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Essays on Financial Structure and Economic Development

by

Zukarnain Zakaria

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ABSTRACT

FACULTY OF HUMANITIES, ART & SOCIAL SCIENCES

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Recently, the relationship between financial sector development, economic growth and other macroeconomic activities has generated intense research interest. This thesis, which is made up of three papers, makes a further contribution to the empirical literature in this area. This thesis begins with an empirical study of the links between financial development, financial structure and economic growth. The roles of the banking sector and of stock market development on economic growth are investigated individually and as a whole. The impact of financial structures on economic growth is also examined to determine whether the impacts depend on the level of income. The estimation is based on the use of panel data and the GMM method. The major findings are first, that banks and stock markets individually have a role in economic growth, but the banks only affect growth indirectly through investment. Second, overall financial development activities positively affect growth, indicating that both banks and stock markets play a complementary role in economic growth. Third, financial structures have a mixed effect on economic growth but do not affect investment. Finally, to have a market-based financial structure will promote higher growth in high-income countries.

Chapter 3 is another empirical study that compares the effectiveness of monetary policy in civil-law and common-law countries. For comparison, the impulse responses of interest rate shocks on output, investment and consumption have been examined. The major findings are first, that monetary policy is more effective in affecting output, investment, and consumption in civil-law countries compared to common-law countries. Second, investment is a major channel through which the impacts of monetary policy shocks are transmitted to output.

The empirical study in Chapter 4 investigates the causal relationship between financial development, foreign direct investment and economic growth in developing countries. The major findings in this chapter are first, in most cases, foreign direct investment has no effect on the development of the domestic banking sector and economic growth. Second, foreign direct investment causally affects the development of domestic stock markets. Finally, the development of a domestic financial sector improves the impact of foreign direct investment on economic growth.

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Chapter 1

Introduction

This thesis is made up of three chapters analysing the relationship between financial structure and economic development. There are three issues that empirically analysed. The empirical study in Chapter 2 provides evidence on the link between financial development, financial structures and economic growth. In Chapter 3, the differences in financial structures that have been found to depend on legal structures of the countries will be empirically investigated with regard to the effectiveness of monetary policy between countries with different legal structures. Chapter 4 investigates the causality relationship between financial sector development and FDI as well as economic growth.

Economists have examined various explanations for growth including investigation of the role of financial intermediaries. In this context, there has been extensive theoretical works on the relationship between financial development and economic growth (for example by Greenwood and Jovanovic, 1990; Saint-Paul, 1992; and Roubini and Sala-I-Martin 1992). These theoretical papers all point to the importance of various intermediary services provided by financial institutions. They show that the roles of financial intermediaries in mobilising savings, allocating resources, exerting corporate control, facilitating risk sharing, and enabling the trading of goods, services and contracts lead to greater capital accumulation and higher investment efficiency, which in turn promote higher economic growth.

Although the theoretical literature offers important insights into the relationship between financial development and growth, empirical studies to document this relationship remain inconclusive. In most cases, cross-country studies report positive effects of financial development on growth. King and Levine (1993a, 1993b), for example, found

that financial indicators are positively and significantly correlated with growth indicators, and suggest the relationship is not just a contemporaneous correlation but that finance seems importantly to lead economic growth. Results from more recent cross-country study by Beck et al. (2000a) also come to the same conclusion that higher levels of banking development produce faster rates of economic growth.

However, time-series studies that test the causality between financial development and growth do not fully support the findings from cross-section analysis. Demetriades and Hussein (1996), for example, detect a feedback relationship between finance and growth in about half of their sample, while in several other countries the relationship runs from growth to finance. Similar results can also be found in more recent studies by Neusser and Kugler (1998), Luintel and Khan (1999), Shah and Morris (2002), and Al-Yousif (2002). The findings from these studies suggest that the results are country specific. This is in line with Arestis and Demetriades' (1996) suggestion that the causal link between finance and growth is crucially determined by the nature and operation of the financial institutions and policies pursued in each country.

Although less attention has been given to the roles of stock markets compared with banking sector, several studies find a positive role for stock markets in economic growth. Demirgüc-Kunt and Maksimovic (2000), for example, show that firms with access to more developed stock markets grow faster, while Rousseau and Wachtel (2000) find a leading role of stock market liquidity and the intensity of activity on per capita output. Kassimatis and Spyrou (2001), however, suggest that stock markets have a role to play only in relatively liberalised economies. In financially repressed economies, the stock market does not affect real sector growth.

At the same time, a different strand of the literature investigates the impact of financial structure on economic growth. Financial structure is a much broader concept than financial depth, reflecting the specific organisation of the financial system. Given the complexity of the financial structure, researchers in examining the link between financial structure and growth have focused on the relative merits of bank-based versus market-based financial structures. The bank-based view highlights the positive role of banks in mobilising resources, identifying good projects, monitoring managers, and managing risk. Meanwhile, the market-based view highlights the positive role of markets in

promoting economic growth particularly in facilitating diversification and the customisation of risk management devices. Emerging evidence, however, suggests that neither view is fully correct. Levine (2002) shows that neither bank-based nor market-based financial structures show a close association with economic growth. Similarly, Beck and Levine (2000) also found that financially dependent industries do not grow faster in bank-based or market-based financial structure. In this regard, Levine (1997) argues that the choice is not either banks or markets. Rather, banks and markets provide complementary financial services to the economy, with both having positive implications for economic growth. This is in line with the view that the financial system provides key financial services, and the division between banks and markets in providing these services is of secondary importance, but overall, financial development is important for economic growth. La Porta et al. (1997), however, reject this view and suggest that establishing a legal environment is much more important than considerations involving a comparison between bank-based or market-based system. Chapter 2 analyse empirically the role of banks, stock markets and financial structures on economic growth.

Following insight that legal origin can determined financial structure, Chapter 3 analyse how the monetary transmission mechanism is influenced by legal origin. This is based on La Porta et al. (1997) who argue that the legal system is the primary determinant of the effectiveness of the financial system in facilitating innovation and growth. With regard to financial structures, La Porta et al. (1997, 1998) conclude that in countries where the protections are strong, equity and bond markets are broad and deep, and primary capital markets will be important. By contrast, in those places where investor protections are weak, finance will come primarily through the banking system. In relation to legal structures, this implies that English common-law countries should have the least concentration of corporate ownership and the largest and deepest capital markets. French civil-law countries should have the most concentrated ownership and the smallest capital markets. This implies that the legal system shapes the financial structure of the country. And, given the importance of banks in the monetary policy transmission process as stressed by the credit view, this leads to the question of whether there is a difference in the effectiveness of monetary policy in countries with different legal structures. The empirical study in Chapter 3 provides some answers to this question.

Chapter 4 examines how the impact of financial development on growth is determined by the presence of FDI. This is in line with Neusser and Kugler (1998) who pointed out that the access to international capital markets may change the character of domestic financial intermediation. In this situation, domestic finance may no longer be essential, and the growth of domestic financial intermediation could be detrimental to manufacturing growth if it diverts savings to foreign rather than domestic entrepreneurs. However, Alfaro et al. (2004) who examine the intermediary role played by local financial institutions in channelling the contributions of FDI spillovers to economic growth found that the level of domestic financial system development could partly determine the positive effect of FDI on economic growth. Thus, Alfaro et al. argued that lack of development of local financial markets can adversely limit the economy's ability to take advantage of potential FDI spillovers. And, earlier than this, McKinnon (1973) also argues that the development of the capital market is "necessary and sufficient" to foster the "adoption of best-practice technologies and learning by doing." In other words, limited access to credit markets restricts entrepreneurial development. If entrepreneurship allows greater assimilation and adoption of best technological practices made available by FDI, then the absence of well-developed financial markets limits the potential positive FDI externalities. If the positive impact of FDI on economic growth depends on the level of financial development, it is justifiable to ask whether FDI itself could contribute to financial development, and financial development individually or together with economic growth could lead to the greater inflow of FDI. To answer this question is a main task of the empirical study in the Chapter 4.

Above, we have provided a brief discussion of the literature on the relationship between financial structure and economic development related to the three issues addressed in this thesis. Now, we specify how this thesis contributes to the empirical literature in the area of financial structure and economic development. Specifically, in Chapter 2, the main objectives are, first, to investigate the relationship between banking sector development, stock market development, and the overall development of the financial sector and economic growth. This is to analyse whether banks and stock markets individually can contribute to economic growth or whether banks and stock markets play complementary roles in economic growth. In line with the first objective, the second objective examines the bank-based and market-based debate with regard to the effects of financial structures on economic growth. However, this chapter goes one step further to investigate whether

the effects of bank-based and market-based financial structures on economic growth depend on the level of income of the countries. This possibility has been neglected by previous empirical studies on this issue. From a methodological point of view, the empirical study in Chapter 2 is based on the recent developments in studying economic growth, which is the usage of panel data, and in the econometrics of dynamic panel data analysis, using GMM-SYSTEMS estimators that were developed by Arellano and Bover (1995), and Blundell and Bond (1998). Panel data methodology is preferred because it controls for group heterogeneity, its gives more information and variability, it enables one to study the dynamics of adjustment and, it eliminates aggregation biases. In this chapter, the panel data are generated by taking the average of non-overlapping five-year periods, partly to avoid picking up business-cycle frequency relations between financial sector and economic growth. In investigating the link between banking sector development and economic growth, the panel data consist of 88 countries and cover the period from 1960 to 1999. Meanwhile, panel data for stock market development have a shorter span (1975 to 1997) and smaller sample (45 countries). In addition to economic growth, this chapter also investigates the impacts of financial sector development and financial structures on investment.

To study the links between financial sector development, financial structures and economic growth has important implications for long term growth strategies. This study provides information on the relative importance of different types of financial sector (banks and stock markets) for economic growth. If banks play a role, to have a developed banking sector is a key factor for a better growth performance. If stock markets also play a role, development of the broader financial sector is crucial as well. If financial structures (bank-based or market-based) play an important role in growth process then choosing the right financial sector to be a key player in the overall financial system is crucial. If a bank-based system offers better growth performance, more attention should be given to the banks in giving savers a wider range of investment and borrowing opportunities, and giving companies more alternative sources of financing. If a market-based financial structure has more impact on growth, then long-term economic planning should be directed at enabling the development of a more market-oriented financial system. If financial structure contributes to better growth, the question arises as to whether same strategy can be applied in both developed and developing countries.

The differences in financial structure across countries could be related to their legal structures. Countries with common-law tradition have been found to be more market-based while countries with civil-law tradition have been found to be more bank-based (La Porta et al. 1997, 1998). If this argument is true, this could imply that monetary policy shocks will have a greater effect on firms in civil-law countries that mostly depend on bank loans compared with firms in common-law countries that have better access to the credit market via stock and bond markets. This is a question that motivates the empirical study in Chapter 3. This chapter investigates the relationship between countries' legal structures and the performance of monetary policy. This is to determine whether the strength of the effect of monetary policy amongst countries can be related to the difference in their legal structures. In this chapter, we compare the effectiveness of monetary policy actions between civil-law countries and common-law countries by using impulse response functions. The impulse is measured by a positive shock in the short term interest rate, with responses being investigated on three macroeconomic variables over the period of 20 quarters. Besides output, which is common in previous studies of the impact of monetary policy, this chapter also investigates the impact of interest rate shocks on the level of investment and consumption. The use of investment and consumption is based on the fact that these variables are directly affected by a shock in the interest rate. The comparisons have been carried out on 24 countries consisting of both developed and developing countries. In this chapter, the impulse response functions were generated by using two estimation methods; first differences multivariate VAR model and VECM approach. The usage of two approaches could provide a better picture on the relationship being studied, and provide a robustness check. The impulse response functions were estimated for individual countries and the effectiveness of monetary policy is evaluated based on the size of the impacts and the speed of adjustments of output, investment and consumption to the shock in interest rate.

Investigation of the relationship between financial structures, legal structures and monetary policy clearly has important implications for policy. This study provides information on the relative impact of monetary policy in different types of legal structures. Indirectly, this study examines the response of macroeconomic variables to the shocks in the economy (in this case, the interest rate shocks). The findings from this study can be used as a guide to policy makers in civil- and common-law countries in evaluating the impact of monetary policy, and provides an explanation of the differences

in the impact of monetary policy between countries with different legal structures. If the impact of shocks is greater in civil-law countries, it would imply that macroeconomic variables in these countries are less stable compared with common-law countries. To reduce this instability, regulation that improved the quality of law related to the investors' protection and enforcement, or policy to develop more market-based financial structures should be considered. If monetary policy is less effective in the common-law countries which generally have market-based financial structures then it is crucial to find alternative policies to facilitate macroeconomic stability.

Chapter 4 examines the direction of causality between FDI, financial development and economic growth with a special focus on the developing countries. The issue of causality between these three variables is investigated from three different aspects. First, the causality relationship between FDI and financial development is examined where as far as can be ascertained no empirical studies have been carried out. The indicators for the financial development used in this study can be classified into two broad categories: those relating to the banking sector and those relating to the stock market. The tests involve causality running from FDI to banking sector or stock market development, and conversely. Second, this chapter examines the direction of causality relationship between FDI and economic growth but, unlike in most previous studies, the tests were carried out in a large number of developing countries and using a multivariate VAR framework. Third, in addition to bivariate causality, this study examines the multivariate causality between FDI and a set of variables (financial development and economic growth). The result could help us to determine whether financial development and economic growth, individually or jointly causes FDI or vice versa. The tests have been carried out for 37 developing countries but in the case of stock markets, the availability of the data have limits the sample to 13 countries. This study uses the Granger causality tests in the framework of first differences VAR model and VECM approach. The usage of two approaches is because although each has shortcomings, together they provide a better picture.

Investigation of causal links between FDI, financial development, and economic growth has important implications for development strategies. If there were a unidirectional causality from FDI to economic growth and/or financial development, it would lend credence to the FDI-led growth and/or financial development hypothesis that FDI not

only leads to capital formation and employment augmentation but also promotes income growth and/or financial development in host economies. If the causal process runs in the opposite direction, it would imply that economic growth and/or financial development may be a determinant for developing countries to attract FDI or that the amount of FDI flows into a country depends on the country's absorptive capacity; the level of income and/or the development of the financial system of the host country. If the causal process were bi-directional, FDI and growth and/or financial development would have a reinforcing causal relationship.

Recently, interest has grown in exploring the links between financial sector and economic growth performance both theoretically and empirically. The development of endogenous growth models since the second half of the 1980s has been important to the increased interest in this issue partly because traditional growth models could not explain the variety of countries' long-term growth experiences. Furthermore, since even small differences in growth rates will cause appreciable differences in living standards, learning about effective policy is crucial. The analysis in this thesis aims to contribute to the knowledge on the role of financial structures in economic development.

Chapter 2

The Impact of Banks, Stock Market Development and Financial Structure on Economic Growth: Evidence from Dynamic Panel Data Analysis

2.0 Introduction

Many economists believe that financial intermediaries play important roles in economic growth. The earliest writer that linked financial sector and economic growth was Bagehot ([1873], 1962) who argued that financial intermediation was critical for rapid industrialization of England in the early nineteenth century. During that period, information was used to divert funds from poor-quality investments to high-quality investments, thus enhancing the overall efficiency of investment. Another important writer in this area is Schumpeter (1912) who suggested that financial intermediaries promote growth by identifying and redirecting funds toward innovative projects. In his book 'The Theory of Economic Development', Schumpeter stressed that the services provided by financial intermediaries in mobilising funds, evaluating and selecting projects, monitoring entrepreneurs, and facilitating transactions are essential for technological innovation and economic development. More recently, Gurley and Shaw (1955) in their paper emphasised the role of financial intermediaries in the credit supply process. They argued that the difference in development between developed and underdeveloped countries are because the developed countries have financial systems that are highly organised, and which are designed to facilitate the flow of loanable funds between savers and investors.

Recent studies by Beck et al. (2000a) and Levine et al. (2000) confirm that well-functioning banks accelerate economic growth. However, these studies omit measures of stock market development. To improve this, Rousseau and Wachtel (2000) employ panel techniques to assess the relationship between stock markets, banks and growth. They used the difference panel estimator to remove any bias created by unobserved country-specific effects and to eliminate parameter inconsistency arising from simultaneity bias. Beck and Levine (2004) employ the system panel estimator to investigate the impact of stock markets and banks on economic growth. A system panel estimator increases the consistency and efficiency of estimation. Findings from Rousseau and Wachtel (2000), and Beck and Levine (2004) shown that both stock markets and banks are important for economic growth. However, the impact of stock markets and banks on economic growth in these studies has been analysed individually. To improve this, Levine (2002) has investigated the impact of financial structure and overall financial development on real per capita GDP growth, real per capita capital growth, total factor productivity growth, and private saving. Beck and Levine (2002) have examined the impact of financial structure, overall financial development and legal system efficiency on industrial expansion, the creation of new establishment, and the efficiency of capital allocation. The findings from both studies show that the overall level of financial development and effective legal system are important for economic growth, while financial structure is not relevant for growth. These studies, however, did not investigate the possibility that the impacts of financial structure on economic growth are different depending on the level of development.

Given this background, the main objective of this study is to examine the relationship between financial development, financial structure and economic growth. Specifically, this study investigates the role of banks and stock markets development in economic growth. To achieve this objective, this study uses two indicators of banking development and two indicators of stock market development. The indicator of banking development is the ratio of liquid liabilities to GDP and the ratio of domestic private credit to GDP. The indicators for stock market development are the market capitalisation ratio and the ratio of value traded to GDP. In this analysis, first, the relationship between banks, stock markets and economic growth will be examined

individually. This is to determine whether banks and stock markets have an independent role in the growth process. Secondly, this study aims to determine whether the development of financial sector as a whole is important for economic growth. For this purpose, an indicator that measures both the development in banking sector and the stock markets was constructed. The indicator measures the overall size and activities of the financial sector in the economy. Finally, this study investigates the impact of financial structures on economic growth. For this purpose, financial structure indicators that measure the relative importance of stock markets and banking sector in the economy were constructed. To examine the impact of financial structure on the difference levels of income, this study has divided the countries into two groups, developed and developing countries, so that the impacts of financial structure on economic growth in these groups can be compared.

This study contributes to the current literature by investigating the impact of overall financial development and financial structure on economic growth. This is due to the fact most of previous studies have investigated the impact of banks and/or stock markets on economic growth individually. In their work, the indicators of banking sector and stock markets development were entered into the growth regression alternatively or simultaneously. In evaluating the impact of overall financial development on economic growth, this study introduces an alternative measure for overall financial development. The main contribution of this study, however, is in evaluating the impact of financial structure on economic growth on the difference levels of development. As far can be ascertained, no studies have been undertaken on this issue. In addition, this study also constructs an alternative measure for financial structure.

2.1 Literature Review

2.1.1 Financial Intermediaries and Economic Growth

There has been an extensive theoretical literature on the relationship between financial development and economic growth. In general, the argument in the theoretical literature is mainly confined to a debate about how financial development affects economic growth. McKinnon (1973) and Shaw (1973), for example, believe

that the interest rate is the key determinant of the rate of capital formation and a high rate of economic growth. According to this view, better financial intermediaries influence growth primarily by raising domestic saving rates and attracting foreign capital, and thus the investment rate. Specifically, in the McKinnon (1973) and Shaw (1973) approach, the effect of financial development on economic growth depends on the effect of financial development on interest rate. Thus, they recommend a 'liberalised' financial system, which they argue, is able to increase the volume of financial saving, and thus the volume of physical capital. McKinnon in his model assumed that investment is lumpy and self-financed and hence will not materialise unless adequate savings are accumulated in the form of bank deposits. Meanwhile, in the model of Shaw, financial intermediaries, through debt intermediation, promote investment, which, in turn, raises the level of output. The McKinnon-Shaw hypothesis suggests that the level of financial intermediation should be closely related to the level of real interest rate, which when held below its normal competitive level, would indicate the extent of financial repression. According to this view, a positive real interest rate stimulates financial saving and financial intermediation, thereby increasing the supply of credit to the private sector, which in turn stimulates investment and growth.

Meanwhile, De Gregorio (1996), and Jappelli and Pagano (1994) in their models show that financial development may also reduce saving, and thereby growth. In their models, they analyse the effect of borrowing constraints on economic growth. A result common to both studies is that the inability of individuals to borrow against future income induces them to increase savings. The reason is that when individuals are unable to borrow, they must build up financial wealth by increasing saving in order to finance current consumption. Thus, they suggest that financial deepening on the side of consumer credit leads to reduction in saving and growth. De Gregorio (1996) also suggests that the relationship between borrowing constraints and growth will ultimately depend on the importance of the effect of borrowing constraints on the marginal productivity of capital relative to their effect on the volume of savings. He argues that a relaxation of borrowing constraints increases the incentives for human capital accumulation and may increase the marginal product of capital, thus leading to higher growth despite the reduction in savings.

Recently, theoretical work on the finance-growth nexus has incorporated the role of financial services in the endogenous growth model to analyse the interaction between financial markets and long-run economic growth. Some authors stressed the importance of financial intermediaries in acquiring information about investment and allocating resources. They defend their view by pointing out that individual savers may have difficulties in identifying the investment projects that generate the highest returns, because of lack of information, whereas financial institutions have a comparative advantage in collecting information on different investment projects and are therefore more able to finance those projects that earn the highest returns. If individuals hold their savings at financial institutions and the latter use these savings to finance investment, the efficient allocation of these resources will be improved. Thus, financial intermediation promotes growth because it allows a higher rate of return to be earned on capital (Boyd and Prescott, 1986; Greenwood and Jovanovic, 1990; King and Levine, 1993a). In other words, financial development reduces the costs of acquiring information about firms and managers, and lowers the costs of conducting transactions. This can reduce adverse selection, and enable savers to invest in risky (but more productive) entrepreneurs.

Some authors look at the monitoring and control role of banks. Diamond (1984), for instance, shows that households delegate financial intermediaries as monitors to take an active role in firms' activities to get information and maintain discipline to prevent incentive problems. They argued that the absence of arrangements that enhance corporate control may impede the mobilisation of savings from individual savers and thereby keep capital from flowing to profitable investments. In terms of long-run growth, financial arrangements that improve corporate control tend to promote faster growth by improving the allocation of capital (Stiglitz and Weiss, 1981, 1983; Bencivenga and Smith, 1993). Other studies stress the role of commitment and emphasise the role of banks in offering financial contracts not available in competitive markets. Mayer (1988), for example, observes that intermediaries make long-term relationships possible by devising contracts that ensure that firms fulfil their commitments.

From a different viewpoint, some authors look at the risk-sharing role of financial intermediaries. They argued that the risk-sharing role performed by financial

intermediaries would allow individuals to share the uninsurable risk of idiosyncratic shocks, such as unobservable taste or liquidity shocks, and diversifiable risk deriving from the volatility of asset returns. Bencivenga and Smith (1991), for example, in their models stress the role of financial intermediaries in reducing liquidity risks. They show that financial intermediaries increase the productivity of investment by directing funds to illiquid, high-yield technology and reducing the investment waste due to premature liquidation. In this model, individuals face uncertainty about their future liquidity needs. They can choose to invest in liquid assets with low productivity and/or illiquid assets, which is riskier but has high productivity. Under these conditions, banks can offer liquid deposits to savers and undertake a mixture of liquid low return investments to satisfy demand deposits, and illiquid high-return investments. By providing demand deposits and choosing an appropriate mixture of liquid and illiquid investments, banks provide complete insurance to savers against liquidity risk while simultaneously facilitating long-run investments in high-return projects and accelerating growth.

Others authors point out the importance of the portfolio diversification role of financial intermediaries. The basic intuition is straightforward. While savers generally do not like risk, high-return projects tend to be riskier than low-return projects. Thus, financial markets that ease risk diversification tend to induce a portfolio shift toward projects with higher expected returns. In the Saint-Paul (1992) model, for example, agents can choose between two technologies. One technology is highly flexible and allows productive diversifications, but has low productivity; the other one is rigid, more specialized and more productive. The economy is exposed to shocks to consumer preferences, which may result in a lack of demand for some products. Therefore, in the absence of financial markets risk-averse individuals may prefer technological flexibility rather than high productivity. Financial markets, in contrast, allow individuals to hold a diversified portfolio to insure themselves against negative demand shocks and, at the same time, to choose the more productive technology.

Besides the focus on banking, there is also theoretical literature on the risk-sharing role of stock markets and economic growth. Levine (1991), and Bencivenga et al. (1995), for example, derived models where more liquid stock markets (markets where

it is less expensive to trade equities) reduce the disincentives to investing in long-duration projects because investors can easily sell their stake in the project if they need their saving before the project matures. Stock market, therefore, facilitates investment in longer-run, higher-return projects that boost productivity growth. The stock market also allows agents to reduce rate-of-return risk by portfolio diversification. Those twofold insurance functions increase willingness to invest in less liquid, more productive projects, and avoid unnecessary terminations. As a result, setting up a stock market raises the productivity of investment and the growth rate.

In summary, theoretically, financial development can contribute to raising the volume of investment, and thus economic growth. In this channel, financial development increases private saving, which in turn increases investment and economic growth. However, as suggested by De Gregorio and Guidotti (1995), the effect of financial development on growth is mainly due to its impact on the efficiency of investment, rather than its volume. In other words, financial development increases the quality of investments, and hence productivity and economic growth. Theoretically, financial intermediaries can improve the efficiency of investments in the following ways. First, financial intermediaries provide information on more productive investment opportunities. Second, financial intermediaries help in channelling funds towards more risky but productive projects by risk sharing and portfolio diversification. Third, financial intermediaries help in channelling funds towards long run and productive projects and reduce premature liquidation by fulfilling unexpected future liquidity demands.

2.1.2 Empirical Evidence from Previous Studies

In general, empirical studies on the relationship between financial development and economic growth can be categorised into two main approaches, a cross-section analysis and time series approach. Studies based on cross-section analysis offered an explanation based on the average influence of variables across countries, whereas time series analysis could provide a dynamic relationship between variables of interest. However, there are drawbacks of pure cross-section analysis. First, the dynamic dimension of data is generally ignored. Second, parameter estimates may be

biased because of omission of cross-country differences. Third, there is no control of endogeneity of regressors. The failure to control effectively for cross country heterogeneity and endogeneity of the explanatory variables creates large biases. However, the most serious criticism of cross-section analysis is that it is unable to examine causality in the Granger sense. Demetriades and Hussein (1996) in their paper have summed up the weaknesses of the cross-sectional approach to testing causality in the following way. First, it is not possible to infer anything more than a contemporaneous correlation between growth and financial development. Second, they do not allow different countries to exhibit different pattern of causality. Third, any causality identified is 'on average' across different countries and this is sensitive to the addition and deletion of a few observations. Forth, they impose identical effects of financial development on growth in all countries (see Neusser and Kugler, 1998).

From this point of view, most of the empirical studies on the causality relationship between finance and growth have used a time-series-modelling framework. Al-Yousif (2002), for example, employed the Granger-Causality tests within an error-correction model (ECM) framework to examine the finance-growth nexus in 30 developing countries. He finds strong support that causality between financial development and economic growth is bi-directional. Furthermore, the results are country specific and tend to vary with the kind of indicators used to measure financial development. Using a different approach, Luintel and Khan (1999) examine the long-run relationship between financial development and economic growth in a multivariate time series framework using data from ten developing countries. Their results find bi-directional causality between financial development and growth. Neusser and Kugler (1998) use a VAR framework to examine the causality relationships between manufacturing total factor productivity (TFP) and a financial depth indicator. In this study, the GDP of financial institutions, insurance companies, and pension funds has been used as a measure of financial depth. By using annual data for 13 OECD countries covering the period 1970-1991, they find that the null hypothesis of no Granger causality from financial sector to manufacturing TFP is rejected only for the USA, Japan, and Germany. Shah and Morris (2002) also apply a VAR model to test the presence of causality relationships between financial development and growth. They use quarterly data from 19 OECD countries and from

China and South Korea from the period 1985-98. Results from the study show little support for the hypothesis that financial development leads economic growth.

Recently, empirical studies on the link between financial development and growth have moved to panel data analysis, which could potentially combine the positive characteristics of the time series approach and cross-section analysis. This is because averaging data over such long periods as is normally done in cross-section analysis may mask some important features of the growth path of the economy. This is why most of the empirical growth literature recently has generally adopted the use of panels, thereby allowing for smoothing out the business cycle fluctuations in output growth without unnecessarily masking all the dynamics in the data. Among other studies that used panel data approach is one by Beck et al. (2000a) who examined the channels through which financial intermediary development is associated with growth. Specifically, they examine whether the level of banking sector development exerts a causal impact on real per capita GDP growth, capital per capita growth, productivity per capita growth and private saving rates. The study used panel data for 63 countries over the period 1960-1995, and finds that banks exert a strong, causal impact on real per capita GDP growth and per capita productivity growth. Meanwhile, the panel data study by BenHabib and Spiegel (2000) shows that indicators of financial development are correlated with both total factor productivity growth and investment. In addition, the results also show that the indicators of financial development that are correlated with total factor productivity growth differ from those that encourage investment. Levine et al. (2000) in their study, use panel data to evaluate whether the exogenous components of financial intermediary development influence economic growth. For the dynamic panel techniques, data for 74 countries are averaged over 5-year intervals covering the period 1960-1995. By using the Generalised-Method-of-Moments (GMM) estimators developed for dynamic models of panel data, they find that the exogenous component of financial intermediary development is positively associated with economic growth.

In contrast with the finance-growth relationship, only a few empirical studies can be found on the relationship between stock market development and growth. Levine and Zervos (1998), for example, evaluate the empirical relationship between various measures of stock market development, banking development, and long run growth.

Using data for 47 countries over the period 1976-1993, they find that, even after controlling for many factors associated with growth, stock market liquidity and banking development are both positively and robustly correlated with contemporaneous and future rates of economic growth. Since measures of stock market liquidity and banking development both enter the growth regression significantly, they suggest that banks provided different financial services from those provided by stock markets. In another paper, Levine and Zervos (1996) by using pooled cross-country, time series regression of 44 countries for the period from 1976 to 1993 also find that stock market development is positively associated with economic growth. Meanwhile, Demirgüc-Kunt and Levine (1995) in their study of 41 countries over 1986-1993 find a rough, positive correspondence between per capita income and stock market development. They also find that market capitalisation and the value-traded ratio are positively correlated with the indicator of financial intermediary development, showing that stock market and financial intermediaries are generally complements. Rousseau and Wachtel (2000) examine the relationship between equity markets and economic growth with panel data for a set of 47 countries with annual data for 1980-1995. They explore the effects of two aspects of stock market development: the size of the market as indicated by total market capitalisation and a combination of size and liquidity in the market as indicated by the volume of trading activity. The results show leading roles for stock market liquidity and the intensity of activity in traditional financial intermediaries on per capita output.

In examining the effects of financial structure on economic growth, most of the studies have examined the relative merits of bank-based versus market-based financial systems. In bank-based financial systems such as in Germany and Japan, banks play a leading role in mobilizing savings, allocating capital, overseeing the investment decisions of corporate management and in providing risk management vehicles. In market-based financial systems such as in England and the United States, securities markets share centre stage with banks in term of getting society's savings to firms, exerting corporate control, and easing risk management. On this issue, Levine (1997) argues that banks or markets provide complementary financial services to the company, with both having positive implications for economic growth. Meanwhile, La Porta et al. (1997, 1998) argue that the legal system is the primary determinant of

the effectiveness of the financial system in facilitating innovation and growth. This view predicts that the efficiency of the legal system will be positively related to innovation and growth. Results from empirical studies on the relationship between financial structure and growth seem consistent with La Porta et al. For example, Beck et al. (2000b) find that distinguishing countries by financial structure does not help in explaining cross-country differences in long-run GDP growth, industrial performance, new firm formation, firm use of external funds, or firm growth. Levine (2002) shows that financial structure is not a good predictor of real per capita GDP growth in a cross-country growth framework. He also finds that financial structure is not a good predictor of capital accumulation, productivity growth and saving rates. Beck and Levine (2000) show that financially dependent industries do not grow faster in bank-based or market-based financial systems. Meanwhile, Demirgüc-Kunt and Maksimovic (2000) show that financial structure is not a robust predictor of the proportion of firms that grow faster.

2.3 Data and Methodology

2.3.1 Data

This study uses a panel data approach, which has both a time series and cross-section dimension. This approach is the best procedure to account for the diversity and experience within and between countries because panel data has several advantages over purely cross-sectional estimation. First, we could take into account how financial development over time within a country may have an effect on the country's growth performance. Second, in a panel data approach, we are able to control for unobserved country-specific effects and thereby reduce biases in the estimated coefficients. Thirdly, panel data enables us to study the dynamics of adjustment. Panel data also make the data less likely to be serially correlated than they would be in a time series setup. Finally, panel data eliminate the aggregation biases resulting from aggregating across countries.

In the panel data approach where empirical data are characterized by time-series (T) and cross-section (N), there are a number of alternative methods for multi-country estimation. At one extreme, the fully heterogeneous-coefficient model imposes no

cross-country parameter restrictions. In this situation, the model can be estimated on a country-by-country basis provided the time-series dimension of the data is sufficiently large. Meanwhile, when the cross-country dimension is large, the mean of long- and short-run coefficients across countries can be estimated consistently by the unweighted average of the individual country coefficients. This is the `Mean Group' (MG) estimator introduced by Pesaran, Smith, and Im (1996). At the other extreme, the fully homogeneous-coefficient model requires that all slope and intercept coefficient be equal across countries. This is the simple `Pooled' estimator. In between the two extremes, there are a variety of estimators. The `Pooled Mean Group' (PMG) estimator, introduced by Pesaran, Shin, and Smith (1999), for example, constrains the long-run coefficients to be identical, but allows the short- run coefficients and error variances to differ across groups. The PMG estimator generates consistent estimates of the mean of short-run coefficients across countries by taking the unweighted average of the individual country coefficients. This estimator is particularly useful when, as in this study, the long-run is given by country-independent equilibrium conditions while the short-run adjustment depends on country characteristics such as financial development and relative price flexibility.

In this study, the panel data to study the relationship between bank development and economic growth and associated control variables are generated by taking the average of non-overlapping five-year periods (1960-1964, 1965-1969, 1970-1974, 1975-1979, 1980-1984, 1985-1989, 1990-1994 and 1995-1999) and include 88 countries. The sample comprises 27 (30.7%) high-income countries, 37 (42%) middle-income countries and 24 (27.3%) low-income countries. This gives eight observations per variable per country. A list of countries in the sample is in Appendix 2.1. By taking non-overlapping five-year averages, we partly avoid picking up business-cycle frequency relations between financial sector development and economic growth. This method has been used in many empirical growth studies to smooth out business cycle fluctuations. However, the panel data to study the relationship between stock market development and economic growth generally have shorter span and smaller sample. The data cover the period from 1975 to 1997, and consist of 45 countries (see Appendix 2.1). Panel data for stock market also are generated from non-overlapping five-year averages (1975-1979, 1980-1984, 1985-1989, 1990-1994 and

1995-1997) except for the last observation based on a three-year average. The source of data for bank development and all control variables is the World Bank CD-ROM World Development Indicators 2000. The data for stock market indicators are taken from the database developed by Beck et al. (2000c).

2.3.2 Banks and Stock Market Indicators

To evaluate the relationship between finance and growth, ideally we have to construct financial indicators that can measure the importance of different financial intermediary functions. However, it is impossible to construct accurate financial indicators to measure all these functions for a broad cross-section of countries. As an alternative, this study uses two indicators of financial development. The first indicator is the ratio of liquid liabilities (M3) to GDP, bd_1. The second indicator, which is denoted by bd_2 is the ratio of private credit to GDP. These two indicators have been widely used in empirical studies of the links between finance and growth. A higher ratio of liquid liabilities to GDP means that the size of financial sector is larger, therefore it may intermediate more financial resources to investment. However, bd_1 is more related to the ability of the financial system to provide transaction services than to the ability to channel funds from savers to borrowers. Thus, this study favours the ratio of private credit to GDP as a measure of banks development, since the decision to finance private sector is highly related to the provision of financial services like reducing risk, portfolio diversification and improving information on the efficiency of different projects. The higher level of private credit as a share of GDP may indicate higher levels of financial intermediary services provided by financial institutions.

Alternatively, in some empirical studies, domestic credit as a share to GDP has been used as a measure of banks development. However, in this study, the use of private credit as an indicator for financial development is preferred than domestic credit. This is due to the fact that domestic credit is also consists of credit to the public sector, and this credit usually was channelled to the unproductive projects. Although, this indicator could be a useful indicator in the context of developing country where credit to public sector can be highly productive, in this study that consist of developed and

developing countries, credit to private sector is more appropriate to measure the effects of finance on growth.

This study uses two indicators to measure the development of stock markets; the market capitalisation ratio and the ratio of value traded to GDP. Specifically, the market capitalisation ratio (sd_1) is measured by the value of listed shares divided by GDP. This indicator measures the size of stock markets and reflects the ability of stock markets to diversify risk. Its main shortcoming is that theory does not suggest that the listing of shares will influence resource allocation and growth. Alternatively, this study uses the ratio of value traded as a share of GDP (sd_2) to measure the activities of stock market where value traded is the value of shares traded on domestic exchanges. This measure of stock market development was used, for example, by Levine and Zervos (1998), and Rousseau and Wachtel (2000). However, this indicator also has two potential pitfalls; first, it does not measure the liquidity of the market but it is frequently used as an indicator of stock market liquidity. Second, since markets are forward looking, they will anticipate higher economic growth by higher prices. Thus, this indicator can rise without an increase in the number of transactions.

Based on banks and stock market indicators discussed above, we have constructed indicators to measure the overall development and the financial structure of the financial system. In general, indicators for the overall development of financial sector are constructed by summing up the indicator for banks development and stock markets development. Meanwhile, an indicator for financial structure is constructed by dividing the stock markets development indicator by the banks development indicator. Thus, a country with a high financial structure indicator has a more market-based financial system. The detail about the overall financial development and financial structure indicators used in this study can be found in Section 2.6.2 and Section 2.6.3, respectively.

This study uses two measures for economic growth. The first measure is the per capita growth rate of real GDP (GDPPG). This is the most commonly used indicator for economic growth in the empirical studies between finance and growth. Alternatively, this study uses the ratio of investment to GDP (INV), where investment

is measured by gross capital formation. The rationale behind using investment ratios is that it is believed to be a channel through which financial development influence growth. For this, we have carry out a simple correlation analysis between investment and GDP per capita growth based on pure cross-country data (one observation per country) of 88 countries for the period 1960-1999. The correlation coefficient is 0.608 and this coefficient is significant at the 1 percent level. Usage of this indicator can be found, for example, in King and Levine (1993a) who finds that the ratio of domestic investment to GDP is positively related to the credit to private sector divided by GDP. This study only focuses on the accumulation channel for the effects of finance on growth and not on the efficiency channel mainly because the difficulties in measuring the investment efficiency.

2.3.3 Control Variables

In order to assess the relationship between stock markets, banking development and economic growth, a wide array of control variables are included in the analysis. The control variables used in this study are the five-year average of the ratio of government consumption to GDP (GOV), the five-year average of the inflation rate (INF), the five-year average of the ratio of trade to GDP (TRADE), and the initial income (LINC). The variable GOV attempts to describe fiscal policy and measures the role of government in economic activity. The expected sign of this variable in the growth equations may be either positive or negative. GOV may appear with a negative sign if the government consumption of the countries in this study is generally larger than would be called as optimal, leading to high tax rates and/or debt financing, which crowds out private investment. On the other hand, GOV should appear with a positive sign, if government expenditures in these countries lead to the provision of necessary public goods. In this study, GOV is measured by the ratio of government consumption expenditure to GDP.

The next variable, INF attempts to measure the inflationary environment. This may reflect monetary policy, macroeconomic shocks and other policies that might cause such an environment. INF should appear with negative signs in the growth equations, based on the assumption that in a highly inflationary environment economic activity is adversely affected. First, high inflation reduces the holding of money, which makes

economic transactions in the economy costlier and/or more time consuming. Second, it has a negative impact on investment decisions, since expectations of profitability are now highly uncertain. The annual growth rate of Consumer Prices Index (CPI) has been used to measure this variable. The variable TRADE attempts to measure the impact of trade performance on economic growth and to some extent the openness of the economy. This variable is the sum of exports and imports divided by GDP. Based on the hypothesis that better export performance contributes to higher economic growth, we expect a positive sign for TRADE in the growth equation. The initial income (LINC) is incorporated in the regression based on the assumption that initial economic conditions are important in explaining the different growth experiences between countries, known also as the convergence hypothesis. The convergence hypothesis suggests that countries with a lower per capita income tend to grow faster. Based on this hypothesis, we expect a negative sign for LINC in the growth equation. In the analysis, the initial income is the real GDP per capita in 1960.

In addition to the control variables as discussed above (government expenditure, inflation rate, trade, and initial income) there are other variables that usually included in the growth equation of the empirical studies on growth. Among other are the level of human capital, level of technology, legal system, and saving rate. However, due to the data constraints, these variables are not included in the growth equation of this study.

2.3.4 Estimation Method: GMM-SYSTEM

This study uses the generalised method of moments (GMM) estimators that was developed by Arellano and Bond (1991), and specifically the GMM-SYSTEM estimator developed by Arellano and Bover (1995), and Blundell and Bond (1998). These techniques have been applied in many growth studies including those that have investigated the relationship between finance and growth. BenHabib and Spiegel (2000), for instance, have applied the first-differenced GMM estimator method, while the study of Levine et al. (2000) uses not only first-differenced GMM, but also the system GMM estimator.

The general form of the first-differenced GMM approach is to write the regression equation as a dynamic model, and take first-differences to remove unobserved time-invariant country specific effects. Then, the right-hand-side variables in the first-differenced equations are instrumented using levels of the series lagged two periods or more, under the assumption that the time-varying disturbances in the original levels equations are not serially correlated. This procedure has important advantages over simple cross-section regression and other estimation methods for dynamic panel data models. First, estimates will no longer be biased by any omitted variables that are constant over time (unobserved country-specific or `fixed' effects). Secondly, the use of instrumental variables allows parameters to be estimated consistently in models that include endogenous right-hand-side variables. Finally, the use of instruments potentially allows consistent estimation even in the presence of measurement error (Bond et al. 2001). To describe this approach, consider the following regression equation.

$$y_{i,t} = \alpha y_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{i,t} \qquad (2.1)$$

Where, y is the logarithm of growth rate of real per capita GDP, X represents the set of explanatory variables, η is an unobserved country-specific effect, and ε is the error term. The subscripts i and t represent country and time period, respectively. To eliminate the country-specific effect, take first-differences of Equation (2.1),

$$y_{i,t} - y_{i,t-1} = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \qquad (2.2)$$

The use of instruments is required to deal with the likely endogeneity of the explanatory variables, and the problem that the error term $(\varepsilon_{i,t} - \varepsilon i_{i,t-1})$ is correlated with the lagged dependent variable $(y_{i,t-1} - y_{i,t-2})$. Under the assumption that the error term (ε) is not serially correlated, and the explanatory variables (X) are weakly exogenous, the first-differenced GMM dynamic panel estimator uses the following moment conditions:

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for} \quad s \geq 2; t = 3,...,T \qquad (2.3)$$

$$E[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \quad \text{for } s \geq 2; t = 3,...,T \tag{2.4}$$

However, there may be a serious statistical shortcoming with this difference estimator. Blundell and Bond (1998), and Alonso-Borrego and Arellano (1999) show that when the time series are persistent and the number of time series observations is small, the first-differenced GMM estimator is poorly behaved. The reason is that, under these conditions, lagged levels of the variables are only weak instruments for subsequent first-differences. Instrument weakness influences the asymptotic and small sample performance of the difference estimator. Asymptotically, the variance of the coefficients rises. In small samples, Monte Carlo experiments show that the weakness of the instruments can produce biased coefficients.

To reduce the potential biases and imprecision associated with the usual difference estimator, this study uses a new estimator that combines the regression in differences with the regression in levels (Arellano and Bover, 1995, and Blundell and Bond, 1998). The basic idea is to estimate a system of equations in both first differences and levels, where the instruments for the regression in differences are lagged levels, whereas for the regression in levels, the instruments are the lagged differences of the corresponding variables. Although the levels of y_t may be correlated with the country-specific effect (η_i) in Equation (2.1), the differences of these variables are not correlated with η_i, thus permitting us to use lagged first-differences as appropriate instruments in the levels equations. The additional moment conditions for the second part of the system (the regression in levels) are

$$E[(y_{i,t-s} - y_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \quad \text{for } s = 1 \tag{2.5}$$

$$E[(X_{i,t-s} - X_{i,t-s-1})(\eta_i + \varepsilon_{i,t})] = 0 \quad \text{for } s = 1 \tag{2.6}$$

We use the moment conditions presented in Equations (2.3), (2.4), (2.5), and (2.6) and employ a GMM procedure to generate consistent and efficient parameter estimates. However, consistency of the GMM estimator depends on the validity of the

instruments. To address this issue we used two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analysing the sample analog of the moment conditions used in the estimation process. It has a $\chi^2_{(m)}$ distribution where m is the number of degrees of freedom given by the difference between the number of instruments and regressors. In the Sargan test, the null hypothesis is that the instrumental variables are uncorrelated with the residuals. The second test examines the hypothesis that the error term $\varepsilon_{i,t}$ is not serially correlated. In the serial correlation test, the null hypothesis is that the error term in the differenced equation exhibits no second-order serial correlation. The test statistic has a standard normal distribution. Failure to reject the null hypotheses of both tests gives support to our regression.

2.4 Descriptive Statistics

Table 2.1 presents the descriptive statistics on banks, stock market and growth indicators. These statistics are calculated from the dataset that includes 88 countries over the period 1960-1999. Data for stock market, however, have a smaller sample (45 countries) and shorter time span (1975-1997). The first part of Table 2.1 shows that the means for bd_1, bd_2, sd_1 and sd_2 are 41.6%, 34.4%, 29.5% and 11.6% of GDP, respectively. The higher percentage of liquid liabilities to GDP (bd_1) and private credit to GDP (bd_2) compared with market capitalisation to GDP (sd_1) and value traded to GDP (sd_2) indicate that in the sample countries, the size and activity of banking sector is bigger than stock market. Table 2.1 also contains the mean value of banks and stock market indicators, which have been calculated by income groups. The classification of income groups is based on World Bank and according to 1999 Gross National Income (GNI) per capita. The groups are: low-income, $755 or less; middle income, $755-$9265; and high income, $9266 or more.

Table 2.1 clearly shows that, as expected, the high-income countries have more developed banking sector than in the medium- and low-income countries. The top panel of Table 2.1 shows that the mean value of bd_1, which is an indicator for

financial depth, goes up when the level of income increases. Specifically, we find that the percentages of bd_1 for low-income countries, middle-income countries, and high-income countries were 22.1%, 40.4% and 66.0%, respectively. Similar patterns can also be observed in the case of bd_2, where for high-income countries, 62.2% of their domestic loans going to private borrowers, whereas in middle- and low-income countries only 30.7% and 14.8%, respectively. We also find that the size of stock market is positively related with levels of income. The ratio of market capitalisation to GDP (sd_1) for the high-income countries is 37.7% compared with only 27.4% in middle-income and 9.7% in the low-income countries. Similar patterns can also be observed on the mean value of sd_2 across income groups. All these indicate that the size and activities of stock markets in high-income countries, as expected, are higher than in the middle- and low-income countries. Meanwhile, in the second panel of Table 2.1, we find that the mean value of GDP per capita growth is higher in high-income countries than in the middle- and low-income countries. This indicates that the high-income countries generally grown faster than middle- and low-income countries during the period being studied.

