.521599	2.090297
GDP-IF	0.361597	1.566409
GDP-MS	0.850440	6.68628
IR-IF	0.202731	1.254282
IR-MS	0.489084	1.957269
IF-MS	0.257306	1.34645

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	5.960966	Prob. F(1,22)	0.0231
Obs*R-squared	5.116532	Prob. Chi-Square(1)	0.0237

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	11.25481	Prob. F(2,18)	0.0007
Obs*R-squared	13.89153	Prob. Chi-Square(2)	0.0010

Solution of Autocorrelation Problem

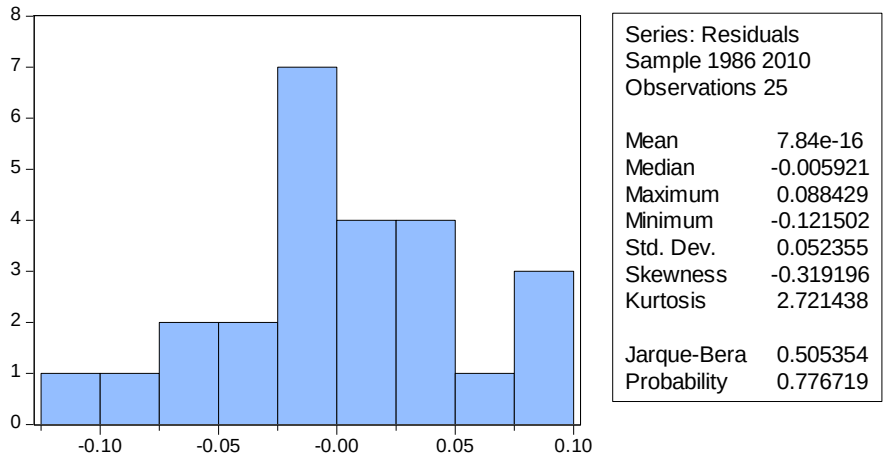
Cochrane-Orcutt Procedure

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.428574	Prob. F(2,17)	0.6583
Obs*R-squared	1.200006	Prob. Chi-Square(2)	0.5488

United States

Normality- JB test



Ramsey Reset Test-model specification

Ramsey RESET Test:

F-statistic	11.84603	Prob. F(1,19)	0.0627
Log likelihood ratio	12.11423	Prob. Chi-Square(1)	0.0605

Multicollinearlity

Correlation between independent variables

	GDP	IF	IR	MS
GDP	1.000000	-0.344449	-0.609175	0.838667
IF	-0.344449	1.000000	0.195265	-0.493103
IR	-0.609175	0.195265	1.000000	-0.660292
MS	0.838667	-0.493103	-0.660292	1.000000

VIF = 1 / (1- R^2)

Variables	R^2	***VIF***
GDP-IR	0.371094	1.590063
GDP-IF	0.118645	1.134617
GDP-MS	0.881095	8.410075
IR-IF	0.038128	1.039639
IR-MS	0.435985	1.773002
IF-MS	0.243150	1.321266

Heteroscedasticity

Heteroskedasticity Test: ARCH

F-statistic	1.258773	Prob. F(1,22)	0.2740
Obs*R-squared	1.298888	Prob. Chi-Square(1)	0.2544

Autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.590824	Prob. F(2,18)	0.0487
Obs*R-squared	7.129844	Prob. Chi-Square(2)	0.0283

2.0 OLS Result

2.1 Stock Market

United States

Dependent Variable: LOG(SP)
Method: Least Squares
Date: 03/09/13 Time: 16:29
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.000104	1.72E-05	6.026816	0.0000
FDI	0.033416	0.010010	3.338351	0.0031
LR	-0.051451	0.013928	-3.693945	0.0013
C	3.379171	0.277069	12.19615	0.0000

R-squared	0.933962	Mean dependent var	4.022405
Adjusted R-squared	0.924528	S.D. dependent var	0.605046
S.E. of regression	0.166219	Akaike info criterion	-0.605378
Sum squared resid	0.580202	Schwarz criterion	-0.410358
Log likelihood	11.56723	Hannan-Quinn criter.	-0.551288
F-statistic	99.00027	Durbin-Watson stat	0.598171
Prob(F-statistic)	0.000000		