2.5 Correlation Analysis

This section presents the correlation analysis on the relationship between banks, stock markets development, and growth indicators. The contemporaneous correlation coefficients between these indicators are calculated by taking the average of annual observations over the period 1960-1999 (1975-1997 in the case of stock market indicators), so that for each country there is one observation. The first part of Table 2.2 shows that banks development indicators have a positive and significant correlation with growth indicators. Specifically, the correlation coefficients between bd_1 and bd_2 with GDPPG are 0.475 and 0.434, respectively. The strong positive and significant correlation between banking sector development and the rate of growth of real GDP may indicate the importance of the banking sector in the growth process. The results also show that the correlations between banking development and investment per GDP are positive and significant. The correlation coefficients of these two banking development indicators with INV are 0.575 and 0.540, respectively. This indicates the existence of a relationship between the source of growth (investment) and level of banking sector development, and the relationship is

relatively stronger than the direct relationship between financial development and growth. Table 2.2 also shows that all stock market indicators have a positive correlation with GDPPG and INV. However, none of the coefficients is significant except the correlation between sd_2 and INV. The correlation coefficient between these two variables is 0.392 indicating that stock markets activities are associated with investment but not to GDP per capita growth.

Table 2.1: Summary Statistics of Banks, Stock Market and Growth Indicators

Banks and Stock Markets				
	Banking Sector Indicators		Stock Market Indicators	
Statistics	bd_1	bd_2	sd_1	sd_2
A. Overall				
Mean	40.6237	34.4144	29.4527	11.6147
Standard Deviation	25.6666	24.9328	31.4743	16.9842
Observations	84	88	45	45
B. Low-income countries				
Mean	22.1288	14.7863	9.6957	1.7129
Standard Deviation	7.8552	7.7875	4.3399	1.8937
Observations	27	27	7	7
C. Middle-income countries				
Mean	40.3866	30.6824	27.3841	7.2994
Standard Deviation	22.8733	13.9806	36.2362	11.6374
Observations	37	37	17	17
D. High-income countries				
Mean	66.0307	62.2496	37.7129	18.4086
Standard Deviation	25.2265	26.3401	30.1893	20.6550
Observations	20	24	21	21
	Growth Indicators			
	GDPPG		*INV*	
A. Overall				
Mean	1.8767		21.1046	
Standard Deviation	1.7641		5.2135	
Observations	88		88	
B. Low-income countries				
Mean	0.5466		16.5566	
Standard Deviation	1.4563		4.7479	
Observations	27		27	
C. Middle-income countries				
Mean	2.3524		22.6114	
Standard Deviation	1.5319		4.0044	
Observations	37		37	
D. High-income countries				
Mean	2.6399		23.8983	
Standard Deviation	1.6285		4.0193	
Observations	27		24	

Note: *All statistics are calculated based on pure cross-country data.*

Table 2.2 also presents correlation analysis on the relationship between financial development, stock markets and growth indicators by income groups. In the case of low-income countries, both banking sector development indicators have a positive and significant correlation relationship with GDP per capita growth. However, in the case of investment to GDP, only bd_2 is positive and significantly correlated. In the middle-income countries, we find that only bd_1 is positively and significantly correlated with growth indicators. Meanwhile in high-income countries, only INV is positively and significantly correlated with banking sector indicators. The correlation analysis of banking sector indicators in Table 2.2 also shows that the correlation coefficients in low-income countries are relatively higher than middle- and high-income countries, and this may indicate that the banking sector played an important role in the early stage of development of the country, and this will gradually reduce when the country becomes more developed.

Meanwhile, the correlation between sd_1 with GDPPG and INV are negative in the low-income countries. However, none of these coefficients is significant. In the case of middle-income and high-income countries, all coefficients are positive but not significant. For the ratio of value traded to GDP (sd_2), we found a positive and significant correlation between this indicator and GDPPG in the case of low- and middle-income countries. The ratio of value traded to GDP also significantly correlated with INV in middle-income countries. In the case of high-income countries, the correlation between sd_2 and GDPPG is negative and not significant. Meanwhile, the correlation coefficient between sd_2 and INV is positive but not significant. This finding may suggest that there is no conclusive evidence to relate the development of stock markets with economic growth except in the case of middle-income countries. The negative correlation, although not significant, suggest that stock markets may associated with the destabilising effect on economic growth especially in the low- income countries.

Table 2.2: Correlation Relationship between Banking Sector Development, Stock Market Development, and Economic Growth

Growth indicator		Banking Sector Indicators		Stock Market Indicators	
		bd_1	bd_2	sd_1	sd_2
A. Overall					
GDPPG	Coefficient	0.475*	0.434*	0.213	0.265
	p-value	0.000	0.000	0.160	0.079
	Observations	84	88	45	45
INV	Coefficient	0.575*	0.540*	0.283	0.392*
	p-value	0.000	0.000	0.059	0.008
	Observations	84	88	45	45
B. Low-income countries					
GDPPG	Coefficient	0.467*	0.385*	-0.106	0.803*
	p-value	0.014	0.047	0.822	0.030
	Observations	27	27	7	7
INV	Coefficient	0.368	0.516*	-0.262	0.507
	p-value	0.059	0.006	0.571	0.246
	Observations	27	27	7	7
C. Middle-income countries					
GDPPG	Coefficient	0.402*	0.258	0.076	0.631*
	p-value	0.014	0.123	0.772	0.007
	Observations	37	37	17	17
INV	Coefficient	0.407*	0.242	0.027	0.557*
	p-value	0.012	0.149	0.917	0.020
	Observations	37	37	17	17
D. High-income countries					
GDPPG	Coefficient	0.176	0.203	0.234	-0.122
	p-value	0.457	0.342	0.307	0.597
	Observations	20	24	21	21
INV	Coefficient	0.473*	0.432*	0.292	0.179
	p-value	0.035	0.035	0.199	0.437
	Observations	20	24	21	21

Note: * *Coefficients are significant at the 0.05 level (2-tailed)*

Table 2.3 contains information on the correlation coefficients between banking sector development indicators and stock market indicators. The first part of Table 2.3 shows that all bank development indicators are positive and significantly correlated with stock market indicators coefficients, and the size of coefficients is greater than 0.5. The higher value of correlation coefficients may indicate that banking sector development and stock markets are interrelated. Further analysis reveals that both banks and stock market indicators are positive and significantly correlated in the middle- and high-income countries. In the low-income countries, none of the coefficients is significant. The positive and significant correlation between banks

and stock markets may indicate that they played a complementary role in the growth process. The positive and significant correlation of the stock markets and banks in high-income and middle-income countries may also indicate countries with developed financial sector tend to have more developed stock markets. In the low-income countries, where the financial system is dominated by banking sector, the stock markets and banking sector are not correlated. This may indicate that the complementary role between bank and stock market in the growth process only exists in the developed financial sector.

Table 2.3: Correlation Coefficients between Banking Sector Development Indicators and Stock Market Development Indicators

Banking Sector Development Indicators		Stock Market Development Indicators	
		Market Capitalisation (sd_1)	Value Traded (sd_2)
A. Overall			
Liquid liabilities (bd_1)	Coefficient	0.547*	0.752*
	p-value	0.000	0.000
	Observations	41	41
Private credit (bd_2)	Coefficient	0.543*	0.726*
	p-value	0.000	0.000
	Observations	45	45
B. Low-income countries			
Liquid liabilities (bd_1)	Coefficient	0.199	0.640
	p-value	0.669	0.122
	Observations	7	7
Private credit (bd_2)	Coefficient	-0.282	0.293
	p-value	0.540	0.523
	Observations	7	7
C. Middle-income countries			
Liquid liabilities (bd_1)	Coefficient	0.510*	0.608*
	p-value	0.037	0.010
	Observations	17	17
Private credit (bd_2)	Coefficient	0.742*	0.670*
	p-value	0.001	0.003
	Observations	17	17
D. High-income countries			
Liquid liabilities (bd_1)	Coefficient	0.549*	0.727*
	p-value	0.023	0.001
	Observations	17	17
Private credit (bd_2)	Coefficient	0.435*	0.691*
	p-value	0.049	0.001
	Observations	21	21

Note: * *Correlation is significant at the 0.05 level (2-tailed)*

2.6 Estimation Results

This section presents the estimation results of dynamic panel regression by using GMM-SYSTEM estimators. In each regression, the p-value for the Sargan test and the serial correlation test are presented. The following strategy has been used in the estimation process. The estimation started with a basic regression where only LINC is incorporated in the regression. Then, the financial development indicator was added into the regression separately, in order to test the hypothesis that the financial indicators positively influence the economic growth performance. Finally, the equation was estimated by adding the control variables into the regression. This is to see whether the hypothesised relation between the financial sector and economic growth remains stable when controlling for these variables. However, the control variables that are not significant at the usual significance levels will be dropped from the regression, and only the final regression will be presented and analysed. Only the estimation results on financial indicators will be discussed. In the estimation process, several other specifications also have been examined, for example, to include both control variables and time dummies in the regression. However, regressions without time dummies produce better results. Thus, we decided not to include time dummies in the regression. The estimations were carried out using PC-GIVE 10.

2.6.1 The Individual Impact of Banks and Stock Markets on Economic Growth and Investment

To assess the individual effects of banks and stock markets development on economic growth, the indicators of banking sector development and stock market development have been entered into the regression equation separately. Based on the assumption that these indicators indirectly incorporate information about the provision of financial services provide by banks and stock markets, we expect positive signs for bd_1, bd_2, sd_1 and sd_2. Table 2.4 presents the regression results of the relationship between banking sector development, stock market development and GDPPG. In all equations, the Sargan tests failed to reject the null hypothesis, which supports the validity of instruments used in the regression. Meanwhile, the serial correlation tests find no second order serial correlation problem in all regression equations of Table 2.4.

Table 2.4: Relationship between Banks, Stock Market Development, and GDP per Capita Growth

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	1.4439* (0.016)	1.5434* (0.022)	1.6192 (0.333)	3.2899* (0.040)
$GDPPG_{t-1}$	0.0516 (0.403)	0.0600 (0.397)	-0.3454* (0.008)	-0.2263 (0.134)
LINC	-0.0525 (0.310)	-0.0441 (0.465)	-0.0129 (0.910)	-0.1846 (0.119)
bd_1	0.0886 (0.799)			
$bd_{1,t-1}$	0.0069 (0.984)			
bd_2		-0.0309 (0.948)		
$bd_{2,t-1}$		0.1964 (0.630)		
sd_1			0.2975* (0.048)	
$sd_{1,t-1}$			-0.5719* (0.024)	
sd_2				0.1389* (0.021)
$sd_{2,t-1}$				-0.2559* (0.018)
TRADE	0.9473 (0.062)	1.0582 (0.053)	0.3127 (0.672)	-1.3865 (0.177)
TRADEt-1	-1.6489* (0.002)	-0.4366* (0.028)	1.3644 (0.088)	1.9987* (0.020)
INF	-0.1029 (0.220)	-0.0327 (0.741)		
INF_{t-1}	-0.1928* (0.005)	-0.2068* (0.037)		
Sargan tests	(1.000)	(1.000)	(0.496)	(0.197)
Serial correlation tests AR(2)	(0.270)	(0.184)	(0.179)	(0.102)
Observations	324	288	103	104

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

The results in Table 2.4 show that none of banking development indicators is statistically significant at 5 percent significant level. This implies that banking sector development has no impact on GDP per capita growth. In contrast, the regression results show that all coefficients of stock market development indicators are significant at 5 percent level. Specifically, estimation results for market capitalisation

ratio ($sd_{1,t}$) and the ratio of value traded to GDP ($sd_{2,t}$) were positive with the values of 0.2975 and 0.1389, respectively. Meanwhile, the coefficients for lag market capitalisation ratio ($sd_{1,t-1}$) and lag ratio of value traded to GDP ($sd_{2,t-1}$) were -0.5719 and -0.2559, respectively, and both are significant. These findings clearly show that the negative effect of lagged stock market indicators on economic growth is bigger than the positive effect of stock market indicators in period-t giving the net impact of stock markets development on economic growth is negative. The estimation results also show that the impact of the stock markets size (sd_1) on economic growth is bigger than the impact of stock markets activity (sd_2) on growth.

Table 2.5 presents the result of GMM-SYSTEM estimators on the individual relationship between banks, stock markets development and INV. The Sargan test in all equations is not significant, which supports the validity of instruments used in the regressions. The serial correlation tests failed to reject the null hypotheses, suggesting that the regressions in Table 2.5 are free from the second-order serial correlation problem. The regression results in Table 2.5 show that INV has a positive relationship with both indicators of banking development, bd_1 and bd_2. These relationships are significant at 5 percent level. The regression results also show that both lagged one period of banking development indicators ($bd_{1,t-1}$ and $bd_{2,t-1}$) are negative and significant at 5 percent level. However, the negative effects of banking development on INV in period t-1 are outweigh by the positive effects of banking development in period t giving the net effects of banking sector development on investment is positive. Meanwhile, the regression results of banking development indicators in period t show that the coefficient of bd_2 (0.3451) is slightly higher than the coefficient of bd_1 (0.2257). This indicates that the development in banking sector activity has slightly bigger impact on investment compared with the impact of banking sector size on investment. In the case of the stock market, although both indicators have a positive coefficient in period-t, only sd_1 is significant at 5 percent level. This indicates that the increase in the size of stock markets will increase the level of investment, but the developments in the stock markets activity do not effect investment. However, the size of coefficient is only 0.0791 indicating that market capitalisation have only little impact on investment.

Table 2.5: Relationship between Banks, Stock Market Development and Investment per GDP

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	-0.9431* (0.000)	-0.9283* (0.000)	0.0487 (0.894)	-0.1753 (0.485)
INV_{t-1}	0.5633* (0.000)	0.5100* (0.000)	0.7889* (0.000)	0.7843* (0.000)
LINC	0.0221 (0.191)	0.0227 (0.080)*	-0.0276 (0.213)	-0.0109 (0.625)
$bd_{1,t}$	0.2257* (0.001)			
$bd_{1,t-1}$	-0.2155* (0.000)			
$bd_{2,t}$		0.3451* (0.002)		
$bd_{2,t-1}$		-0.2793* (0.000)		
$sd_{1,t}$			0.0791* (0.009)	
$sd_{1,t-1}$			-0.0827 (0.071)	
$sd_{2,t}$				0.0208 (0.400)
$sd_{2,t-1}$				-0.0106 (0.555)
TRADE	0.5842* (0.000)	0.6666* (0.000)		
$TRADE_{t-1}$	-0.6009* (0.000)	-0.6082* (0.000)		
INF			-0.0524 (0.072)	-0.0405* (0.021)
INF_{t-1}			-0.0118 (0.788)	-0.0001 (0.998)
Sargan tests	(0.537)	(0.367)	(0.798)	(0.219)
Serial correlation tests AR(2)	(0.128)	(0.395)	(0.726)	(0.521)
Observations	556	533	155	154

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

In summary, the results show that both stock markets development indicators used in this study have a positive relationship with real GDP per capita growth and investment. However, after take into account the negative effect of lagged stock markets development on GDP per capita growth, we find that stock markets development has an adverse effect on growth. This indicates that stock markets development have a destabilising effect on economic growth. Meanwhile, banking

sector development has no impact on economic growth but have a positive net effect on investment. The positive and significant relationship between investment and banking development indicators indicate that investment is the channel that links banks with economic growth.

2.6.2 The Impact of Overall Development of Financial Sector on Economic Growth and Investment

To examine the effects of the overall financial sector development on economic growth and investment, we have constructed two indicators that measure the overall size and activity of banks and stock markets in the economy. The purpose is to capture the development of the financial sector as a whole. In general, these indicators are generated by summing up the ratio of banking sector development indicator and the ratio of stock market development. The first indicator is the sum of bd_2 and sd_1, and we denote this indicator as FD_1. This indicator measures the Overall-Size of the banking sector and stock markets. The second overall financial development indicator (FD_2) is constructed by taking the sum of bd_2 and sd_2. This indicator measures the Overall-Activity of banking sector and stock markets. Similar indicators have been used by Beck and Levine (2002). By using the same principle, we have constructed another two measures of overall development of financial sector based on bd_1. The third indicator (FD_3) is bd_1 plus sd_1, and this is the alternative indicator to measure the Overall-Size of financial sector. The fourth indicator is the sum of bd_1 and sd_2. This indicator is to measure the Overall-Activity of financial sector, and we denoted this indicator as FD_4.

Table 2.6 presents the regression results of the relationship between overall development of financial sector and GDPPG. In all regressions, both Sargan tests and serial correlation tests are not significant, which support the validity of instruments used in all regressions and reject the existence of second order serial correlation in the equations, respectively. Regression results in Table 2.6 show that all overall financial development indicators in period-t have a positive relationship with GDPPG, however only $FD_{2,t}$ and $FD_{4,t}$ are significant at 5 percent level. Regression results also show that all lagged overall financial development indicators have a negative sign except $FD_{1,t-1}$, however, only $FD_{4,t-1}$ is significant at 5 percent level. The

estimation results also show that the positive effect of $FD_{4,t}$ on GDPPG is higher than the negative effects of $FD_{4,t-1}$ on GDPPG indicating that FD_4 have a positive net effect on economic growth. Meanwhile, the regression results in period-t show that both measures of Overall-Activity of financial development are significant, while measures of Overall-Size are not significant. The results indicate that the increase in the overall activity of financial sector have a positive effect on economic growth but not the increase in the size of overall financial sector. The coefficients of overall activity indicator $FD_{2,t}$ and $FD_{4,t}$ is 0.7057 and 0.6896, respectively, which implies that the impact of overall activity of financial sector on economic growth is economically significant.

Table 2.7 presents estimation results on the relationship between overall financial development indicators and investment per GDP. In all regression equations, the results of the Sargan test support the validity of instruments used in the regressions. The serial correlation tests also reject the existence of second-order serial correlation in the regressions. Specifically, we find that $FD_{1,t}$ and $FD_{2,t}$ are significant, while $FD_{3,t}$ and $FD_{4,t}$ are not significant at 5 percent significant level. The regressions result also show that $FD_{1,t-1}$ and $FD_{2,t-1}$ are significant at 5 percent level, and both variables have a negative sign. The higher positive effect of $FD_{1,t}$ and $FD_{2,t}$ on investment than the negative effect of $FD_{1,t-1}$ and $FD_{2,t-1}$ on INV suggesting that the net impact of overall financial development on investment is positive. Meanwhile, regression results in period-t show that the coefficient $FD_{2,t}$ is higher than $FD_{1,t}$ indicating that the overall activity of financial sector development has slightly more impact on investment than the impact of the overall size of financial sector on investment. This is consistent with the finding in Table 2.6 where overall activity of financial sector has more impact on economic growth than the impact of overall size of financial sector.

Table 2.6: Relationship between Overall Financial Sector Development and GDP per Capita Growth

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	1.4506* (0.015)	1.0906 (0.064)	1.3516* (0.024)	1.1193* (0.036)
$GDPPG_{t-1}$	0.0515 (0.404)	0.0757 (0.237)	0.0509 (0.436)	0.0651 (0.297)
LINC	-0.0498 (0.350)	-0.0204 (0.725)	-0.0461 (0.374)	-0.0081 (0.879)
$FD_{1,t}$	0.0079 (0.976)			
$FD_{1,t-1}$	0.0105 (0.969)			
$FD_{2,t}$		0.7057* (0.015)		
$FD_{2,t-1}$		-0.4165 (0.135)		
$FD_{3,t}$			0.1956 (0.538)	
$FD_{3,t-1}$			-0.1575 (0.628)	
$FD_{4,t}$				0.6896* (0.000)
$FD_{4,t-1}$				-0.3979* (0.000)
TRADE	0.9021* (0.040)	1.0164* (0.022)	0.9870 (0.060)	1.2293* (0.004)
$TRADE_{t-1}$	-1.5376* (0.003)	-1.7062* (0.002)	-0.6393* (0.004)	-1.7525* (0.002)
INF	-0.1159 (0.192)	-0.0447 (0.578)	-0.1106 (0.187)	-0.0185 (0.826)
INF_{t-1}	-0.2073* (0.006)	-0.2044* (0.017)	-0.1942* (0.003)	-0.2246* (0.007)
Sargan tests	(1.000)	(1.000)	(1.000)	(1.000)
Serial correlation tests AR(2)	(0.254)	(0.103)	(0.289)	(0.120)
Observations	324	309	324	310

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

In summary, this study finds that the overall development of financial sector has a positive impact on economic growth and investment. However, not all overall measures of financial sector development have a significant impact on economic growth. Only indicators that measure the development of overall activity of financial sector will affect growth, but not the overall size of financial sector. In the case of

investment, the regression results show that both overall size and activity of financial sector will affect investment. The effect of overall activity of financial sector is slightly higher than the effect of overall size on investment. We also find that the effect of overall activity on investment is relatively smaller than the effect of overall activity on GDP per capita growth.

Table 2.7: Relationship between Overall Financial Sector Development Indicators and Investment per GDP

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	-1.0209* (0.000)	-0.8371* (0.000)	-0.9921* (0.000)	-0.8899* (0.000)
INV_{t-1}	0.5599* (0.000)	0.5969* (0.000)	0.5641* (0.000)	0.6008* (0.000)
LINC	0.0109 (0.354)	0.0193 (0.109)	0.0075 (0.531)	0.0269 (0.057)
$FD_{1,t}$	0.1456* (0.028)			
$FD_{1,t-1}$	-0.1388* (0.032)			
$FD_{2,t}$		0.1923* (0.012)		
$FD_{2,t-1}$		-0.1917* (0.004)		
$FD_{3,t}$			0.1343 (0.052)	
$FD_{3,t-1}$			-0.1149 (0.079)	
$FD_{4,t}$				0.1087 (0.179)
$FD_{4,t-1}$				-0.1034 (0.069)
TRADE	0.4900* (0.000)	0.5805* (0.000)	0.5673* (0.000)	0.6238* (0.000)
$TRADE_{t-1}$	-0.4424* (0.000)	-0.5424* (0.001)	-0.5314* (0.000)	-0.5984* (0.000)
GOV_t	0.0721 (0.555)		0.0819 (0.508)	
GOV_{t-1}	-0.1824 (0.090)		-0.2017 (0.066)	
Sargan tests	(0.930)	(0.332)	(0.966)	(0.365)
Serial correlation tests AR(2)	(0.180)	(0.454)	(0.163)	(0.282)
Observations	543	551	543	553

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

2.6.3 The Impacts of Financial Structure on Economic Growth and Investment

To examine the effect of financial structures on economic growth and investment, this study has constructed several indicators to capture the structure of financial sector in the economy. Since there is no widely accepted empirical definition of financial structure, this study uses four indicators of financial structure to measure the comparative size and activity of stock markets and banks. The indicators are constructed so that higher values indicate more market-based financial systems. The first indicator is the ratio of market capitalisation to private sector credit (fs_1). This indicator measures the comparative size of stock market to the banking sector development (Structure-Size). The second indicator is the ratio of value traded to private sector credit (fs_2). This indicator measures the comparative activity of stock market to banking sector development (Structure-Activity). By using the same concept, we have constructed the third and fourth indicators of financial structure. The third indicator is an alternative measure of Structure-Size of financial structure, constructed by taking the ratio of market capitalisation to liquid liabilities (fs_3). The fourth indicator is the ratio of value traded to liquid liabilities (fs_4). This is an alternative measure for Structure-Activity of financial structure. Since, there is little reason to favour one particular measure of financial structure over another; this study has merged these two measures to produce the overall measure of financial structure. The first measure of Overall-Structure (FS_1) was constructed by taking the average of fs_1 and fs_2. Meanwhile, the second measure of Overall-Structure (FS_2) was constructed by taking the average of fs_3 and fs_4. As in the case of Structure-Size and Structure-Activity, higher values of Overall-Structure represent a higher degree of stock market development relative to the development of the banking system.

Only countries that have both banks and stock markets data were included in the analysis. Thus, in the regression, panel data of 45 countries for the period 1975-1999 have been used. Table 2.8 presents the regression results of GMM-SYSTEM estimators on the relationship between financial structure indicators and GDP per capita growth. In all regressions, the Sargan tests failed to reject the null hypothesis, which supports the validity of instruments used in the regressions. The serial correlation tests also find no second-order serial correlation in all regressions. The

regression results in Table 2.8 show that all financial structure indicators are significantly related with GDPPG at 5 percent level except $fs_{3,t}$ and $fs_{1,t-1}$. Table 2.8 also shows that all financial structure indicators in period-t are positive while all financial structure indicators in period t-1 are negative. For all regressions, the negative values of lagged financial structure outweigh the positive values of financial structure in period-t indicating the adverse effect of financial structure on economic growth. The results may suggest that to have more market-based financial system have a negative effect on economic growth.

In detail, we find that fs_1 and fs_3 that measured the comparative size of stock market to the banking sector development have relatively bigger net negative impact on growth compared with fs_2 and fs_4 that measured the comparative activity of stock market to banking sector development. This may indicates that Structure-Size have more destabilising effects on growth than Structure-Activity. Table 2.8 also shows that the coefficients of financial structure indicators in period-t is ranging from 0.2164 to 0.3987 indicating that the impact of financial structure on economic growth is economically important. Meanwhile, the values of coefficient $fs_{1,t}$, $fs_{2,t}$ and $fs_{4,t}$ may suggest that the impact of Structure-Size on GDPPG is almost same with the impact of Structure-Activity on GDPPG. This implies that an increase in the size or activity of stock markets relative to banking sector development has almost similar impact on economic growth.

Table 2.9 presents the regression results of GMM-SYSTEM estimators on the relationship between financial structure indicators and investment per GDP. In all regressions, the Sargan tests support the validity of instruments used in the regressions. Meanwhile, the serial correlation tests reject the existence of second-order serial correlation in all regressions. The regression results in Table 2.9 show that the relationship between financial structure indicators and INV in period-t is positive and the relationship between lagged financial structure indicators and investment is negative. However, none of the financial structure indicators in Table 2.9 is significant at 5 percent significant level. This indicates that financial structure in term of size and activity has no impact on investment.

Table 2.8: Relationship between Structure-Size, Structure-Activity and GDP per Capita Growth

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	0.8375 (0.735)	3.5044* (0.030)	1.6636 (0.201)	0.3515 (0.859)
$GDPPG_{t-1}$	-0.3496* (0.030)	-0.2297 (0.213)	-0.1943 (0.187)	-0.1399 (0.450)
LINC	-0.0572 (0.477)	-0.1768 (0.124)	-0.0219 (0.910)	-0.0451 (0.755)
$fs_{1,t}$	0.3987* (0.048)			
$fs_{1,t-1}$	-0.5273 (0.058)			
$fs_{2,t}$		0.2164* (0.043)		
$fs_{2,t-1}$		-0.2232* (0.036)		
$fs_{3,t}$			0.2959 (0.083)	
$fs_{3,t-1}$			-0.5760* (0.045)	
$fs_{4,t}$				0.3681* (0.016)
$fs_{4,t-1}$				-0.3735* (0.028)
TRADE	-1.6868* (0.009)	-1.3188 (0.162)	0.1239 (0.940)	-1.3951 (0.495)
$TRADE_{t-1}$	2.6929* (0.002)	2.3513* (0.003)	1.1867 (0.051)	1.9055 (0.234)
GOV_t	0.2713 (0.835)			-0.6463 (0.712)
GOV_{t-1}	-1.1650 (0.422)			-0.0347 (0.983)
INF_t	0.0689 (0.703)			0.1569 (0.564)
INF_{t-1}	-0.2009 (0.240)			-0.1594 (0.611)
Sargan tests	(0.970)	(0.275)	(0.701)	(0.997)
Serial correlation tests AR(2)	(0.213)	(0.089)	(0.184)	(0.232)
Observations	103	104	81	81

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

The estimation results on the relationship between Overall-Structure, GDPPG and INV is presented in Table 2.10. In all regressions, the Sargan tests fail to reject the null hypothesis, which supports the validity of instruments used in the regression. The serial correlation tests also reject the existence of second-order serial correlation in the regressions. In all regression equations, the overall financial structure in period-*t* is positively related with GDPPG and INV. The regression results also show that the relationship between lagged overall financial structure, growth and investment is negative. In the case of GDPPG, we find that overall financial structure $FS_{1,t}$ and $FS_{1,t-1}$ are significant at 5 percent level and the coefficients for these variables are 0.4984 and -0.4504, respectively. This implies that the net effect of FS_1 on economic growth is positive. The finding supports the important role of market-based financial system on economic growth. The regression results also show that $FS_{2,t}$ is not significantly related with GDPPG. Meanwhile, $FS_{2,t-1}$ is significant at 5 percent level and the relationship between $FS_{2,t-1}$ and GDPPG is negative. The results suggest that the different measure of overall financial structure has different impact on economic growth. In the case of INV, both overall financial structure indicators are not significant at 5 percent level. This indicates that to have market-based financial system did not help to increase the level of investment in the country.

In summary, estimation results show that both indicators of financial structure; Structure-Size and Structure-Activity are significantly related with economic growth. However, the net effect of individual financial structure indicator on growth is negative. These results suggest that to have more market-based financial system have a destabilising effect on economic growth. However, from the results of Overall Structure, this study finds that the Overall Structure might have a positive or negative effect on economic growth depends on the indicator used in the regression. In the case of investment, we find that Structure-Size and Structure-Activity have no impact on the level of investment. The level of investment is also not affected by the overall structure of financial sector.

Table 2.9: Relationship between Structure-Size, Structure-Activity and Investment per GDP

Variables	Regression			
	(1)	(2)	(3)	(4)
Constant	-0.8947 (0.082)	-1.0956 (0.097)	-0.8206* (0.015)	-1.4301 (0.264)
INV_{t-1}	0.5998* (0.000)	0.5213* (0.005)	0.5695* (0.000)	0.6221* (0.000)
LINC	0.0151 (0.482)	0.0097 (0.727)	-0.0077 (0.688)	0.0237 (0.575)
$fs_{1,t}$	0.0555 (0.089)			
$fs_{1,t-1}$	-0.0605 (0.089)			
$fs_{2,t}$		0.0041 (0.874)		
$fs_{2,t-1}$		-0.0028 (0.922)		
$fs_{3,t}$			0.0272 (0.516)	
$fs_{3,t-1}$			-0.0578 (0.112)	
$fs_{4,t}$				0.0299 (0.070)
$fs_{4,t-1}$				-0.0242 (0.286)
TRADE	-0.0027 (0.977)	0.0343 (0.816)	0.1189 (0.346)	0.1976 (0.316)
$TRADE_{t-1}$	0.1504 (0.383)	0.0784 (0.627)	-0.0103 (0.936)	-0.1857 (0.431)
GOV_t	0.1709 (0.122)	0.0647 (0.845)	0.1056 (0.612)	-0.1521 (0.635)
GOV_{t-1}	-0.2765 (0.069)	-0.3216 (0.269)	-0.3498 (0.103)	-0.1563 (0.594)
INF_t		-0.0249 (0.412)	-0.0424* (0.001)	
INF_{t-1}		-0.0444 (0.331)	-0.0545 (0.088)	
Sargan tests	(0.428)	(0.528)	(0.902)	(0.642)
Serial correlation tests AR(2)	(0.993)	(0.916)	(0.962)	(0.805)
Observations	146	145	128	125

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

Table 2.10: Relationship between Overall Financial Structure, GDP per Capita Growth and Investment per GDP

Variables	GDP per capita growth		Investment per GDP	
	(1)	(2)	(3)	(4)
Constant	1.1114 (0.601)	-2.0350 (0.410)	-0.8853* (0.039)	-0.7015 (0.210)
$GDPPG_{t-1}$	-0.3643* (0.046)	-1.0461 (0.506)		
INV_{t-1}			0.5083* (0.008)	0.5386* (0.006)
LINC	-0.0513 (0.577)	0.0542 (0.468)	-0.0065 (0.677)	-0.0103 (0.659)
$FS_{1,t}$	0.4984* (0.001)		0.0169 (0.690)	
$FS_{1,t-1}$	-0.4504* (0.028)		-0.0494 (0.225)	
$FS_{2,t}$		0.3147 (0.101)		0.0373 (0.313)
$FS_{2,t-1}$		-0.5031* (0.045)		-0.1675 (0.052)
$TRADE_t$	-0.9127 (0.158)	-1.0461 (0.506)	0.0896 (0.681)	0.0953 (0.516)
$TRADE_{t-1}$	2.2504* (0.003)	1.5056 (0.060)	0.0888 (0.611)	0.0447 (0.754)
GOV_t	1.1227 (0.534)	-2.3618 (0.289)	0.2238 (0.326)	0.1574 (0.362)
GOV_{t-1}	-1.8789 (0.198)	1.2523 (0.430)	-0.4563 (0.056)	-0.3178 (0.077)
INF_t	0.1328 (0.523)		-0.0283 (0.116)	-0.0416* (0.001)
INF_{t-1}	-0.1156 (0.427)		-0.0539 (0.234)	-0.0414 (0.298)
Sargan tests	(0.985)	(0.904)	(0.934)	(0.888)
Serial correlation tests AR(2)	(0.140)	(0.060)	(0.981)	(0.998)
Observations	100	78	140	122

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

2.6.4 The Impact of Financial Structures on Economic Growth and Investment: Comparison between Developed and Developing Countries

The effect of financial structures on economic growth and investment may depend on the level of income of the country. To investigate this, we have divided our sample into two groups, developed and developing countries. Then, the regressions have

been carried out for these two groups of countries separately. The regression results between overall financial structure and GDPPG for developed and developing countries are presented in Table 2.11. In the case of developed countries, the results show that $FS_{1,t}$ is positive and significant at 5 percent level, while $FS_{1,t-1}$ is negative but not significant. The result suggests the positive and important role of financial structure on economic growth in developed countries. Meanwhile, $FS_{2,t}$ and $FS_{2,t-1}$ has a negative relationship with GDPPG, however, both are not significant. Regression results clearly show that the different measures of overall financial structure have a different effect on economic growth in the developed countries. In the case of developing countries, both $FS_{1,t}$ and $FS_{2,t}$ are positive but not significant at 5 percent level. The regression results also show that $FS_{1,t-1}$ and $FS_{2,t-1}$ are significant at 5 percent level and both have a negative sign. This indicates the negative effects of financial structure on economic growth in developing countries.

The regression results show that there is a different effect of overall financial structure on economic growth in developed and developing countries. The market-based financial system seems to have a positive impact on economic growth in developed countries but has an adverse effect on economic growth in developing countries. Since, developed countries generally have more developed stock market and banking sector, the result shows that the positive impact of financial structure on growth will happen if the country have a developed banking system and stock markets. This finding may indicate the effect of financial structure on economic growth is depends on the level of income.

Table 2.12 presents the regression results between overall financial structure and INV for developed and developing countries. In all equations, Sargan tests support the validity of instruments used in the regressions. Meanwhile, the serial correlation tests failed to reject the null hypothesis, which mean there is no second order serial correlation in the regressions. In the case of developed countries, only $FS_{2,t}$ is significant at 5 percent level. However, the regression result suggests that $FS_{2,t}$ have a negative sign. This implies that market-based financial system have a negative effect on investment in developed countries. In the case of developing countries, all measures of financial structure are not significant at 5 percent level. The results show that financial structure has no impact on the level of investment in the developing

countries. The finding suggests the different effect of financial structure on investment in the developed and developing countries. The level of investment will decrease in the developed country with more developed stock markets relative to banking sector development. Meanwhile, to have market-based financial system did not help to increase the level of investment in the developing countries.

Table 2.11: Relationship between Overall Financial Structure and GDP per Capita Growth in Developed and Developing Countries

Variables	Developed countries		Developing countries	
	(1)	(2)	(3)	(4)
Constant	-4.5347 (0.585)	2.4661 (0.680)	2.5437 (0.110)	0.5581 (0.704)
$GDPPG_{t-1}$	-0.3249 (0.091)	-0.5732* (0.000)	0.0998 (0.730)	0.3148 (0.248)
LINC	0.4528 (0.525)	-0.2316 (0.552)	-0.0078 (0.927)	-0.0076 (0.947)
$FS_{1,t}$	0.6497* (0.007)		0.3465 (0.110)	
$FS_{1,t-1}$	-0.4754 (0.055)		-0.6083* (0.024)	
$FS_{2,t}$		-0.0957 (0.908)		0.2633 (0.055)
$FS_{2,t-1}$		-0.0070 (0.993)		-0.5589* (0.035)
$TRADE_t$		-2.6836* (0.007)	-1.7411 (0.214)	
$TRADE_{t-1}$		1.4847 (0.522)	2.4867* (0.014)	
INF_t			-0.1146 (0.738)	0.0389 (0.870)
INF_{t-1}			-0.5839* (0.000)	-0.2579* (0.023)
Sargan tests	(0.679)	(1.000)	(1.000)	(0.999)
Serial correlation tests AR(2)	(0.190)	(0.128)	(0.596)	(0.875)
Observations	60	34	44	44

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

Table 2.12: Relationship between Overall Financial Structure and Investment per GDP in Developed and Developing Countries

Variables	Developed countries		Developing countries	
	(1)	(2)	(3)	(4)
Constant	-2.9183 (0.358)	-1.8006 (0.289)	-1.6019 (0.095)	-1.8231 (0.132)
INV_{t-1}	0.9137 (0.175)	0.1473 (0.685)	0.3132 (0.246)	0.2895 (0.356)
LINC	0.1674 (0.446)	-0.2528 (0.115)	0.0102 (0.712)	0.0182 (0.565)
$FS_{1,t}$	-0.1021 (0.083)		0.0434 (0.259)	
$FS_{1,t-1}$	0.0486 (0.225)		-0.0799 (0.058)	
$FS_{2,t}$		-0.1001* (0.028)		0.0170 (0.711)
$FS_{2,1-1}$		-0.0214 (0.658)		-0.0471 (0.417)
$TRADE_t$		-0.4581 (0.055)	0.0239 (0.934)	0.1383 (0.427)
$TRADE_{t-1}$		-0.1597 (0.800)	0.1521 (0.534)	-0.0516 (0.832)
GOV_t	-1.9688* (0.016)	-2.1583* (0.021)	0.2338 (0.601)	0.0919 (0.843)
GOV_{t-1}	1.4775 (0.093)	0.5296 (0.564)	-0.6652* (0.038)	-0.5607* (0.037)
INF_t			-0.0291 (0.422)	-0.0415 (0.196)
INF_{t-1}			-0.1144 (0.060)	-0.1142 (0.068)
Sargan tests	(0.873)	(1.000)	(1.000)	(1.000)
Serial correlation tests AR(2)	(0.610)	(0.353)	(0.455)	(0.503)
Observations	71	49	77	77

Note: *In all regressions, transformation used is first difference. All variable are in log. Figures in parenthesis are p-values. (*) Coefficients are significant at 5 percent level.*

In summary, the effect of the overall financial structure on economic growth and investment is different between developed and developing countries. The market-based financial system has a positive impact on growth performance in developed countries. The results show that the impact of financial structure on economic growth in developed countries is economically significant. However, the impact depends on the indicator used in the regression. In contrast, to have a market based financial system might have a negative effect on economic growth in the developing countries. A market-based financial system also has a negative impact on the level of

investment in developed countries but do not affect the level of investment in the developing countries. These findings indicate that the effect of financial structures on economic growth and investment depends on the level of development of the country.

2.7 Discussion and Conclusion

This study has assessed the impact of banks and stock markets development on economic growth and investment. In investigating the individual impact of financial sector development on economic growth, two indicators of banks and two indicators of stock markets development have been used. Regression results find that none of the banking sector development indicators is significantly related with economic growth. Meanwhile, both indicators of banking sector development, the ratio of private credit to GDP and liquid liabilities as a share of GDP is significantly related with investment per GDP. Furthermore, this study finds that the net effects of these two indicators on investment are positive indicating the importance of banking sector development to the level of investment in the country. This finding suggests that investment is the channel through with banking sector development may have an effect on economic growth. The findings do not support the existence of the relationship between banking sector development and economic growth but strongly support the important role of banking sector development on investment. Meanwhile, in the case of stock markets development, this study finds that market capitalisation ratio and the ratio of value traded to GDP are significantly related with economic growth. However, the net effects of both stock markets indicators on GDP per capita growth are negative. This study also finds that market capitalisation ratio is positively and significantly related with investment but, the net effect of market capitalisation ratio on investment is also negative. The finding suggests that the development of stock markets has destabilising effects on economic growth and investment.

In investigating the overall impact of financial sector development on economic growth and investment, this study has constructed two groups of overall indicators, Overall-Size and Overall-Activity. Consistent with the previous studies, this study finds that overall development of financial sectors is important for economic growth

and the level of investment. Specifically, the regression results revealed that the overall size of financial sector development not significantly related with GDP per capita growth. However, the overall activity of financial sector has a positive and significant relationship with GDP per capita growth. This implies that increase in financial activities will positively affect economic growth but the increase in the overall size of financial sector has no impact on economic growth. Meanwhile, in the case of investment per GDP, this study finds that only one of Overall-Size and Overall-Activity indicators of financial sector development were significant. Furthermore, we find that the overall development of financial sector in term of size and activity has almost a similar impact on investment. The estimation results also show that the impact of the overall activity of financial sector on GDP per capita growth is higher than the impact of overall activity of financial sector on investment. This implies that the overall activity of financial sector will promote growth largely through its impact on investment efficiency.

To study the impact of financial structure on economic growth and investment, we have constructed four indicators to measure the financial structure of the country. These indicators have been categorised into two groups, Structure-Size and Structure-Activity. The results find that three out of four indicators of financial structure in period-t are significantly and positively related with GDP per capita growth. This may indicate the importance of Structure-Size and Structure-Activity of financial system for economic growth. The findings imply that the development of stock markets whether through the expansion in the size or activity of stock markets will increase the economic growth. However, after taking into account the negative effect of lagged financial structure on GDP per capita growth, this study finds that financial structure has a mixed effect on economic growth. The Structure-Size could have a positive or negative net effect on economic growth depends on indicator used in the regression. Meanwhile, both Structure-Activity indicators have a negative net effect on economic growth. In the case of investment per GDP, none of financial structure indicator is significant. This implies that to have a more market-based financial system does not increase the level of investment.

To analyse further the relationship between financial structure, economic growth and investment, this study has constructed two indicators to measure the overall structure

of financial system. The estimations show mixed results where one overall structure indicator has a positive net effect on economic growth, while another one has a negative net effect. The findings imply that the effect of overall financial structure on economic growth depends on the indicator used in the regression. Meanwhile, in the case of investment, this study finds that both overall financial structure indicators are not significantly related with investment per GDP. The finding is consistent with Levine (2002) who shows that financial structure is not a good predictor of real per capita GDP growth. The fact that financial structure could have a positive net impact on GDP per capita growth but not on investment per GDP indicates that the market-based financial structure will improve the investment efficiency but not the level of investment.

Finally, this study investigated the relationship between financial structure, economic growth and investment in the case of developed and developing countries. This study finds that the net effect of the overall financial structure indicator on economic growth in developed countries is positive and significant. In contrast, this net effect is negative in the case of developing countries. These findings suggest that to have more developed stock markets relative to the banking sector will promote better growth in the high-income countries but not in the middle- and low income countries implying that the impact of financial structure depends on the level of income of the country. Meanwhile, only in the case of developed countries, investment is significantly related with financial structure but not in the case of developing countries. These findings provide strong evidence that the effect of financial structure on investment depends on the level of income of the country. However, the relationship between financial structure and investment in the case of developed countries is negative indicating that market-based financial structure has a negative effect on investment in these countries. In conclusion, a positive impact of overall financial structure on economic growth implies that market-based financial system, as expected, will increase the investment efficiency in the high-income countries. Meanwhile, a negative impact of financial structure on investment implies that market-based financial system will reduce the level of investment in the high-income countries probably due to the negative wealth effect of stock market development on saving rate.

Chapter 3

Financial Structure, Legal Structure, and the Performance of Monetary Policy: A Comparison Study between Civil-Law and Common-Law Countries

3.0 Introduction

Banks perform a variety of functions, and traditionally provide money changing and payment processing services. Recently, researchers and policymakers have acknowledged that a critical role of banks is to manage and control risks. These functions give banks a central position within the process of saving and investment allocation that makes these institutions relevant for the transmission of monetary policy. This is because monetary policy influences the economy through the intermediaries of money and credit, where in both activities, banks are the major actors. In general, most economists agree that monetary policy has significant effects on the real sector in the short run. However, the channels through which monetary policies are transmitted remain a matter of discussion. Proponents of traditional theories stressed the interest-rate channel and argued that interest-rate changes affect investment by changing the required rate of return on an investment project. Many empirical studies, however, found that interest-rate elasticities of investment were generally low. Therefore, for a long time, economists have regarded the monetary transmission mechanism as a "black box" (Bernanke and Gertler, 1995).

Recently, the literature has shed more light on the channels of the transmission mechanism especially through the so-called credit view. In this view the monetary

transmission mechanism can be divided into two separate channels, the bank lending channel, and the balance sheet channel. The former is related to banks' ability and the latter to their willingness to supply loans to the private sector. In contrast with traditional theories, the credit view focuses on the importance of banks in transmitting monetary policy actions. This is based on the fact that the banking sector serves as the main source of finance for both households and firms, thus changes in banks loan could have consequences on the total output through its effect on private sector spending. The credit view, however, relies on the assumption of imperfect capital markets, which implies that the effects of monetary policy may differ between firms, industries or countries. This means that differences in countries' financial structures may have different impacts from monetary policy impulses. Meanwhile, the differences in financial structure across countries could be related to their legal structures. This argument draws from the work of La Porta et al. (1997), who focus on the relationship between legal structure and finance. In their paper, La Porta et al. show that the variations in the financial structures across countries are related to differences in the countries' legal systems. Cecchetti (1999), by using the La Porta et al. argument and the credit view of monetary policy has investigated the possibility that the legal system in a country has an influence on the impact of monetary policy on output and prices. In a study of eleven European Union countries, Cecchetti found that a country's legal structure, financial structure, and monetary transmission mechanism are interconnected. Specifically, the study found that in countries with better legal protection for shareholders and debtors, the impact of an interest rate change on output and inflation is lower.

Based on the above discussion, the objective of this study is to investigate the relationship between countries' legal structure and the performance of monetary policy. In other words, this paper investigates whether the strength of the effect of monetary policy amongst countries can be shown to be related to differences in their legal structure. Specifically, the objective of this paper is to determine whether there is any difference in the effectiveness of monetary policy actions between countries with different legal structures, that is, between civil- and common-law countries. This is based on the fact that legal structure will determine the shape of financial structures in the countries, and that the difference in the countries' financial structures is important in explaining differences in the effectiveness of monetary policy between

countries. Empirical studies that directly look at the relationship between legal structure and monetary policy effectiveness, however, are very limited. Thus, there are several questions related to this relationship that need further clarification, and this has motivated this study. Specifically, this study intends to address some important questions, particularly whether monetary policy is more effective in civil-law countries where their financial structure is more bank-based (see La Porta et al. 1997, 1998; and Demirgüc-Kunt and Levine, 1999), as compared with common-law countries where their financial structure is more market-based.

The is because the finding from Cecchetti (1999) on the issue is far from conclusive, due to the fact that his study only focuses on 11 developed countries of European Union where the development of the financial sector is relatively similar. In this regard, the question of interest is whether similar patterns can be observed if the sample in the study is extended to include both developed and developing countries. With a different level of financial development and growth pattern among countries, this study with a larger sample and covering both developed and developing countries is expected to provide more information on the effectiveness of monetary policy in civil-law countries and common-law countries. In this paper, the relationship between legal structures and the effectiveness of monetary policy was investigated in a larger sample of 24 countries. The sample consists of 12 civil-law countries and 12 common-law countries. Out of 12 countries of civil-law tradition, 8 are developing countries, while for common-law countries, there are 6 developing countries. The impulse responses of a monetary policy shock on macroeconomic variables have been estimated for individual countries and then comparisons have been carried out between civil- and common-law countries. A second question of interest is whether the same finding will still be observed if macroeconomic variables other than output are used in the analysis. Empirical studies on the effectiveness of monetary policy and legal structures normally look at the impact of monetary policy actions on output and/or price. As far as we can ascertain, no studies have been carried out to compare the effectiveness of monetary policy between civil-law and common-law countries in affecting the level of investment or consumption. The usage of investment and consumption in addition to output in this study is based on the fact that these two variables are the main channels through which the impact of monetary policy actions is transmitted to output. The direct impact of monetary policy changes on these

variables could provide a clearer picture of the relationship between legal structure and monetary policy.

In addition, this study will extend the current literature on this issue by looking at credit as one of the variables in the impulse response function in addition to the interest rate, which is commonly used in previous studies. The use of credit is to represent the credit channel of the monetary policy transmission mechanism. This paper will also expand the current literature by including the exchange rate as one of the variables in the impulse response function together with output, price, interest rate and credit. This is not only based on the fact that exchange rate stability has become a popular monetary policy target especially in developing countries, but the inclusion of the exchange rate is also intended to expand the model to incorporate the open economy. The inclusion of the exchange rate in the impulse response estimation is also to represents the exchange rate channel of the monetary policy transmission mechanism.

3.1 Literature Review

3.1.1 Transmission Mechanism

The monetary transmission mechanism is a process through which monetary policy actions are transmitted into changes in income and inflation (Taylor, 1995). Monetary transmission is a complex topic because there are several channels through which monetary policy operates. Prior to the present debate, the traditional view proposes that the transmission mechanism is the process by which monetary factors operate via equilibrium in asset markets to influence output and asset prices, and these in turn influence desired consumption and investment spending (Purvis, 1992). In the more recent literature, however, there are two main views surrounding the debate on the transmission mechanism. The first view emphasises the role of money (the money view), the second view emphasises the role of credit (the credit view) in the transmission mechanism process. There are number of comprehensive surveys have been carried out on these theories. These include Bernanke (1993), Gertler and

Gilchrist (1993), Kashyap and Stein (1994, 1997), Hubbard (1995), and Cecchetti (1995).

The money view, which is largely the foundation for the textbook IS-LM model, is based on the notion that changes in the monetary aggregate affect output via the interest rate channel. In the traditional IS-LM framework, monetary policy impulses influence only the supply of money, leaving the IS curve unchanged. A bank is modelled as an institution that holds demand deposits on the liabilities side and reserves and bonds on the assets side. There are two assumptions in this view of the transmission mechanism. First, all non-money assets are lumped together into bonds implying that the credit market is largely ignored. Second, all markets are perfect implying that borrowers are homogeneous from the lenders' point of view, therefore banks cannot discriminate between the characteristics of different borrowers. According to the money view, a contractionary monetary policy action by the central bank that drains reserves from the banking system will increase competition for bank reserves on the interbank market. This monetary policy action leads to a rise in the real interest rate and the user cost of capital. This induces households to re-evaluate their portfolio decisions and reallocate more money from demand deposits into interest-bearing bonds thereby causing a postponement in consumption or a reduction in investment, as there are fewer profitable projects available at higher required rates of return.

The exchange rate channel is also familiar from textbook models, which is an important element in conventional open-economy models. The chain of transmission here runs from interest rates to the exchange rate via the uncovered interest rate parity condition relating interest rate differentials to expected exchange rate movements. Thus, an increase in the domestic interest rate, relative to foreign rates, would lead to a stronger currency and a reduction both in net exports and in the overall level of aggregate demand. Equity prices may also play a role in the transmission mechanism whether through Tobin's q or through wealth effects. Tobin's q is defined as the market value of firms divided by the replacement cost of capital. A high q indicates that new plant and equipment are relatively cheap. Thus investment will rise (down) if q goes up (down). Meanwhile, reduction of the money stock will stimulate the private sector to rebalance its portfolio, and the lowered demand for stocks will drive

down prices. If the price of equity goes down, private wealth will decrease, which in turn will restrict consumption.

Although the interest rate channel is often considered to be the main channel of monetary policy actions, various empirical studies had great difficulty in identifying significant effects of interest rates through the cost of capital. As pointed out by Bernanke and Gertler (1995), the macroeconomic response to policy-induced interest rate changes is considerably larger than is implied by conventional estimates of the interest elasticities of consumption and investment. This suggests that some mechanism other than the interest rate may also be at work in the transmission of monetary policy. Therefore, some economists claim that the credit market is also important in affecting the aggregate spending level. In general, the credit view focuses on the consequences of imperfect capital markets and argues that asymmetric information and moral hazard may cause firms to be financially constrained. This is because asymmetric information makes it impossible for lenders to discriminate between good and bad borrowers. Therefore, a risk premium will be charged for all borrowers, leading to a higher cost of external finance. Moral hazard has similar implications. Debt contracts in general include a fixed payment in the case of a successful investment, whereas the loss for the borrower is bounded at zero. Thus, the borrower is tempted to invest external funds into riskier projects than he would have done with internal capital. As the lender knows these incentives, he will require either a risk premium or collateral. A monetary policy action can affect the size of the risk premium as well as the worth of the collateral, which provides an additional channel for the influence of monetary policy.

There are two possible channels of transmission in the credit view theory. The first one is the balance-sheet channel. This channel emphasises the impact of monetary policy on the borrower's balance sheet by focusing on the role of the firm's net worth in obtaining external finance. There are several ways in which monetary policy can affect the net worth of a firm. First, a restrictive monetary policy increases interest payments for the firm, thus reducing cash flow and net worth of the firm. Second, rising interest rates could also cause share prices to fall and hence reduce the value of the firm. The unexpected share price decreases lead to a higher debt burden, thereby making agency problems more acute. The proponents of this channel argued that a

negative monetary shock would make external finance more expensive relative to funds raised internally. Since the net worth of the firm is inversely related to the external finance premium for a given amount of finance required, the shrinkage in the net worth will reduce the borrower's spending and production (Bernanke et al. 1996). The effect of a negative monetary shock will become more significant when there are no close substitutes for bank credit, particularly for the households and small firms which depend largely on banks for external finance. The second linkage of transmission mechanism in the credit view is the bank-lending channel. This channel focuses on the possible effect of monetary policy actions on the supply of loans by the banking system. The bank-lending channel argues that a tight monetary policy will restrict interbank lending, and hence reduce banks' credit supply. For the bank-lending channel to work, banks have to reduce lending because they cannot fully compensate for the shortage in reserves by taking in deposits. Although there might be some individual banks that succeed in lifting funds elsewhere, letting them insulate their loan portfolios against monetary policy, some other banks are forced to restrict their supply of credit.

In conclusion, in the credit view theory, the effectiveness of policy depends on capital market imperfections that make it easier for some firms to obtain financing than others. Information asymmetries and moral hazard problems, together with bankruptcy laws, mean that the state of a firm's balance sheet has implications for its ability to obtain external finance. More important for the transmission mechanism per se is that some firms are dependent on banks for finance, and that monetary policy affects bank loan supply. A reduction in the quantity of reserves forces a reduction in the level of deposits, which must be matched by a fall in loans. Lower levels of bank loans will have an impact on the real economy if there are firms without an alternative source of investment funds (Cecchetti, 2001). Substantial empirical evidence supports the importance of both capital market imperfections and firm dependence on bank financing. Kashyap and Stein (1997) provide a summary of two types of studies. The first type suggests that banks rely to a substantial extent on reservable-deposit financing, thus a contraction in reserves will prompt banks to contract their balance sheets, reducing the supply of loans. The second type establishes that there is a significant number of bank-dependent firms that are unable to mitigate the shortfall in bank lending with other sources of finance.

3.1.2 Financial Structure and Monetary Policy

Financial structure refers to the nature of the components that make up a financial system. Allen and Gale (2001) identify these components as the agents in the system, financial institutions, financial markets, the central bank, the regulatory authority, the political system (that is, government and its policies), the legal system (particularly contract enforcement and governance mechanisms), custom (that is, the importance of reputation and other implicit mechanisms for contract enforcement), accounting systems, and the nature of the incentive to generate and disseminate information. Empirically, Levine (2002) measures financial structure by constructing an index that reflects the aggregate size, activity, and efficiency of the financial institutions sector relative to the financial markets sector of the country. Based on Levine, Tadesse (2001) uses a dummy variable to classify a financial system as either market-based or bank-based. If Levine's conglomerate index of size, activity, and efficiency for a country is above the mean value of the index then Tadesse classifies the country as having a bank-based financial system. If the index is below the mean then Tadesse classifies the financial system as market-based. Cecchetti (1999) focuses on the structural aspects of the financial systems that are important for the transmission mechanism. He constructs an aggregate index of financial structure based on the size and concentration of the banking sector, the health of the banking system, and the relative amount of credit allocated through banks. These are the financial variables that the lending view of the transmission mechanism suggests should be important.

Empirical findings clearly indicate that the nature of the transmission mechanism is influenced by the structure of a country's financial system. Cecchetti (1999), for example, investigates the importance of firms' dependence on bank loans for the effectiveness of policy changes. He looks at how differences in the size, concentration, and health of the banking systems, across a sample of 16 countries, are likely to affect the impact of monetary policy and concludes that countries with many small banks, less healthy bank systems, and poorer direct capital access display a greater sensitivity to policy changes than do countries with big healthy banks and deep, well-developed capital markets. Allen and Gale (2001) look at the evidence related to differences in financial structure and growth between countries over a long average period of time. They find that, in general, financial structure does affect

aggregate real economic variables. Meanwhile, Cecchetti and Krause (2001) study the issue of whether financial structure affects the effectiveness of monetary policy. Cecchetti and Krause look at 23 developed and emerging market countries and find that financial structure does matter. Specifically, countries with less direct state ownership of banking system assets have lower variances of both output and inflation.

3.1.3 Regulation, Legal Structure and Monetary Policy

The nature of financial regulation has an intense influence on the intermediation process. The goal of such regulation is to ensure the stability of the financial system. In doing so, governmental oversight has an affect both on the structure of the financial system and on the behaviour of individual intermediaries. The decision by governments to insure banking system liabilities either through direct ownership of banks or through deposit insurance is a pathway for regulation to affect intermediation. Cross-country differences in the extent to which governments guarantee deposits, implicitly or explicitly, have a clear impact on the nature of bank dependence and the extension of credit in an economy. The effect of state-ownership of banks on the size and development of financial markets has been extensively discussed in the literature. Barth et al. (1999), for example, look at the relationship between ownership practices and the performance of the financial sector. The evidence presented in their paper points to a detrimental effect of state ownership of banks on financial development and the securities markets. Similarly, La Porta et al. (2000) also discover an unfavourable effect of government ownership of banks on several financial development variables. Meanwhile, Cecchetti and Krause (2000) observe that countries with an explicit insurance scheme in place have smaller external capital markets. The reason for this is that increasing depositor's protection makes bank deposits more attractive than the (riskier) equity shares, requiring higher rates for the latter and resulting in a lower issuance of stocks.

Meanwhile, with regard to legal structures, La Porta et al. (1997, 1998) found that a country's legal system is related to its financial structure. According to La Porta et al., investors provide capital to firms only if they believe they will get their money

back. For equity holders, this means that they must be able to vote out directors and managers who do not pay them. For creditors and holders of bonds, this means that they must have authority to repossess collateral. Furthermore, these legal rights must be accompanied by confidence that the laws will be enforced. In countries where these protections are strong, equity and bond markets are broad and deep and primary capital markets will be important. By contrast, in countries were investor protections are weak, finance will come primarily through the banking system. Specifically, La Porta et al. examined the relationship between shareholders' rights, creditor rights, and enforcement on the one hand and the concentration of ownership and availability of external finance on the other, and came to two conclusions. La Porta et al. found that civil-law give investors weaker legal rights than common-laws do. Common-law countries give both shareholders and creditors the strongest, and French-civil-law countries the weakest, protection. German-civil-law and Scandinavian countries generally fall between the other two. The quality of law enforcement is the highest in Scandinavian and German-civil-law countries, next highest in common-law countries, and again the lowest in French-civil-law countries.

In addition, La Porta et al. (1997, 1998) also found that, first, corporate ownership is more concentrated in countries where shareholders and creditors are poorly protected by both the substance of the law and its enforcement. Second, countries with weaker legal rules and less rigorous law enforcement have smaller and narrower capital markets. The findings suggest that English common-law countries have the least concentration of corporate ownership and the largest and deepest capital markets. Meanwhile, French civil-law countries have the most concentrated ownership and the smallest capital markets. In line with La Porta et al., Demirgüc-Kunt and Levine (1999) also find that countries with common-law tradition have been found to be more market-based while countries with a French civil-law tradition have been found to be more bank-based, suggesting that financial structure is not independent of the legal structure used by the system. These findings clearly indicate that legal structure shapes the financial structure of the countries. Given the importance of banks in the monetary transmission process, this leads us to conclude that country legal structure is important for monetary policy effectiveness.

With regard to the effects of monetary policy on economic activities, empirical studies found that the effectiveness of monetary policy varied considerably among countries. Gerlach and Smets (1995), for example, found that the effects of a change in the monetary shock on output were somewhat larger in Germany than in France or Italy, while the United Kingdom fell somewhere in between. However, the differences in the transmission of monetary policy documented in the Gerlach-Smets study were not very large. Meanwhile, Barran et al. (1996) found that the effect of a contractionary monetary shock on output is relatively long lasting in Germany, with output bottoming out about 10 quarters after the shock, somewhat less long lasting in the United Kingdom with output bottoming out after about 8 quarters, whilst in France output reaches the trough about 6 quarters after the shock. Dornbusch et al. (1998) estimate the impact of a coordinated monetary policy move on activity in a group of EU countries, controlling for intra-European exchange rates. They find that the 'impact-effects' of a change in monetary policy are similar in Germany, France, and the United Kingdom, but smaller than in Sweden and Italy. The full effects of the coordinated monetary policy move are, however, lower in the United Kingdom than in Germany and France, a result that is broadly consistent with that of Britton and Whitley (1997). Ramaswamy and Sløk (1998) looked at the speed of adjustment to an unanticipated contraction in monetary policy. Using the VAR approach, they found that the EU countries fall into two broad groups as far as the transmission of monetary policy is concerned. In one group (Austria, Belgium, Finland, Germany, the Netherlands, and the United Kingdom) output typically bottoms out about 11 to 12 quarters following a contractionary monetary shock. In the other group (Denmark, France, Italy, Portugal, Spain, and Sweden), output typically bottoms out about 5 to 6 quarters after a contractionary monetary shock.

3.2 Methodology

3.2.1 Estimation Strategy

In this paper, the effectiveness of monetary policy actions in the countries being studied are examined by using impulse response functions. In order to calculate the impulse responses, this study employs a vector autoregression (VAR) approach. In general, the impulse response functions can be derived from two types of VARs. One

is a standard VAR with all variables specified in levels. The other is a vector error correction model (VECM) that explicitly models variables integrated of order one [I(1)] and cointegrating relationships that are present in the data. Impulse responses for the monetary policy based on levels VAR can be found in the studies by Sims (1992), Christiano et al. (1996), Ramaswamy and Sløk (1998), and Clements et al. (2001). Meanwhile, the impulse responses for monetary policy based on VECM can be found in the studies by King et al. (1991), Ehrmann (1998), Lütkepohl and Wolters (1998), and Cecchetti (1999).

If a VAR is estimated in levels, without imposing cointegrating restrictions present in the data, VAR parameters can be estimated consistently by least squares (Sims et al. 1990). This method of estimating parameters, however, is not efficient because information about cointegration is ignored in an unrestricted levels VAR. VECM estimation instead will produce more precise and efficient parameter estimates. In general, the VECM specification can generate efficient estimates without losing the information on the long-run relationships between the variables. If cointegration exists, and the true cointegrating relationship is both known and can be given an economic interpretation, the VAR should be estimated using the VECM with the reduced rank estimation suggested by Johansen (1995). However, if the true cointegrating relationships are unknown, and furthermore, when the relationships are not the main focus of the analysis, the imposing cointegration may not be the appropriate estimation strategy. Imposing inappropriate cointegration relationships can lead to biased estimates and hence bias the impulse responses derived from the reduced form VARs (Ramaswamy and Sløk, 1998).

Meanwhile, there is serious reason to question the finding of time series studies that do not properly account for unit roots in the data. Failing to account for the presence of unit roots can lead to inconsistent coefficient estimates and result in wrong inferences being drawn. Phillips (1998) criticised the use of levels VARs in the presence of some unit roots or some near-unit roots in order to derive impulse responses. He showed that long run impulse response estimates are inconsistent in unrestricted levels VARs. Many macroeconomic variables are well described by unit root processes so this criticism should be taken seriously. Thus, this study first examines the unit root properties of each series of the VAR model. The presence of

unit roots has been tested by using the Augmented Dickey-Fuller tests (ADF) and the Phillips-Perron tests (PP). The results from these tests are presented in Appendix 3.1. In general, the findings from unit root tests show that most of the series in this study are nonstationary in levels but stationary in the first differences. This finding suggests that the first differences VAR is more appropriate than levels VAR to model the series in this study. Further investigations tests the number of the cointegration relationships among the series. This accomplished by using Johansen's maximum likelihood-based trace statistics. In this test we allow for presence of an intercept but not for deterministic trends in the cointegrating equations. The results of cointegration tests are presented in Appendix 3.2-3.4. In most of the cases, the tests indicate the existence of at least one cointegration equation in the model. Based on this finding, VECM is a more appropriate approach to model the relationship among series in the study. However, in this paper, both first differences VAR and VECM will be used. Results from these two approaches will be discussed separately, and also will be compared as part of a robustness check.

In order to derive impulse responses, a set of identifying restrictions has to be imposed. There are two approaches that are widely used to achieve identification of the shocks. The first approach is based on imposing restrictions on the contemporaneous effects of shocks, while the second approach is based on imposing long-run restrictions on the effects of shocks. To impose contemporaneous restrictions, the standard approach is a Choleski decomposition of the residual covariance matrix from the VAR model. This approach imposes a contemporaneous recursive structure on the shocks that depends in a crucial way on the ordering of the variables in the system. The ordering reflects the speed at which variables respond to shocks. The literature on monetary transmissions has suggested several different orderings. However, there is no agreement on the ordering because different economic theories imply different orderings. Meanwhile, an example of a long run identifying assumption could be that nominal shocks have no effects on real output. The arguments for imposing certain restrictions are usually based on economic theory, and depending on the theory, different long run restrictions have been proposed. Faust and Leeper (1997), however, argued that imposing a long-run restriction does not necessarily provide a reliable basis for drawing structural inferences. This paper will not follow the approach of imposing long run restrictions

in order to achieve identification of the shocks. Instead restrictions will be imposed on the contemporaneous effects of shocks.

3.2.2 Model and Data Set

This paper employs a VAR approach of which the main characteristic is a relatively small number of variables describing the dynamic of the economy. Commonly, a macroeconomic VAR model to study monetary policy shocks will include at least four variables: output, price, money, and short-term interest rate. These correspond to the variables of a standard IS-LM model. The four-variable VAR model, however, often results in the price puzzle, which is a finding of a sustained price rise following an unanticipated monetary tightening represented by a positive innovation of the interest rate. Sims (1992) argued that the price puzzle is a result of omitting variables which the monetary authority observes to obtain information on future inflationary pressures, and suggested that it could be resolved by including the exchange rate and commodity price in the set of variables. Meanwhile, to formalise the credit view, Bernanke and Blinder (1988) suggest that the VAR model should also include the loan price and the loan quantity in the set of variables to model. Based on the above discussion, a complete VAR model should consist of the prices and quantities of the three markets (goods, money and credit market) as well as the exchange rate and the commodity price. However, due to the limitations of the data, the VAR model in this paper has five variables only. The vector of endogenous variables of the VAR model used in estimation is as follows:

$$V' = [\, v_t \quad p_t \quad r_t \quad cr_t \quad x_t \,] \tag{3.1}$$

where v is a macroeconomic variable, p is the price level, r is a short term interest rate, cr is credit, and x is the exchange rate. In this study, there are three macroeconomic variables being studied; output (y), investment (inv) and consumption (con). In the estimation process, however, these three macroeconomic variables were entered into the regression equations separately. In other words, the impulse responses of monetary policy shock on output, investment and consumption will be investigated individually. Meanwhile, the monetary policy shock is identified

through a standard Choleski-decomposition with the ordering of variables as in Equation 3.1. The ordering of endogenous variables in Equation 3.1 is fairly standard in the recent empirical literature of transmission of monetary policy shocks. This ordering is based on the assumption regarding the operation of monetary policy transmission mechanisms. The underlying assumption is that policy shocks have no contemporaneous impact on macroeconomic variables and prices, but may affect credit and the exchange rate immediately. However, the policy interest rate does not respond to contemporaneous changes in credit and the exchange rate. Specifically, the macroeconomic variable (v) is placed before all other variables, which means that the other variables can affect v only with lags. Meanwhile, price (p) is placed before the interest rate (r), which implies that r can affect p with lags. The ordering also allows contemporaneous changes in r to influence cr and x. During the estimation process, experimenting with other orderings especially by swapping the position of cr with x did not change the results significantly. Thus, in all regressions, the ordering of endogenous variables as in Equation 3.1 has been used.

To draw valid empirical inferences about the response of output and price to a change in monetary policy, we need an appropriate way of identifying the monetary shocks. There are two dimensions of the conduct of monetary policy. One is that central banks adjust the instruments of monetary policy in response to changes in variables related to their objectives, the reaction function. The other concerns actions taken by central banks to adjust the instruments of monetary policy to affect the real economy. This study is more related to the latter issue which requires us to identify the policy-induced component of changes in output. For this purpose, this paper follows the study by Bernanke and Blinder (1992), and Christiano et al. (1996) which focus on short-term interest rates as a monetary policy instrument. This is due to the fact that most central banks smooth overnight or other short-term interest rates when they deliberately intend to change the stance of monetary policy. Thus, the disturbances to the interest rate in the VAR are identified as shocks to monetary policy in this study. Meanwhile, the response of output, investment or consumption to an interest rate shocks is interpreted as responses of those variables to an unpredicted shift in monetary policy. The results of the impulse responses of interest rate to output, investment and consumption have been used to compare the effectiveness of monetary policy between civil-law and common-law countries. For this purpose,

comparison was based on the maximum magnitude of the impact, the speed of the adjustment, and the maximum periods taken for the impact to disappear.

For each country, the VAR and VECM model is estimated by using quarterly data over the period 1980-2003. In certain countries, due to the limitation of the data, the slightly shorter data periods have been used in the estimation (see Appendix 3.5). The main sources of data are the International Financial Statistics of International Monetary Fund (IMF) and World Development Indicators 2004 of World Bank. Specifically, the quarterly data for price (p), measured by Consumer Price Index, CPI (base year 2000); interest rate (r), measured by lending rate; credit (cr), measured by domestic credit; and the exchange rate (x), measured by nominal effective exchange rate (for France, Italy, Netherlands, and Spain, the exchange rate has been measured by real effective exchange rate), were collected from Financial Statistics. This study uses the lending rate as the monetary policy rate as this is the only short term interest rate available for the all countries being studied over the whole sample period. Meanwhile, annual data for output (y) is measured by real Gross Domestic Product (GDP); investment (inv) by real gross fixed capital formation; and consumption (con) by real household final consumption expenditure were gathered from World Bank Indicators. These annual data have been converted into quarterly data by using SPLINE methods in the EXPAND procedure that provided by SAS/ETS. In general, the SPLINE method fits a cubic spline curve to the input values (annual data). A cubic spline is a segmented function consisting of third-degree (cubic) polynomial functions joined together so that the whole curve and its first and second derivatives are continuous. Once the cubic spline curve is fitted to the data, the spline is extended by adding linear segments at the beginning and end. These linear segments are used for extrapolating values beyond the range of the input data (SAS/ETS User's Guide, 1993).

In this study, there are 12 common-law countries and 12 civil-law countries in the sample. The selection and the number of countries used in this study were determined solely based on the availability of the data. Meanwhile, the classification of the country's legal structure is based on La Porta et al. (1997) which found that the nature of the laws is a product of the legal tradition on which the civil codes of a country are based (see Appendix 3.5 for a more detailed explanation of this

classification). This study will only focus on two legal structures, civil-law and common-law, due to the fact that these are the major legal frameworks in the world. In all estimations, the data are expressed in logs, and the estimation was carried out by using statistical software E-View. In all estimations, the lag lengths were determined by using the Akaike Information Criteria (AIC) and Schwartz Information Criteria (SIC). The results from this analysis are presented in Appendix 3.6-3.8. Based on AIC and BIC in Appendix 3.6-3.8, this study finds that most appropriate lag length is 4 quarters. Experimenting with longer lag lengths, especially lag 6 and lag 8, generally did not improve the results except in certain cases.

Theoretically, we expect that monetary policies will be more effective in civil-law countries compared with common-law countries. The prediction is based on the argument that civil-law countries have been found to be more bank-based while common-law countries are more market-based (see La Porta et al. 1997; Demirgüc-Kunt and Levine, 1999). In other words, the financial sector of civil-law countries is dominated by banking institutions and their capital markets are relatively small. This is contrast with the financial sector in common-law countries which have relatively large and deep capital markets. This implies that monetary policy shifts will have a greater effect on firms in civil-law countries which mostly depend on bank loans compared with firms in common-law countries which have better access to the credit market via stock and bond markets. With the small capital markets, firms in the civil-law countries find it relatively more difficult to find alternative sources of finance when there is a shortage of supply of bank loans due to the tight monetary policy. Meanwhile, in the common-law countries, with the existence of relatively larger stock and capital markets, the substitution of bank loans is relatively much easier. Therefore, firms in the common-law countries are expected to be less sensitive to monetary policy actions.

3.3 Data analysis and Findings

3.3.1 Impulse Response: The First Differences VAR Approach

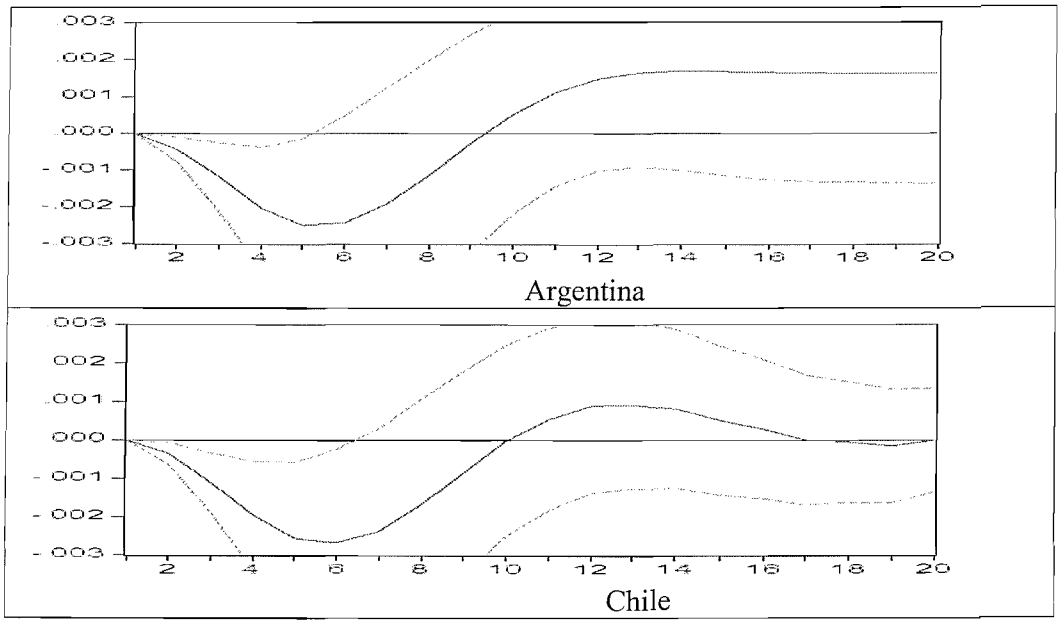
This section discusses the results of impulse response functions of output, investment and consumption for civil-law countries and common-law countries that were obtained from the first difference VAR model. Since the objective of this study is to examine the response of output, investment and consumption to a shock in the interest rate, the focus will be on the impulse response functions and not on the coefficients of the VAR. The effectiveness of monetary policy in these two groups of countries is examined by comparing the magnitude and the speed of adjustment of output, investment and consumption following a shock in interest rate. Since the impacts of a positive shock in interest rate on output, investment or consumption are expected to be negative, the size of impact in this study is evaluated by looking at the maximum negative impact on output, investment or consumption. Meanwhile, the speed of adjustment is evaluating by looking at the time for this negative impact to appear and the time taken for that impact to disappear. In this analysis, the size of shock is an increase of one standard-deviation change in the interest rate, and the response of output, investment and consumption to this shock will be investigated over a period of 20 quarters. In each graph, the solid line indicates the impulse response function of output, investment or consumption to a positive shock in the interest rate, and the dotted lines give a 90% confidence level of the impulse response.

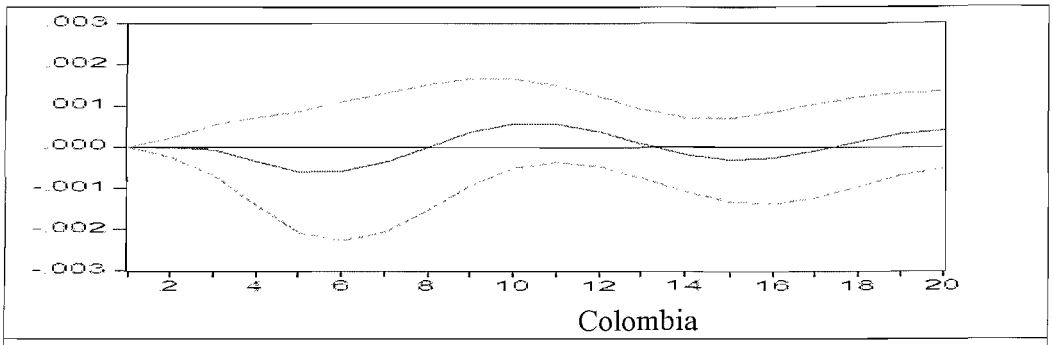
3.3.1.1 Impact of the Interest Rate Shock on Output

This section discusses the impulse response functions of the interest rate shock on output in the two groups of countries being studied. The responses of output to the shock in the interest rate for the civil-law countries are presented in Figure 3.1, whereas Figure 3.2 presents the impulse response functions for a similar shock in the case of common-law countries. Figure 3.1 shows that in all civil-law countries, the initial impact of an increase in interest rate on output is negative. This is consistent with the earlier expectation that an increase in interest rate would negatively affect output. As expected, graphs in Figure 3.1 show that the interest rate shock affects output after a lag. In most of the cases the negative impact on output only can be

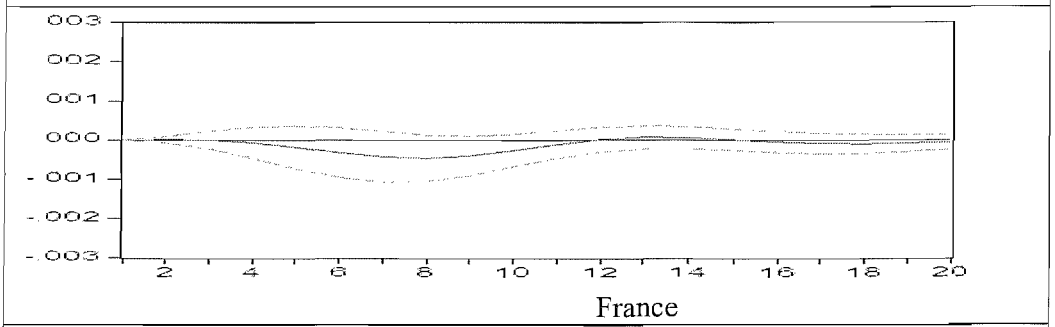
observed after the second quarter except in Mexico, Netherlands and France. In Mexico and Netherlands, the negative impact can only be observed after third quarter whereas for France after fourth quarter. Figure 3.1 also shows that, in many cases, the maximum negative impact of interest rate shock on output in civil-law countries will take place between quarter 5 to 7 except for France and Netherlands which is at quarter 8 and 9, respectively. The time taken for the output to reach the base line again after the negative impacts ranges from 9 to 20 quarters except for the Netherlands. In the Netherlands, the negative effect on output still can be observed even after quarter 20. In terms of magnitude, graphs in Figure 3.1 clearly show that the impact of interest rate shock on output is relatively large in Argentina, Chile and Peru. This is contrast with France, Netherlands, Philippines and Spain where the impact is almost negligible. Table 3.1 shows that the values of the maximum negative impacts of impulse response functions of output in civil-law countries ranged from -0.000237 to -0.002548.

Figure 3.1: Response of Output (y) to the Positive Shock in the Interest Rate (r) in Civil-Law Countries: The First Differences VAR Approach

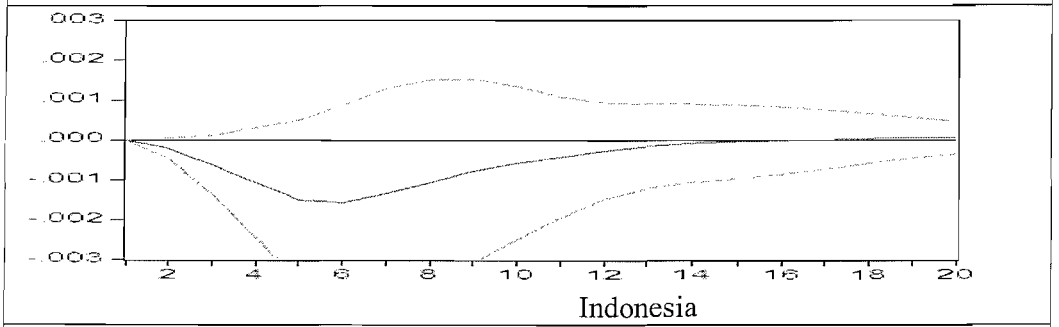




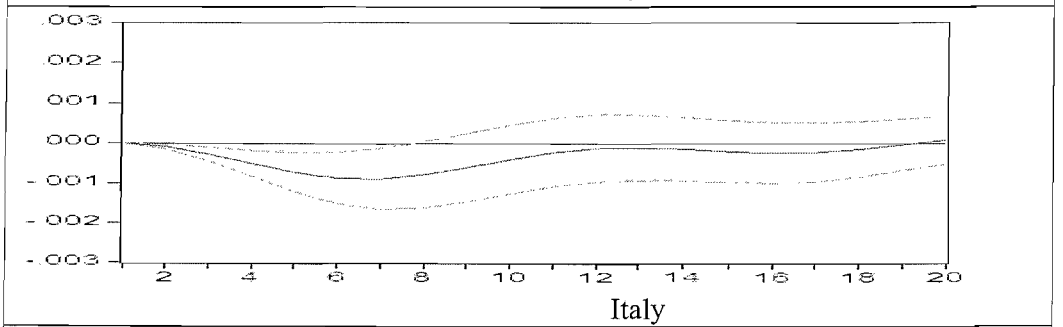
Colombia



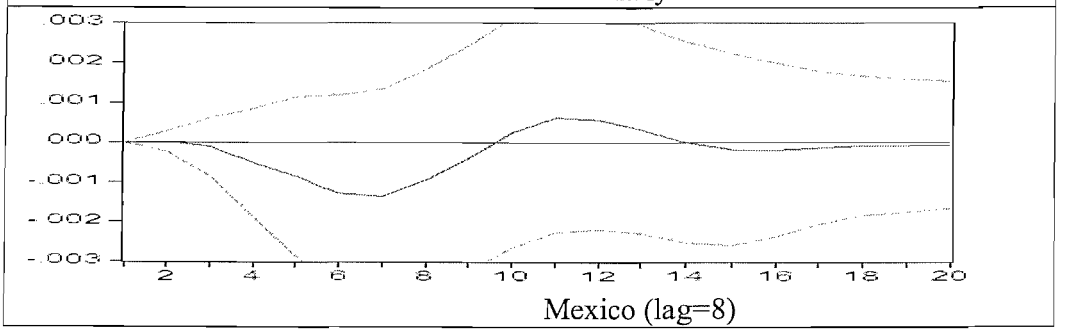
France



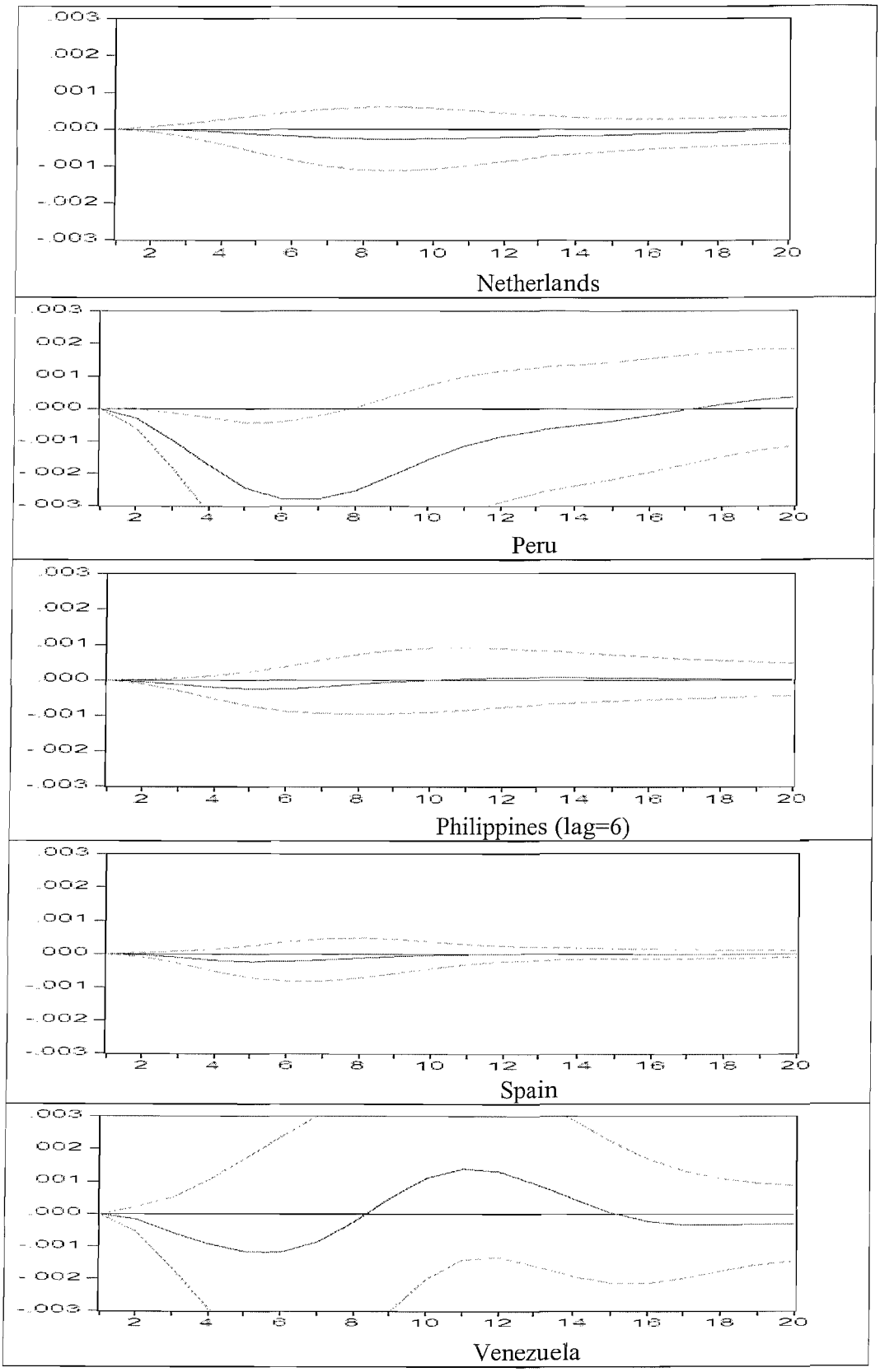
Indonesia



Italy



Mexico (lag=8)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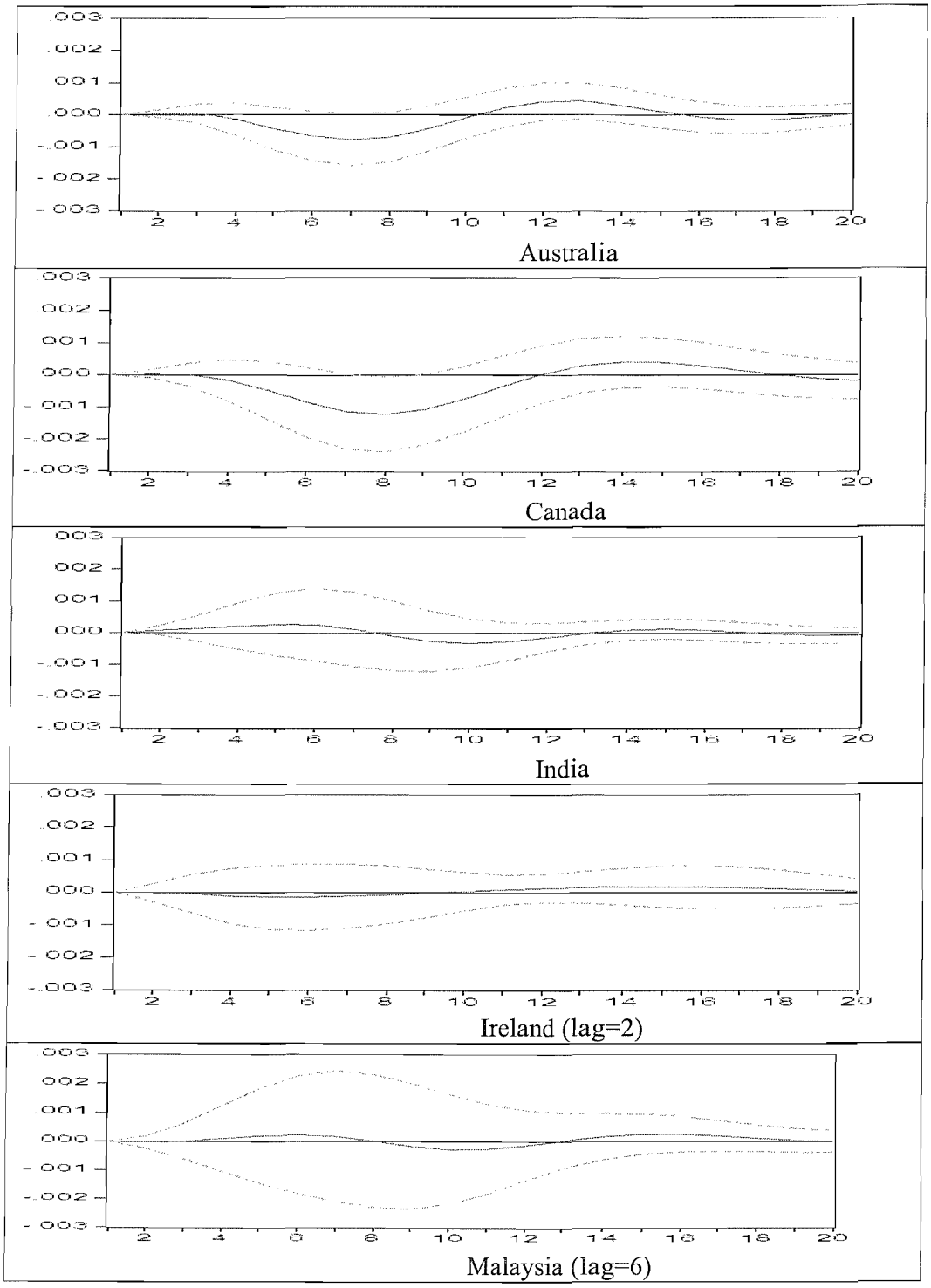
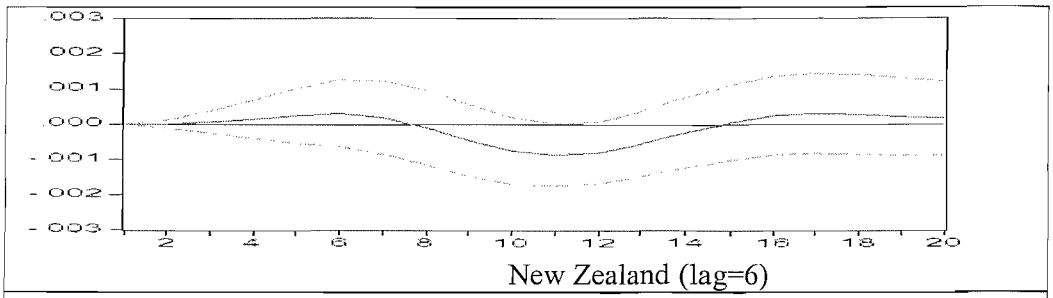
20
Netherlands
Peru
Philippines (lag=6)
Spain
Venezuela

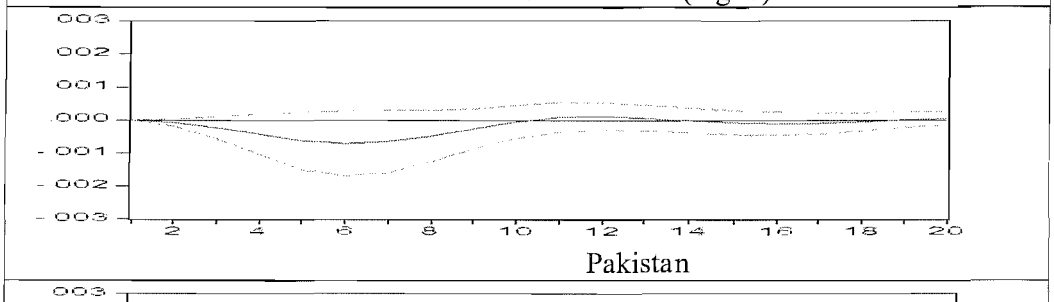
Figure 3.2 presents the impulse response of the interest rate shock on output for the common-law countries. As in the case of civil-law countries, the graphs in Figure 3.2 show that the interest rate shock in common-law countries affects output after a lag. However, the time taken for the effect to materialise is relatively longer. Specifically, in Ireland, Pakistan, Singapore and United Kingdom the negative impact of interest rate shocks on output can be observed starting from the second quarter. The impact, however, takes a longer period to materialise in the case of Australia, Canada, and USA. In other countries (India, Malaysia, New Zealand, South Africa and Thailand), the initial impact of the interest rate shock is an increase in output. However, this positive impact is only temporary and started to decline in the third quarter in case of South Africa, and between the fifth and sixth quarters in the case of India, Malaysia, New Zealand and Thailand. After quarter 8, the responses of output in these countries turn negative except in the case of South Africa, where the positive response only disappears after quarter 6. Graphs in Figure 3.2 also show that the negative impact on output in common-law countries reaches its maximum values between quarter 5 and quarter 11. After this period, the impulse response functions gradually move to the base line, and subsequently the negative impacts on output disappear between quarter 10 and quarter 13. Table 3.1 shows that the values of maximum negative impacts on output for common-law countries ranged from -0.000146 to -0.001299. Inspecting the graphs in Figure 3.2 closely, we also find that the impact of the interest rate shocks on output is stronger in Canada and Singapore but relatively smaller in Ireland.