United Kingdom

Dependent Variable: LOG(SP)
Method: Least Squares
Date: 03/09/13 Time: 16:26
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.000412	0.000231	1.783099	0.0890
FDI	0.014164	0.003829	3.698810	0.0013
LR	-0.047196	0.019943	-2.366535	0.0276
C	3.957868	0.304528	12.99674	0.0000

R-squared	0.831527	Mean dependent var	4.294934
Adjusted R-squared	0.807460	S.D. dependent var	0.435110
S.E. of regression	0.190924	Akaike info criterion	-0.328238
Sum squared resid	0.765490	Schwarz criterion	-0.133218
Log likelihood	8.102974	Hannan-Quinn criter.	-0.274148
F-statistic	34.54973	Durbin-Watson stat	0.809536
Prob(F-statistic)	0.000000		

Canada

Dependent Variable: LOG(SP)
Method: Least Squares
Date: 03/04/13 Time: 20:27
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.001095	8.42E-05	12.99178	0.0000
FDI	0.012244	0.001896	6.456754	0.0000
LR	-0.018042	0.009345	-1.930690	0.0671
C	2.988636	0.137112	21.79698	0.0000

R-squared	0.973033	Mean dependent var	4.108831
Adjusted R-squared	0.969180	S.D. dependent var	0.496025
S.E. of regression	0.087080	Akaike info criterion	-1.898334
Sum squared resid	0.159241	Schwarz criterion	-1.703314
Log likelihood	27.72917	Hannan-Quinn criter.	-1.844243
F-statistic	252.5734	Durbin-Watson stat	1.104716
Prob(F-statistic)	0.000000		

Australia

Dependent Variable: LOG(SP)
Method: Least Squares
Date: 03/04/13 Time: 20:33
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.01E-06	1.54E-07	6.592104	0.0000
FDI	0.015816	0.008009	1.974748	0.0616
LR	-0.030710	0.011782	-2.606407	0.0165
C	3.571516	0.199384	17.91273	0.0000

R-squared	0.910294	Mean dependent var	4.102054
Adjusted R-squared	0.897479	S.D. dependent var	0.464629
S.E. of regression	0.148769	Akaike info criterion	-0.827194
Sum squared resid	0.464778	Schwarz criterion	-0.632174
Log likelihood	14.33992	Hannan-Quinn criter.	-0.773103
F-statistic	71.03251	Durbin-Watson stat	1.188189
Prob(F-statistic)	0.000000		

2.2 Bond Market

United States

Dependent Variable: LOG(BP)
Method: Least Squares
Date: 02/25/13 Time: 23:09
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-9.15E-06	6.39E-06	-1.433724	0.1664
BY	-0.046273	0.011954	-3.870798	0.0009
CBR	7.65E-05	3.30E-05	2.317995	0.0306
C	5.044155	0.127278	39.63110	0.0000

R-squared	0.854508	Mean dependent var	4.711459
Adjusted R-squared	0.833724	S.D. dependent var	0.069193
S.E. of regression	0.028215	Akaike info criterion	-4.152289
Sum squared resid	0.016718	Schwarz criterion	-3.957269
Log likelihood	55.90361	Hannan-Quinn criter.	-4.098199
F-statistic	41.11270	Durbin-Watson stat	1.928821
Prob(F-statistic)	0.000000		

United Kingdom

Dependent Variable: LOG(BP)
Method: Least Squares
Date: 02/25/13 Time: 23:09
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-8.40E-05	7.23E-05	-1.161492	0.2585
BY	-0.049361	0.008554	-5.770450	0.0000
CBR	-0.000147	0.000317	-0.462938	0.6482
C	5.133807	0.115161	44.57938	0.0000

R-squared	0.862585	Mean dependent var	4.714795
Adjusted R-squared	0.842954	S.D. dependent var	0.100677
S.E. of regression	0.039897	Akaike info criterion	-3.459364
Sum squared resid	0.033428	Schwarz criterion	-3.264344
Log likelihood	47.24205	Hannan-Quinn criter.	-3.405274
F-statistic	43.94052	Durbin-Watson stat	2.108928
Prob(F-statistic)	0.000000		