Figure 3.2: Response of Output (y) to the Positive Shock in the Interest Rate (r) in Common-Law Countries: The First Differences VAR Approach

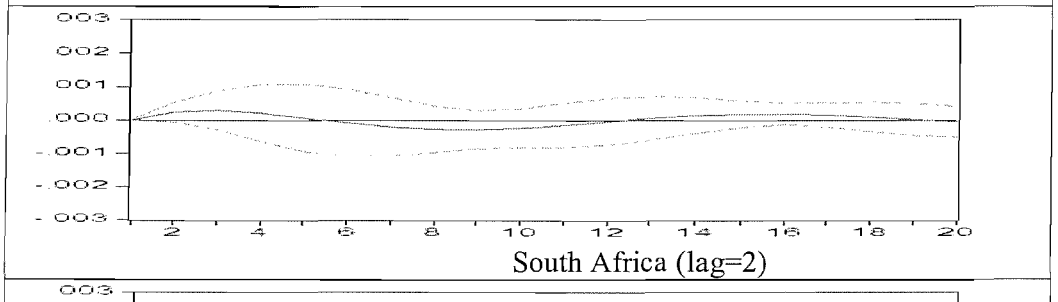




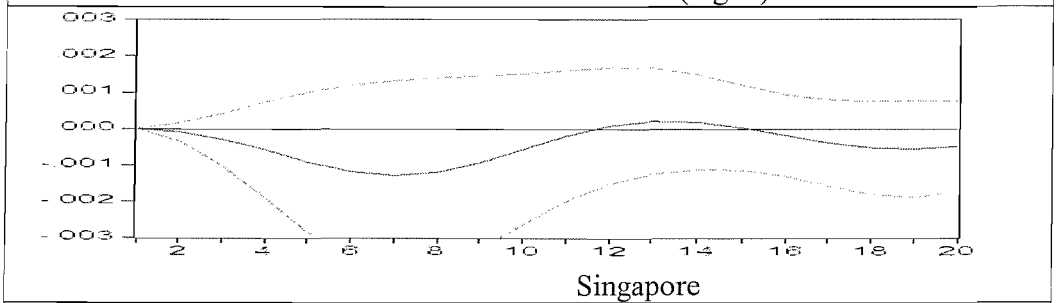
New Zealand (lag=6)



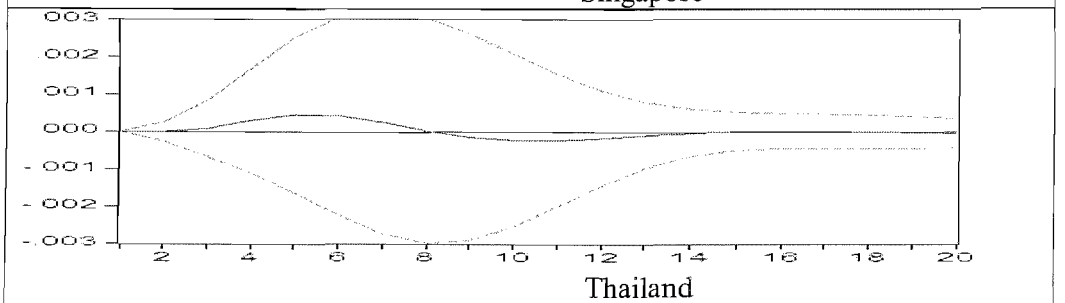
Pakistan



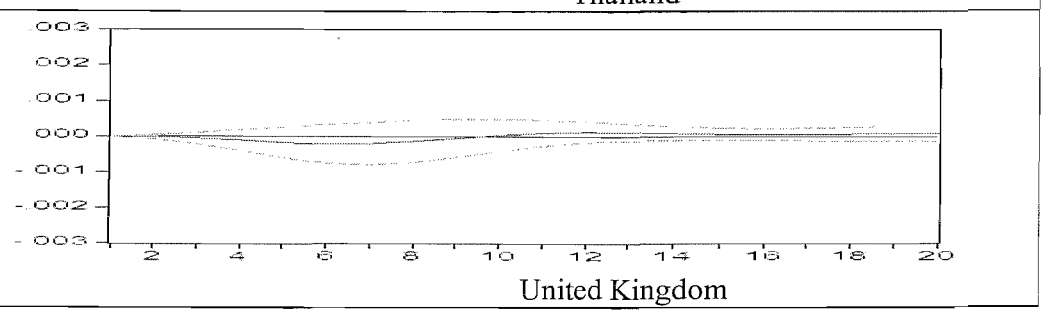
South Africa (lag=2)



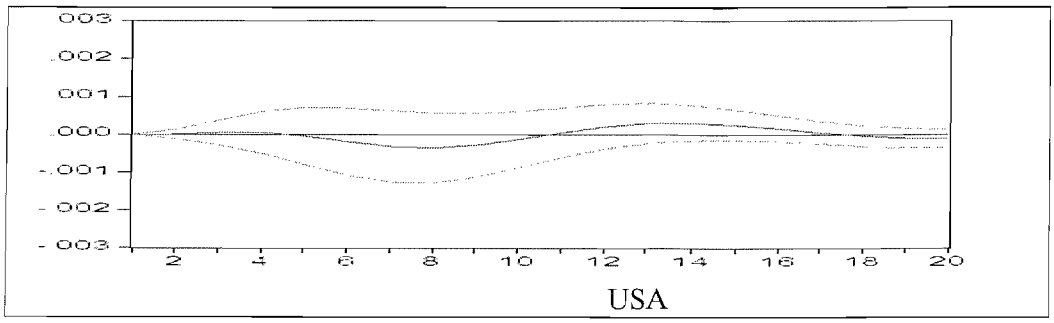
Singapore



Thailand



United Kingdom



By comparing the graphs in Figure 3.1 and Figure 3.2, this study finds that, in many cases, the response of output to an increase in the interest rate is relatively larger in civil-law countries in common-law countries. The mean values of the maximum negative responses of output to the interest rate shock for civil-law countries and common-law countries as presented in Table 3.1 strongly support the earlier finding based on the graphs. From Table 3.1, the mean value of the maximum negative impacts for civil-law countries (-0.00122292) is higher than the mean value for common-law countries (-0.00056958). This finding may indicate that, in general, the effect of the interest rate on output is stronger in the civil-law countries than in the common-law countries. The graphs in Figure 3.1 and Figure 3.2 also show that output in the civil-law countries responds more quickly to the change in the interest rate compared with output in the common-law countries. In most of the civil-law countries, the negative effect on output appears in the second quarter, while in most of the common-law countries, the negative impact only takes place after quarter 4.

Figure 3.1 also shows that none of civil-law countries experienced a temporary increase in output due to the positive shock in the interest rate. In common-law countries, however, the temporary positive increase in output can be observed in 5 out of 12 countries being studied. The temporary positive responses in these countries have delayed the negative impact of the interest rate on output. Specifically, for civil-law countries, the average time for the negative effects on output to appear is 2.3 quarters, whereas for common-law countries, the average period for the negative impact on output to take place is 5.08 quarters. Graphs in Figure 3.1 and Figure 3.2 also show that the negative impacts of interest rate shock on output generally take longer to die out in civil-law countries compared with common-law countries. The average period for the negative impact on output in civil-law countries to disappear is

13.42 quarters, which is higher than common-law countries (12.17 quarters). All these findings may indicate that the impact of monetary policy on output in civil-law countries is stronger, more responsive, and long lasting compared with common-law countries. These findings strongly suggest that monetary policy relatively is more effective in affecting output in civil-law countries compared with common-law countries.

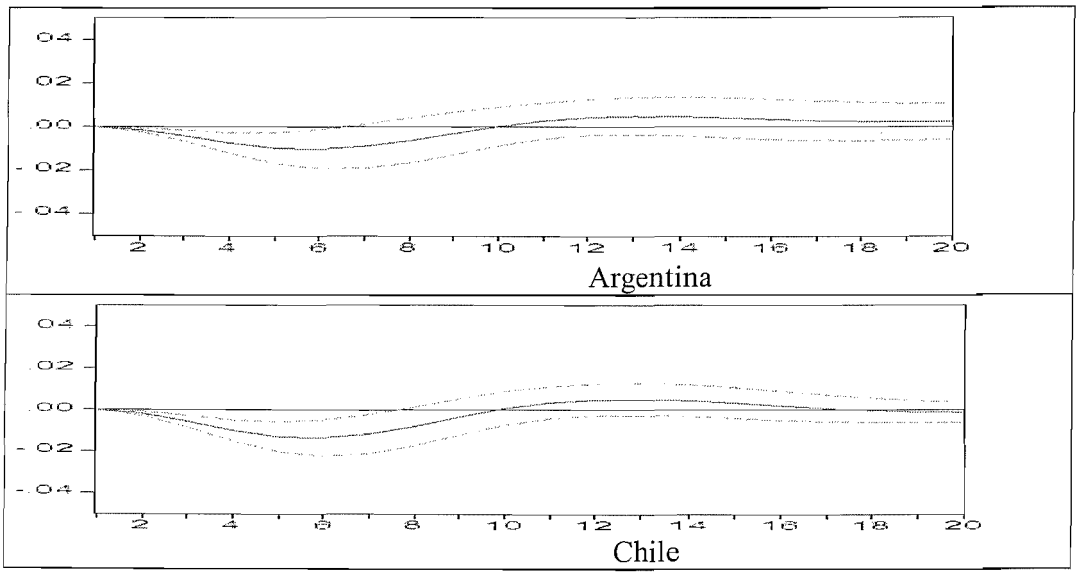
Table 3.1: Summary Statistics for Impulse Response Functions of Output to the Positive Shock in the Interest Rate: The First Differences VAR Approach

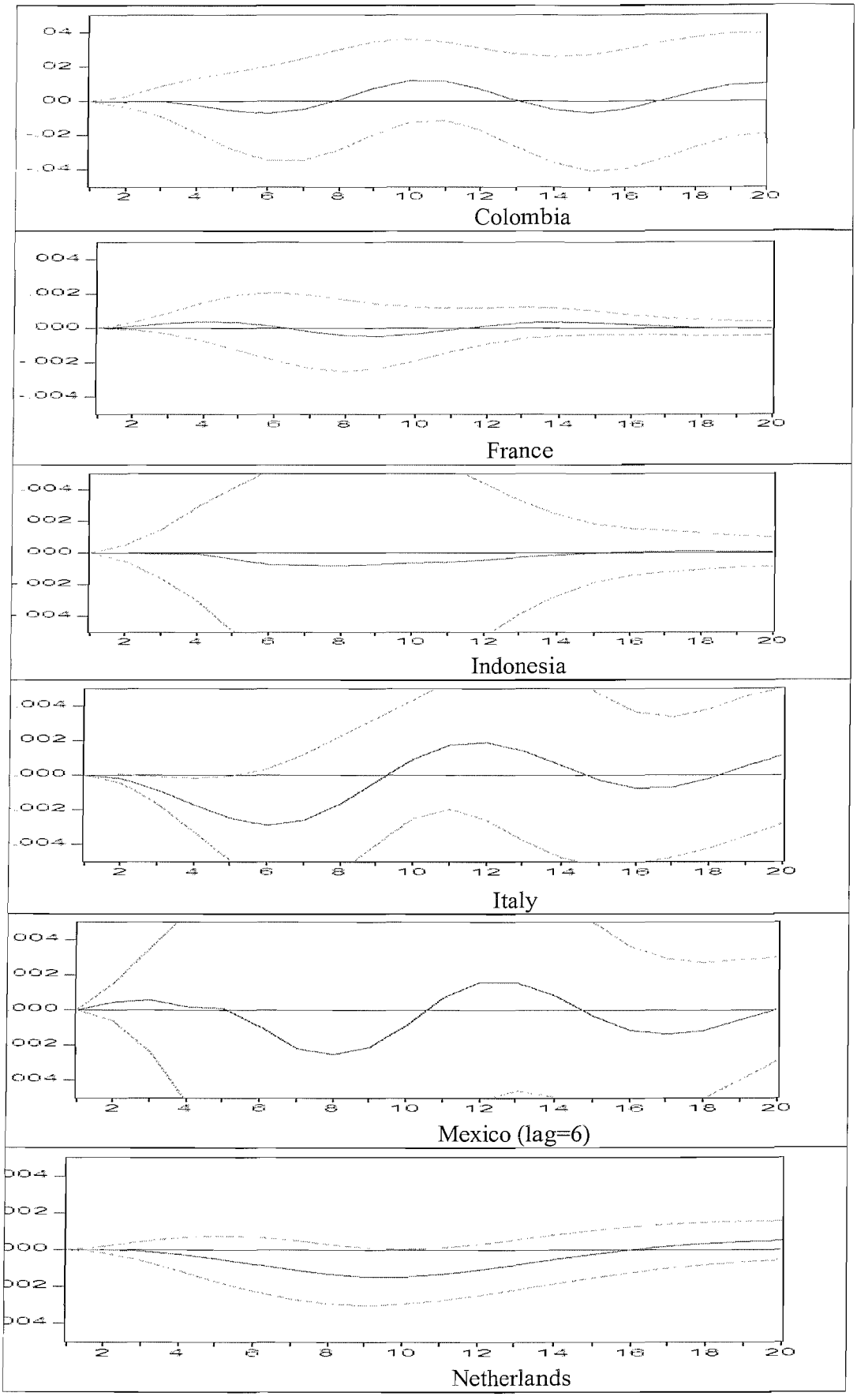
Responses of output (y) to interest rate shock				
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.002496(5)		2	10
Chile	-0.002548(5)		2	11
Colombia	-0.000594(5)		2	9
France	-0.000464(8)		4	12
Indonesia	-0.001569(6)		2	17
Italy	-0.000893(7)		2	20
Mexico	-0.001362(7)		3	10
Netherlands	-0.000260(9)		3	22
Peru	-0.002792(7)		2	18
Philippines	-0.000255(6)		2	11
Spain	-0.000237(5)		2	12
Venezuela	-0.001180(6)		2	9
Average	-0.00122292		2.33	13.42
B. Common-law countries				
Australia	-0.000781(7)		4	11
Canada	-0.001299(8)		4	12
India	-0.000329(10)	0.000264(5)	8	13
Ireland	-0.000146(5)		2	10
Malaysia	-0.000279(10)	0.000225(6)	9	13
New Zealand	-0.000864(11)	0.000306(6)	8	15
Pakistan	-0.000709(6)		2	11
South Africa	-0.000284(9)	0.000296(3)	6	13
Singapore	-0.001285(7)		2	12
Thailand	-0.000228(11)	0.000458(5)	9	15
United Kingdom	-0.000210(6)		2	10
USA	-0.000354(8)		5	11
Average	-0.000569583		5.08	12.17

3.3.1.2 Impact of the Interest Rate Shock on Investment

This section discusses the impacts of a monetary policy shock represented by an increase in the interest rate on the level of investment in the civil-law and common-law countries. The impacts of the monetary policy shock on investment were investigated by using impulse response functions generated from the five variables first differences VAR model. In this section, however, output has been replaced by investment. Specifically, this section investigates whether there is a difference in the effectiveness of monetary policy in affecting the level of investment between the civil-law and common-law countries. Figure 3.3 presents the impulse response functions of investment to an increase in interest rate for civil-law countries, whereas the similar impulse response functions for common-law countries are presented in Figure 3.4. As in the case of output, the effectiveness of monetary policy between these two groups of countries will be determined by comparing the maximum negative impacts of interest rate shock on investment, the speed for the effects to take place, and the period for the effects to disappear.

Figure 3.3: Responses of Investment (*inv*) to the Positive Shock in the Interest Rate (*r*) in Civil-Law Countries: The First Differences VAR Approach




Colombia
France
Indonesia
Italy
Mexico (lag=6)
Netherlands

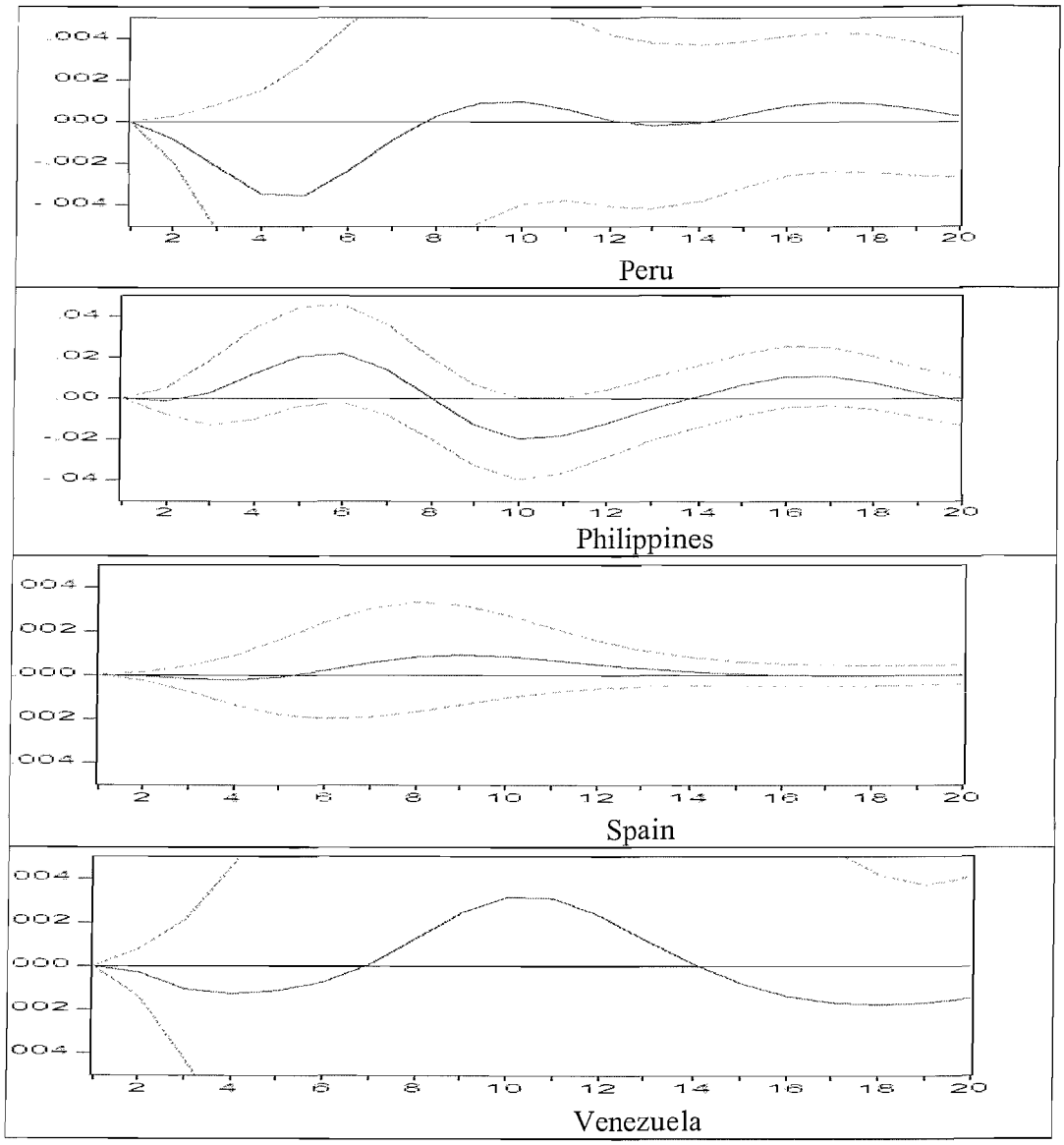
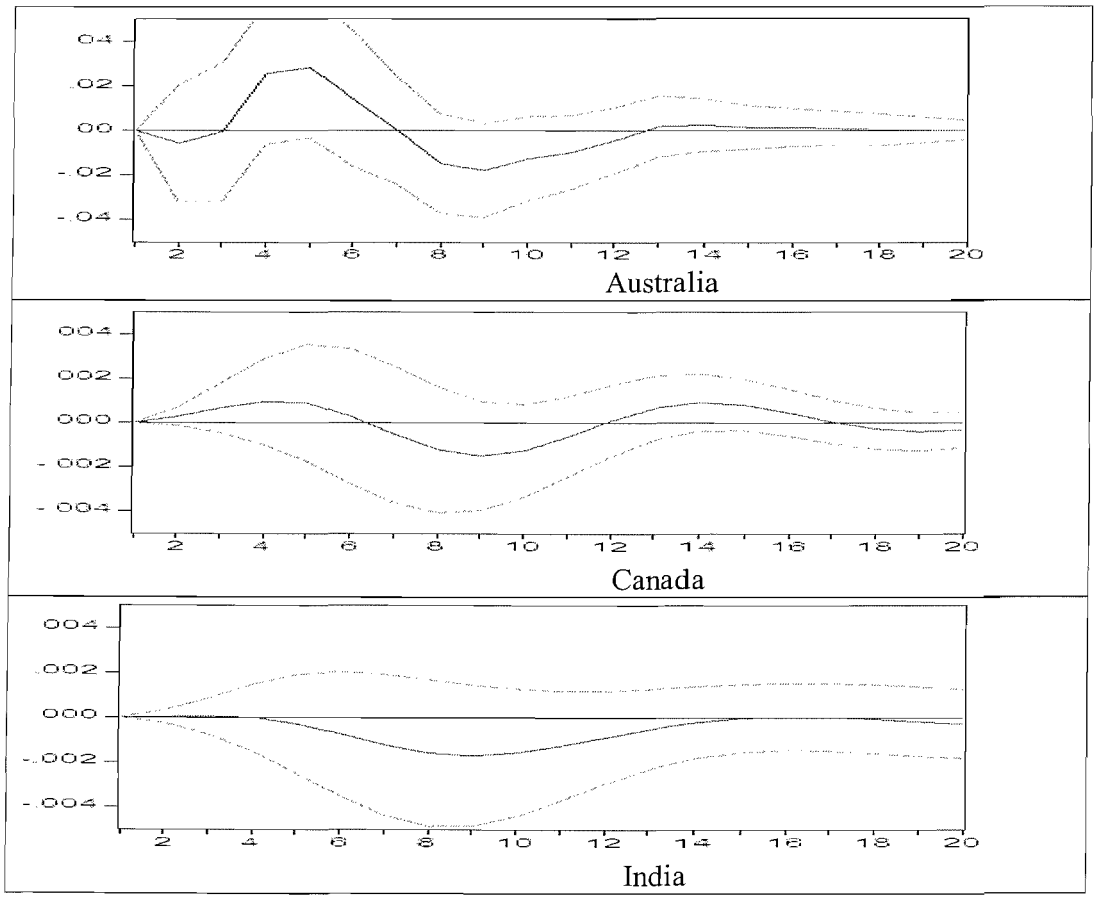
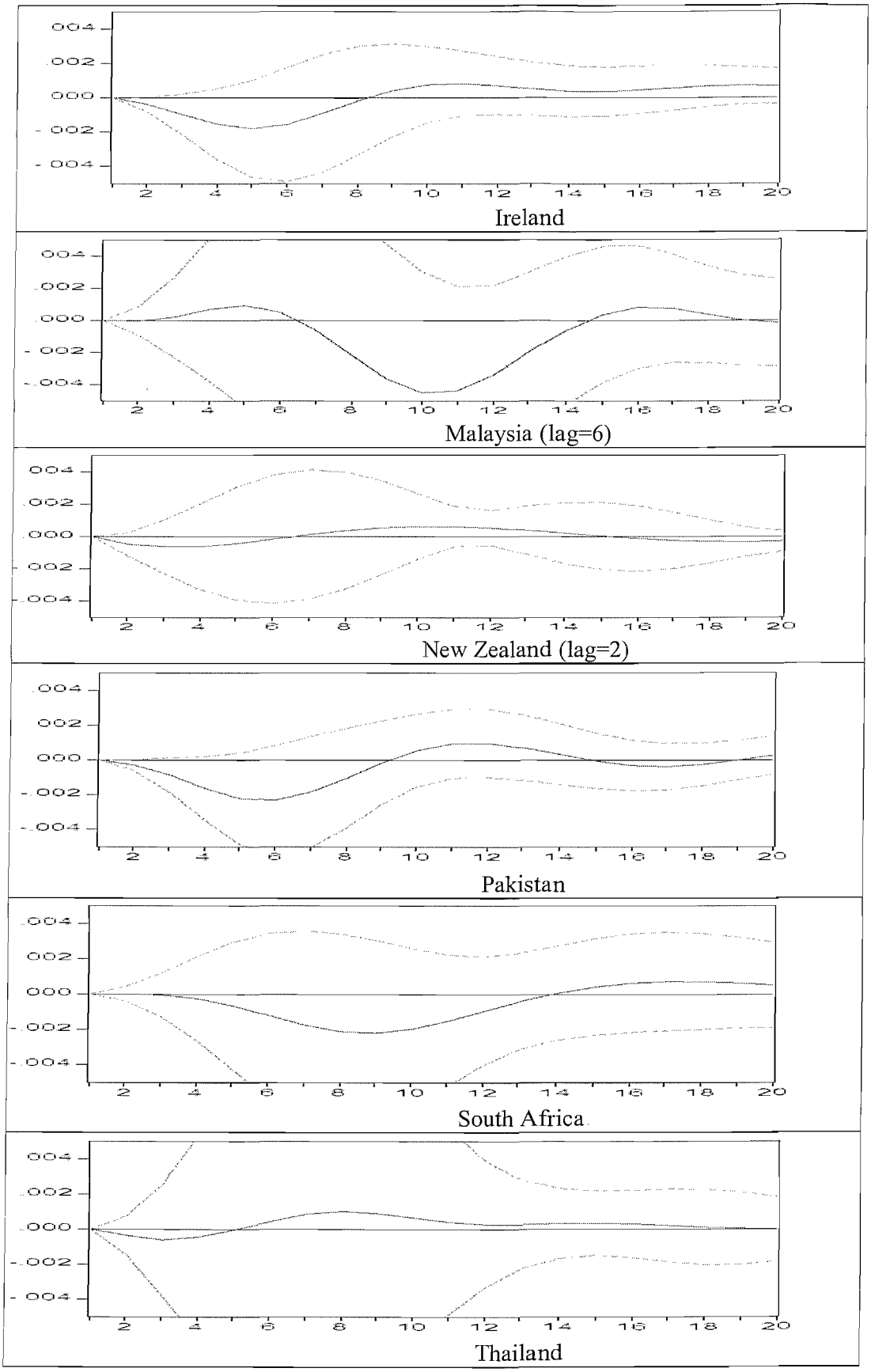


Figure 3.3 shows that, as expected, an increase in the interest rate has negative impacts on investment. In the most civil-law countries being studied, a negative impact on investment due to an increase in the interest rate can be observed with a 2 quarter lag except in France, Mexico and the Philippines. In these 3 countries, the initial impact of interest rate increase is a temporary increase in investment, so the negative impact can only be observed after quarter 8. The largest temporary positive impact can be found in case of the Philippines where the impulse response function initially increases to the maximum level (0.021799) at quarter 6 before it decreases and turns negative at quarter 9. In France and Mexico, although the temporary positive impact on investment is relatively small, these impacts have deferred the

negative impacts on investment to quarter 7 and quarter 6, respectively. In terms of magnitude, Figure 3.3 shows that the value of maximum negative impacts of investment in civil-law countries ranges from -0.000225 to -0.019701. The largest impact can be found in the case of the Philippines and the smallest is in Spain. Besides the Philippines, the large negative impact of the interest rate shock on investment can also be observed in Argentina (-0.0120247) and Chile (-0.013684). Figure 3.3 also shows that the time taken for the negative impacts on investment to disappear or the impulse response functions to reach the base line after experiencing a negative shock ranges from 6 to 16 quarters. In 5 out of 12 countries, the impact will only die out after quarter 10.

Figure 3.4: Responses of Investment (*inv*) to the Positive Shock in the Interest Rate (*r*) in Common-Law Countries: The First Differences VAR Approach

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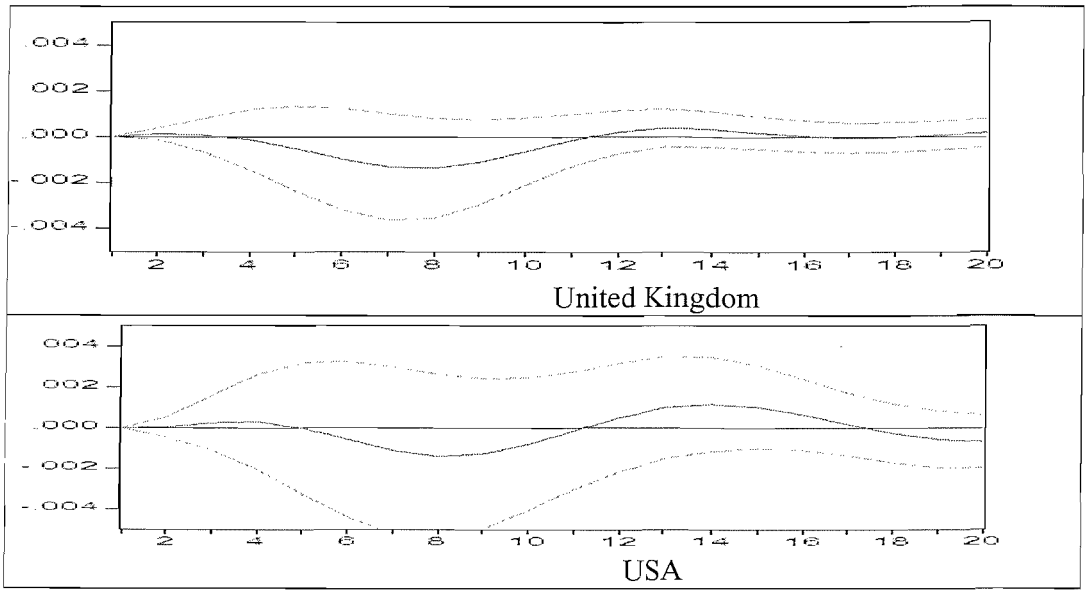
Ireland
Malaysia (lag=6)
New Zealand (lag=2)
Pakistan
South Africa
Thailand



The responses of investment to the one standard deviation innovation in interest rate in common-law countries are presented in Figure 3.4. Figure 3.4 shows that the immediate negative impacts on investment can only be observed in case of India, Ireland, New Zealand, Pakistan, South Africa, Thailand, and United Kingdom. However, as expected, in these countries the interest rate affects investment with lags of 2 to 4 quarters. In other countries (Australia, Canada, Malaysia, Singapore, and USA), this study finds that the initial impacts of an increase in the interest rate on investment are positive. These positive impacts, however, quickly disappeared and turn negative after quarter 3 to quarter 5. Meanwhile, the values of the maximum negative impacts on investment for common-law countries range from -0.000607 to -0.017935. The smallest impact is in the case of Thailand and the largest impact can be found in the case of Australia. These negative impacts disappeared in quarter 6 in the case of Thailand, but in India it takes longer to die out (16 quarters). In most of the cases (8 out of 12 countries being studied) the impulse response functions return to the base line after quarter 10.

By closely examining the graphs in Figure 3.3 and Figure 3.4, this study finds that, in general, the interest rate shock has larger impacts on investment in the civil-law countries compared with the common-law countries. In civil-law countries, 3

(Argentina, Chile and Philippines) out of 12 countries have a maximum negative impact of investment of more than -0.01. In contrast, for the common-law countries, this is only happened in the case of Australia. Table 3.2 shows that the mean of the maximum negative impact on investment in civil-law countries (-0.005329) is higher than the mean value for the common-law countries (-0.003500). This finding indicates that the interest rate generally has greater impact on investment in civil-law countries compared with common-law countries. Comparing the graphs in Figure 3.3 and Figure 3.4 also shows that investment in the civil-law countries is responds more quickly to the shock in interest rate compared with common-law countries. From Figure 3.3, this paper finds that in 8 civil-law countries, the negative impacts on investment take place after quarter 2, while in common-law tradition this only occurs in 4 countries (Figure 3.4). In other common-law countries, the negative impact on investment takes a longer time to materialise. In addition, in civil-law countries, only in 3 cases is the initial impact on investment positive, compared with 5 cases in the common-law countries.

From Table 3.2, we find that mean time for the negative impacts on investment to appear in civil-law countries is 3.42 quarters which is lower than mean time for common-law countries (4.42 quarters). Comparing the time taken for the negative impact on investment to disappear or the impulse response functions reach the base line after a negative shock, however, give a contradictory result. This study finds that the negative impacts on investment in common-law countries take slightly a longer time to disappear compared with the civil-law countries. Table 3.2 shows that the average period for the negative impacts to disappear in the civil-law countries is 10.67 quarters compared with 11.5 quarters in common-law countries. All these findings suggest that the effect of monetary policy on investment in civil-law countries is greater and more responsive than in common-law countries. However, the impact of monetary policy on investment in common-law countries is slightly longer lasting than in civil-law countries. In general, the results that were obtained in this section are consistent with our earlier finding regarding the impact of monetary policy on output in Section 3.3.1.1.

Table 3.2: Summary Statistics for Impulse Response Functions of Investment to the Positive Shock in the Interest Rate: The First Differences VAR Approach

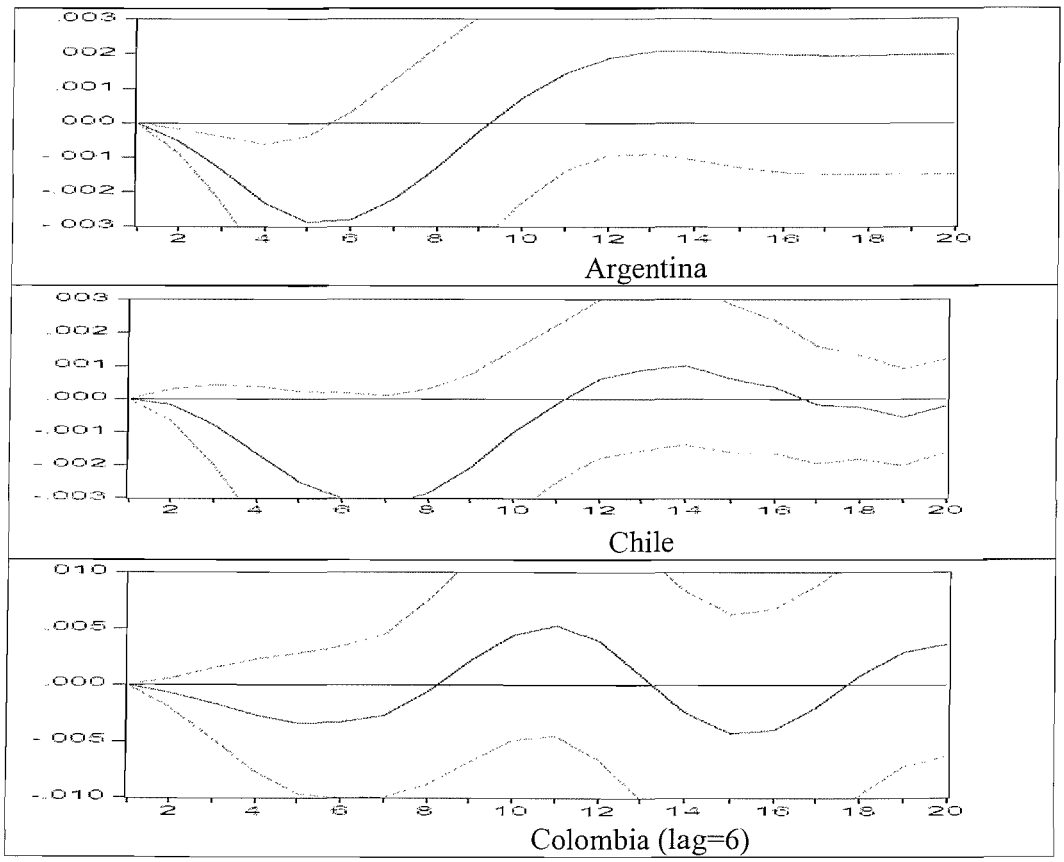
Responses of investment (*inv*) to interest rate shock				
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.010247(6)		2	10
Chile	-0.013684(6)		2	10
Colombia	-0.007120(6)		2	8
France	-0.000477(9)	0.000381(4)	7	12
Indonesia	-0.000813(8)		2	16
Italy	-0.002903(6)		2	10
Mexico	-0.002529(8)	0.000580(3)	6	11
Netherlands	-0.001461(9)		3	16
Peru	-0.003530(5)		2	8
Philippines	-0.019701(10)	0.021799(6)	9	14
Spain	-0.000225(4)		2	6
Venezuela	-0.001264(4)		2	7
Average	-0.0053295		3.42	10.67
B. Common-law countries				
Australia	-0.017935(9)	0.028521(5)	8	13
Canada	-0.001503(9)	0.000952(4)	7	12
India	-0.001710(9)		4	16
Ireland	-0.001816(5)		2	9
Malaysia	-0.004496(10)	0.000939(5)	7	15
New Zealand	-0.000622(3)		2	7
Pakistan	-0.002320(6)		2	10
South Africa	-0.002115(8)		3	14
Singapore	-0.006225(9)	0.012715(3)	7	12
Thailand	-0.000607(3)		2	6
United Kingdom	-0.001374(8)		4	12
USA	-0.001279(9)	0.000303(4)	5	12
Average	-0.003500167		4.42	11.50

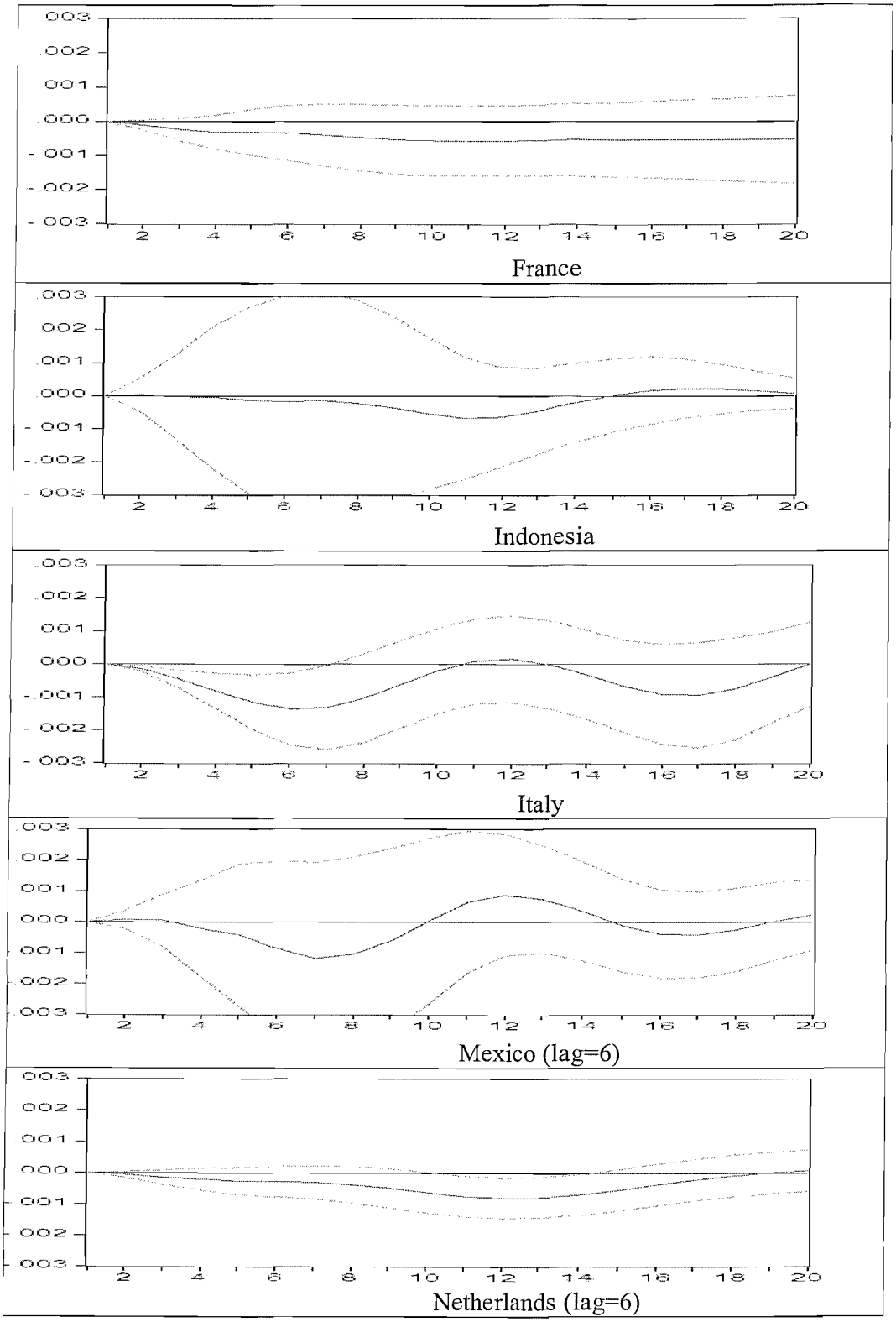
3.3.1.3 Impact of Interest Rate on Consumption

In this section, the results from impulse responses analysis of the impact of interest rate innovation on consumption will be discussed. The impulse response functions in this section were generated by using the first difference five-variable VAR model consists of consumption, price, interest rate, domestic credit, and the exchange rate.

The innovation in this analysis is an increase of one standard deviation in interest rate, and the response is the change in consumption. The purpose of this analysis is to examine whether there is a difference in the effectiveness of monetary policy in affecting consumption in civil-law and common-law countries. The results from this analysis are presented in Figure 3.5 and Figure 3.6. Figure 3.5 shows the impulse responses of consumption to the positive innovation in interest rate for civil-law countries, while Figure 3.6 presents the impulse response functions for common-law countries. All graphs except for Colombia used the same scale to facilitate comparison between them.

Figure 3.5: Responses of Consumption (*con*) to the Positive Shock in the Interest Rate (*r*) in Civil-Law Countries: The First Differences VAR Approach

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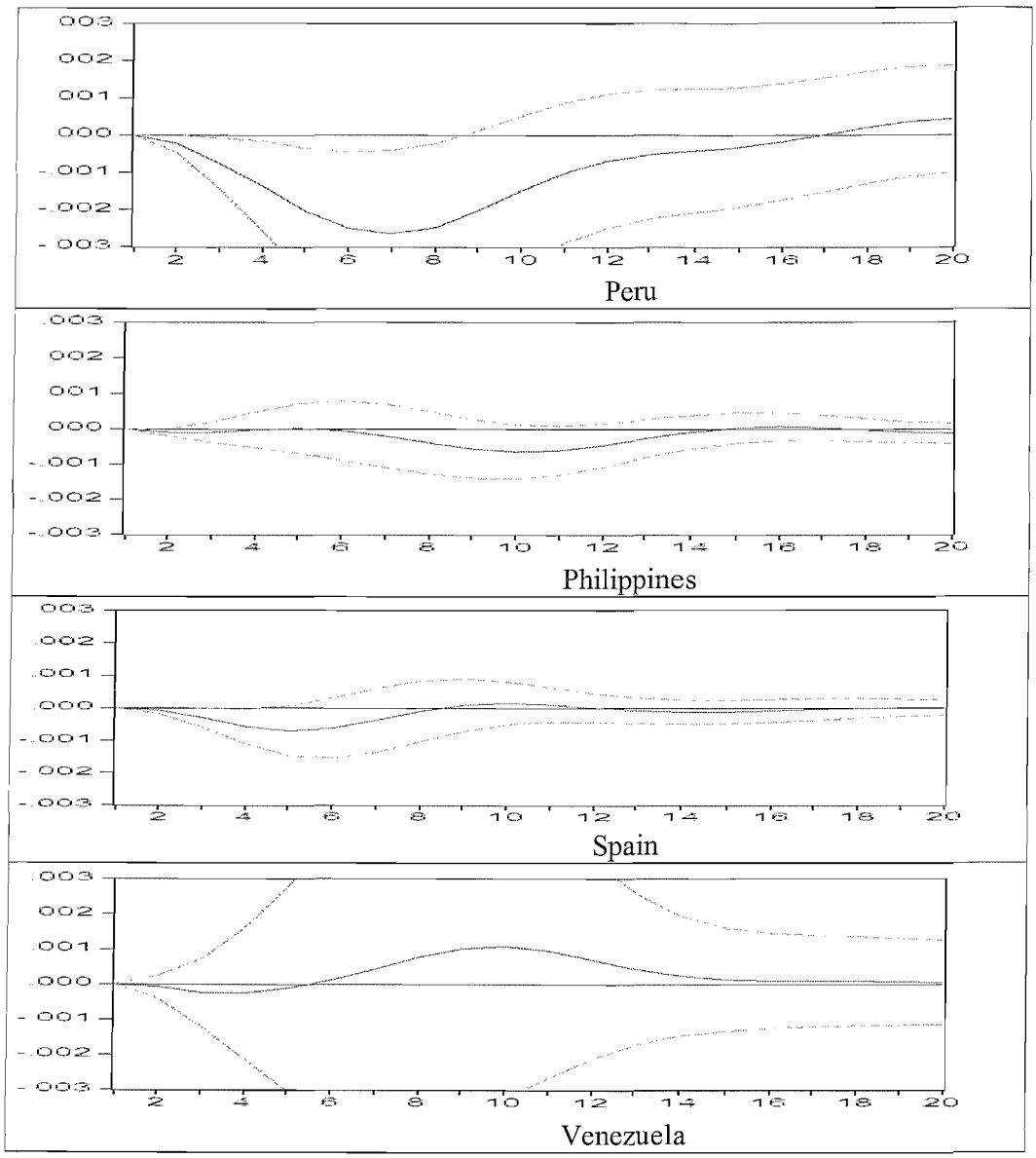
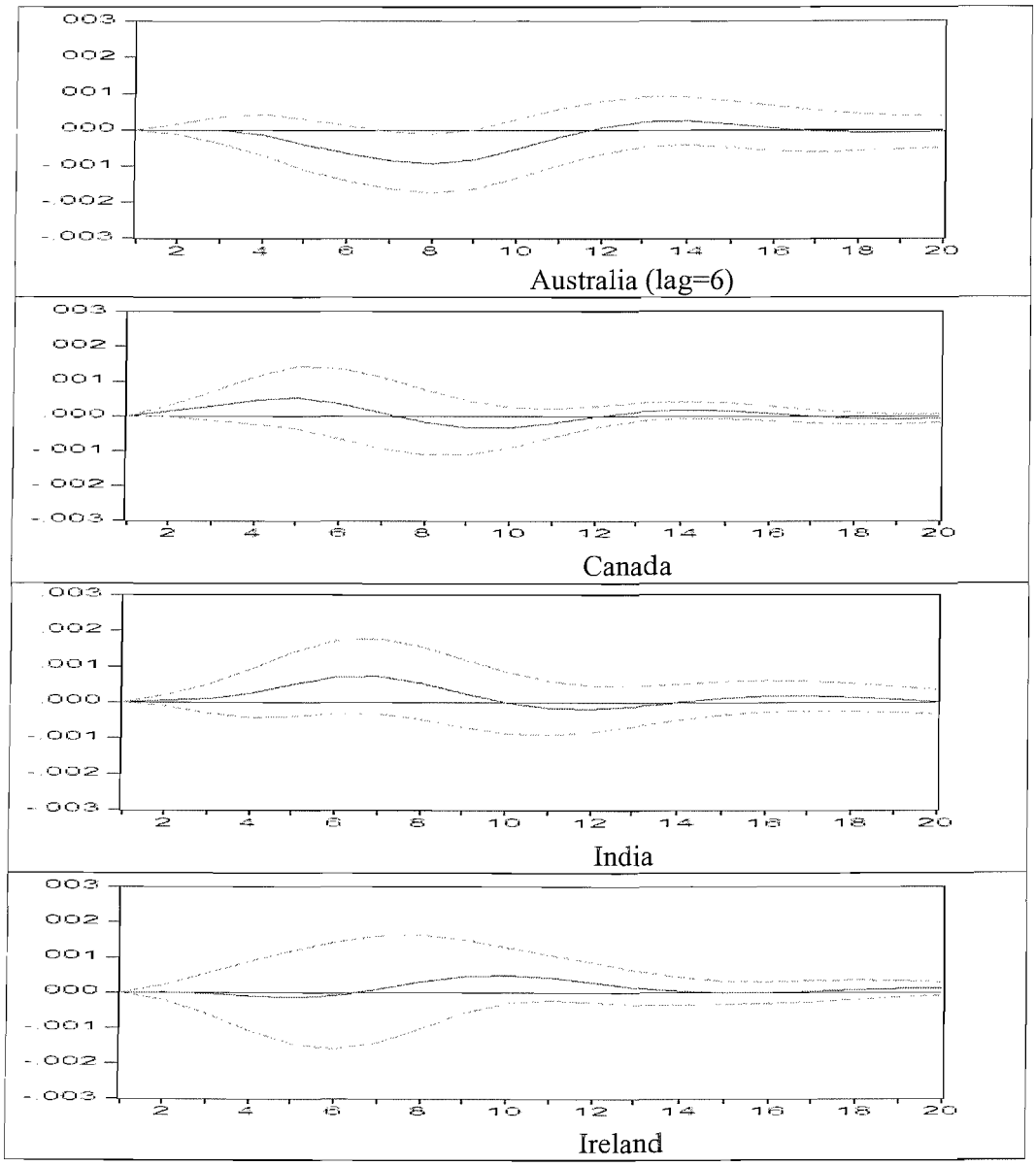
Indonesia
Italy
Mexico (lag=6)
Netherlands (lag=6)

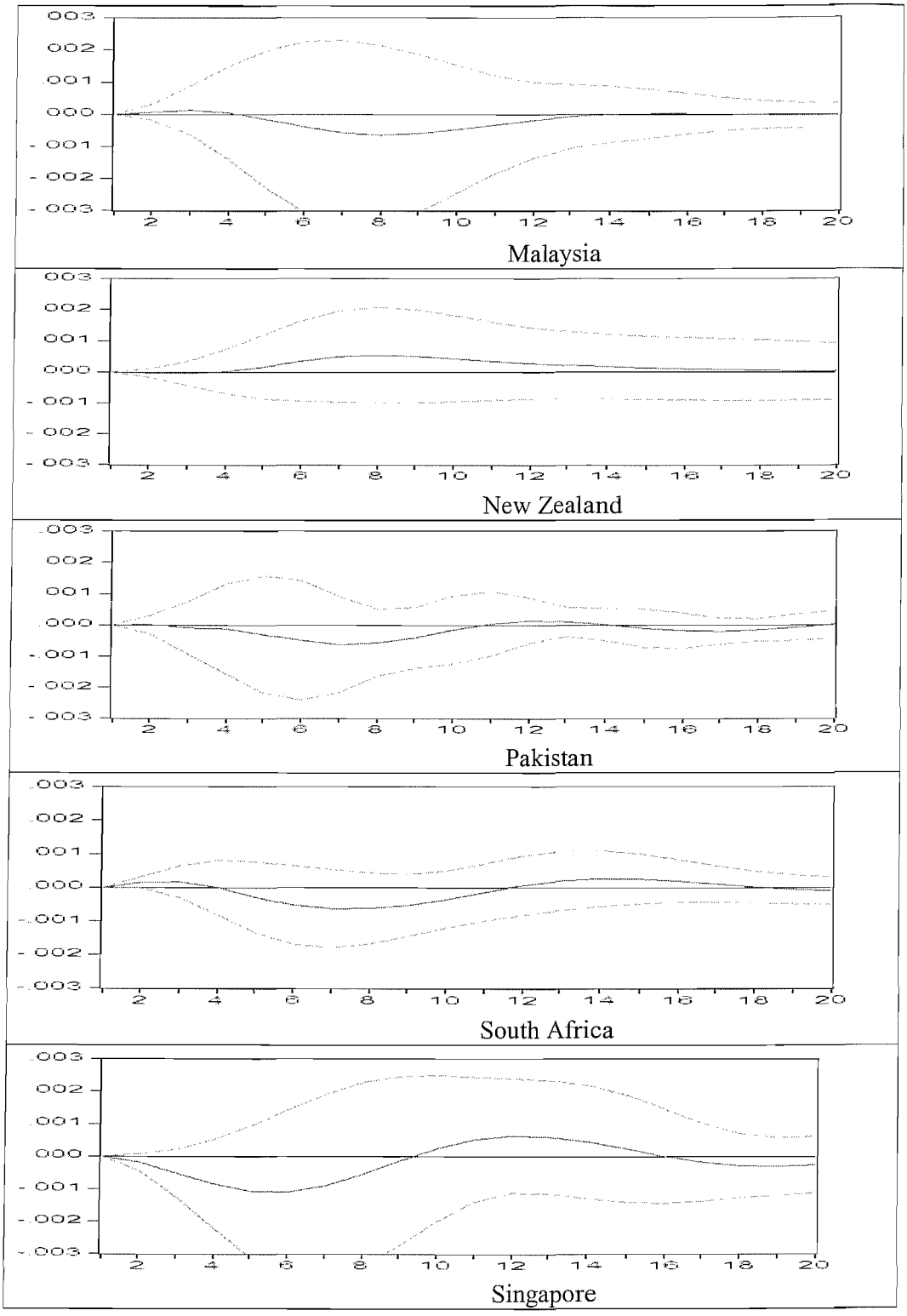


From Figure 3.5, we find that, in the civil-law countries, the interest rate shocks have significantly large impacts on consumption in Argentina, Chile, Colombia and Peru. In contrast, the impacts are considerably smaller in the cases of France, Indonesia, the Netherlands, the Philippines, Spain, and Venezuela. Detailed investigation of the values of the maximum negative impacts on consumption reveal that the values range from -0.000248 to -0.003414. Comparing the maximum negative impacts on consumption among the civil-law countries being studied shows that the highest impact is in the case of Colombia and the smallest impact is in Venezuela. Meanwhile, Figure 3.5 shows that in all civil-law countries being studied, an increase

in interest rate affects consumption with a 2 quarter lag except in Indonesia and Mexico where the negative impacts on consumption can only be observed after quarter 3 and quarter 4, respectively. The time taken for the negative impacts to disappear or the impulse response functions to reach the base line again after experiencing the negative impacts vary from 6 to 19 quarters. In case of France the negative impact on consumption takes more than 20 quarters to disappear.

Figure 3.6: Responses of Consumption (*con*) to the Positive Shock in the Interest Rate (*r*) in Common-Law Countries: The First Differences VAR Approach

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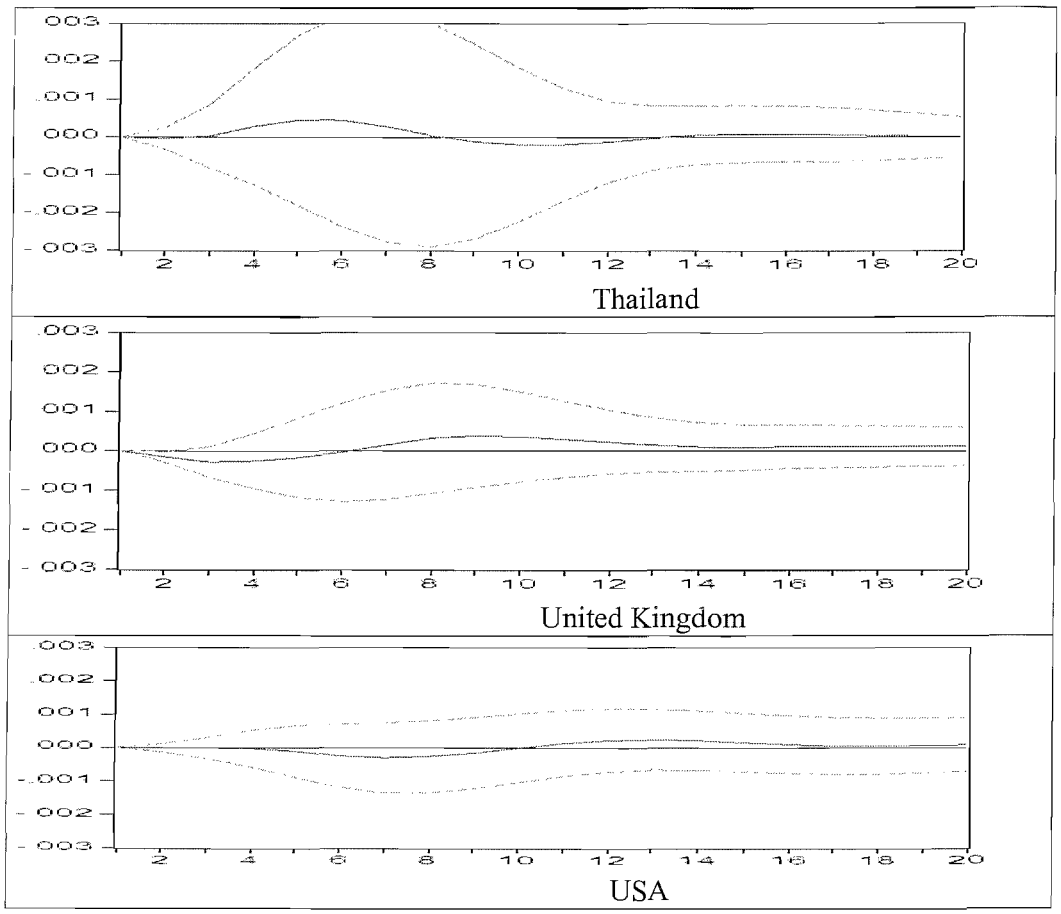
2 4 6 8 10 12 14 16 18 20
Malaysia
New Zealand
Pakistan
South Africa
Singapore



The results of impulse response functions of interest rate shock on consumption in common-law countries are presented in Figure 3.6. Unlike in the case of civil-law countries, the graphs in Figure 3.6 show that, in common-law countries, only in four cases (New Zealand, Singapore, United Kingdom, and USA) can the negative impacts on consumption be observed after quarter 2. In other countries, the negative impact on consumption takes a longer period to materialise. In India and Thailand, for example, the negative impacts on consumption only appear after quarters 10 and 9, respectively. In 5 cases (Canada, India, Malaysia, South Africa, and Thailand), we find that the initial impact of the shock in interest rate on consumption is positive. These temporary positive impacts only disappear after quarter 5 in Malaysia and South Africa, and after quarter 8 in case of Canada, India, and Thailand. This study also finds that the negative impacts on consumption are short-lived in Ireland, New Zealand, and United Kingdom. Figure 3.6 reveals that the negative impacts on consumption in these countries disappear after quarter 4 in case of New Zealand, and

quarter 7 for Ireland and United Kingdom. In other countries, the negative impact on consumption dies out before quarter 14. With regard to the size of negative impacts on consumption, this study finds that the values of maximum negative impacts on consumption in common-law countries range from -0.0000473 to -0.001102. The highest negative impact can be found in the case of Singapore, while the smallest is in New Zealand.

The results of impulse response functions in Figure 3.5 and Figure 3.6 clearly show that, in general, the effects of the interest rate shock on consumption are higher in civil-law countries than in common-law countries. To support this, the mean values of the maximum negative impacts of the interest rate shock on consumption for both groups of countries being studied were calculated. Table 3.3 shows that the average value of the maximum negative impacts on consumption in civil-law countries is substantially higher than common-law countries. This finding indicates that monetary policy generally has more impact on consumption in civil-law countries than in common-law countries. Comparing graphs in Figure 3.5 and Figure 3.6 also reveals that, in general, consumption in civil-law countries respond more quickly to the shock in the interest rate compared with common-law countries. The impact of the interest rate on consumption in civil-law countries also takes a longer time to disappear than in common-law countries. All these findings suggest that monetary policy generally is more effective in affecting consumption in civil-law countries compared with common-law countries. This finding is consistent with the earlier findings concerning the effect of monetary policy on output as discussed in Section 3.3.1.1 and on investment in Section 3.3.1.2. Finally, this finding in line with the earlier expectation that monetary policy is more effective in civil-law countries than in common-law countries.

Table 3.3: Summary Statistics for Impulse Response Functions of Consumption to the Positive Shock in the Interest Rate: The First Differences VAR Approach

Responses of consumption (*con*) to interest rate shock				
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.002881(5)		2	10
Chile	-0.003228(7)		2	12
Colombia	-0.003414(5)		2	19
France	-0.000571(11)		2	>20
Indonesia	-0.000675(11)		3	15
Italy	-0.001365(6)		2	11
Mexico	-0.001182(7)		4	10
Netherlands	-0.000800(12)		2	19
Peru	-0.002650(7)		2	17
Philippines	-0.000645(10)		2	15
Spain	-0.000696(5)		2	9
Venezuela	-0.000248(4)		2	6
Average	-0.001529667		2.25	(1 cases > 20)
B. Common-law countries				
Australia	-0.000930(8)		3	12
Canada	-0.000332(9)	0.000532(5)	8	13
India	-0.000187(12)	0.000727(7)	10	14
Ireland	-0.000135(5)		3	7
Malaysia	-0.000645(8)	0.00038(3)	5	14
New Zealand	-0.0000473(3)		2	4
Pakistan	-0.000634(7)		3	11
South Africa	-0.000627(7)	0.000176(3)	5	12
Singapore	-0.001102(6)		2	10
Thailand	-0.000202(10)	0.000451(5)	9	14
United Kingdom	-0.000283(3)		2	7
USA	-0.000302(7)		2	11
Average	-0.000452192		4.50	10.75

3.3.2 Impulse Response: The VECM Approach

This section presents the results of impulse response functions that were obtained from the VECM approach. In this approach, first, the number of cointegration equations in the model was estimated by using the Johansen (1988) procedure. With the number of cointegration tests complete, the next step is to estimate the VECM, and based on these estimations the impulse responses of the interest rate shock on

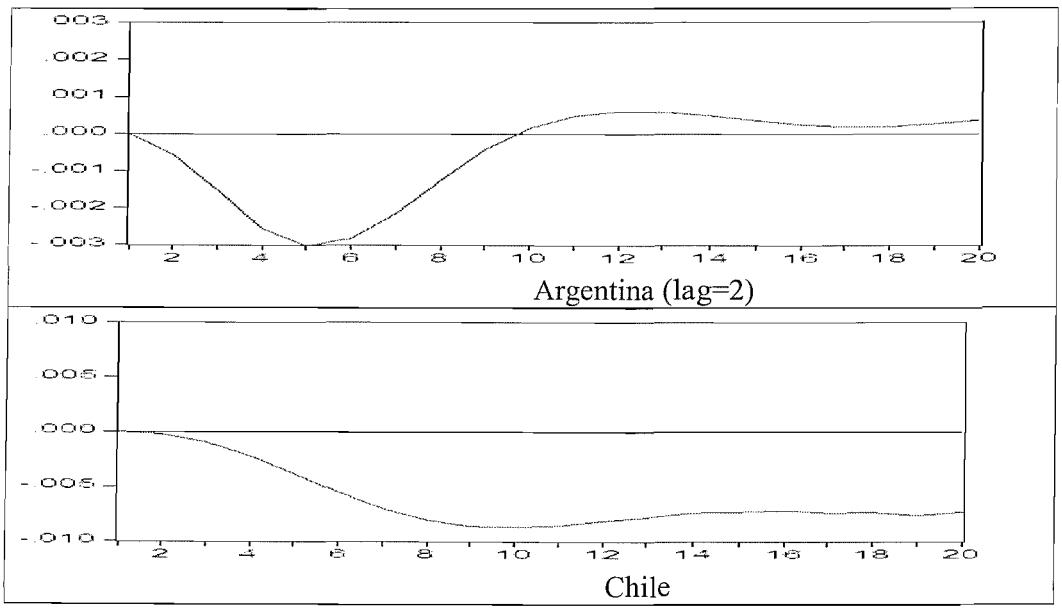
output, investment or consumption are generated. As in the case of the first differences VAR, the size of the shock in this approach is an increase of one standard deviation in the interest rate. The impacts on output, investment and consumption will be investigated over a period of 20 quarters. In analysing the result from impulse response analysis, the focus is, first, on the difference between the results that were obtained from VECM approach and the first differences VAR approach. Second, the characteristics of the impulse response functions within the group of countries will be studied. And, finally, the difference in the impacts of the interest rate shock on output, investment and consumption between these two groups of countries will be examined. As in the case of the VAR approach, the relative effectiveness of monetary policy between these two groups of countries will be determined by comparing the size and the speed of the adjustment. Specifically, with regard to the size, comparison will be carried out based on the maximum negative impacts of the interest rate shock on output, investment and consumption. This is in line with the theoretical argument that the expected impact of an increase in the interest rate on these three variables is negative. Furthermore, the speed of adjustments will be evaluated in terms of how fast a positive shock in interest rate affects output, investment or consumption, and the time taken for the negative impact on these variables to disappear.

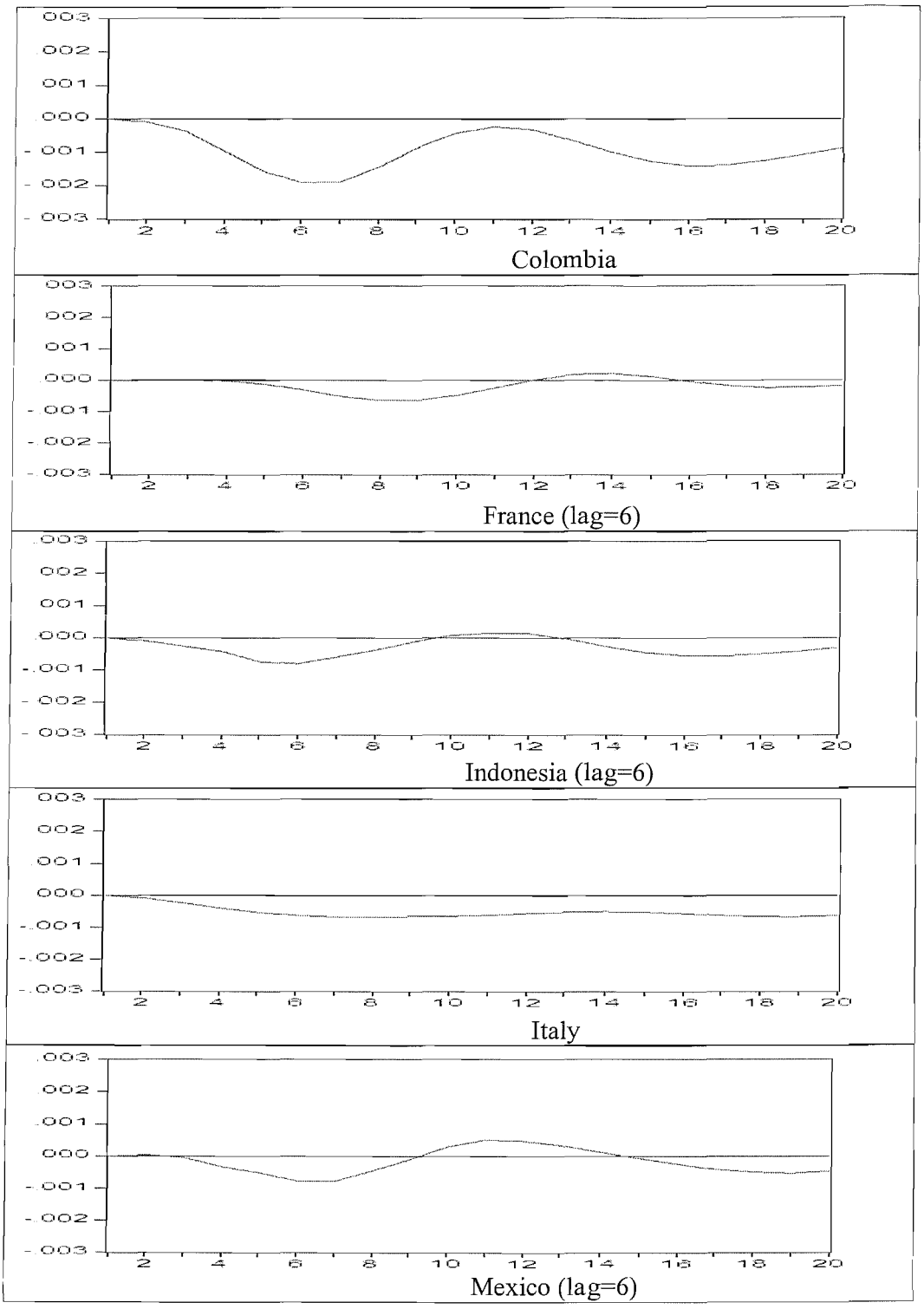
3.3.2.1 The Impact of the Interest Rate Shock on Output

The solid line in Figure 3.7 presents the impulse response functions of output for civil-law countries that were obtained from the VECM approach. Figure 3.8 presents similar impulse response functions for common-law countries. Unlike in the VAR approach, graphs in Figure 3.7 and Figure 3.8 do not show confidence intervals. From Figure 3.7 and Figure 3.8, in general, it can be seen that the impulse response functions of output to the interest rate shock that were generated by the VECM approach are consistent with the results that were produced by the first differences VAR approach. However, the time taken for the impacts to disappear or for the impulse response functions to return to the base line after experiencing a negative shock generated through the VECM approach are relatively longer than that obtained from the first differences VAR approach. Figure 3.7 shows, in most of the civil-law countries being studied, interest rate changes affect output with 2 quarter lags, except

in the case of France, Mexico and the Netherlands. In these countries, the impacts on output can only be observed after the third quarter. Figure 3.7 also shows that, in 7 out of 12 countries, the negative impacts still can be observed even after quarter 20. Only in the case of Spain do the negative impacts disappear in less than 10 quarters. Consistent with the first differences VAR approach, the results show that the negative impact on output is relatively higher in Argentina, Chile, Peru, and Venezuela. Meanwhile, the impacts are relatively smaller in the case of the Netherlands, the Philippines, and Spain. A significant difference, however, can be observed in the case of Colombia. In Colombia, the maximum negative impact that was generated from the VECM approach is higher than the result from the first difference VAR approach. By inspecting Figure 3.7 closely, it can be seen that the values of the maximum negative impacts on output in civil-law countries ranged from -0.000205 to -0.004131.

Figure 3.7: Responses of Output (y) to the Positive Shock in the Interest Rate (r) in Civil-Law Countries: The VECM Approach

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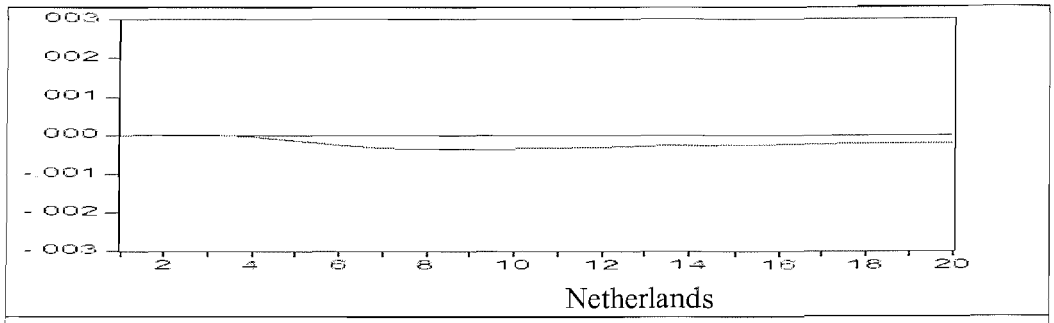
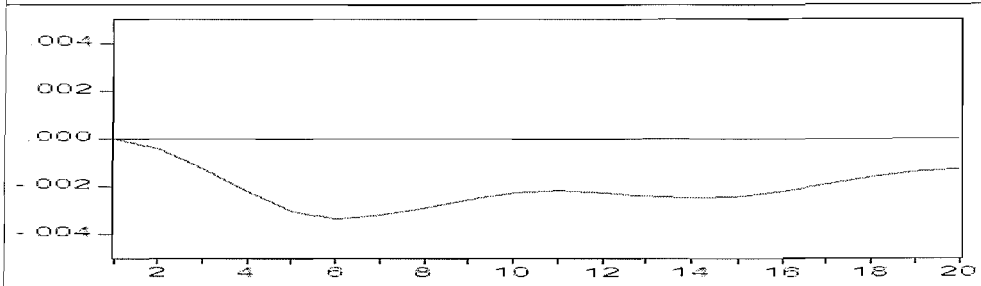
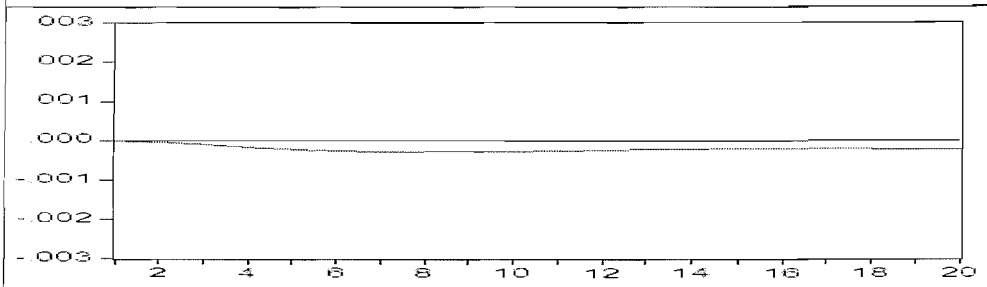
Colombia
France (lag=6)
Indonesia (lag=6)
Italy
Mexico (lag=6)



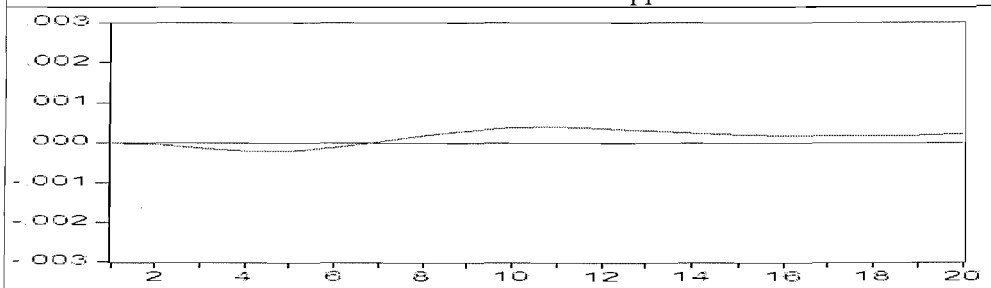
Netherlands



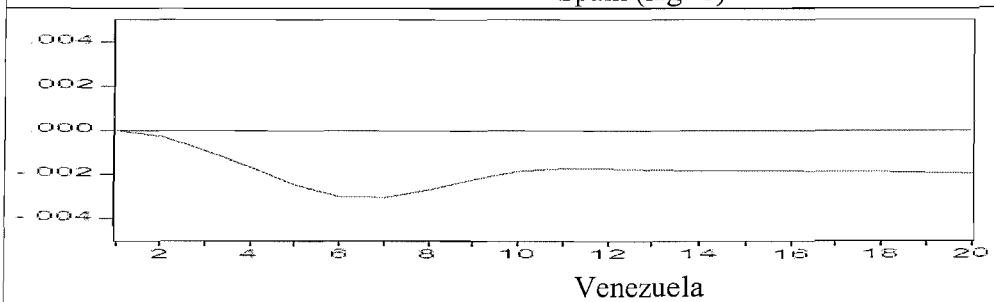
Peru



Philippines



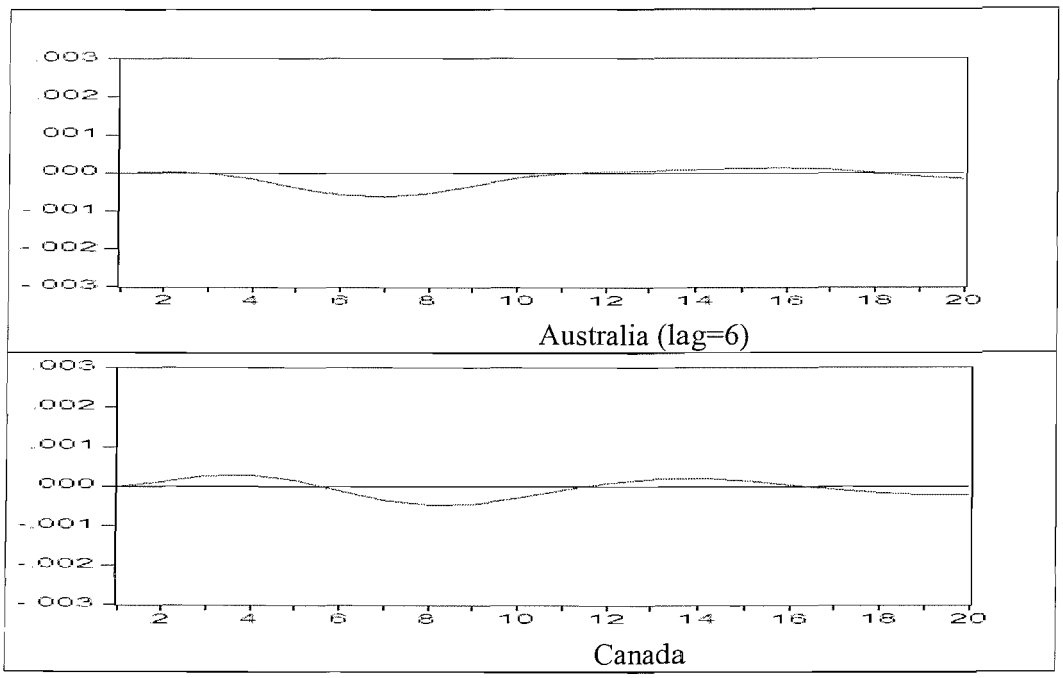
Spain (lag=6)

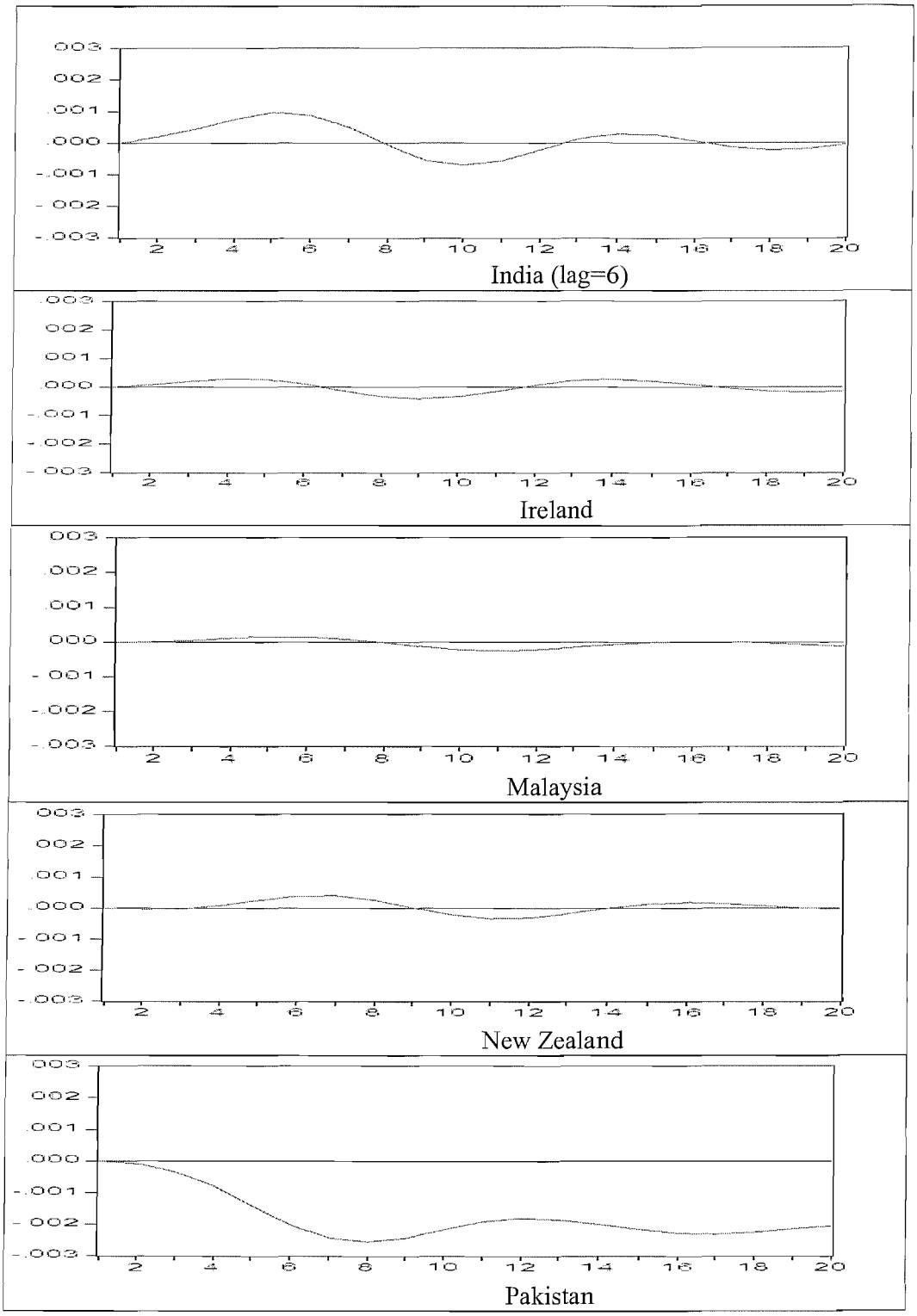


Venezuela

Meanwhile, inspecting each graph in Figure 3.8 closely shows that, in 6 out of 12 common-law countries being studied, the initial impact of the positive shock in interest rate on output is positive. The countries where the initial impact is positive were Canada, India, Ireland, Malaysia, New Zealand and South Africa. In other countries, the impact of a positive shock in the interest rate is a decrease in output that appeared starting from quarter 2 in case of Pakistan, Singapore and Thailand. However, in Australia, United Kingdom and USA, the negative impact only appears after quarter 3. In all common-law countries being studied, the negative impact on output takes at least 10 quarters to disappear, however, in Pakistan, Singapore and USA the impact still can be observed even after quarter 20. Figure 3.8 also shows that the values of maximum negative impacts on output in common-law countries ranged from -0.000105 to -0.003564. As in the case of the first differences VAR approach, the highest negative impact has been found in the case of Singapore. However, in contrast with the first differences VAR, the impulse response functions in Figure 3.8 show that the negative impacts are also relatively high in Pakistan and South Africa.

Figure 3.8: Responses of Output (y) to the Positive Shock in the Interest Rate (r) in Common-Law Countries: The VECM Approach




.003
.002
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-.001
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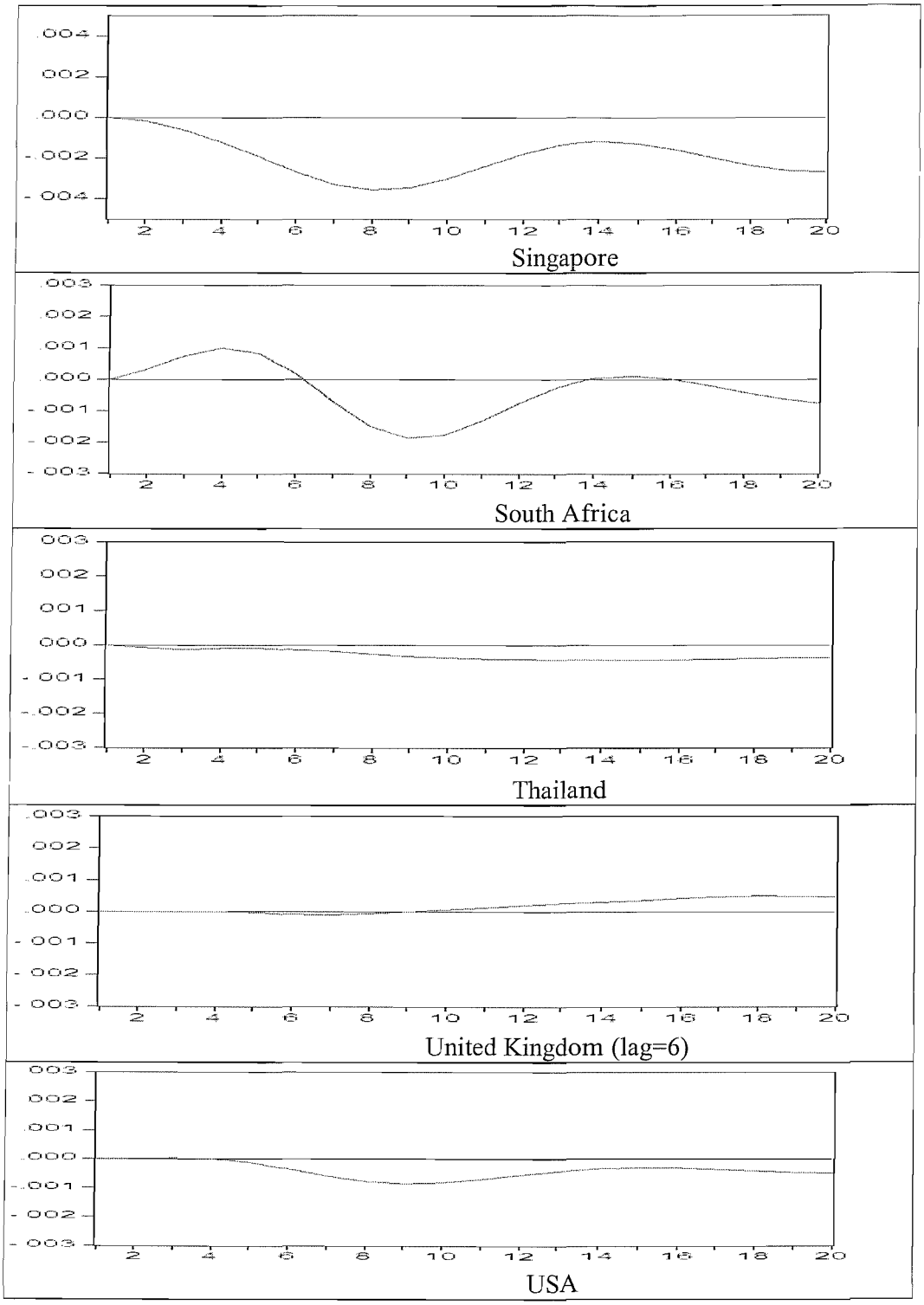
-.003
2
4
6
8
10
12
14
16
18
20
India (lag=6)
Ireland
Malaysia
New Zealand
Pakistan



A comparison of the impulse response functions in Figure 3.7 and Figure 3.8 clearly indicates that the impacts of the interest rate change on output are relatively stronger in civil-law countries than common-law countries. To support this finding, we have

calculated the mean of the maximum negative impacts for each group of countries being studied, and the results are presented in Table 3.4. From Table 3.4, the mean value of maximum negative impacts on output for civil-law countries is -0.001673 which is higher than the mean value for common-law countries (-0.000999). This finding indicates that, in general, the impact of interest rate on output is relatively stronger in civil-law countries compared with common-law countries. This finding is also consistent with the finding obtained from the first differences VAR approach. Figure 3.7 and Figure 3.8 also indicate that output in civil-law countries is responds more quickly to the change in interest rate compared with common-law countries. In most of the civil-law countries, the negative impacts on output can be observed in quarter 2, and these impacts will only disappeared after quarter 20.

Meanwhile, for common-law countries, we find that only in 3 cases, the negative impacts on output will survive after quarter 20. The finding may indicate that, in general, the impact of the interest rate on output in civil-law countries is more long-lasting than in common-law countries. Furthermore, in common-law tradition, only in 3 countries can the negative impacts on output be observed after quarter 2, while in 6 countries, the initial impact of interest rate increase is a temporary increase in output. In contrast, none of civil-law countries have shown a temporary positive impact on output. This finding may indicate that output in civil-law countries is more responsive to the change in interest rate compared with common-law countries. The findings on the magnitude of the impact of the interest rate shock on output, the time taken for the output to adjust to the change in the interest rate, and the time taken for the impacts on output to disappear, all suggest that monetary policy is more effective in affecting output in civil-law countries compared with common-law countries. This finding is consistent with the finding that obtained through the first differences VAR approach. This finding is also in line with the earlier expectation that monetary policy is more effective in civil-law countries than in the common-law countries.

Table 3.4: Summary Statistics for Impulse Response Functions of Output to the Positive Shock in the Interest Rate: The VECM Approach

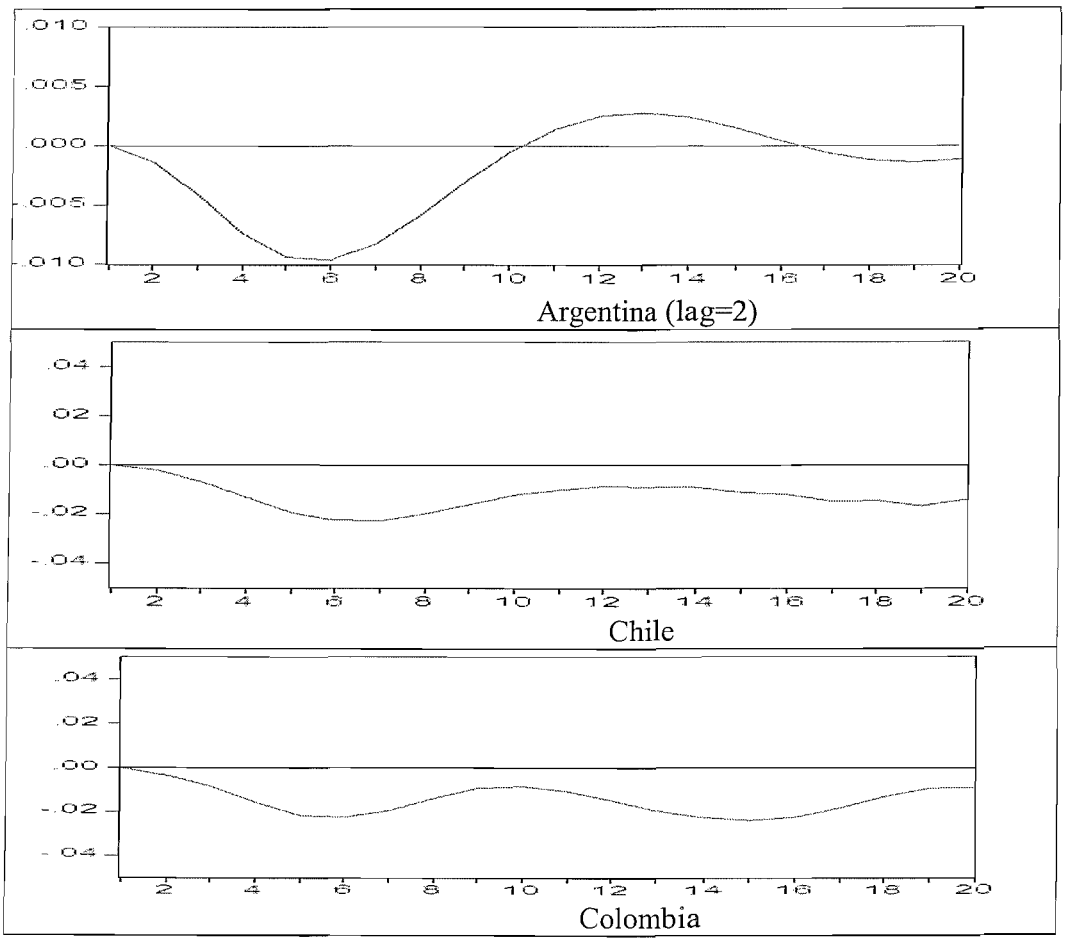
	Responses of output (y) to interest rate shock			
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.003025(5)		2	10
Chile	-0.004131(7)		2	>20
Colombia	-0.002247(7)		2	>20
France	-0.000643(8)		4	12
Indonesia	-0.000809(6)		2	10
Italy	-0.000674(7)		2	>20
Mexico	-0.000775(7)		3	10
Netherlands	-0.000355(8)		4	>20
Peru	-0.003364(6)		2	>20
Philippines	-0.000294(8)		2	>20
Spain	-0.000205(4)		2	7
Venezuela	-0.003043(7)		2	>20
Average	-0.00163042		2.41	(7 cases > 20)
B. Common-law countries				
Australia	-0.000432(7)		3	10
Canada	-0.000469(8)	0.000284(4)	6	12
India	-0.000699	0.000975(5)	8	13
Ireland	-0.000423(9)	0.000281(4)	7	12
Malaysia	-0.000256(11)	0.000151(5)	8	16
New Zealand	-0.000339(11)	0.000398(7)	10	15
Pakistan	-0.002555(8)		2	>20
South Africa	-0.001862(9)	0.000892(5)	7	14
Singapore	-0.003564(8)		2	>20
Thailand	-0.000428(14)		2	20
United Kingdom	-0.000105(7)		5	10
USA	-0.000854(9)		5	>20
Average	-0.000998833		5.42	(3 cases > 20)

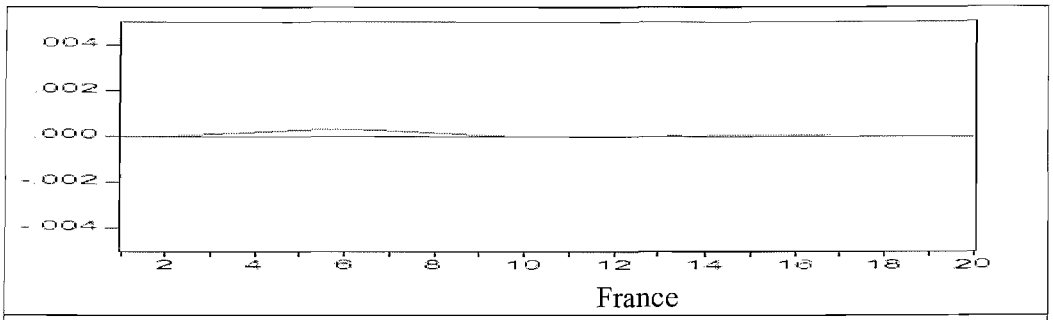
3.3.2.2 The Impact of Interest Rate Shock on Investment

This section discusses the results of impulse response functions of investment to the positive innovation in the interest rate in the two groups of countries being studied obtained from the VECM approach. The results are presented in Figure 3.9 and Figure 3.10. Figure 3.9 presents the impulse response functions of investment for

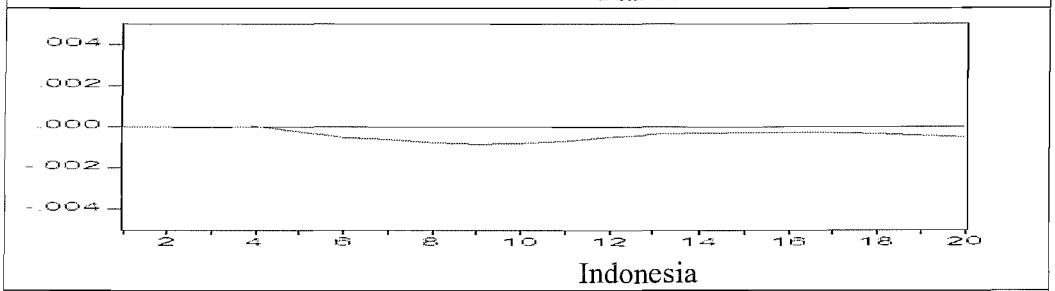
civil-law countries, while the similar impulse response functions for common-law countries are presented in Figure 3.10. Impulse response functions in Figure 3.9 show that in most of civil-law countries, the interest rate affects investment with a 2 quarter lag. However, in France, the negative impact on investment can only be observed after quarter 11 because the initial impact of interest rate shock on investment in France is positive. Meanwhile, in case of Mexico, the impulse response function shows that the impact of the interest rate shocks on investment is positive, and takes more than 20 quarters to disappear. Figure 3.9 also shows that, in most of the cases, the negative impacts of interest rate shock on investment in civil-law countries take more than 20 quarters to disappear. Only in case of Spain does the negative impact die out in less than 10 quarters.