Canada

Dependent Variable: LOG(BP)
Method: Least Squares
Date: 02/25/13 Time: 23:16
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BY	-0.046869	0.006612	-7.088880	0.0000
GDP	0.000230	9.63E-05	2.385005	0.0266
CBR	-0.008487	0.003247	-2.613421	0.0162
C	5.141897	0.092006	55.88681	0.0000

R-squared	0.940032	Mean dependent var	4.758488
Adjusted R-squared	0.931465	S.D. dependent var	0.098527
S.E. of regression	0.025794	Akaike info criterion	-4.331741
Sum squared resid	0.013971	Schwarz criterion	-4.136720
Log likelihood	58.14676	Hannan-Quinn criter.	-4.277650
F-statistic	109.7284	Durbin-Watson stat	2.295621
Prob(F-statistic)	0.000000		

Australia

Dependent Variable: LOG(BP)
Method: Least Squares
Date: 02/25/13 Time: 23:10
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-3.41E-07	7.69E-08	-4.440166	0.0002
CBR	2.97E-06	1.17E-06	2.532995	0.0193
BY	-0.033340	0.004526	-7.366263	0.0000
C	5.109664	0.062421	81.85860	0.0000

R-squared	0.754368	Mean dependent var	4.713982
Adjusted R-squared	0.719278	S.D. dependent var	0.078875
S.E. of regression	0.041790	Akaike info criterion	-3.366660
Sum squared resid	0.036675	Schwarz criterion	-3.171639
Log likelihood	46.08324	Hannan-Quinn criter.	-3.312569
F-statistic	21.49790	Durbin-Watson stat	1.768859
Prob(F-statistic)	0.000001		

Foreign Exchange Market

United States

Dependent Variable: LOG(RER)
Method: Least Squares
Date: 03/04/13 Time: 20:05
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	4.35E-05	1.12E-05	3.865608	0.0010
IR	-0.031014	0.009216	-3.365184	0.0031
IF	-0.027751	0.018588	-1.492902	0.1511
MS	-0.000914	0.000158	-5.767876	0.0000
C	5.342414	0.154796	34.51251	0.0000

R-squared	0.741669	Mean dependent var	4.496345
Adjusted R-squared	0.690003	S.D. dependent var	0.103007
S.E. of regression	0.057351	Akaike info criterion	-2.702379
Sum squared resid	0.065784	Schwarz criterion	-2.458604
Log likelihood	38.77974	Hannan-Quinn criter.	-2.634767
F-statistic	14.35503	Durbin-Watson stat	1.306958
Prob(F-statistic)	0.000011		

United Kingdom

Dependent Variable: LOG(RER)
Method: Least Squares
Date: 03/04/13 Time: 20:05
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.000929	0.000215	4.323612	0.0003
IR	0.020188	0.010472	1.927882	0.0682
IF	0.014846	0.009979	1.487767	0.1524
MS	-6.75E-07	2.08E-07	-3.249412	0.0040
C	3.982605	0.146695	27.14893	0.0000

R-squared	0.645734	Mean dependent var	4.642083
Adjusted R-squared	0.574880	S.D. dependent var	0.100528
S.E. of regression	0.065545	Akaike info criterion	-2.435289
Sum squared resid	0.085924	Schwarz criterion	-2.191514
Log likelihood	35.44111	Hannan-Quinn criter.	-2.367676
F-statistic	9.113673	Durbin-Watson stat	0.546482
Prob(F-statistic)	0.000232		

Canada

Dependent Variable: LOG(RER)
Method: Least Squares
Date: 03/04/13 Time: 20:01
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.000360	0.000195	-1.842897	0.0802
IR	0.028019	0.009629	2.909707	0.0087
IF	0.042828	0.009884	4.333128	0.0003
MS	-0.001680	0.000485	-3.465531	0.0024
C	4.220540	0.136373	30.94854	0.0000

R-squared	0.636749	Mean dependent var	4.491699
Adjusted R-squared	0.564098	S.D. dependent var	0.108673
S.E. of regression	0.071749	Akaike info criterion	-2.254423
Sum squared resid	0.102959	Schwarz criterion	-2.010648
Log likelihood	33.18028	Hannan-Quinn criter.	-2.186810
F-statistic	8.764574	Durbin-Watson stat	0.664986
Prob(F-statistic)	0.000295		