Figure 3.9: Responses of Investment (*inv*) to the Positive Shock in the Interest Rate (*r*) in Civil-Law Countries: The VECM Approach

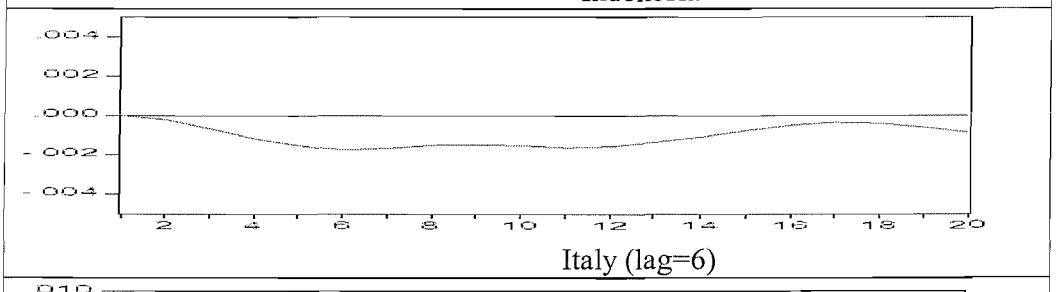




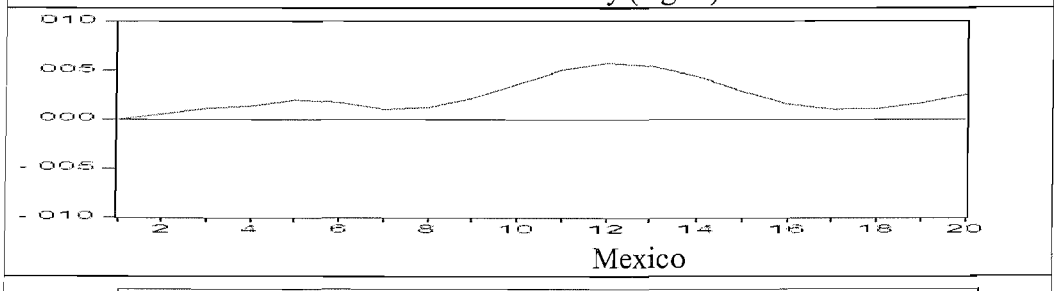
France



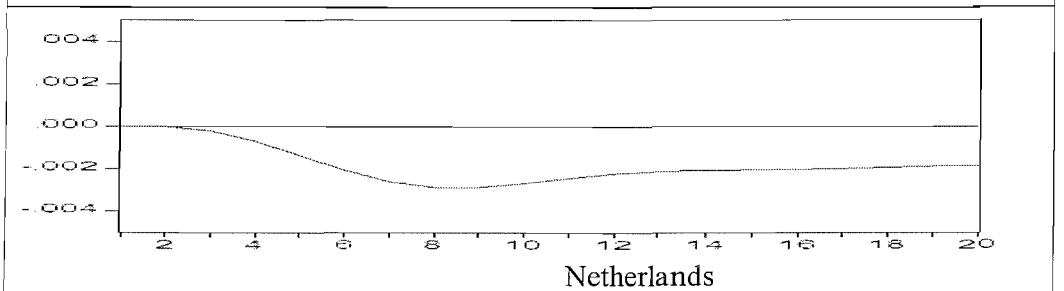
Indonesia



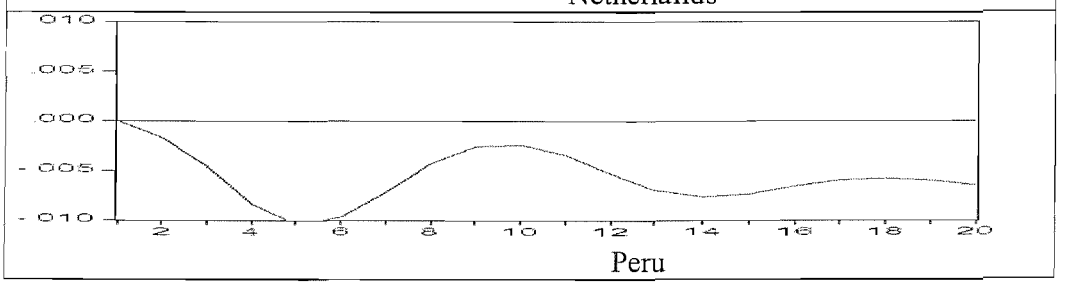
Italy (lag=6)



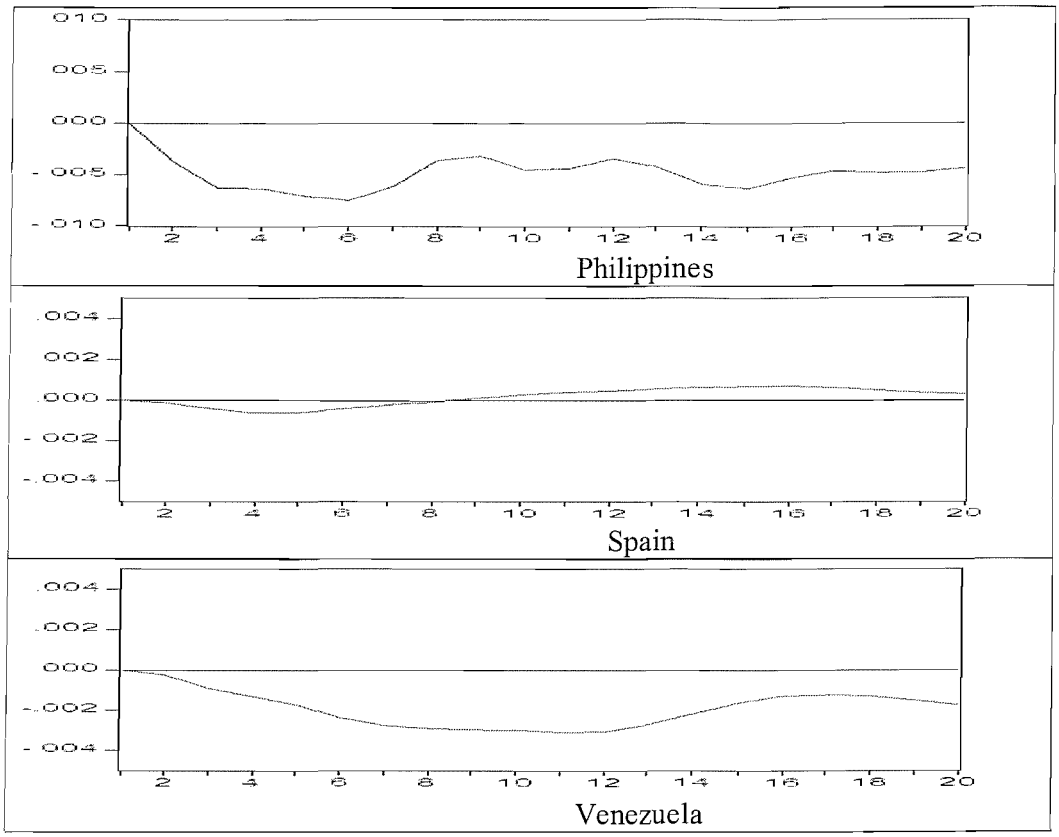
Mexico



Netherlands



Peru

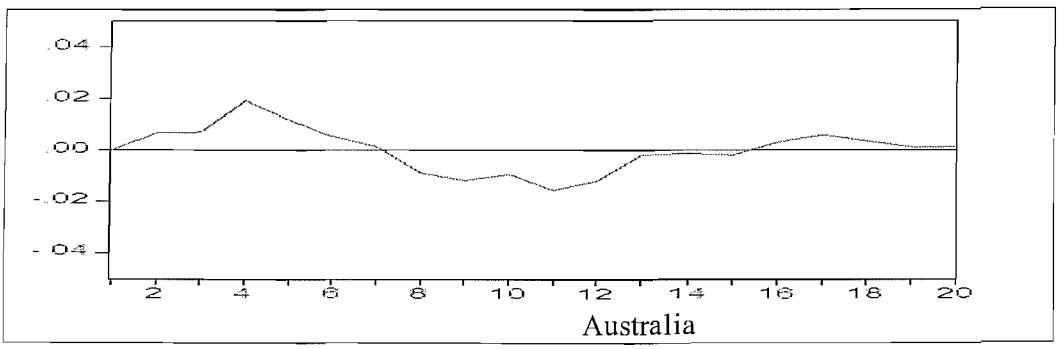


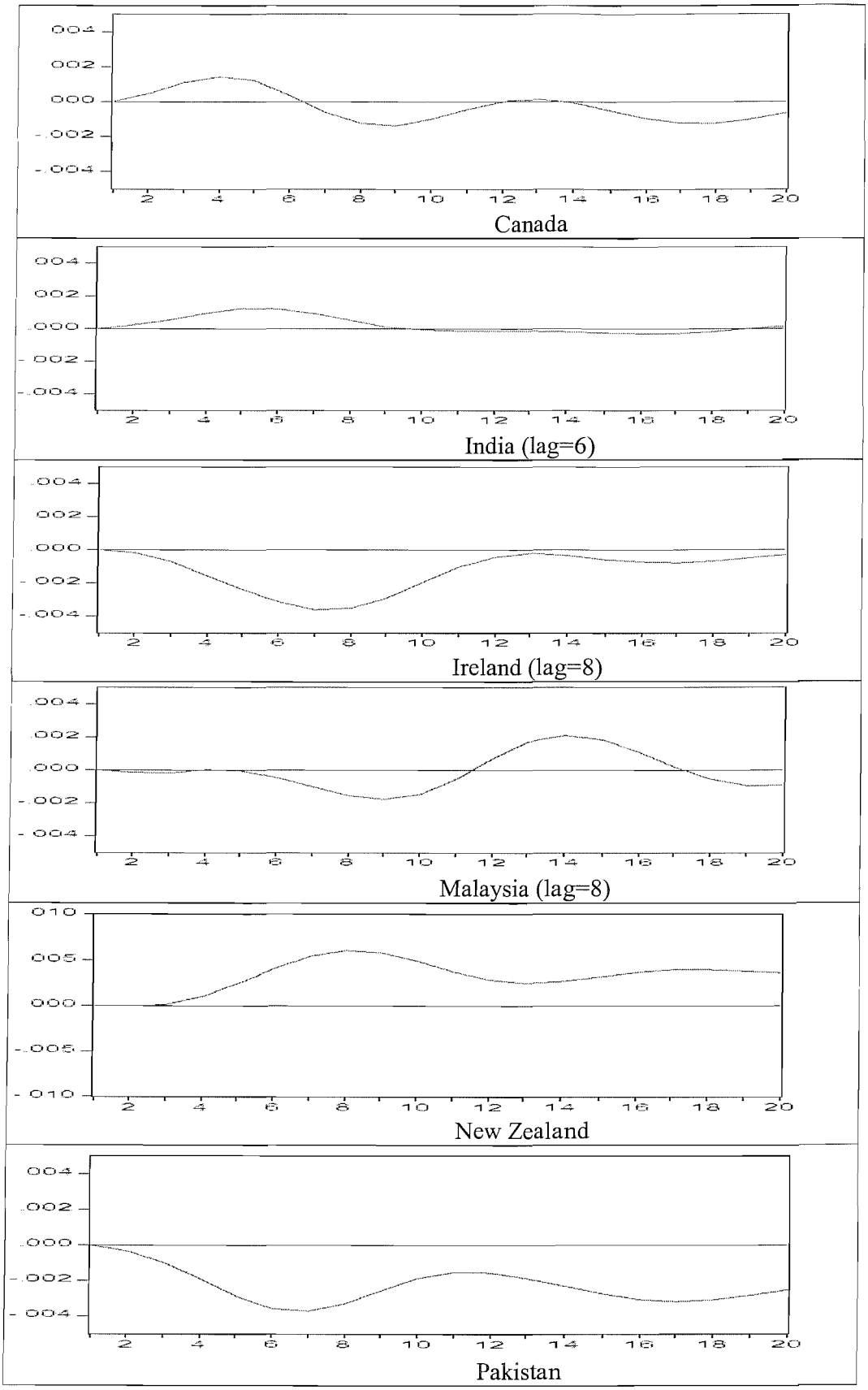
With regard to the size of the negative impacts, Figure 3.9 shows that the values of maximum negative impact in civil-law countries range from -0.0000473 to -0.02274. This study finds that the impacts are large in Chile and Colombia but almost negligible in the case of France and Spain. In comparison, the results of impulse response functions in Figure 3.9 that were generated from the VECM approach are slightly different to the results in Figure 3.3 that were obtained from the VAR approach. In the case of Mexico, for example, the impulse response function that was calculated from the VECM shows that the impact of the interest rate shock on investment is positive, and this positive impact persists for more than 20 quarters. This is in contrast with the impulse response function that was calculated from the first differences VAR which showed that the negative impact on investment appears immediately after the temporary positive impact disappeared in quarter 6. The slightly different result can also be observed in the case of the Philippines.

Figure 3.10 shows that in 6 out of the 12 common-law countries being studied, the negative impacts on investment can be observed after quarter 2. In other countries,

this negative impact only appeared after quarter 6. Meanwhile, in Australia, India and the United Kingdom, this study finds that the initial impact of an increase in the interest rate on investment is positive. Figure 3.10 also shows that only in 3 cases can the negative impact on investment still be observed after 20 quarters. Comparing the graphs in Figure 3.10 with Figure 3.4, it was found that, in some cases, the impulse response functions that were obtained from the VECM are slightly different from the results from the VAR. The differences can be observed in the case of Canada, India, Malaysia, New Zealand and United Kingdom. In the case of India and United Kingdom, the impulse response functions from the VECM approach indicate that the initial impacts of the interest rate shock on investment were positive although these temporary positive impacts had not appeared in the VAR approach. Meanwhile, for Canada and Malaysia, the opposite situation happened. In these countries, the impulse response functions that were generated by the VECM show no sign of a positive temporary impact on investment. These temporary positive impacts, however, appeared in the VAR approach. In New Zealand, the negative impact only appeared in the second quarter, and then immediately disappeared. With regard to the size of the maximum negative impacts on investment in common-law countries, Table 3.5 shows that the values range from -0.000036 to -0.015571 with a largest impact being found in the case of Australia.

Figure 3.10: Responses of Investment (*inv*) to the Positive Shock in the Interest Rate (*r*) in Common-Law Countries: The VECM Approach

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Canada
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India (lag=6)
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-.004
2 4 6 8 10 12 14 16 18 20
Ireland (lag=8)
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.002
.000
-.002
-.004
2 4 6 8 10 12 14 16 18 20
Malaysia (lag=8)
.010
.005
.000
-.005
-.010
2 4 6 8 10 12 14 16 18 20
New Zealand
.004
.002
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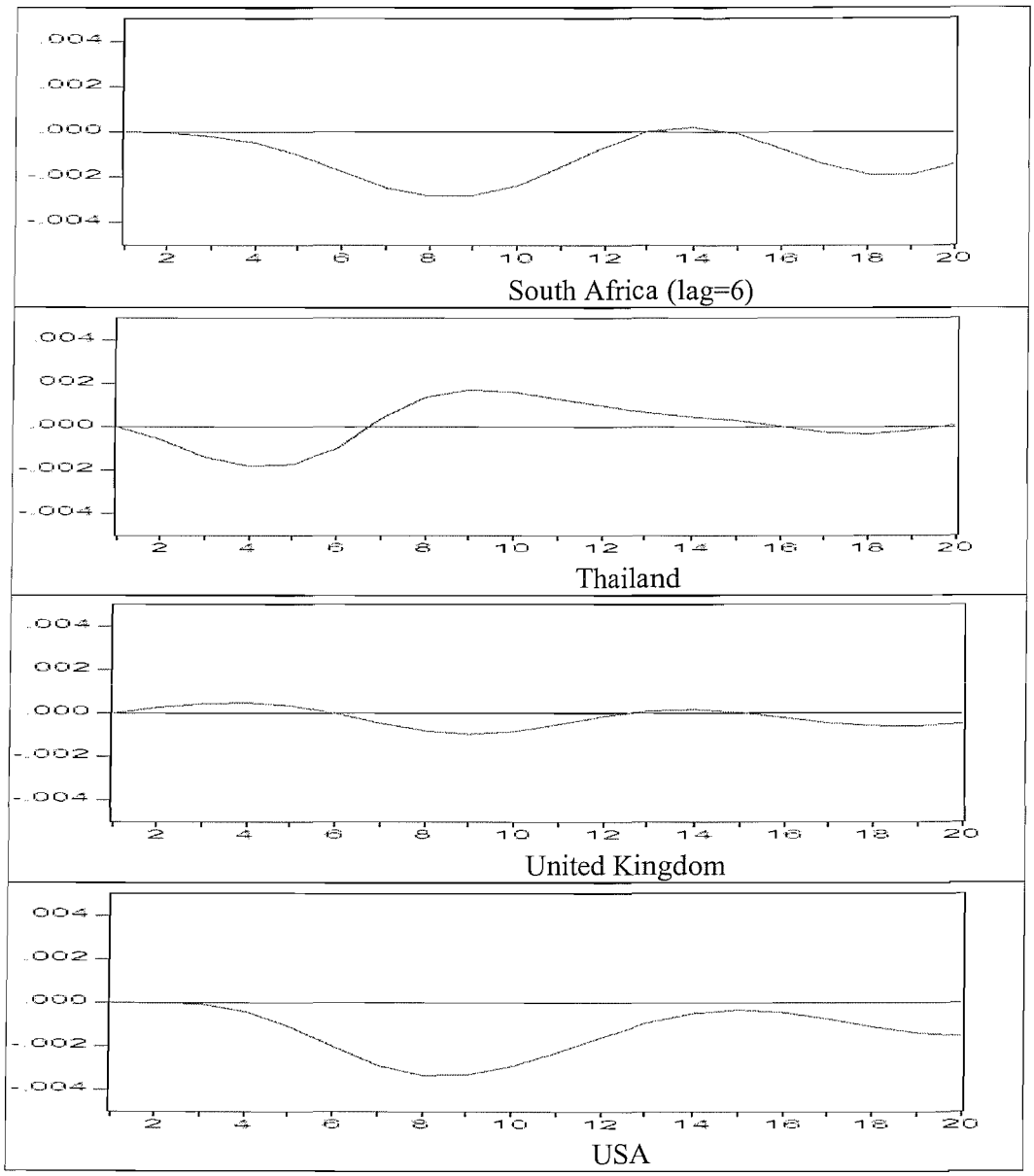
-.004
2 4 6 8 10 12 14 16 18 20
Pakistan



The discussion of the responses of investment to the positive shock in the interest rate in the civil-law countries and common-law countries clearly indicates that an interest rate generally has greater impact on investment in civil-law countries. The above discussion also suggests that investment in civil-law countries is generally more responsive to the change in the interest rate. The mean value of the maximum negative impacts of interest rate shock on investment between these two groups of countries also support the earlier prediction that the impact is generally higher in civil-law countries than in common-law countries. Table 3.5 shows that the mean

values for civil-law countries and common-law countries were -0.007457 and -0.003216, respectively. Table 3.5 also provided information on the actual measure of financial structure for each country, and also a mean value of this indicator for each group of country being studied. The mean values of financial structure indicator presented in Table 3.5 was found consistent with our classification that based on legal origin where financial system in common-law countries is more market based than the financial system in civil-law countries.

The study also finds that, generally, investment in civil-law countries responds more quickly to the shock in the interest rate compared with common-law countries. In 10 out of the 12 civil-law countries being studied, the negative impacts of interest rate shock on investment can be observed after quarter 2 compared with only 6 cases in common-law countries. This finding suggests that the speed of adjustment of investment in civil-law countries in most cases is faster than common-law countries. The negative impacts on investment in civil-law countries are also relatively long-lasting compared with common-law countries. In 8 out of the 12 civil-law countries, it is found that the negative impacts on investment still can be observed even after quarter 20 compared with only 4 cases in the common-law countries. All these findings give the impression that the monetary policy in civil-law countries is more effective than in common-law countries. In comparison, this study finds that the results in this section are consistent with the results that were produced by using the VAR approach in Section 3.3.1.2. The impulse response functions of investment in this section are also consistent with the results concerning the impulse response functions of output in Section 3.3.2.1.

Table 3.5: Summary Statistics for Impulse Response Functions of Investment to the Positive Shock in the Interest Rate: The VECM Approach

Responses of investment (*inv*) to interest rate shock					
	Actual financial structure indicator[a]	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries					
Argentina	0.5499	-0.009605(6)		2	11
Chile	0.9728	-0.022748(7)		2	>20
Colombia	0.2314	-0.022498(6)		2	>20
France	0.3669	-0.0000473(11)	0.000312(6)	10	13
Indonesia	0.4158	-0.000845(9)		2	>20
Italy	0.4094	-0.001746(6)		2	>20
Mexico	0.7638		0.005778(12	-	-
Netherlands	0.7651	-0.002870(8)		2	>20
Peru	0.1250	-0.010421(5)		2	>20
Philippines	0.6808	-0.007528(6)		2	>20
Spain	0.4688	-0.000628(4)		2	9
Venezuela	0.2033	-0.003086(11)		2	>20
Average	0.4961	-0.007456573		2.73	(8 cases > 20)
B. Common-law countries					
Australia	0.9613	-0.015571(11)	0.019352(4)	8	16
Canada	0.8688	-0.001401(9)		7	>20
India	0.5690	-0.000304(17)	0.001236(5)	10	20
Ireland	-	-0.003618(7)		2	>20
Malaysia	1.2316	-0.001775(9)		2	12
New Zealand	0.4809	-0.0000360(2)		-	-
Pakistan	0.5098	-0.003719(7)		2	>20
South Africa	1.3832	-0.002828(8)		2	13
Singapore*	0.4541	-	-	-	-
Thailand	0.3054	-0.001809(4)		2	7
United Kingdom	1.0837	-0.000977(9)	0.000473(4)	6	13
USA	1.5349	-0.003345(8)		2	>20
Average	0.8529	-0.00321664		4.30	(4 cases > 20)

Note: **Cointegration tests show that variables inv, p, r, cr, and x are no cointegrated*

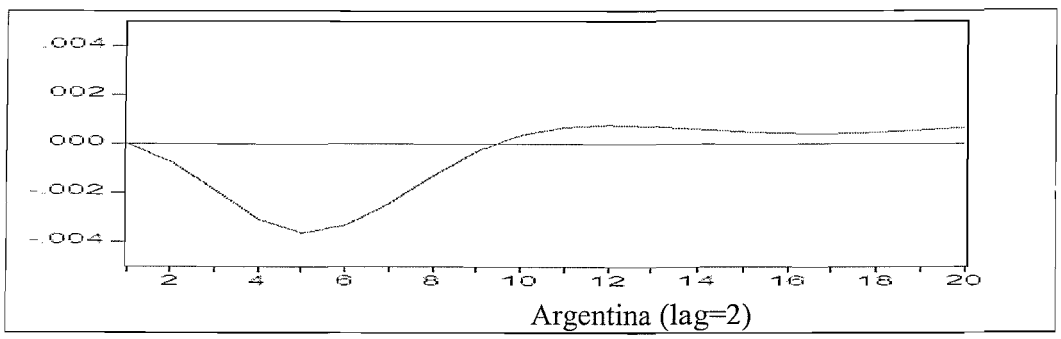
[a] *The indicator was calculated by using the ratio of market capitalisation to private sector credit except for Italy and Peru. For Italy, this indicator was measured by the ratio of market capitalisation to liquid liabilities, while for Peru, the ratio of value traded to private sector credit. In many cases, the data period that used in the calculation is from 1975 to 1999.*

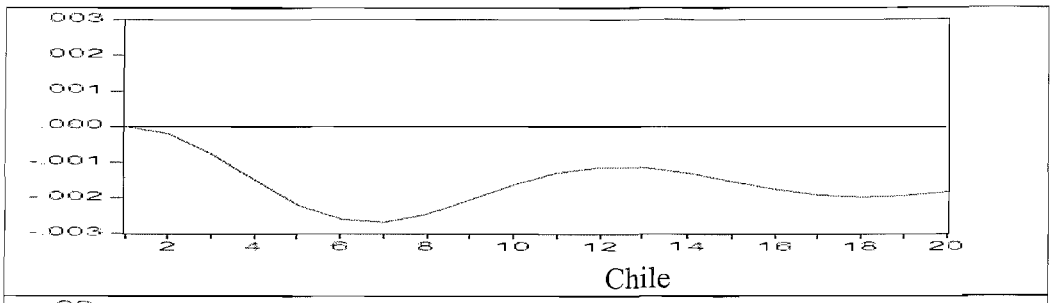
3.3.2.3 The Impact of Interest Rate Shock on Consumption

This section presents the results from impulse response analysis on the impacts of an interest rate shock on consumption. As in the case of output and investment, the

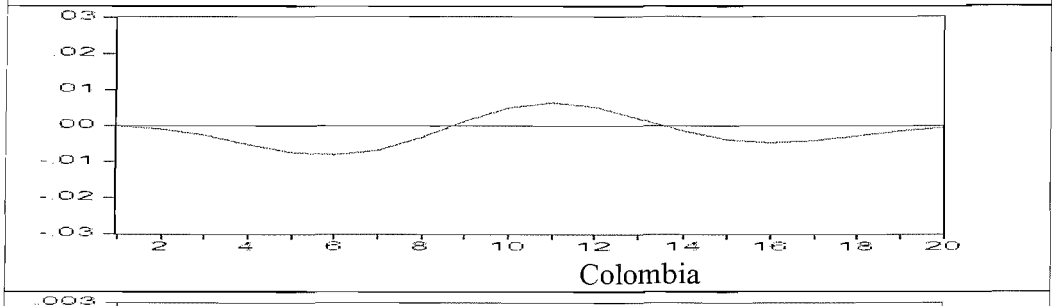
impulse in this section is calculated based on a shock of one standard deviation in the interest rate and is represented by solid line in the graphs. Figure 3.11 shows the impulse response functions of consumption to the positive shock in the interest rate for the civil-law countries. Meanwhile, the impulse response functions for the common-law countries are presented in Figure 3.12. In all graphs, the impact of consumption was investigated over 20 quarters. In analysing the findings, focus will be on the magnitude and the speed of adjustment of consumption as a result of a positive shock in the interest rate. Comparing the impulse response functions in Figure 3.11 and Figure 3.12 that were generated by the VECM approach and the impulse response functions in Figure 3.7 and Figure 3.8 that were generated by the first difference VAR approach clearly shows that both methods produce almost identical result. In other words, the impulse response functions in this section are consistent with the impulse response functions that were obtained from the first differences VAR in Section 3.3.1.3. A significant difference, however, can be observed in the case of Thailand where the initial impact of response on consumption that was produced by the VECM is positive. This is in contrast with the impulse response function that was obtained from the first differences VAR approach that found no temporary positive impact. Meanwhile, in case of Canada, the impulse responses from the VECM show that the impact of interest rate shock on consumption is positive. This is in contrast with the VAR approach that found a negative impact that appeared after the temporary positive impact disappeared.

Figure 3.11: Responses of Consumption (*con*) to the Positive Shock in the Interest Rate (*r*) in Civil-Law Countries: The VECM Approach

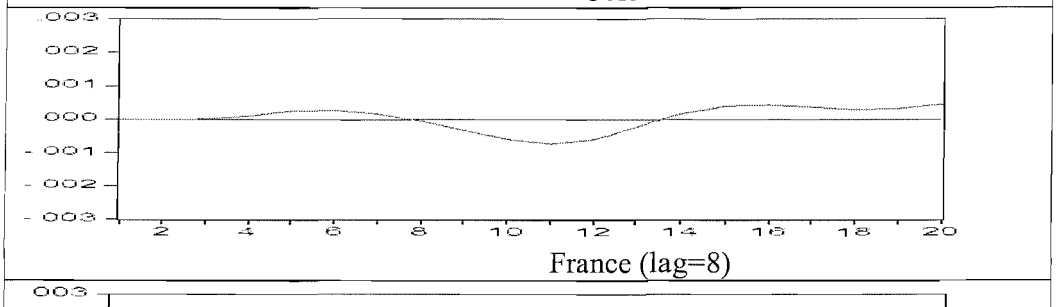




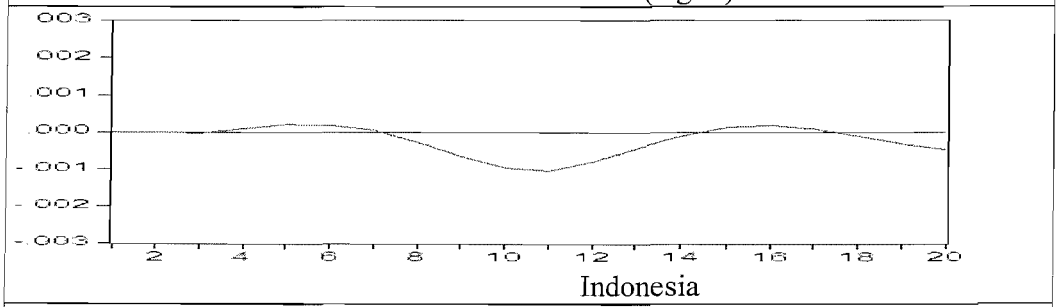
Chile



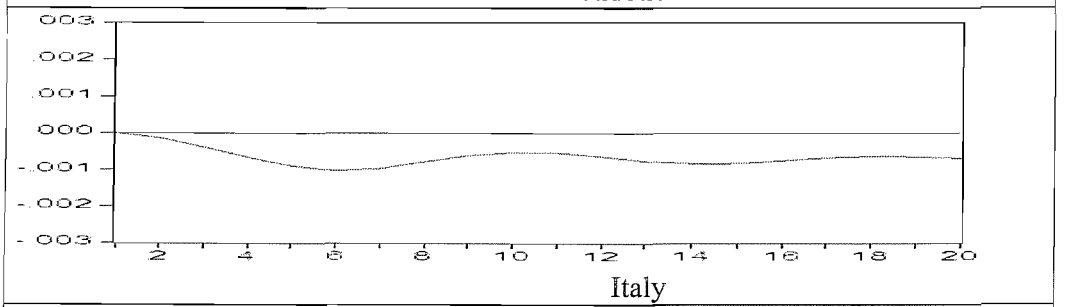
Colombia



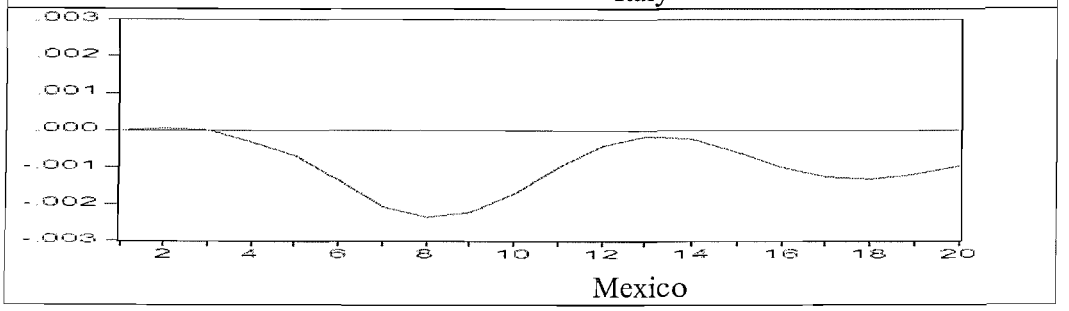
France (lag=8)



Indonesia



Italy



Mexico

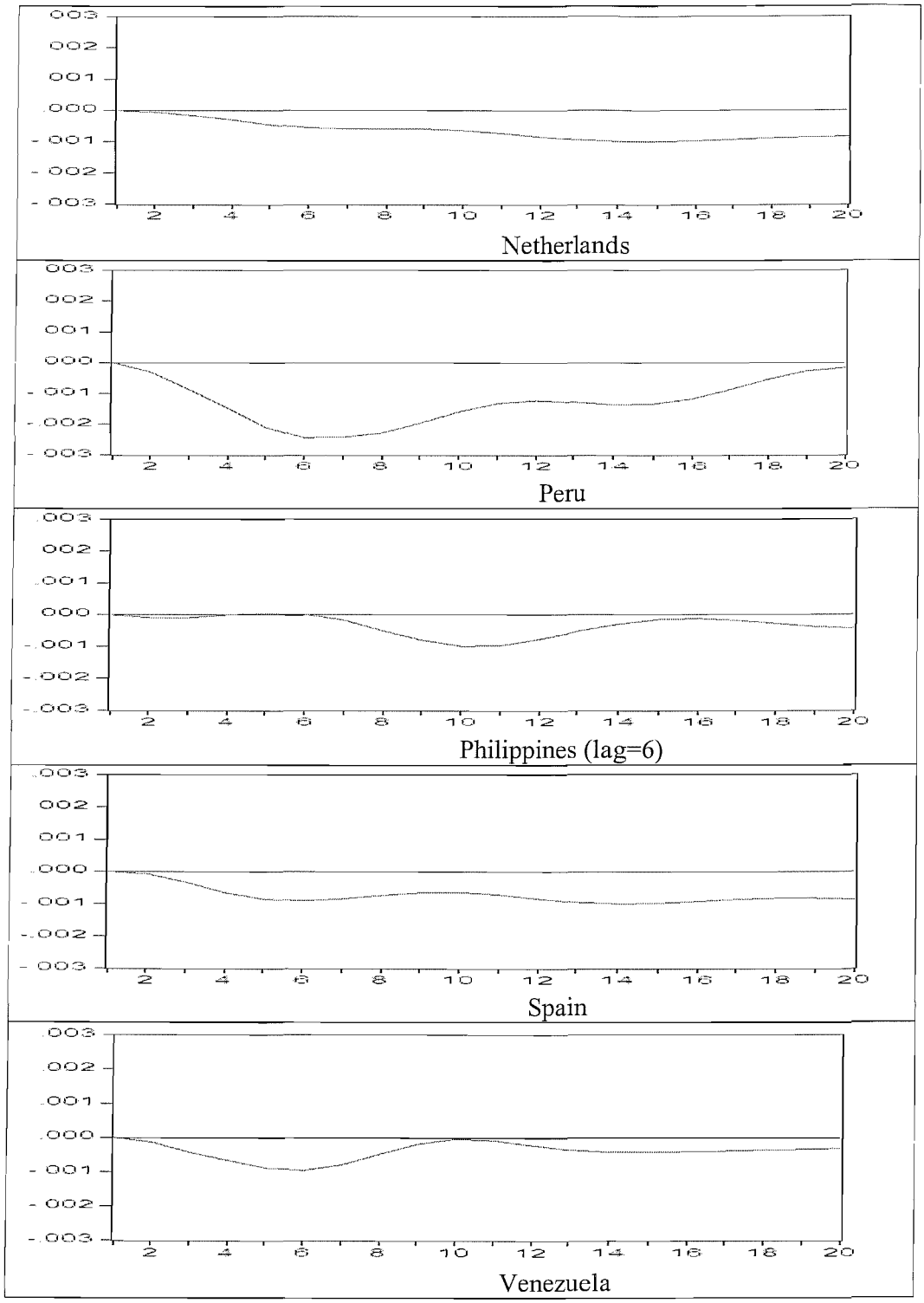


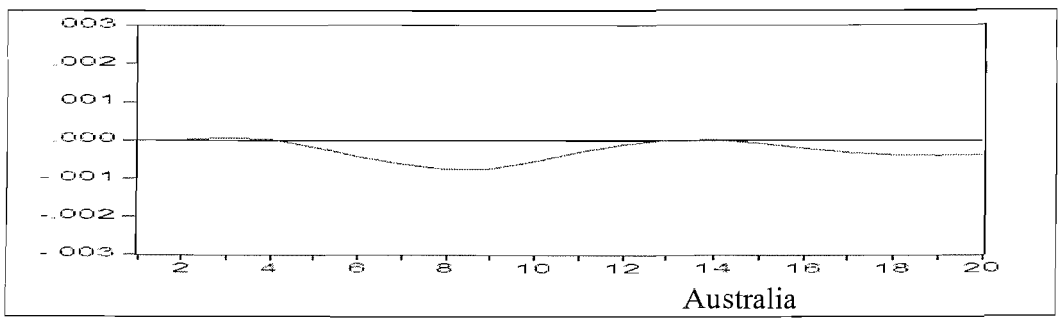
Figure 3.11 shows that in most of the civil-law countries, consumption responds quickly to a shock in the interest rate. Specifically, in 8 out of the 12 civil-law countries being studied, the negative impacts on consumption can be observed after

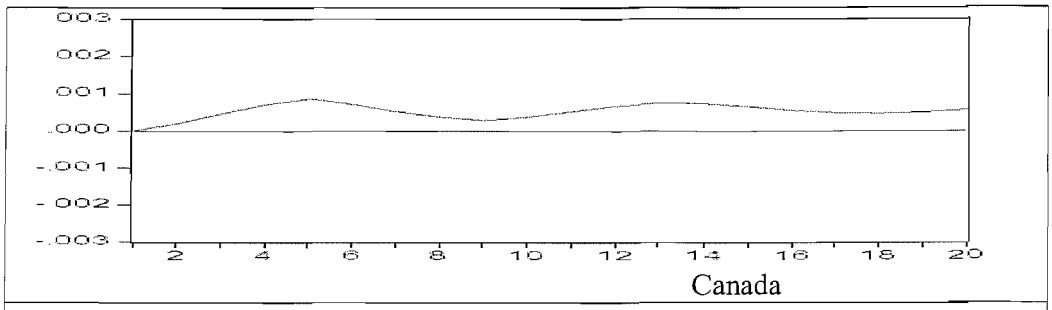
quarter 2. Meanwhile, in 3 countries (France, Indonesia and Philippines), the negative impact on consumption only appears after quarter 7. Graphs in Figure 3.11 also show that the negative impact on consumption in civil-law countries takes a very long time to disappear. In most of the cases, the negative impact can still be observed even after quarter 20. With regard to the size of the impact, it is found that the values of maximum negative impacts on consumption for civil-law countries ranged from -0.000728 to -0.003626, and these maximum values occur between quarter 5 and quarter 15. This study also finds that the values of the maximum negative impacts on consumption for civil-law countries that were obtained from the VECM approach are consistent with the results that were obtained from the first differences VAR.

The results of impulse response functions for common-law countries in Figure 3.12 shows that in 7 out of the 12 common-law countries being studied, the negative impact on consumption can be observed after quarter 2. In the other countries, the negative impacts only appeared after quarter 5. Figure 3.12 shows that in 3 countries (India, Malaysia and South Africa) the initial impact of the positive shock in the interest rate on consumption is positive. These temporary positive impacts, however, turn negative after quarter 6 in the cases of Malaysia and South Africa, and after quarter 10 in the case of India. In the case of New Zealand, the negative impact on consumption can only be observed in quarter 2. The impact immediately turns positive starting from quarter 3. The negative impacts of interest rate on consumption in common-law countries generally take a shorter time to die out compared with civil-law countries. Only in 3 cases can the negative impacts on consumption still be observed over 20 quarters after the shock. In other cases, the negative impacts disappeared between quarter 6 and quarter 16. Meanwhile, with regard to the size of the impacts, this study finds that the values of the maximum negative impacts on consumption for common-law countries range from -0.00000431 to -0.005908. Large impacts can be found in the case of Thailand, Singapore and South Africa. In Singapore, this finding is consistent with the finding that obtained from the VAR approach. For Thailand and South Africa, however, the maximum negative impact on consumption that was generated from the VECM is relatively higher than the result from the VAR.

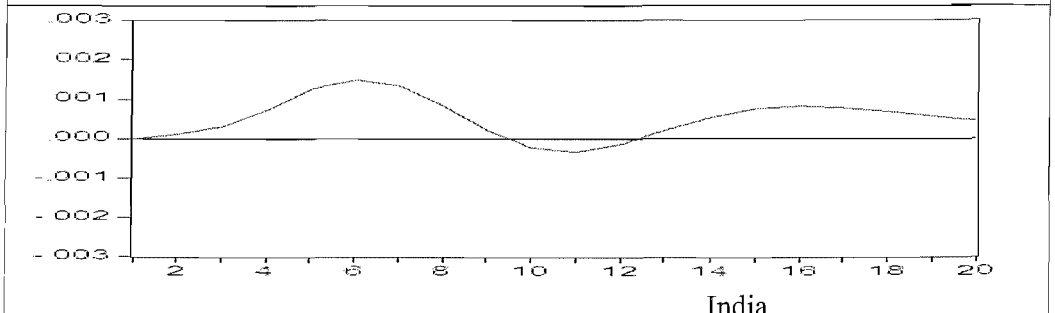
From the above discussion, in general, interest rate shocks have a greater impact on consumption in civil-law countries than in common-law countries. Table 3.6 shows that the mean value of maximum negative impacts for civil-law countries (-0.002148) is higher than the mean value of maximum negative impact for common-law countries (-0.001119). This finding indicates that the effect of monetary policy on consumption in civil-law countries is higher than in common-law countries. Consumption in civil-law countries was also found to respond more quickly to the shock in the interest rate than in common-law countries. This is based on the fact that in civil-law countries, in 8 out of 12 cases, the negative impact on consumption takes place after quarter 2. Meanwhile, in common-law countries, this situation only can be observed in 6 cases. Furthermore, the impact of the interest rate shock on consumption in civil-law countries is more long lasting than in common-law countries. In 8 out of 12 civil-law countries in the sample, it was found that the negative impacts on consumption can still be observed after quarter 20. Meanwhile, in common-law countries the same situation can only be observed in 3 cases. All these findings suggest that, in general, monetary policy is more effective in affecting consumption in civil-law countries compared with common-law countries. This study also finds that the results from the VECM approach in this section are consistent with the results that were obtained from the VAR approach in Section 3.3.1.3. The results of impulse response functions on consumption in this section are also consistent with the results on output and investment in Section 3.3.2.1, and Section 3.3.2.2, respectively. Finally, the finding in this section is also in line with the earlier expectation that monetary policy is more effective in civil-law countries compared with common-law countries.

Figure 3.12: Responses of Consumption (*con*) to the Positive Shock in the Interest Rate (*r*) in Common-Law Countries: The VECM Approach

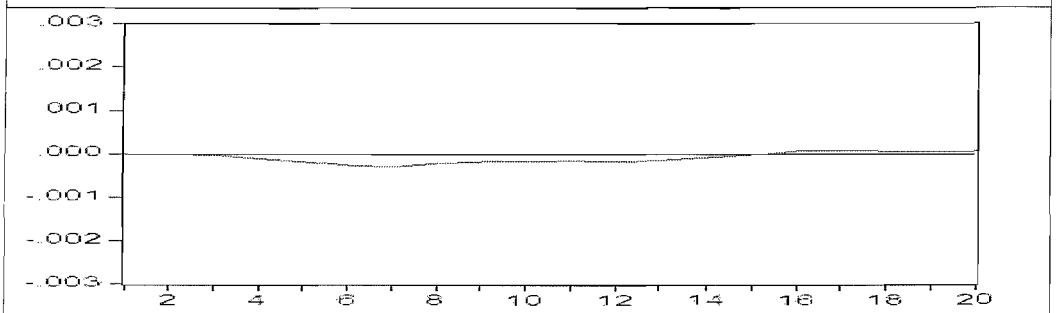




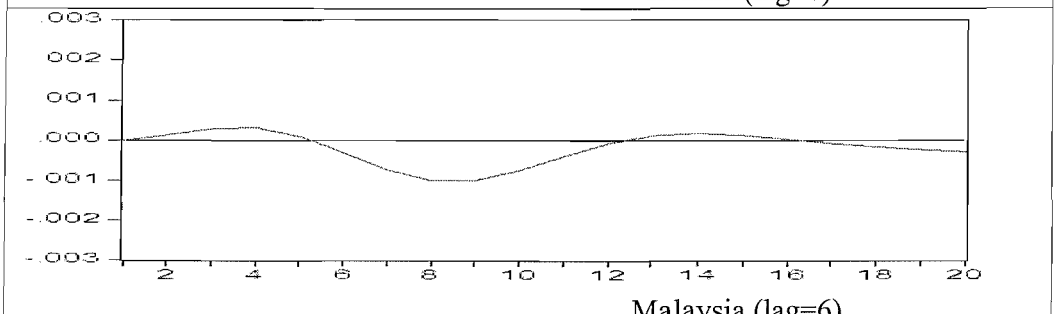
Canada



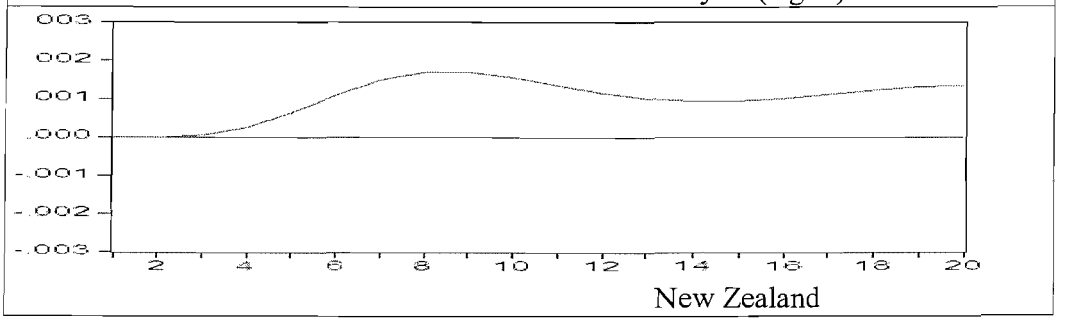
India



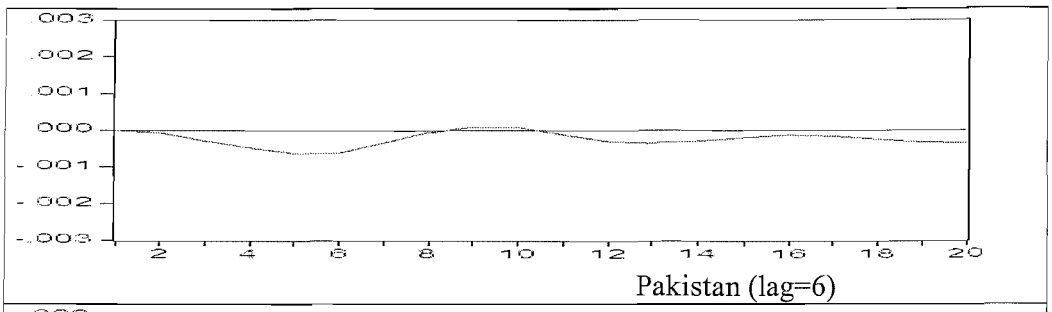
Ireland (lag=8)



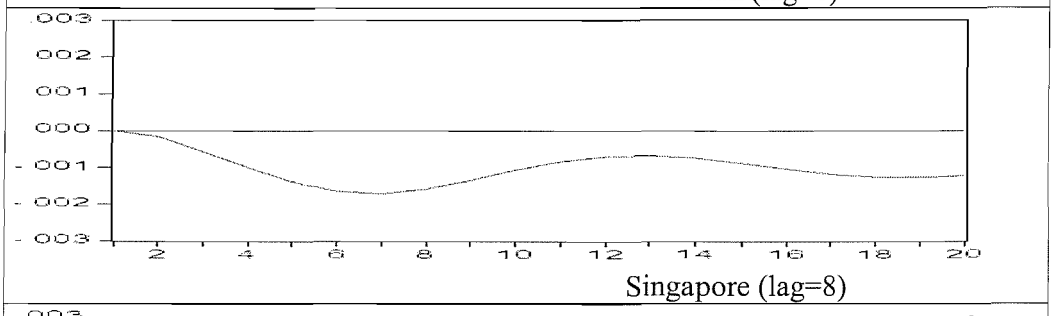
Malaysia (lag=6)



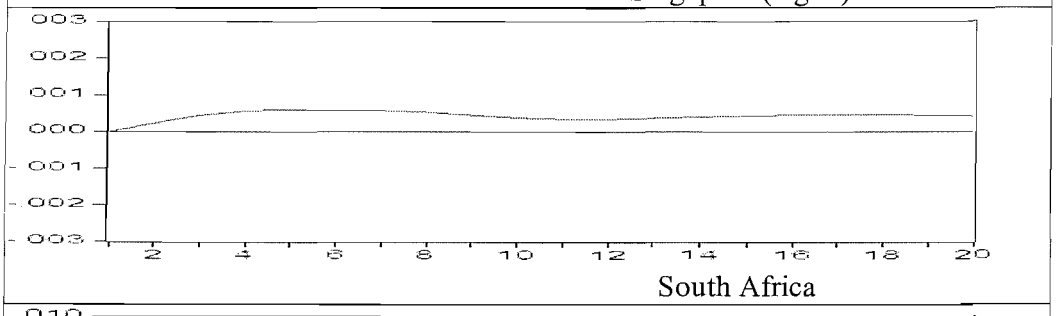
New Zealand



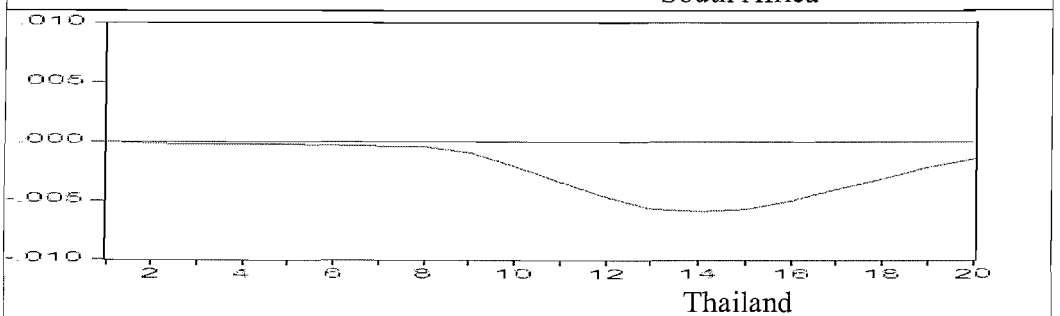
Pakistan (lag=6)



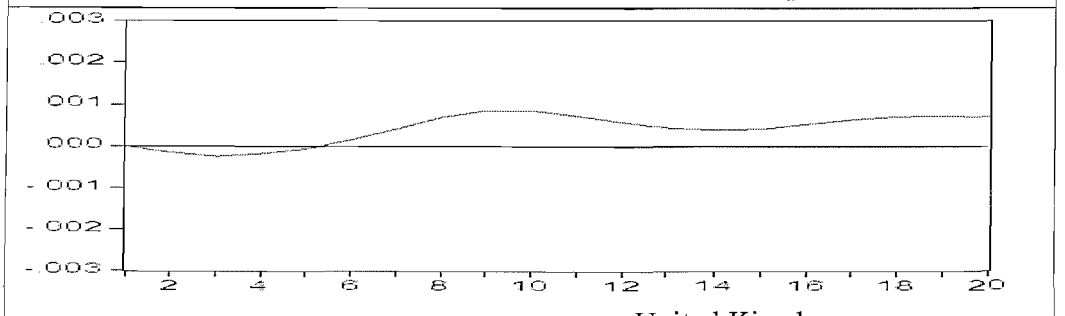
Singapore (lag=8)



South Africa



Thailand



United Kingdom

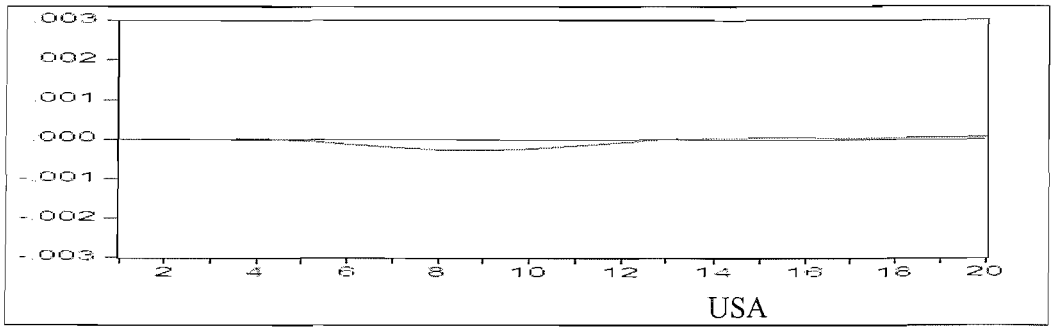


Table 3.6: Summary Statistics for Impulse Response Functions of Consumption to the Positive Shock in the Interest Rate: The VECM Approach

Responses of consumption (*con*) to interest rate shock				
	Maximum negative impact (Quarter)	Maximum positive impact (Quarter)	Time taken for negative impact to appear (in quarter)	Time taken for negative impact to disappear (in quarter)
A. Civil-law countries				
Argentina	-0.003626(5)		2	10
Chile	-0.002681(7)		2	>20
Colombia	-0.008043(6)		2	9
France	-0.000728(11)		8	14
Indonesia	-0.001037(11)		8	15
Italy	-0.001.23(6)		2	>20
Mexico	-0.002351(8)		4	>20
Netherlands	-0.001003(15)		2	>20
Peru	-0.002436(6)		2	>20
Philippines	-0.000994(10)		7	>20
Spain	-0.000903(6)		2	>20
Venezuela	-0.000953(6)		2	>20
Average	-0.002148167		3.58	(8 cases >20)
B. Common-law countries				
Australia	-0.000764(8)		5	13
Canada		0.000870(5)	-	-
India	-0.000335(11)	0.001487(6)	10	13
Ireland	-0.000293(7)		2	16
Malaysia	-0.000998(8)	0.000294(3)	6	13
New Zealand	-0.00000431(2)		2	-
Pakistan	-0.000634(5)		2	9
South Africa	-0.001145(8)	0.000410(3)	6	>20
Singapore	-0.001713(7)		2	>20
Thailand	-0.005908(14)		2	>20
United Kingdom	-0.000240(3)		2	6
USA	-0.000273(9)		5	13
Average	-0.001118846		4.00	(3 cases > 20)

3.4 Conclusion

This study investigates whether there is a difference in the impact of monetary policy between two groups of countries being studied, civil-law countries and common-law countries. Specifically, the study investigates whether the effectiveness of monetary policy actions depends on the countries' financial structures, which in turn depend on their differences in legal origin. This is in line with empirical studies which found that the financial structures of common-law countries are more market-based and the civil-law countries are more bank-based. Furthermore, the empirical results showed that differences in financial structures contribute to differences in the sensitivity of monetary policy actions across countries. The objective of this study is to compare the effectiveness of monetary policy actions between civil-law countries and common-law countries by investigating the impulse response of monetary policy actions on three major macroeconomic variables, output, investment and consumption. The question of interest is to determine whether countries of common-law origin are less sensitive to monetary policy actions compared with civil-law countries. For this purpose, impulse response functions have been used to examine the impact on output, investment and consumption to a shock in monetary policy actions which is represented by an increase in the interest rate. The impulse response functions were generated through the estimation of first differences VAR and VECM consisting of five variables, macroeconomic variable (output, investment and, consumption), price, the interest rate, credit, and the exchange rate. Generally, this paper finds that both methods produce consistent results except in certain cases.

The major findings of this study were, first, the impact of an increase in the interest rate on output is relatively stronger, responds more quickly and long lasting in civil-law countries compared with common-law countries. This finding may indicate that monetary policy is relatively more effective in influencing output in civil-law countries than in common-law countries. This finding is in line with the earlier prediction that monetary policy would be generally less effective in common-law countries than in civil-law countries. This prediction is based on the fact that financial structures in most of the common-law countries are more market-based. Thus, the firms in these countries have relatively better access to the capital markets.

Consequently, the substitutes for bank loans are more easily available in the common-law countries, and this might reduce the contractionary effect of monetary policy of reduction in supply of credit. The finding from this study is consistent with the finding from Cecchetti (1999).

Second, this study finds that the impact of an interest rate shock on investment and consumption is higher, more responsive, and longer lasting in civil-law countries than in common-law countries. These findings suggest that monetary policy relatively is more effective in affecting the level of investment and consumption in civil-law countries compared with common-law countries. In both group of countries, this study also finds that the impact of an interest rate shock on investment is relatively higher than the impact on consumption. This finding suggests that, in both groups of countries being studied, investment is a major channel through which the effects of a monetary policy shock were transmitted to output. This may indicate that, as expected, monetary policy in civil- and common-law countries has more impact on firms' spending compared with households' spending. The findings that monetary policy in civil-law countries is relatively more effective to affect investment and consumption are consistent with the results for output. Thus, these findings provide extra support to the argument that monetary policy is more effective in civil-law countries than in common-law countries.

Chapter 4

Causality between Foreign Direct Investment, Financial Development and Economic Growth: a Case of Developing Countries

4.0 Introduction

Many policy makers in the developing countries believe that Foreign Direct Investment (FDI) has several positive effects. These include productivity gains, technology transfers and the introduction of new processes, managerial skills and expertise, employee training, international production networks, and access to international markets. This has encouraged policy makers in developing countries to ease restrictions on inward FDI and in many cases provide special incentives to attract FDI. They believe that FDI which accompanied by significant inflows of capital may ease credit constraints faced by domestic firms. They also believe that FDI can benefit domestic firms through the spillover effects of knowledge and new technologies through the direct or indirect contact between foreign firms and local firms or through labour turnover from foreign to domestic firms. The spillover effects may also take place when the entrance of foreign firms forces domestic firms to become more efficient by upgrading their existing technology and managerial skills.

Several papers have highlighted the role of FDI in the technological progress and hence economic growth of the host country especially in the developing countries (for example, Findlay, 1978; Wang, 1990; De Mello, 1999; and Obwona, 2001). These authors argue that FDI may increase the rate of technical progress in the host country through the advanced technology introduced by the foreign firms. Empirical studies,

however, show that the effect of FDI on growth depends on the absorptive capability of the host country, which includes the initial level of development (Blomstrom et al. 1992), the level of human capital development (Borensztein et al. 1998), and trade policy (Balasubramanyam et al. 1996). Recently, empirical studies have found that the level of development of the domestic financial system could also partly determine the positive effects of FDI on economic growth (Hermes and Lensink, 2000; and Alfaro et al. 2004). The existence of financial intermediaries could motivate domestic firms to upgrade their existing technology or to adopt new technologies introduced by foreign firms. Therefore, the development of domestic financial markets may influence the impact of FDI in transmitting new technologies, and hence economic growth of the host country.

If that positive impact of FDI on growth depends on having a minimum threshold level of financial development, it is legitimate to ask whether FDI itself could contribute to financial development, so could improve its chances in stimulating growth. In this regard, FDI may lead to the development of domestic financial markets through the participation of foreign firms in domestic financial markets. Meanwhile, the development of the financial system may also determine to what extent foreign firms are able to borrow from domestic capital markets in order to increase their activities in the host country. From this point of view, a country with a better-developed financial system would be more attractive to foreign investors, suggesting that financial development may lead to greater FDI. This study investigates this issue by examining the causal relationship between FDI and financial development. Specifically, the objective of this study is to examine two competing hypotheses regarding the causal relationship between FDI and financial development. In the first hypothesis, FDI is assumed to have a positive effect on the development of the financial system in the host country. In the second hypothesis, the development of domestic financial markets is seen as one of the main determinants of FDI. Thus, a country with a more developed financial system is expected to attract more FDI.

The study seeks to contribute to the current literature by examining the direction of causality between FDI, financial development and economic growth. This study will add to the existing literature in several ways. First, although the role of FDI on economic growth has been studied extensively, most of the existing studies have

focused on the direction of causality between FDI and economic growth. Meanwhile, as far as we can ascertain, there is no proper study that has been carried out to examine the causal relationship between FDI and the level of financial system development, and this study is intended to fill this gap. In this study, the development of the financial markets will be categorised into two sectors; credit markets and equity markets. Second, this study will contribute to the existing studies on the causal relationship between FDI and economic growth. In detail, many existing works on the direction of causality between FDI and economic growth use Granger-causality test in a bivariate framework, which could result in spurious causality. To solve this problem, the causality tests in this study will be carried out in the framework of a multivariate model. This study will also add to the existing literature by investigating the causal relationship between FDI and economic growth in large number of developing countries. The existing time series studies of the causal relationship between FDI and growth usually focus on a specific country or only on a few countries. In this study, causality tests have been carried out for 37 developing countries. With a different history of macroeconomic episodes, policy regimes, the level of the financial system development and growth pattern among countries in the sample, this study is expected to provide more information on the nature of the causal relationship between FDI and economic growth. Third, this study adopts a different approach in investigating the causal relationship between FDI, financial development and economic growth. Specifically, this study examines the causality between FDI and a set of variables (financial development and economic growth) in addition to bivariate causality between these variables. This study provides time series evidence to support the findings from the existing panel data studies which generally found that financial system development significantly improved the effect of FDI on economic growth.

4.1 Literature Review

4.1.1 FDI and Economic Growth

In the 50s and 60s, the role of FDI was not considered seriously as an engine for economic growth by mainstream economics. This is because, in the neoclassical models, the impact of FDI on the growth rate of output was constrained by the

existence of diminishing returns in physical capital. With diminishing returns to physical capital, these models treated technological progress as an exogenous process and focused on capital accumulation as the main source of growth. Therefore, FDI could only exert a level effect on the output per capita, but not a rate effect. In other words, it was unable to alter the long run growth rate of output. In addition, the assumptions about the immobility of factors of production and identical production functions across nations in the neoclassical trade theory postulates that no international differences existed at the scientific and technological levels, and not to mention technology transfer. Meanwhile, the neoclassical financial theory of portfolio flow views multinational enterprises as arbitrageurs of capital in response to interest rate differentials. Thus, capital flows from countries where returns are low to those where it is higher to earn arbitrage rents.

Starting from the mid 80s, in the light of the endogenous growth theory, the role of FDI has been approached from a new angle. In endogenous growth theory, the importance of technological change for economic growth has been emphasised. Specifically, the endogenous growth theory focused on the creation of technological knowledge and its transmission, and views innovation and imitation efforts as major engines for economic growth. Therefore, it emphasises the role of Research and Development (R&D), human capital accumulation, and externalities on economic growth (Romer, 1990). In this regard, the growth rate of developing countries is perceived to be highly dependent on the extent to which these countries can adopt and implement new technologies available in developed countries. One important channel through which adoption and implementation of new technologies and ideas by developing countries may take place is through FDI. Subsequently, FDI has become a popular area of research and has been studied extensively in relation to four main issues: (i) by examining the role of multinational enterprises in the host countries; (ii) by exploring the determinants of FDI; (iii) by looking at the contribution of FDI to economic growth; and (iv) by studying the direction of causality between FDI and economic growth.

Theoretical literature has developed various arguments that explain why FDI may potentially enhance economic growth in the host country. First, FDI can be considered as one of the main transmission vehicles of advanced technology from

leaders to developing countries (Borensztein et al. 1998). In general, developing countries lack the necessary background in order to be able to innovate and generate new discoveries and designs. Therefore, these countries have to adopt technology that is produced elsewhere, and one of the ways whereby advanced technology may spread out to developing countries is through the channel of FDI. Second, FDI may ease the exploitation and distribution of raw materials that are produced in the host country, by means of helping to improve the network of transport and communication. Third, FDI does not lead to the problems associated with alternative ways of raising funds in international markets. The experience of the severe debt crisis of the 70s has shown that a heavy burden of debt may easily jeopardise the economic growth of developing countries. This has not to be the case regarding FDI because if a particular project is not successful, it is not the obligation of the host country to pay the interest, thus the country is exonerated from the possibility of bankruptcy. Finally, the technological advances brought in by foreign firms may conceivably spillover to other firms in the country, therefore originating externalities and encouraging the flourishing of domestic private activity.

The spillover effects of FDI may take place through several channels. Spillovers through the demonstration channel emphasise that technologies used by foreign firms are more advanced than those used by domestic firms, and these domestic firms may imitate the newer technologies, which will make them more productive. The same may hold for managerial practices introduced by foreign firms. The demonstration channel may take place through direct or indirect contact between firms or through labour turnovers from foreign to domestic firms. The competition channel stresses that the entrance of foreign firms intensifies competition in the domestic market. This will force domestic firms to become more efficient, which may lead to upgrading their existing technology or developing (or copying) new technologies and managerial skills. The linkages channel stresses the fact that foreign firms may transfer new technology to domestic firms through their interactions with these firms. Lall (1980) has identified the foreign firm interactions that may increase the productivity and efficiency of local firms. These include helping prospective suppliers set up production facilities, demanding from suppliers reliable, high quality products that are delivered on time, providing the suppliers with technical assistance or information to help improve the products or facilitate innovations, providing

training and help in management and organisation, and assisting suppliers to find additional customers including their sister affiliates in other countries. Selling to foreign firms may also encourage domestic firms to upgrade the production process based on the technical and quality requirements demanded by the foreign buyers. Finally, the training channel emphasises that the introduction of new technologies, needs to be supported by an upgrading of the human capital available domestically. Domestic firms can only adopt these new technologies when the labour force is able to work with them. Therefore, local firms may be stimulated to train their own employees when foreign firms enter the market, and hence increase their productivity.

Results from empirical studies seem to support the existence of spillover effects of FDI. Studies by Caves (1974), Globerman (1979), and Nadiri (1992) in developed countries found that the productivity of domestically owned firms is positively related to the presence of foreign firms. Meanwhile, for developing countries, the results are mixed; with some studies showing that a higher foreign presence increased productivity in the host country, but others pointing to limited or no efficiency spillovers. Aitken et al. (1997), for example, find that foreign manufacturing investors in Mexico act as exports catalyst for domestic firms. Study by Aitken and Harrison (1999) for Venezuelan find that foreign equity participation is positively correlated with plant productivity, but this relationship is robust only for small enterprises. Harrison (1994) cites case study evidence in Morocco and Venezuela, which indicates that firms with foreign equity participation are more productive than domestic firms and have higher productivity growth. However, she finds that in Venezuela the productivity of domestic competitors was hurt because the presence of multinational enterprises decreased their market share.

Empirical studies have identified that the spillover effect can only be successful if certain characteristics exist in the host country. These characteristics together determine the absorptive capacity of technology spillovers of the host country. Borensztein et al. (1998), for example, show that the adoption of new technologies and management skills is possible only when there is a certain minimum, or threshold level of human capital available in the host country. In their study, Borensztein et al. developed an endogenous growth model in which FDI increases long run growth through its effect on the rate of technological diffusion from the industrialised world

to the host country. They use seemingly unrelated regression with instrumental variables estimation to conduct cross-country analysis of 69 developing countries with panel data averaged over two separate periods 1970-1979 and 1980-1989. They conclude that FDI, by itself, has a positive but insignificant effect on economic growth. Only when a country has a minimum threshold stock of human capital is FDI an important determinant of economic growth. Balasubramanyam et al. (1996) show that the process of technological spillovers may be more efficient in the presence of well-functioning markets. Their study used cross-sectional annual data averaged over the period 1970-1985 for a sample of 46 developing countries and find that the size of the domestic market, the competitive climate in relation to local producers and interactions between FDI and human capital exert an important influence upon growth performance. Their analysis indicates that FDI is more productive in countries that have pursued export promotion rather than import substitution policies.

The effects of FDI on economic growth could also take place through its effects on domestic investment. Some literature suggests that FDI has a 'crowding-in' effect on domestic investment. They argued that FDI has two potential effects on domestic investment. First, by competing in product and financial markets, foreign firms may displace domestic firms. Second, FDI may also facilitate the expansion of domestic firms through complementarity in production and productivity spillovers. Borensztein et al. (1998), for example, argued that FDI can increase growth in two ways: (i) it increases total investment by attracting higher levels of domestic investment; and (ii) through interaction of the more advanced technology with the host's human capital. However, the study by Bosworth and Collins (1999) does not find the 'crowding-in' effect of Borensztein et al. instead, they find that the positive effect of FDI on domestic fixed investment tends to fall off significantly when more country characteristics are controlled. Meanwhile, using time series and panel data for a sample of 32 OECD and non-OECD countries covering the period 1970-1990, De Mello (1999) found that: (i) FDI has a positive impact on output growth; (ii) there is a dominant complementarity effect between FDI and domestic investment; and (iii) FDI appears to have a positive impact on the technological change in OECD countries but, a negative relationship exists between FDI and TFP in non-OECD countries. The last finding suggests that for technological followers (non-OECD

countries), FDI may reduce TFP growth by fostering producer capital accumulation given the complementarity effect.

4.1.2 Causality between FDI and Economic Growth

The importance of economic growth in attracting FDI is closely linked to the fact that FDI tends to be an important component of firms' strategic decisions. Brewer (1993) suggests three hypotheses in explaining strategic FDI projects namely, `efficiency seeking hypothesis', `resource seeking hypothesis', and `market seeking or market size hypothesis'. The importance of economic growth in determining FDI flows can be explained by the market size hypothesis. The market size hypothesis on FDI argued that market size is one of the most important considerations in making investment decisions for three reasons; larger potential for local sales, the greater profitability of local sales than export sales, and the relatively diverse resources which make local sourcing more feasible. Wang and Swain (1995), for example, argued that "...FDI in any period is a function of the market size of the domestic market, which is given by the level of GDP". They further stated, "while the size of the domestic market is an important factor, its growth rate is also thought to influence foreign capital inflows." (pp. 360). The market size hypothesis predicts that rapid economic growth leads to a high level of aggregate demand for investment including FDI. Moreover, better economic performance tends to give multinational firms more opportunities to generate greater sales and profits.

The existing theoretical studies on the relationship between FDI and growth also indicate that FDI and growth can `cause' each other. In other words, the causality between FDI and economic growth could run in either direction. First, FDI could promote further growth. In this regard, FDI is expected to help boost economic growth by encouraging the incorporation of new inputs and foreign technologies in the production function of the recipient economy. As a result, foreign investors may increase productivity in the recipient economy, and hence economic growth. Second, rapid economic growth could induce the inflow of FDI (Dowling and Hiemenz, 1982; and Lee and Rana, 1986). This is because rapid growth will usually create high levels of capital requirements in the host country and hence the host country will demand more FDI by offering concessional terms for FDI to attract

overseas investors. Rapid economic growth in the host country will also build the confidence for overseas investors investing in the host country. More importantly, rapid economic growth will create opportunities for FDI to invest in industrial sectors, consumer durable goods and infrastructure sectors in the host country. From this point of views, both FDI and economic growth are positively interdependent and could lead to bi-directional causality.

Several studies have been conducted to examine empirically the causality between these two variables. Ericsson and Irandoust (2001), for example, have examined the causal effects between FDI growth and output growth for four OECD countries: Denmark, Finland, Norway, and Sweden. Using a multivariate VAR model including FDI, output and TFP growth and estimation techniques developed by Toda and Yamamoto (1995), and Yamada and Toda (1998) the authors failed to detect any causal relationship between FDI and output growth for Denmark and Finland. They suggested that the specific dynamics and nature of FDI entering these countries could be responsible for these no-causality results. In particular, they argued that, since most of the multinational firms in Denmark and Finland are in service (especially distribution) sectors, the causal relationship between FDI and GDP might not exist. For Norway, they found a long-run unidirectional causal relationship running from FDI growth to GDP growth. This finding supports the argument that economic policies promoting FDI inflows may be an effective instrument for stimulating economic growth. However, the reverse (for example, policies that enhance economic growth may enhance the attractiveness of Norway for FDI flows) was not established. In the case of Sweden, they found support the existence of a bi-directional causal relationship, which provides evidence that FDI affects economic growth and economic growth itself exerts a major influence to the extent of FDI inflows. In other words, by stimulating economic growth, Sweden can promote inflows of FDI and this in turn will have an additional positive impact on output growth.

In the case of developing countries, empirical studies on the causal relationship between FDI and growth also show mixed results. Similar findings, for example, can be found in De Mello (1996). This study used Granger-causality tests to test the hypothesis of increasing returns to domestic capital due to FDI flows for five Latin

American economies: Brazil, Mexico, Venezuela, Chile, and Colombia. Using data covering 1970-1991, his findings support the existence of causality for both directions depending on the recipient economy's trade regime, open economy performance variables, and domestic policy variables. Specifically, his findings show that capital accumulation in Brazil appears to have preceded output growth while TFP growth seems to precede FDI flows. Meanwhile, in Chile, evidence revealed that FDI precedes both output and TFP growth. De Mello's findings suggest that the direction of causation depends on existing factor endowments and scale effects in such a way that larger economies are more attractive to FDI than smaller ones.

Mixed results on the causal relationship between FDI and growth can also be found in the empirical studies for the developing countries in other regions. Gyapong and Karikari (1999), for example, by using Granger-causality tests have examined the causal relationship between FDI and economic performance in two Sub-Saharan African countries (Ghana and Ivory Coast), from the 1960s to 1980. The results from the bivariate causality tests show that in Ivory Coast, a superior economic performance enhanced the inflow of export-oriented FDI, while in Ghana, where FDI took the form of market-development in response to an import-substitution strategy, the effect is ambiguous. Meanwhile, Zhang (2001) by using a cointegration approach has investigated the causal relationship between the two variables for 11 economies in East Asia and Latin America. His findings show that FDI tends to be more likely to promote economic growth in East Asia than Latin America. He concluded that the extent to which FDI is growth enhancing appears to depend on country-specific characteristics. More recently, Chowdhury and Mavrotas (2003), for example, have examined the causal relationship between FDI and economic growth for three developing countries, namely Chile, Malaysia and Thailand. The study used time-series data covering the period 1969-2000, and econometric methodology proposed by Toda and Yamamoto (1995). Their empirical findings suggest that it is GDP that causes FDI in Chile and not vice versa. In the case of Malaysia and Thailand, they found a strong evidence of a bi-directional causality between GDP and FDI.

Empirical studies have also been carried out to investigate the causal relationship between FDI and growth in specific developing countries. For India, Chakraborty and Basu (2002) have examined the link between FDI and output growth using

annual data over the period 1974-1996. Their model consists of net inflow of FDI, real GDP, and unit cost of labour as endogenous variables while the proportion of import duties in tax revenue is treated as an exogenous variable. Using a cointegration model with a Vector Error Correction Mechanism (VECM), they concluded that real GDP in India is not Granger caused by FDI and the causality runs from real GDP to FDI. Meanwhile, Shan et al. (1997) in their study have investigated the FDI-led growth hypothesis for China. The study used quarterly time series data over the period 1988–1996, a vector autoregression (VAR) model and the Granger-causality procedure developed by Toda and Yamamoto (1995). Unlike, Chakraborty and Basu (2002), Shan et al. (1997) found a bi-directional causality running from industrial growth and FDI growth for China. In other words, the inflows of FDI and rapid industrial growth in China have reinforced each other. Liu et al. (2002) in their study also investigated the existence of causal relationships among economic growth, foreign direct investment and trade in China. The study used a cointegration approach with quarterly data over the period 1981 to 1997. Similarly, they found that the causal relationship among these variables is bi-directional. However, they cautioned that it might still be probable that the resulting causalities simply indicate that FDI flows pose as a close proxy for the openness of the macroeconomic policy stance of the Chinese government.

The issue of causality between FDI and economic growth has also been investigated empirically by using a panel data approach. Choe (2003), for example, examined the causal relationship between economic growth and FDI in 80 countries over the period 1971-1995, by using a panel data of five-year averages and VAR model as proposed by Holtz-Eakin et al. (1988). The results show that FDI Granger-causes economic growth, and vice versa; however, the effects are rather more apparent from growth to FDI than from FDI to growth. Meanwhile, Nair-Reichert and Weinhold (2001), in their study, used a panel of 24 developing countries from 1971 to 1995 to analyse the dynamic relationship between FDI and economic growth. By using the Mixed Fixed and Random (MFR) model introduced by Hsiao (1989) to deal with heterogeneity panel, they found that the causal relationship between investment, both foreign and domestic, and economic growth in developing countries is highly heterogeneous. In addition, they found a causal relationship running from FDI to growth, and the efficiency of FDI is higher in the more open economies.

In summary, the empirical studies reviewed above use different models and econometric techniques to test the causal relationship between FDI and economic growth and/or the magnitude of the impact of FDI flow on economic growth. These studies also used time series and panel data sets that cover a variety of countries and regions. The results from these studies generally point to an FDI-led economic growth hypothesis for the countries examined, while others suggest a feedback and long-run equilibrium relationship between FDI and economic growth. Some studies, however, did not find any causal relationship between FDI and growth. We find that many empirical studies applied bivariate techniques to examine the causal relationship between FDI and growth. The results from these studies may be spurious due to the omission of important variables in their model.

4.1.3 FDI and Domestic Financial Market

As discussed above, the effects of FDI on economic growth depend on the absorptive capacity of host countries and these include the development of the domestic financial system, a characteristic that has received less attention in the literature. When we considered the different channels through which technology spillovers may take place, it become clear that in many cases domestic firms will need to invest when upgrading their own technology or adopting new technologies. The same holds if they aim at upgrading the skills of their employees, and these investments need to be financed. Thus, although FDI by its nature relies on capital from abroad, it is important to recognise that the spillovers for the host economy might depend on the extent of the development of domestic financial markets.

There are different ways in which financial markets are matter. First, without external financing, the spillovers may be restricted to only costless improvements in the organisation. Generally, to take advantage of the new technologies and/or knowledge, local firms need to alter everyday activities, and these usually required them to buy new machines, hire new managers and skilled labour. Although some local firms might be able to finance these new requirements internally, the greater the technological-knowledge gaps between their current practices and new technologies,

the greater the need for external finance. Thus, the development of the domestic financial system will determine to what extent domestic firms may be able to realise their investment plans in case external finance is needed.

Second, the development of the financial system also influences the allocative efficiency of financial resources over investment projects. Moreover, investment related to upgrade of existing or adoption of new technologies is more risky than other investment projects. The financial system in general, and specific financial institutions in particular, may help to reduce these risks, thereby stimulating domestic entrepreneurs to undertake the upgrading of existing technology or to adopt new technologies introduced by foreign firms. Thus, financial institutions positively affect the speed of technological innovation, thereby enhancing economic growth (Huang and Xu, 1999). The more developed the domestic financial system, the better it will be able to reduce risks associated with investment in upgrading old and/or new technologies.

Finally, the development of the domestic financial system may also determine to what extent foreign firms will be able to borrow in order to extend their innovative activities in the host country, which would further increase the scope for technological spillovers to domestic firms. FDI as measured by the financial flow data may be only part of the FDI to developing countries, as some of the investment is financed through debt and/or equity rose in financial markets in the host countries (Borensztein et al. 1998). Thus, the availability and quality of domestic financial markets also may influence FDI and its impact on the diffusion of technology in the host country. This diffusion process may be more efficient once financial markets in the host country are better developed, since this allows the subsidiary of a MNC to expand their investment once it has entered the country. Therefore, FDI and domestic financial are complementary with respect to enhancing the process of technological diffusion, thereby increasing the rate of economic growth.

Although empirical studies on this issue are limited, existing studies, in general, show that the development of financial markets played a significant role in enhancing the positive effects of FDI on economic growth. Alfaro et al. (2004), for example, has examined the various links among FDI, financial markets, and economic growth

using cross-country data from 1975-1985. They investigated whether countries with better financial systems can exploit FDI more efficiently. The indicators of financial development in the study cover both the banking sector (credit market) and the stock market (equity market). The data set relating to the `credit market indicators' includes 20 OECD countries and 51 non-OECD countries, while the data set on `equity market indicators' consists of 20 OECD countries and 29 non-OECD countries. Their findings show that FDI plays an important role in contributing to economic growth. However, the level of development of local financial markets is crucial for these effects to be realised.

Similar results also can be found in the panel data study by Hermes and Lensink (2000). The data set used in Hermes and Lensink are from the 1970-1995 period and contains 67 developing countries. The indicators of financial development used in Hermes and Lensink, however, only focused on the banking sector development which is the ratio of credit to the private sector as a percentage of GDP. Their results strongly suggest that the development of the financial system enhanced the positive relationship between FDI and economic growth. Specifically, they found that, of the 67 countries in data set, 37 have a sufficiently developed financial system in order to let FDI contribute positively to economic growth. Most of these countries are in Latin America and Asia. Most countries in Sub-Saharan African have very weak financial systems, and consequently FDI does not contribute positively to growth in these countries.

Bailliu (2000) in his study, focused on the effects of a broad measure of capital flows on economic growth, rather than on a more specific category, such as FDI. The study finds that the domestic financial sector played a significant role in the process linking capital flows and growth. The study used panel data for 40 developing countries from 1975-1995, and the ratio of domestic assets held by commercial banks to the total held by both commercial banks and the central bank to measure the level of development of the banking sector. The paper finds that capital inflows foster economic growth, but only for countries where the banking sector has reached a certain level of development. For countries with poorly developed banking sectors, the effect of capital flows on growth is found to be negative. He argued the result

could be caused by a correlation between a low level of financial sector development and government-imposed distortions in the financial sectors of the sample countries.

In summary, the development of the financial system is an important factor in determining the transfer of new technologies introduced by foreign investors into domestic economy are materialised. Empirical studies show that the development of the financial sector will increase the absorptive capability of spillover effects of FDI by the domestic firms, and hence positively affect economic growth.

4.1.4 Causality between FDI and Financial Development

Although the role of the financial system in enhancing the positive effects of FDI has been recognised and empirically investigated, the question still arises with respect to the relation between FDI and financial market development, mainly due to lack of empirical studies on the causal relationship between these two variables. In general, there are two views regarding the relationship between FDI and financial development. First, FDI can contribute to the development of domestic financial markets especially the stock market. According to this view, FDI can fuel the development of the stock market through different channels. First, FDI can be positively related to the participation of foreign firms in capital markets, since foreign investors might want to finance part of their investment with external capital or might want to recover their investment by selling equity in capital markets.

Alternatively, if the foreign investments are partly invested through purchasing existing equity, the liquidity of the domestic stock markets might increase. Under this view, FDI can be a complement of stock market development, thus should be positively correlated with the development of domestic equity markets. Claessens et al. (2001), for a sample of 77 countries show that FDI is positively correlated with stock market capitalisation and value traded. They concluded that FDI is a complement and not a substitute for domestic stock market development. Second, there is the view that FDI tends to be larger in countries that are riskier, financially underdeveloped, and institutionally weak. Under this view, FDI is a substitute for stock market development. FDI takes place to overcome the difficulties of investing through capital markets, given that shareholders rights are not protected. According to

this view, FDI should be negatively correlated with the development of stock markets. This view has been expressed, among others, by Hausmann and Fernandez-Arias (2000).

Many believe that FDI is associated with the inflow of funds into domestic financial market could help to ease credit constraints that faced by local firms in the developing countries. They argued that credit constraints is a major obstacle for the domestic firms in the developing countries to invest in the potentially profitable projects, hence limit the capability of the firms to absorb new technologies. In this regard, FDI may help to reduce credit constraints faced by local firms by bringing in scarce capital to the host countries. Recent studies show that domestically owned firms in the developing countries are much more likely to face credit constraints than multinational firms. For example, a study by Harrison and McMillan (2003) using firm data from Ivory Coast finds that domestic firms are more credit constrained than foreign firms.

Meanwhile, if foreign firms borrow heavily from domestic financial institutions, they may exacerbate domestic firms' financing constraints by crowding them out of domestic capital markets. In this regard, foreign investors may borrow on domestic capital markets for a variety of reasons, including as a hedging device against exchange rate fluctuations or in response to artificially low domestic interest rates. One of the possible mechanisms by which crowding out could happen is based on the fact that foreign firms may simply be more profitable and/or have access to more collateral and thus be a better investment for lending institutions. It also may because lending to local enterprises is more costly because they were generally considered more risky. The problem was compounded by the fact that interest rates in some developing countries were fixed, thus creating excess demand for loans and the likelihood of credit rationing. Because of interest rate ceilings, banks could not compensate for the extra cost of lending to domestic firms and hence preferred to lend to foreign firms. Alternatively, it may have been that foreign firms had better relationships with bankers for any of a variety of reasons. This competitive pressure may discourage local firms from investing in new technologies due to increase in the costs of external financing, and hence could limit the effects of FDI on economic growth.

However, unlike the empirical studies of the causal relationship between FDI and growth, and studies of the causal relationship between financial development and economic growth, which have been conducted extensively, as far as we can ascertain no proper studies have been carried out on the causality relationship between FDI and financial development. Thus, this study aims to provide evidence on whether a causal relationship between FDI and financial development exists in developing countries.

4.2 Methodology and Data Set

This study uses Granger-causality tests to examine the direction of causal relationships between, FDI and financial development indicators (FS), and FDI and economic growth (G). Specifically, the causality testing will be conducted in two cases: (i) causalities from one variable (FDI) to one variable (FS or G); and (ii) from a set of variables (FS and G) to one variable (FDI). The restriction will be tested by employing Wald tests. The tests are based on the following vector autoregressive (VAR) representations.

$$G_t = \alpha_1 + \sum_{i=0}^{m} \beta_{1i} FDI_{t-i} + \sum_{i=1}^{n} \gamma_{1i} G_{t-i} + \sum_{i=0}^{p} \lambda_{1i} FS_{t-i} + \mu_{1t} \qquad (4.1)$$

$$FDI_t = \alpha_2 + \sum_{i=1}^{m} \beta_{2i} FDI_{t-i} + \sum_{i=0}^{n} \gamma_{2i} G_{t-i} + \sum_{i=0}^{p} \lambda_{2i} FS_{t-i} + \mu_{2t} \qquad (4.2)$$

$$FS_t = \alpha_3 + \sum_{i=0}^{m} \beta_{3i} FDI_{t-i} + \sum_{i=0}^{n} \gamma_{3i} G_{t-i} + \sum_{i=1}^{p} \lambda_{3i} FS_{t-i} + \mu_{3t} \qquad (4.3)$$

The econometric methodology firstly will examine the stationarity properties of the time series. For this purpose, two unit root tests will be used; the Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) tests. Subsequently, the time series will be examined for the order of integration. Conditional on the outcome of the test, the second stage involves investigating bivariate cointegration utilizing the Johansen maximum likelihood approach. If bivariate cointegration exists then either unidirectional or bi-directional Granger-causality must also exist. The third stage involves constructing standard Granger-causality tests, augmented where appropriate

with a lagged error correction term (see Appendix 4.1 for detail discussion on unit root tests, cointegration tests, Error Correction Model, and Granger-causality tests). In all tests and regressions, the lag length is determined by using Akaike Information Criteria (AIC), and estimation process has been carried out by using statistical software SAS.

The strategy for causality testing is as follows: If there are no unit roots, the series is stationary, thus, the standard Granger causality tests will be used in levels VAR framework. If there are unit roots, but the variables are not cointegrated, causality tests will be performed in the first differenced VAR framework without the error correction (EC) term. If the variables are cointegrated, the EC term will be included in the regression. In this study, causality tests will be carried out on individual countries. Study of individual countries will give more information about the causality relationship between FDI, financial development and economic growth. The sample in this study consists of 37 developing countries and covering the period from 1970 to 1999. However, in the case of stock markets, the restrictiveness of the availability of the data limits the sample to 13 countries and the length of period to 1975-1999. The countries included in the sample are listed in the Appendix 4.2. The main source of data is the World Development Indicators (WDI, 2001) of World Bank; meanwhile for stock market development indicators, data are taken from Beck et al. (2000c) database.

The data for FDI is measured by net foreign direct investment, that is, the net inflows of foreign direct investment into the country. The use of net FDI seems more appropriate to examine the effects of foreign direct investment in the host country. In this study, FDI is measured as a ratio to Gross Domestic Product (GDP). Meanwhile, the indicators for the financial sector development used in this study can be classified into two broad categories: those relating to the banking sector (or credit market) and those relating to the stock market (or equity market). For the credit market, the indicators that were introduced by Levine et al. (2000), which in turn were based on King and Levine (1993a) will be used. The indicators are, first, liquid liabilities of the financial system (henceforth, B1), which is currency plus demand deposits and interest-bearing liabilities of banks and non-financial intermediaries divided by GDP. B1 provides a measure for the overall size of the financial sector. The second

indicator is the value of credit by financial intermediaries to the private sector divided by GDP (henceforth, B2). This indicator has been widely used in the recent empirical studies of financial development and economic growth. This indicator seems appropriate, based on the argument that FDI may have an effect on the availability of credit in the host country. For the equity market, two indicators of stock market development that were introduced by Levine and Zervos (1998) will be used. The first indicator is the average value of listed domestic shares on domestic exchanges as a share of the size of the GDP. This variable is to capture the relative size of the stock markets, and labelled as 'market capitalisation' (henceforth, S1). The second indicator is the value of stock trading relative to the size of the economy, labelled as 'value traded' (henceforth, S2). The indicator is to measure the stock market liquidity. Meanwhile, the growth rate of output is measured as the growth of real per capita GDP in constant dollars.

4.3 Empirical Analysis

4.3.1 Descriptive Statistics: Correlation Analysis

This section begins by looking at the simple correlation between FDI and banking development indicators, stock market development indicators, and economic growth. Table 4.1 presents the contemporaneous correlation coefficients between FDI and the indicators of the banking sector development (B1 and B2), indicators of stock markets development (S1 and S2) and economic growth (G). Statistics in Table 4.1 shows that FDI and banking development indicators are positively correlated in most of the cases. Specifically, Table 4.1 shows that correlation coefficients of FDI and B1 are positive in 24 out of 37 countries being studied. However, only in 12 countries are these correlation coefficients significant with the value of correlation coefficients range from 0.3415 to 0.8249, indicating a positive and strong association between FDI and B1. Meanwhile, negative correlation has been found in 13 cases but only in Nigeria and Venezuela are these correlation coefficients significant. Similar pattern can also be observed on the correlation between FDI and B2, where, in most of the cases, the correlation coefficients between these two variables are positive. In detail, FDI and B2 are found positively correlated in 27 out of 37 countries being

studies. However, only in 15 countries are these correlation coefficients significant, and the value of correlation coefficients for these countries range from 0.3126 to 0.6636. This indicates that the correlation between FDI and B2 is relatively less strong compared with the correlation between FDI and B1. Meanwhile, in 10 countries, the correlations between FDI and B2 are negative, but only in Venezuela is the coefficient significant.

Meanwhile, correlation analysis between FDI and both stock market development indicators (S1 and S2) show that these two variables are positively correlated in almost all countries being studied. Specifically, for FDI and S1, positive and significant correlation relationships have been found in 7 out of 8 countries being studied, and the value of correlation coefficients range from 0.4017 to 0.6487. The values of correlation coefficients indicate that the relationships between FDI and S1 in these countries are strong. A similar pattern can also be observed in the correlation relationships between FDI and S2, where the analysis finds that correlation between FDI and S2 is significant in 9 out of 13 countries being studied. The value of correlation coefficients between FDI and S2 are ranging from 0.4531 to 0.9153, indicating strong positive relationship between FDI and S2. The last column of Table 4.1 presents the correlation coefficients between FDI and G. In general, the results show that FDI and G are positively correlated in most of the countries being studied. Table 4.1 shows that the correlation coefficients between FDI and G are positive in 26 out of 37 in the sample. However, only in 8 countries, FDI was found significantly correlated with economic growth. The values of correlation coefficients in these countries are ranging from 0.3105 to 0.4906, indicating that the correlation relationship between these two variables is not very strong. Meanwhile, in the 11 cases, this analysis found that the correlation between FDI and G is negative but not significant except in Thailand.