Australia

Dependent Variable: LOG(RER)
Method: Least Squares
Date: 03/04/13 Time: 20:02
Sample: 1986 2010
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.23E-06	2.61E-07	4.706409	0.0001
IF	0.014268	0.005495	2.596359	0.0173
IR	0.021543	0.008823	2.441681	0.0240
MS	-3.62E-06	1.30E-06	-2.780647	0.0115
C	3.955464	0.095790	41.29324	0.0000

R-squared	0.844430	Mean dependent var	4.550841
Adjusted R-squared	0.813316	S.D. dependent var	0.119970
S.E. of regression	0.051835	Akaike info criterion	-2.904628
Sum squared resid	0.053738	Schwarz criterion	-2.660853
Log likelihood	41.30785	Hannan-Quinn criter.	-2.837015
F-statistic	27.13981	Durbin-Watson stat	1.724595
Prob(F-statistic)	0.000000		

3.0 Unit Root Test

3.1 Stock Market

Australia

Intercept

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.009915	0.0065
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.045893	0.0005
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.073063
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Intercept & Trend

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.897023	0.0320
Test critical values:	1% level	-4.498307	
	5% level	-3.658446	
	10% level	-3.268973	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.845236	0.0040
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.057509
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

Canada

Intercept

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.852854	0.0008
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.857289	0.0008
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant
Bandwidth: 3 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.069881
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Intercept and Trend

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.702926	0.0055
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.702342	0.0055
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.068825
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United Kingdom

Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.704908	0.0891
Test critical values:	1% level	-3.769597	
	5% level	-3.004861	
	10% level	-2.642242	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.761781	0.0098
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.224071
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.993607	0.1558
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.622654	0.0499
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.058837
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United States

Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.817854	0.7896
Test critical values:	1% level	-3.857386	
	5% level	-3.040391	
	10% level	-2.660551	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.617453	0.0135
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(US) is stationary
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.210973
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.714169	0.7024
Test critical values:	1% level	-4.571559	
	5% level	-3.690814	
	10% level	-3.286909	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.546032	0.0578
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(US) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.064028
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

3.2 Bond Market

Australia

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.055690	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.204436	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.218158
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.241759	0.0000
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-10.61721	0.0000
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.133708
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

Canada

Intercept

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.178861	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Bandwidth: 6 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-12.17082	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.081085
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.542654	0.0013
Test critical values:	1% level	-4.498307	
	5% level	-3.658446	
	10% level	-3.268973	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-11.98024	0.0000
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.071878
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United Kingdom

Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.766806	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Bandwidth: 4 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.132218	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant
Bandwidth: 6 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.177190
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.118104	0.0029
Test critical values:	1% level	-4.498307	
	5% level	-3.658446	
	10% level	-3.268973	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.299386	0.0000
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.129077
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United States

Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.961027	0.0009
Test critical values:	1% level	-3.831511	
	5% level	-3.029970	
	10% level	-2.655194	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Bandwidth: 7 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-14.46965	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(US) is stationary
Exogenous: Constant
Bandwidth: 4 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.184463
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.885296	0.0353
Test critical values:	1% level	-4.571559	
	5% level	-3.690814	
	10% level	-3.286909	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 7 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-13.96275	0.0000
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(US) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.120499
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

3.3 Foreign Exchange Market

Australia

Intercept

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.569969	0.0150
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.596929	0.0141
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant
Bandwidth: 0 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.226348
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.635715	0.0487
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(AUSTRALIA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.588490	0.0533
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(AUSTRALIA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.076256
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

Canada

Intercept

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.729700	0.0844
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.729700	0.0844
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.237674
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.915162	0.1761
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(CANADA) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.905479	0.1789
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(CANADA) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.100136
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United Kingdom

Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.701653	0.0112
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.673703	0.0119
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant
Bandwidth: 0 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.174900
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.751308	0.0389
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(UK) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.721072	0.0412
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(UK) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.098844
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

United States

Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.446970	0.0196
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.445225	0.0197
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

Null Hypothesis: D(US) is stationary
Exogenous: Constant
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.211998
Asymptotic critical values*:	1% level	0.739000
	5% level	0.463000
	10% level	0.347000

Trend and Intercept

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.222217	0.1048
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(US) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.219236	0.1053
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

Null Hypothesis: D(US) is stationary
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West using Bartlett kernel)

		LM-Stat.
Kwiatkowski-Phillips-Schmidt-Shin test statistic		0.137057
Asymptotic critical values*:	1% level	0.216000
	5% level	0.146000
	10% level	0.119000

4.0 Granger Causality Test

4.1 Stock Market

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 03/12/13 Time: 23:37
Sample: 1986 2010
Included observations: 22

Dependent variable: D(US)

Excluded	Chi-sq	df	Prob.
D(UK)	5.669658	2	0.0587
D(CANADA)	0.030231	2	0.9850
D(AUSTRALIA)	0.626364	2	0.7311
All	6.680387	6	0.3514

Dependent variable: D(UK)

Excluded	Chi-sq	df	Prob.
D(US)	2.876020	2	0.2374
D(CANADA)	0.004843	2	0.9976
D(AUSTRALIA)	1.909843	2	0.3848
All	6.853272	6	0.3346

Dependent variable: D(CANADA)

Excluded	Chi-sq	df	Prob.
D(US)	1.413307	2	0.4933
D(UK)	2.128105	2	0.3451
D(AUSTRALIA)	1.324086	2	0.5158
All	3.751019	6	0.7103

Dependent variable: D(AUSTRALIA)

Excluded	Chi-sq	df	Prob.
D(US)	11.48569	2	0.0032
D(UK)	11.34925	2	0.0034
D(CANADA)	0.212616	2	0.8991
All	12.04330	6	0.0610

4.2 Bond Market

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 03/12/13 Time: 23:43
Sample: 1986 2010
Included observations: 22

Dependent variable: D(US)

Excluded	Chi-sq	df	Prob.
D(UK)	8.548342	2	0.0139
D(CANADA)	2.030304	2	0.3623
D(AUSTRALIA)	2.205008	2	0.3320
All	13.15963	6	0.0406

Dependent variable: D(UK)

Excluded	Chi-sq	df	Prob.
D(US)	1.502454	2	0.4718
D(CANADA)	3.003284	2	0.2228
D(AUSTRALIA)	7.865344	2	0.0196
All	21.37388	6	0.0016

Dependent variable: D(CANADA)

Excluded	Chi-sq	df	Prob.
D(US)	1.494136	2	0.4738
D(UK)	22.07154	2	0.0000
D(AUSTRALIA)	4.297947	2	0.1166
All	23.71092	6	0.0006

Dependent variable: D(AUSTRALIA)

Excluded	Chi-sq	df	Prob.
D(US)	1.172134	2	0.5565
D(UK)	14.20726	2	0.0008
D(CANADA)	3.194001	2	0.2025
All	22.63879	6	0.0009

4.3 Foreign Exchange Market

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 03/17/13 Time: 00:16
Sample: 1986 2010
Included observations: 22

Dependent variable: D(US)

Excluded	Chi-sq	df	Prob.
D(UK)	1.283026	2	0.5265
D(CANADA)	0.085228	2	0.9583
D(AUSTRALIA)	0.046909	2	0.9768
All	3.317896	6	0.7680

Dependent variable: D(UK)

Excluded	Chi-sq	df	Prob.
D(US)	15.28266	2	0.0005
D(CANADA)	56.15396	2	0.0000
D(AUSTRALIA)	23.40180	2	0.0000
All	90.64576	6	0.0000

Dependent variable: D(CANADA)

Excluded	Chi-sq	df	Prob.
D(US)	2.204851	2	0.3321
D(UK)	2.712425	2	0.2576
D(AUSTRALIA)	0.202810	2	0.9036
All	4.805087	6	0.5690

Dependent variable: D(AUSTRALIA)

Excluded	Chi-sq	df	Prob.
D(US)	0.426228	2	0.8081
D(UK)	2.452716	2	0.2934
D(CANADA)	1.037676	2	0.5952
All	5.072873	6	0.5345