Table 4.1: Correlation between FDI, Banking Development Indicators, Stock Markets Development Indicators, and Economic Growth

Country	Variables				
	B1	B2	S1	S2	G
Algeria	-0.09759 (0.6079)	0.11342 (0.5507)	-	-	0.49060 (0.0059)*
Argentina	0.25278 (0.1778)	0.14075 (0.4582)	-	0.18691 (0.3818)	-0.09504 (0.6174)
Barbados	-0.12154 (0.5223)	0.18824 (0.3192)	-	-	0.17977 (0.3418)
Bolivia	0.8009 (0.0001)*	0.49226 (0.0057)*	-	-	0.21270 (0.2591)
Brazil	-0.15316 (0.4277)	-0.26795 (0.1523)	-	-	-0.02672 (0.8885)
Central Africa	0.23116 (0.2190)	0.38496 (0.0357)*	-	-	0.08909 (0.6396)
Chile	0.70387 (0.0001)*	0.45656 (0.0112)*	0.6371 (0.0019)*	0.69929 (0.0001)*	0.10816 (0.5694)
Colombia	0.50874 (0.0041)*	0.24655 (0.1890)	0.40169 (0.0574)*	0.45309 (0.0262)*	-0.24175 (0.1981)
Congo Republic	-0.04708 (0.8049)	-0.02110 (0.9119)	-	-	0.38131 (0.0376)*
Costa Rica	0.06474 (0.7340)	-0.23313 (0.2150)	-	-	0.31046 (0.0950)**
El Salvador	0.34145 (0.0648)**	0.43108 (0.0174)*	-	-	0.03328 (0.8614)
Ghana	0.11996 (0.5278)	0.27436 (0.1423)	-	-	0.04161 (0.8272)
Guatemala	-0.20275 (0.2826)	-0.08990 (0.6366)	-	-	0.19290 (0.3071)
Honduras	0.82496 (0.0001)*	0.41239 (0.0235)*	-	-	-0.14432 (0.4467)
India	-0.03979 (0.8376)	-0.00593 (0.9757)	-	0.55914 (0.0045)*	0.13956 (0.4703)
Indonesia	0.14737 (0.4371)	0.49517 (0.0054)*	-	-	0.37327 (0.0422)*
Israel	-0.07533 (0.6924)	0.03973 (0.8349)	-	-	0.15899 (0.4014)
Jamaica	-0.21647 (0.2506)	-0.00137 (0.9943)	-	-	0.40464 (0.0266)*
Kenya	0.07297 (0.7016)	0.19456 (0.3029)	-	-	-0.19422 (0.3038)
Malaysia	0.01838 (0.9232)	0.24744 (0.1874)	0.49039 (0.0205)*	0.47196 (0.0199)*	0.31691 (0.0879)**
Mauritania	0.11642 (0.5401)	0.09119 (0.6318)	-	-	0.07254 (0.7033)
Mauritius	0.53041 (0.0026)*	0.40698 (0.0256)*	-	-	0.02630 (0.8903)
Mexico	-0.04094 (0.8299)	0.04017 (0.8331)	0.56996 (0.0057)*	0.72251 (0.0001)*	-0.16489 (0.3839)

Table 4.1 (continued)

Country	Variables				
	B1	B2	S1	S2	G
Morocco	0.42570 (0.0213)*	0.31256 (0.0988)**	-	-	-0.10912 (0.5731)
Nigeria	-0.36665 (0.0463)*	-0.29472 (0.1139)	0.44845 (0.0363)*	0.23307 (0.2731)	0.05636 (0.7674)
Pakistan	0.26090 (0.1638)	0.34450 (0.0623)**	-	-	-0.24012 (0.2012)
Panama	0.61400 (0.0003)*	0.48790 (0.0062)*	-	-	0.16200 (0.3924)
Paraguay	0.28647 (0.1248)	0.42257 (0.0200)*	-	-	0.08929 (0.6389)
Peru	0.23459 (0.2121)	0.43079 (0.0175)*	-	0.91533 (0.0001)*	0.27914 (0.1352)
Philippines	0.65827 (0.0001)*	0.15149 (0.4242)	0.64865 (0.0006)*	0.56379 (0.0041)*	0.06323 (0.8920)
Singapore	0.57594 (0.0009)*	0.53476 (0.0023)*	-	0.22881 (0.2713)	0.02589 (0.8920)
South Africa	0.05896 (0.7613)	0.27269 (0.1524)	0.49494 (0.0139)*	0.55600 (0.0039)*	0.37392 (0.0457)*
Sri Lanka	0.68850 (0.0001)*	0.66363 (0.0001)*	-	-	0.36831 (0.0452)*
Thailand	0.78748 (0.0001)*	0.65626 (0.0001)*	0.21383 (0.3157)	0.30301 (0.1501)	-0.51572 (0.0035)*
Tunisia	-0.16865 (0.3730)	-0.14500 (0.4446)	-	-	0.05036 (0.7916)
Venezuela	-0.51597 (0.0035)*	-0.59698 (0.0005)*	-	0.57862 (0.0024)*	-0.04996 (0.7932)
Zambia	-0.29350 (0.1154)	-0.18090 (0.3388)	-	-	-0.12495 (0.5106)

Note: * *Indicates that the coefficient is significant at 5% levels*
** *Indicates that the coefficient is significant at 10% levels*
Figures in parentheses are p-value

To investigate the dynamic relationship between FDI and the variables being studied, this study has examined the correlation relationships between FDI and lagged values of B1, B2, S1, S2, and G. The correlation analysis have been carried out between FDI and lagged 1 to lagged 4 period of B1, B2, S1, S2, and G. Results from this analysis are presented in Appendix 4.3. In general, this study finds that the results from dynamic correlation between FDI and lagged banking development indicators (B1 and B2) are consistent with the results from cotemporaneous correlation analysis. The dynamic correlation analysis of FDI and B1, however, shows that the number of positive and significant relationships increased to 14 cases compared with only 12

cases in the cotemporaneous analysis. This is because, in the case of Jamaica and Kenya, the correlation coefficients between FDI and lagged B1 were found positive and significant which is contrast with the result of cotemporaneous correlation that not significant. For the correlation relationship between FDI and lagged B2, the coefficients were found positive and significant in 14 cases compared to 15 cases in the cotemporaneous analysis. This is because, in the case of Honduras, lagged B2 and FDI are not significantly correlated compared with positive and significant in the cotemporaneous analysis. Meanwhile, in the case of stock market development indicators, the results from dynamic correlation analysis are quite similar with the results obtained from cotemporaneous analysis.

4.3.2 Results from Unit Root Tests

This section presents the result from the unit root tests for testing the stationarity properties and the order of integration of the variables being studied. For these purposes, two types of unit root tests have been conducted and reported, the Augmented Dickey Fuller tests (ADF) and Phillips-Perron tests (PP). The null hypothesis for the test is that there is a unit root in the series against the alternative that the series are stationary. The results of unit root tests are presented in Appendix 4.4. Appendix 4.4 shows that FDI is stationary at levels in 19 countries suggesting that that FDI in these countries is I(0). Meanwhile, in 18 countries, FDI is stationary in first differences suggesting that FDI in these countries is I(1).

The unit root tests on banking development indicators and stock market development indicators generally find that both variables are not stationary at levels. Specifically, for B1, results from the unit root tests show that the variable is stationary at levels only in the case of Brazil, Congo Republic, Guatemala, and India, while in the other countries, this variable is stationary in first differences. For B2, unit root tests find that only in Argentina, Brazil, Congo Republic, Jamaica, Kenya and Philippines is the variable stationary at levels, while in 23 other countries, B2 is stationary at first differences, and in 7 countries B2 is stationary at second differences. These findings suggest that, in most of the cases, the variable B2 is I(1). The countries in which variable B2 is stationary at second differences were Honduras, Indonesia, Pakistan,

Panama, South Africa, Sri Lanka and Thailand, indicating that B2 in these countries is I(2).

This study also finds that stock market development indicators in most of the countries are stationary at first differences, indicating that, in general, S1 and S2 are I(1). Specifically, the unit root tests show that S1 is stationary at levels in Chile, but stationary at first differences in Malaysia, Nigeria, Philippines, and Thailand, and stationary at second differences in the case of Colombia, Mexico, and Thailand. For S2, the results of unit root tests indicate that the variable, in most of the cases, is stationary at first differences. In the case of India, Nigeria, Peru and South Africa, S2 is stationary at second differences, suggesting that S2 in these countries is I(2). Meanwhile, with regard to economic growth, in most of the cases, the result of unit root tests shows that the variable is stationary at level, suggesting that G is I(0). Specifically, unit root tests show that G is stationary at level in the 32 out of 37 countries in the sample, while in 5 countries, G is stationary at first differences. The countries in which G is stationary at first differences were Bolivia, Colombia, Congo Republic, Guatemala, and Paraguay.

4.3.3 Result from Cointegration Tests

With the order of integration tests complete, the next step is to conduct a cointegration test to examine the existence of a stable long-run relationship between FDI and banking development, FDI and stock market development, and FDI and economic growth. In this study, the cointegration tests are performed by using Johansen (1988) tests, and the results from this test are presented in Appendix 4.5. Specifically, Appendix 4.5 presents the Johansen trace statistics for testing the existence of bivariate cointegration between FDI and banking development indicators, FDI and stock market development indicators, and FDI and economic growth (G). The null hypothesis for cointegration tests is that there is zero cointegrating vectors among the pairs of variables against the alternative that there is at least 1 cointegrating vector.

The results of cointegration tests in Appendix 4.5 shows that FDI is cointegrated with B1 in 22 countries, and with B2 in 18 countries out of 37 countries in our sample. In

detail, results from cointegration tests show that FDI is cointegrated with both B1 and B2 in 16 cases. In six countries, FDI only cointegrated with B1, while in Mauritius and Peru, FDI is only cointegrated with B2. Meanwhile, for stock market development indicators, the results show that S1 is cointegrated with FDI in 5 out of 8 countries being studied, while S2 is cointegrated with FDI in 8 out of 13 countries in the sample. The results show that FDI is cointegrated with both S1 and S2 in 4 cases. In Mexico only S1 is cointegrated with FDI, while in Nigeria only S2 is cointegrated with FDI. Meanwhile, in Chile and the Philippines, both stock market indicators are not cointegrated with FDI. In respect to the relationship between FDI and economic growth, the test results show that these two variables are significantly cointegrated in 31 out of 37 countries being studied. The countries in which FDI and G are not cointegrated were Bolivia, Brazil, Honduras, Israel, Mexico, and Philippines.

In summary, the results from cointegration tests show that variable FDI and banking development indicators (B1 and B2) are cointegrated in about half of the cases being studied. In most of the cases, both stock market development indicators (S1 and S2) and FDI are cointegrated. FDI and economic growth was also found cointegrated in majority of countries in the sample.

4.4 Bivariate Granger-Causality Tests

This section presents the estimation results from bivariate Granger-causality tests between FDI and banking development indicators, FDI and stock market indicators, and FDI and economic growth. In this study, the bivariate causality tests between FDI and the variables being studied was carried out by using two methods of estimation, the first difference VAR and the VECM. This is based on the results of unit root test, which found that most of the variables except economic growth are not stationary at level but become stationary at first differences. The findings imply that the appropriate method of estimation for causality tests in this situation is a first difference VAR. Meanwhile, in most of the countries, results from the cointegration tests show that FDI is cointegrated with the variables being studied. In this situation, a VAR with error correction is the appropriate method of estimation for causality test. Thus, the discussion in this paper only focuses on the results that obtained from VECM approach. Meanwhile, results from first difference VAR approach are

presented in Appendix 4.6-4.10. In both estimation methods, Wald statistics were used to test the existence of causal relationships between variables.

4.4.1 Bivariate Causality between FDI and Banking Development

This section discusses the results of the bivariate Granger-causality tests on the relationship between FDI and financial development indicators from the VECM approach. In general, from the Wald statistics in Table 4.2, this study finds that FDI and B1 are not causally related in 18 out of 37 countries in the sample, while in 4 countries the direction of causality is bi-directional, and in 15 countries the causality is unidirectional. The countries where the direction of causality between FDI and B1 is bi-directional were Barbados, Morocco, Pakistan, and Paraguay. Meanwhile, out of 15 countries where unidirectional causality between FDI and B1 is significant, in 6 countries the direction of causality runs from FDI to B1, while in 9 countries the causality runs in the opposite direction. With regard to the causal relationship between FDI and B2, this study finds that these two variables are not causally related in 20 out of 37 countries being studied. In 5 countries, the causality is from FDI to B2, while in 7 countries, the direction of causality is from B2 to FDI, and not vice versa. Meanwhile, bi-directional causality between these two variables has been found significant in 5 countries, Barbados, Central Africa, Nigeria, Pakistan, and Thailand.

The causality tests also have been performed in the multivariate VECM framework where economic growth and two control variables (trade openness and government expenditure) have been included in the model in addition to FDI and banking development indicators. In most of the cases (25 countries), the findings from the multivariate model are consistent with the findings from the bivariate model. However, in some cases, results from the multivariate VECM are slightly different from the bivariate VECM model. For example, in Barbados, causality test based on bivariate VECM shows the direction of causality between FDI and B1, and FDI and B2, both are bi-directional, but in the multivariate VECM, only causality that runs from FDI to B2 is significant. Meanwhile, in Central Africa, Jamaica, Pakistan, and Panama, causality tests based on the multivariate VECM does not support the finding

from bivariate VECM that FDI causes B1. Findings from multivariate VECM also does not support findings from the bivariate VECM that FDI causes B2 in the case of Central Africa, Costa Rica, and Pakistan. Differences also can be observed in the case of causality between FDI and B2 especially in Barbados, Central Africa, Costa Rica, Honduras, Mauritania, and Pakistan.

Table 4.2: Granger-Causality Tests between FDI and Banking Sector Development: The VECM Approach

Country	**Null hypothesis**	**Wald Statistics**	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Algeria	FDI does not Granger-cause B1	3.58(0.4660)	0.59(0.7443)
	B1 does not Granger-cause FDI	1.86(0.7615)	1.65(0.4391)
	FDI does not Granger-cause B2	1.96(0.7428)	0.30(0.8618)
	B2 does not Granger-cause FDI	2.78(0.5953)	3.83(0.1473)
Argentina	FDI does not Granger-cause B1	0.71(0.3989)	0.71(0.3989)
	B1 does not Granger-cause FDI	0.63(0.4280)	0.63(0.4280)
	FDI does not Granger-cause B2	1.33(0.2490)	1.33(0.2490)
	B2 does not Granger-cause FDI	0.09(0.7656)	0.09(0.7656)
Barbados	FDI does not Granger-cause B1	9.93(0.0771)**	0.95(0.3310)
	B1 does not Granger-cause FDI	13.65(0.0180)*	0.77(0.3811)
	FDI does not Granger-cause B2	10.84(0.0546)**	17.86(0.0001)*
	B2 does not Granger-cause FDI	49.22(0.0001)*	2.86(0.2388)
Bolivia	FDI does not Granger-cause B1	1.07(0.3002)	5.43(0.2461)
	B1 does not Granger-cause FDI	0.17(0.6772)	11.13(0.0251)*
	FDI does not Granger-cause B2	0.21(0.6470)	6.09(0.1924)
	B2 does not Granger-cause FDI	0.02(0.8998)	4.81(0.3078)
Brazil	FDI does not Granger-cause B1	5.73(0.2199)	5.73(0.2199)
	B1 does not Granger-cause FDI	18.87(0.0008)*	18.87(0.0008)*
	FDI does not Granger-cause B2	4.56(0.3358)	4.56(0.3358)
	B2 does not Granger-cause FDI	14.38(0.0062)*	14.38(0.0062)*
Central Africa	FDI does not Granger-cause B1	19.39(0.0007)*	0.51(0.4742)
	B1 does not Granger-cause FDI	2.73(0.6046)	0.13(0.7169)
	FDI does not Granger-cause B2	22.31(0.0005)*	0.33(0.5656)
	B2 does not Granger-cause FDI	34.25(0.0001)*	4.49(0.0341)*
Chile	FDI does not Granger-cause B1	0.04(0.8339)	2.56(0.6336)
	B1 does not Granger-cause FDI	0.12(0.7284)	1.98(0.7395)
	FDI does not Granger-cause B2	3.08(0.5442)	3.08(0.5442)
	B2 does not Granger-cause FDI	1.54(0.8191)	1.54(0.8191)
Colombia	FDI does not Granger-cause B1	16.00(0.0030)*	16.00(0.0030)*
	B1 does not Granger-cause FDI	7.68(0.1040)	7.68(0.1040)
	FDI does not Granger-cause B2	16.16(0.0028)*	16.16(0.0028)*
	B2 does not Granger-cause FDI	7.49(0.1121)	7.49(0.1121)
Congo Republic	FDI does not Granger-cause B1	4.64(0.4610)	4.08(0.3949)
	B1 does not Granger-cause FDI	11.25(0.0467)*	5.00(0.2870)
	FDI does not Granger-cause B2	0.36(0.9857)	0.36(0.9858)
	B2 does not Granger-cause FDI	0.13(0.9981)	0.31(0.9981)

Table 4.2 (continued)

Country	Null hypothesis	Wald Statistics	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Costa Rica	FDI does not Granger-cause B1	0.28(0.6786)	1.46(0.2267)
	B1 does not Granger-cause FDI	11.94(0.0026)*	0.16(0.6854)
	FDI does not Granger-cause B2	13.49(0.0012)*	1.03(0.3105)
	B2 does not Granger-cause FDI	2.65(0.2655)	2.56(0.1097)
El Salvador	FDI does not Granger-cause B1	0.35(0.5550)	0.35(0.5554)
	B1 does not Granger-cause FDI	0.09(0.7704)	0.09(0.7704)
	FDI does not Granger-cause B2	0.04(0.7596)	0.09(0.7595)
	B2 does not Granger-cause FDI	0.64(0.4255)	0.64(0.4255)
Ghana	FDI does not Granger-cause B1	0.76(0.9443)	0.76(0.9443)
	B1 does not Granger-cause FDI	4.92(0.2957)	4.92(0.2957)
	FDI does not Granger-cause B2	0.01(0.9970)	0.53(0.4683)
	B2 does not Granger-cause FDI	2.87(0.2381)	0.33(0.5673)
Guatemala	FDI does not Granger-cause B1	6.30(0.0429)*	8.10(0.0881)**
	B1 does not Granger-cause FDI	2.85(0.2409)	13.55(0.0089)*
	FDI does not Granger-cause B2	5.09(0.2779)	5.09(0.2779)
	B2 does not Granger-cause FDI	21.82(0.0002)*	21.82(0.0002)*
Honduras	FDI does not Granger-cause B1	2.15(0.7075)	2.15(0.7075)
	B1 does not Granger-cause FDI	14.39(0.0062)*	14.39(0.0067)*
	FDI does not Granger-cause B2	0.00(0.9891)	0.77(0.9425)
	B2 does not Granger-cause FDI	0.44(0.5060)	9.14(0.0577)**
India	FDI does not Granger-cause B1	0.87(0.9282)	0.87(0.9282)
	B1 does not Granger-cause FDI	7.61(0.1070)	7.61(0.1070)
	FDI does not Granger-cause B2	7.67(0.1043)	7.67(0.1043)
	B2 does not Granger-cause FDI	7.00(0.1361)	7.00(0.1361)
Indonesia	FDI does not Granger-cause B1	4.21(0.3782)	4.21(0.3782)
	B1 does not Granger-cause FDI	0.37(0.9852)	0.37(0.9852)
	FDI does not Granger-cause B2	18.47(0.0004)*	12.91(0.0003)*
	B2 does not Granger-cause FDI	2.02(0.5691)	0.17(0.6801)
Israel	FDI does not Granger-cause B1	1.88(0.7575)	1.88(0.7575)
	B1 does not Granger-cause FDI	3.06(0.5485)	3.06(0.5485)
	FDI does not Granger-cause B2	2.96(0.5650)	2.96(0.5650)
	B2 does not Granger-cause FDI	1.66(0.7978)	1.66(0.7978)
Jamaica	FDI does not Granger-cause B1	9.06(0.0595)**	2.47(0.1158)
	B1 does not Granger-cause FDI	6.29(0.1784)	0.25(0.6182)
	FDI does not Granger-cause B2	0.66(0.7177)	0.66(0.7177)
	B2 does not Granger-cause FDI	5.06(0.0796)**	5.06(0.0796)**
Kenya	FDI does not Granger-cause B1	6.68(0.1539)	0.00(0.9502)
	B1 does not Granger-cause FDI	6.87(0.1431)	0.05(0.8233)
	FDI does not Granger-cause B2	1.36(0.8517)	0.03(0.8657)
	B2 does not Granger-cause FDI	4.55(0.3368)	0.19(0.6612)
Malaysia	FDI does not Granger-cause B1	3.72(0.4445)	3.72(0.4445)
	B1 does not Granger-cause FDI	13.14(0.0106)*	13.14(0.0106)*
	FDI does not Granger-cause B2	5.33(0.2548)	5.33(0.2548)
	B2 does not Granger-cause FDI	23.25(0.0001)*	23.25(0.0001)*
Mauritania	FDI does not Granger-cause B1	47.50(0.0001)	1.12(0.2910)
	B1 does not Granger-cause FDI	1.12(0.8918)	0.46(0.4971)
	FDI does not Granger-cause B2	0.26(0.9921)	0.01(0.9070)
	B2 does not Granger-cause FDI	9.86(0.0428)*	1.35(0.2456)

Table 4.2 (continued)

Country	Null hypothesis	Wald Statistics	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Mauritius	FDI does not Granger-cause B1	0.30(0.9901)	0.30(0.9901)
	B1 does not Granger-cause FDI	4.31(0.3662)	4.31(0.3662)
	FDI does not Granger-cause B2	2.70(0.6100)	2.70(0.6100)
	B2 does not Granger-cause FDI	4.53(0.3389)	4.53(0.3389)
Mexico	FDI does not Granger-cause B1	7.52(0.1108)	7.52(0.1108)
	B1 does not Granger-cause FDI	3.18(0.5284)	3.18(0.5284)
	FDI does not Granger-cause B2	9.29(0.0543)**	9.29(0.0543)**
	B2 does not Granger-cause FDI	3.55(0.4702)	3.55(0.4702)
Morocco	FDI does not Granger-cause B1	7.80(0.0052)*	7.80(0.0052)*
	B1 does not Granger-cause FDI	4.57(0.0325)*	4.57(0.0325)*
	FDI does not Granger-cause B2	3.22(0.5219)	2.22(0.1361)
	B2 does not Granger-cause FDI	2.96(0.5640)	0.91(0.3389)
Nigeria	FDI does not Granger-cause B1	4.59(0.3321)	4.59(0.3321)
	B1 does not Granger-cause FDI	6.40(0.1711)	6.40(0.1711)
	FDI does not Granger-cause B2	11.82(0.0188)*	11.82(0.0188)*
	B2 does not Granger-cause FDI	26.00(0.0001)*	26.00(0.0001)*
Pakistan	FDI does not Granger-cause B1	21.65(0.0002)*	2.14(0.3436)
	B1 does not Granger-cause FDI	18.46(0.0010)*	9.24(0.0098)*
	FDI does not Granger-cause B2	14.72(0.0053)*	0.15(0.9291)
	B2 does not Granger-cause FDI	13.09(0.0108)*	8.60(0.0136)*
Panama	FDI does not Granger-cause B1	2.52(0.06409)**	2.52(0.6409)
	B1 does not Granger-cause FDI	0.79(0.9404)	0.79(0.9404)
	FDI does not Granger-cause B2	14.33(0.0008)*	40.70(0.0001)*
	B2 does not Granger-cause FDI	2.85(0.2411)	1.74(0.7838)
Paraguay	FDI does not Granger-cause B1	8.90(0.0637)**	8.90(0.0637)**
	B1 does not Granger-cause FDI	9.73(0.0453)*	9.73(0.0453)*
	FDI does not Granger-cause B2	4.03(0.4019)	4.03(0.4019)
	B2 does not Granger-cause FDI	12.43(0.0144)*	12.43(0.0144)*
Peru	FDI does not Granger-cause B1	3.06(0.5472)	3.06(0.5472)
	B1 does not Granger-cause FDI	6.04(0.1964)	6.04(0.1964)
	FDI does not Granger-cause B2	3.68(0.4510)	3.68(0.4510)
	B2 does not Granger-cause FDI	1.64(0.8020)	1.64(0.8020)
Philippines	FDI does not Granger-cause B1	3.16(0.5318)	3.16(0.5318)
	B1 does not Granger-cause FDI	10.45(0.0334)*	10.45(0.0334)*
	FDI does not Granger-cause B2	0.26(0.6120)	0.26(0.6120)
	B2 does not Granger-cause FDI	0.78(0.3769)	0.78(0.3769)
Singapore	FDI does not Granger-cause B1	0.69(0.9521)	0.69(0.9521)
	B1 does not Granger-cause FDI	5.16(0.2714)	5.16(0.2714)
	FDI does not Granger-cause B2	6.89(0.1419)	6.89(0.1419)
	B2 does not Granger-cause FDI	2.93(0.3704)	2.93(0.5704)
South Africa	FDI does not Granger-cause B1	7.05(0.0079)*	16.90(0.0020)*
	B1 does not Granger-cause FDI	1.79(0.1805)	11.62(0.0204)
	FDI does not Granger-cause B2	0.00(0.9915)	0.37(0.9284)
	B2 does not Granger-cause FDI	0.00(0.9655)	2.20(0.6999)
Sri Lanka	FDI does not Granger-cause B1	6.99(0.1366)	6.99(0.1366)
	B1 does not Granger-cause FDI	3.74(0.4423)	3.74(0.4423)
	FDI does not Granger-cause B2	0.96(0.9157)	0.96(0.9157)
	B2 does not Granger-cause FDI	3.10(0.5405)	3.10(0.5404)

Table 4.2 (continued)

Country	Null hypothesis	Wald Statistics	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Thailand	FDI does not Granger-cause B1	4.39(0.3563)	0.05(0.8151)
	B1 does not Granger-cause FDI	22.40(0.0002)*	3.45(0.0632)
	FDI does not Granger-cause B2	22.02(0.0001)*	22.02(0.0001)*
	B2 does not Granger-cause FDI	7.14(0.0076)*	7.14(0.0076)*
Tunisia	FDI does not Granger-cause B1	0.12(0.7322)	0.12(0.7322)
	B1 does not Granger-cause FDI	2.90(0.0884)**	2.90(0.0884)**
	FDI does not Granger-cause B2	4.24(0.3745)	4.24(0.3745)
	B2 does not Granger-cause FDI	2.61(0.6252)	2.61(0.6252)
Venezuela	FDI does not Granger-cause B1	0.95(0.3291)	0.95(0.3291)
	B1 does not Granger-cause FDI	4.70(0.0302)*	4.70(0.0302)*
	FDI does not Granger-cause B2	0.60(0.4393)	0.60(0.4393)
	B2 does not Granger-cause FDI	3.94(0.0472)*	3.94(0.0472)*
Zambia	FDI does not Granger-cause B1	0.47(0.4929)	0.47(0.4929)
	B1 does not Granger-cause FDI	1.22(0.2694)	1.22(0.2694)
	FDI does not Granger-cause B2	0.00(0.9904)	0.00(0.9904)
	B2 does not Granger-cause FDI	0.78(0.3783)	0.78(0.3783)

Note: * *Significant at 5 percent levels*
** *Significant at 10 percent levels.*
In all regressions, the lag lengths are determined by using AIC. In the multivariate model, variables economic growth and trade openness have been included in the regressions.

4.4.2 Bivariate Causality between FDI and Stock Market Development

Table 4.3 presents the results of causality tests for the relationship between FDI and two indicators of stock markets development (S1 and S2) that were obtained from the VECM estimation. From the Wald statistics of the bivariate VECM in Table 4.3, S1 was found not causally related with FDI in the cases of Chile and Colombia. Meanwhile, in Malaysia, South Africa, and Thailand, the causality tests show that the direction of causality between FDI and S1 is bi-directional. In Mexico and Philippines, the direction of causality is from FDI to S1, while in Nigeria the causality runs from S1 to FDI. With regard to S2, causality test based on the VECM estimation find that the direction of causality between FDI and S2 in India, Mexico, Philippines, Singapore, and Thailand is bi-directional. In the case of Malaysia, the result shows that FDI significantly causes S2, while in Argentina, Chile, Colombia, Peru, and Venezuela, the direction of causality is from S2 to FDI.

Table 4.3: Granger-Causality Tests between FDI and Stock Market Development: The VECM Approach

Country	Null hypothesis	Wald Statistic	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Argentina	FDI does not Granger-cause S2	2.57(0.6323)	2.57(0.6323)
	S2 does not Granger-cause FDI	16.89(0.0020)*	16.89(0.0020)*
Chile	FDI does not Granger-cause S1	2.44(0.6561)	2.44(0.6561)
	S1 does not Granger-cause FDI	5.60(0.2308)	5.60(0.2308)
	FDI does not Granger-cause S2	5.17(0.2706)	5.17(0.2706)
	S2 does not Granger-cause FDI	28.29(0.0001)*	28.29(0.0001)*
Colombia	FDI does not Granger-cause S1	0.02(0.8983)	4.62(0.3287)
	S1 does not Granger-cause FDI	2.34(0.1259)	10.24(0.0366)*
	FDI does not Granger-cause S2	3.46(0.4842)	1.68(0.1947)
	S2 does not Granger-cause MDI	20.18(0.0005)*	5.38(0.0203)*
India	FDI does not Granger-cause S2	21.93(0.0001)*	34.86(0.0001)*
	S2 does not Granger-cause FDI	42.11(0.0001)*	20.41(0.0004)*
Malaysia	FDI does not Granger-cause S1	22.94(0.0001)*	22.94(0.0001)*
	S1 does not Granger-cause FDI	9.50(0.0496)*	9.50(0.0496)*
	FDI does not Granger-cause S2	45.70(0.0001)*	45.70(0.0001)*
	S2 does not Granger-cause FDI	3.10(0.5406)	3.10(0.5406)
Mexico	FDI does not Granger-cause S1	4.85(0.0277)*	2.77(0.5964)
	S1 does not Granger-cause FDI	0.24(0.6272)	16.72(0.0022)*
	FDI does not Granger-cause S2	20.97(0.0003)*	20.97(0.0003)*
	S2 does not Granger-cause FDI	9.67(0.0464)*	9.67(0.0464)*
Nigeria	FDI does not Granger-cause S1	3.14(0.5353)	3.14(0.5353)
	S1 does not Granger-cause FDI	20.77(0.0004)*	20.77(0.0004)*
	FDI does not Granger-cause S2	0.22(0.6363)	41.23(0.0001)*
	S2 does not Granger-cause FDI	0.62(0.4310)	15.84(0.0032)*
Peru	FDI does not Granger-cause S2	1.71(0.1907)	17.55(0.0015)*
	S2 does not Granger-cause FDI	18.45(0.0001)*	125.59(0.0001)*
Philippines	FDI does not Granger-cause S1	3.26(0.0709)**	12.13(0.0164)*
	S1 does not Granger-cause FDI	0.61(0.4331)	20.34(0.0004)*
	FDI does not Granger-cause S2	14.76(0.0052)*	14.76(0.0052)*
	S2 does not Granger-cause FDI	26.30(0.0001)*	26.30(0.0001)*
Singapore	FDI does not Granger-cause S2	17.86(0.0013)*	17.86(0.0013)*
	S2 does not Granger-cause FDI	19.23(0.0007)*	19.23(0.0007)*
South Africa	FDI does not Granger-cause S1	7.33(0.0068)*	10.16(0.0378)*
	S1 does not Granger-cause FDI	3.49(0.0616)**	24.23(0.0001)*
	FDI does not Granger-cause S2	0.10(0.7939)	7.36(0.1179)
	S2 does not Granger-cause MDI	0.00(0.9983)	9.37(0.0526)**
Thailand	FDI does not Granger-cause S1	4.41(0.0356)*	4.41(0.0356)*
	S1 does not Granger-cause FDI	11.30(0.0008)*	11.30(0.0008)*
	FDI does not Granger-cause S2	33.03(0.0001)*	33.03(0.0001)*
	S2 does not Granger-cause FDI	12.79(0.0123)*	12.79(0.0123)*
Venezuela	FDI does not Granger-cause S2	0.72(0.8507)	0.32(0.8507)
	S2 does not Granger-cause FDI	49.03(0.0001)*	49.03(0.0001)*

Note: * *Significant at 5 percent levels*

** *Significant at 10 percent levels*

In all regressions, the lag lengths are determined by AIC. In multivariate model variables economic growth and trade openness have been included in the regressions.

Column 4 of Table 4.3 provides the Wald statistics that were obtained from the multivariate VECM approach. In general, the results from the multivariate VECM model are consistent with the results that were obtained from the bivariate VECM model. Specifically, causality tests based on the multivariate model show that the direction of causality between FDI and S1 is bi-directional in the case of Malaysia, Philippines, South Africa, and Thailand. Meanwhile, in Colombia, Mexico and Nigeria, the causality runs from S1 to FDI, and not vice versa. With regard to the causality between FDI and S2, this study finds the direction of causality between these two variables is bi-directional in the case of India, Mexico, Nigeria, Peru, Philippines, Singapore, and Thailand. The unidirectional causality from FDI to S2 was found significant in Malaysia, while in Argentina, Chile, Colombia, South Africa, and Venezuela, S2 causes FDI.

4.4.3 Bivariate Causality between FDI and Economic Growth

Table 4.4 presents the Wald statistics for causality testing on the relationship between FDI and economic growth that were obtained from the VECM estimation. In general, from column 3 of Table 4.4, we find that FDI does not cause G in 19 out of 37 countries being studied. This study finds that only in Algeria, Congo Republic, South Africa, and Tunisia, the direction of causality between FDI and G is bi-directional. In 7 countries, Brazil, Chile, Colombia, Costa Rica, El Salvador, India, and Thailand, the causality is from FDI to G, and not vice versa. Meanwhile, a unidirectional causality that runs from G to FDI is found statistically significant in 7 countries (Barbados, Ghana, Guatemala, Indonesia, Mauritania, Panama and Philippines).

The bivariate causality between FDI and economic growth has also been tested in the multivariate VECM in which banking development indicators and two control variables (trade openness and government expenditure) have been included in the model in addition to FDI and G. The Wald statistics for causality tests from the multivariate VECM estimation are presented in column 4 and 5 of Table 4.4. In column 4, banking development indicator, B1 has been used as one of the variables in the regressions, while in the fifth column B1 has been replaced by B2. This study finds that the findings of causality test that were generated from the multivariate model produce similar results with the bivariate approach in most of the cases being

investigated. The causality tests from the multivariate VECM also find that, generally, FDI does not cause G. The differences, however, can be observed in the case of Barbados, Chile, and Ghana where the results from the multivariate model show that FDI and G is not causally related in these countries. In South Africa and Tunisia, the results from the multivariate model show that the causality is from G to FDI, while in Mauritania, FDI causes G. In Jamaica, the causality between FDI and G is bi-directional, and this is in contrast with the no causality relationship that was produced by the bivariate model. We also find that the results of causality tests from the multivariate model with B2 as one of variables are consistent with the results that were produced by the multivariate model with B1 except in the case of Barbados, Ghana, Indonesia, Jamaica, and Tunisia.

4.4.4 Discussion

The results of causality tests from the multivariate VECM are slightly different with the results from the first-difference multivariate approach. In most of the cases, both methods find that FDI and banking development indicators are not causally related. In detail, for the hypothesis that FDI causes B1, both estimation methods indicate that the causality is significant in only 5 cases. Meanwhile, for opposite causality that runs from B1 to FDI, the multivariate VECM estimations show that the causality is significant in 11 cases compared with only 7 in the first-difference multivariate VAR estimations. Similar pattern can also be observed in the causality between B2 and FDI where both estimation methods show that FDI and B2 generally are not causally related. With regard to the causality between FDI and stock market development, in general, this paper finds that in both estimation methods, FDI and stock market indicators are causally related. Meanwhile, for the causality between FDI and G, this paper finds that the results from the multivariate VECM are slightly different with the results that were obtained from the first-difference multivariate VAR model. However, in general, both estimation methods show that FDI and G are not causally related in the majority of countries being studied. Specifically, from the multivariate first-differences VAR approach, FDI and G was found not causally related in 25 countries, while from the VECM multivariate approach, in 19 countries.

Table 4.4: Granger-Causality Tests between FDI and Economic Growth: The VECM Approach

Country	Null hypothesis	Wald Statistics		
		Bivariate	Multivariate (B1)	Multivariate (B2)
(1)	(2)	(3)	(4)	(5)
Algeria	FDI does not Granger-cause G	7.34(0.0254)*	7.34(0.0254)*	7.34(0.0254)*
	G does not Granger-cause FDI	95.80(0.0001)*	45.80(0.0001)*	95.80(0.0001)*
Argentina	FDI does not Granger-cause G	0.02(0.8813)	0.02(0.8813)	0.02(0.8813)
	G does not Granger-cause FDI	0.63(0.4271)	0.63(0.4271)	0.63(0.4271)
Barbados	FDI does not Granger-cause G	1.40(0.9248)	0.00(0.9420)	0.42(0.8111)
	G does not Granger-cause FDI	10.40(0.0647)**	0.87(0.3507)	5.18(0.0750)**
Bolivia	FDI does not Granger-cause G	0.02(0.8968)	5.09(0.2780)	5.09(0.2780)
	G does not Granger-cause FDI	1.13(0.2873)	2.53(0.6387)	2.53(0.6397)
Brazil	FDI does not Granger-cause G	12.13(0.0164)*	12.13(0.0164)*	12.13(0.0164)*
	G does not Granger-cause FDI	5.40(0.2491)	5.40(0.2481)	5.40(0.2481)
Central Africa	FDI does not Granger-cause G	0.52(0.2179)	1.52(0.2179)	1.52(0.2179)
	G does not Granger-cause FDI	0.07(0.7886)	0.07(0.7886)	0.07(0.7886)
Chile	FDI does not Granger-cause G	2.84(0.0921)**	6.52(0.1635)	6.52(0.1635)
	G does not Granger-cause FDI	0.22(0.6395)	1.94(0.7461)	1.94(0.7461)
Colombia	FDI does not Granger-cause G	22.18(0.0001)*	34.18(0.0001)*	34.18(0.0001)*
	G does not Granger-cause FDI	1.01(0.6027)	1.68(0.7941)	1.68(0.7941)
Congo Republic	FDI does not Granger-cause G	34.89(0.0001)*	23.17(0.0001)*	23.17(0.0001)*
	G does not Granger-cause FDI	20.19(0.0012)*	9.54(0.0490)*	9.54(0.0490)*
Costa Rica	FDI does not Granger-cause G	2.72(0.0990)**	2.72(0.0990)**	2.72(0.0990)**
	G does not Granger-cause FDI	0.42(0.5161)	0.42(0.5161)	0.42(0.5161)
El Salvador	FDI does not Granger-cause G	3.06(0.0800)*	3.06(0.0800)*	3.06(0.0800)*
	G does not Granger-cause FDI	0.08(0.7734)	0.08(0.7734)	0.08(0.7734)
Ghana	FDI does not Granger-cause G	0.00(0.9640)	4.47(0.3460)	0.00(0.9640)
	G does not Granger-cause FDI	4.80(0.0284)*	5.52(0.2377)	4.80(0.0284)*
Guatemala	FDI does not Granger-cause G	0.81(0.9373)	0.81(0.9373)	0.81(0.9373)
	G does not Granger-cause FDI	14.36(0.0062)*	14.36(0.0062)*	14.36(0.0062)*
Honduras	FDI does not Granger-cause G	7.68(0.1042)	7.68(0.1042)	7.68(0.1042)
	G does not Granger-cause FDI	3.70(0.4480)	3.70(0.4480)	3.70(0.4480)
India	FDI does not Granger-cause G	20.22(0.0005)*	20.22(0.0005)*	20.22(0.0005)*
	G does not Granger-cause FDI	2.86(0.5823)	2.86(0.5823)	2.86(0.5823)
Indonesia	FDI does not Granger-cause G	0.40(0.8183)	3.97(0.4095)	0.02(0.8871)
	G does not Granger-cause FDI	7.78(0.0204)*	7.97(0.0926)*	1.92(0.1658)
Israel	FDI does not Granger-cause G	4.24(0.3740)	4.24(0.3740)	4.24(0.3740)
	G does not Granger-cause FDI	6.55(0.1619)	6.55(0.1619)	6.55(0.1619)
Jamaica	FDI does not Granger-cause G	0.51(0.9167)	3.56(0.0590)*	10.15(0.0063)*
	G does not Granger-cause FDI	4.82(0.1857)	3.45(0.0634)*	0.75(0.6858)
Kenya	FDI does not Granger-cause G	1.44(0.2300)	1.44(0.2300)	1.44(0.2300)
	G does not Granger-cause FDI	0.07(0.7953)	0.07(0.7953)	0.07(0.7953)
Malaysia	FDI does not Granger-cause G	1.06(0.7005)	1.06(0.9005)	1.06(0.9005)
	G does not Granger-cause FDI	7.12(0.1298)	7.12(0.1298)	7.12(0.1298)
Mauritania	FDI does not Granger-cause G	7.69(0.1035)	2.92(0.0874)**	2.92(0.0874)**
	G does not Granger-cause FDI	25.16(0.0001)*	0.69(0.4067)	0.69(0.4067)
Mauritius	FDI does not Granger-cause G	5.85(0.2104)	5.85(0.2104)	5.85(0.2104)
	G does not Granger-cause FDI	5.60(0.2313)	5.60(0.2313)	5.60(0.2313)
Mexico	FDI does not Granger-cause G	5.96(0.2021)	5.96(0.2021)	5.96(0.2021)
	G does not Granger-cause FDI	1.11(0.8922)	1.11(0.8922)	1.11(0.8922)

Table 4.4 (continued)

Country	Null hypothesis	Wald Statistics		
		Bivariate	Multivariate (B1)	Multivariate (B2)
(1)	(2)	(3)	(4)	(5)
Morocco	FDI does not Granger-cause G	2.07(0.1498)	2.07(0.1497)	2.07(0.1498)
	G does not Granger-cause FDI	1.98(0.1593)	1.98(0.1593)	1.98(0.1593)
Nigeria	FDI does not Granger-cause G	1.97(0.3725)	7.67(0.1045)	7.67(0.1045)
	G does not Granger-cause FDI	0.11(0.9444)	1.17(0.8825)	1.17(0.8825)
Pakistan	FDI does not Granger-cause G	2.71(0.2583)	2.71(0.2583)	2.71(0.2583)
	G does not Granger-cause FDI	4.46(0.1078)	4.46(0.1078)	4.46(0.1078)
Panama	FDI does not Granger-cause G	0.69(0.9530)	0.86(0.9530)	0.69(0.9530)
	G does not Granger-cause FDI	8.12(0.0874)**	8.12(0.0874)**	8.12(0.0874)**
Paraguay	FDI does not Granger-cause G	1.85(0.7631)	1.85(0.7631)	1.85(0.7631)
	G does not Granger-cause FDI	1.59(0.8101)	1.59(0.8101)	1.59(0.8101)
Peru	FDI does not Granger-cause G	4.96(0.2915)	4.96(0.2915)	4.96(0.2915)
	G does not Granger-cause FDI	3.57(0.4679)	3.57(0.4679)	3.57(0.4679)
Philippines	FDI does not Granger-cause G	1.15(0.2834)	3.60(0.4628)	1.15(0.2834)
	G does not Granger-cause FDI	3.18(0.0747)**	18.91(0.0008)*	3.18(0.0747)**
Singapore	FDI does not Granger-cause G	3.10(0.5410)	3.10(0.5410)	3.10(0.5410)
	G does not Granger-cause FDI	4.35(0.3604)	4.35(0.3604)	4.35(0.3604)
South Africa	FDI does not Granger-cause G	3.76(0.0526)**	7.38(0.1169)	7.38(0.1169)
	G does not Granger-cause FDI	3.79(0.0514)**	9.51(0.0496)*	9.51(0.0496)*
Sri Lanka	FDI does not Granger-cause G	2.11(0.5494)	2.09(0.7184)	2.09(0.7184)
	G does not Granger-cause FDI	0.95(0.8122)	6.89(0.1419)	6.89(0.1419)
Thailand	FDI does not Granger-cause G	18.57(0.0010)*	4.66(0.0308)*	4.66(0.0308)*
	G does not Granger-cause FDI	3.97(0.4104)	0.18(0.6724)	0.18(0.6724)
Tunisia	FDI does not Granger-cause G	8.39(0.0783)**	0.01(0.9104)	8.39(0.0783)**
	G does not Granger-cause FDI	12.79(0.0123)*	5.92(0.0150)*	12.79(0.0123)*
Venezuela	FDI does not Granger-cause G	0.37(0.5412)	0.37(0.5412)	0.37(0.5412)
	G does not Granger-cause FDI	0.52(0.4692)	0.52(0.4692)	0.52(0.4692)
Zambia	FDI does not Granger-cause G	2.22(0.1364)	2.22(0.1364)	2.22(0.1364)
	G does not Granger-cause FDI	0.40(0.5270)	0.40(0.5270)	0.40(0.5270)

Note: * *Significant at 5 percent levels*
** *Significant at 10 percent levels*
In all regressions, lag lengths are determined by AIC. Multivariate estimations in column 4 used B1 as one of the dependent variables, while in multivariate estimations in column 5, B1 has been replaced by B2.

4.5 Multivariate Causality

4.5.1 Multivariate Causality between FDI, Banking Sector Development and Economic Growth

Table 4.5 presents the Wald statistics for causality tests between FDI and a set of variables consist of banking development indicators and economic growth from the multivariate VECM estimation. The Wald statistics in Table 4.5 show that FDI and a

set of variables, B1 and G are not causally related in 13 out of 37 countries being studied. Meanwhile, in 9 countries, the causality between these two groups of variables is bi-directional meaning that FDI causes B1 and G as a group, and vice versa. Meanwhile, the unidirectional causality that runs from FDI to set of variables, B1 and G was found significant in 6 countries, and the reverse causality from a set of variables, B1 and G to FDI was found significant in 9 countries.

With regard to the causality between FDI, and B2 and G as a group, this study finds that these two groups of variables are not causally related in 15 out of 37 countries in the sample. Meanwhile, the bi-directional causality between these two groups of variables was found significant in 7 countries. Specifically, in Barbados, Brazil, Guatemala, Nigeria, Panama, Thailand, and Tunisia, B2 and G are jointly causes FDI, and vice versa. This study also finds evidence of unidirectional causality from FDI to a set of variables, B2 and G in the case of Bolivia, Colombia, Congo Republic, India, Indonesia, Israel, Jamaica, and Mexico. Meanwhile, the reverse causality between these two groups of variables was found statistically significant in the case of Algeria, Ghana, Malaysia, Pakistan, Paraguay, Sri Lanka, and Venezuela.

Table 4.5: Granger-Causality Tests between FDI, and Banking Sector Development and Economic Growth as a Group: The VECM Approach

Country (1)	**Null hypothesis** (2)	**Wald statistics** (3)
Algeria	FDI does not Granger-cause B1, Growth	7.79(0.0996)**
	B1, Growth does not Granger-cause FDI	97.38(0.0001)*
	FDI does not Granger-cause B2, Growth	6.62(0.1571)
	B2, Growth does not Granger-cause FDI	98.57(0.0001)*
Argentina	FDI does not Granger-cause B1, Growth	0.32(0.8505)
	B1, Growth does not Granger-cause FDI	1.37(0.5042)
	FDI does not Granger-cause B2, Growth	1.41(0.4940)
	B2, Growth does not Granger-cause FDI	0.66(0.7205)
Barbados	FDI does not Granger-cause B1, Growth	2.48(0.2898)
	B1, Growth does not Granger-cause FDI	1.41(0.4931)
	FDI does not Granger-cause B2, Growth	21.63(0.0002)*
	B2, Growth does not Granger-cause FDI	9.75(0.0449)*
Bolivia	FDI does not Granger-cause B1, Growth	12.20(0.1425)
	B1, Growth does not Granger-cause FDI	16.65(0.0340)*
	FDI does not Granger-cause B2, Growth	14.43(0.0713)**
	B2, Growth does not Granger-cause FDI	11.51(0.1744)

Table 4.5 (continued)

Country (1)	**Null hypothesis** (2)	**Wald Statistics** (3)
Brazil	FDI does not Granger-cause B1, Growth	18.52(0.0177)*
	B1, Growth does not Granger-cause FDI	44.78(0.0001)*
	FDI does not Granger-cause B2, Growth	18.18(0.0199)*
	B2, Growth does not Granger-cause FDI	32.83(0.0001)*
Central Africa	FDI does not Granger-cause B1, Growth	6.37(0.0415)*
	B1, Growth does not Granger-cause FDI	0.18(0.9151)
	FDI does not Granger-cause B2, Growth	1.74(0.4183)
	B2, Growth does not Granger-cause FDI	4.53(0.1037)
Chile	FDI does not Granger-cause B1, Growth	6.76(0.5623)
	B1, Growth does not Granger-cause FDI	4.20(0.8390)
	FDI does not Granger-cause B2, Growth	8.41(0.3946)
	B2, Growth does not Granger-cause FDI	4.89(0.7698)
Colombia	FDI does not Granger-cause B1, Growth	82.20(0.0001)*
	B1, Growth does not Granger-cause FDI	13.48(0.0964)**
	FDI does not Granger-cause B2, Growth	55.68(0.0001)*
	B2, Growth does not Granger-cause FDI	9.52(0.3006)
Congo Republic	FDI does not Granger-cause B1, Growth	27.59(0.0006)*
	B1, Growth does not Granger-cause FDI	30.49(0.0002)*
	FDI does not Granger-cause B2, Growth	40.04(0.0001)*
	B2, Growth does not Granger-cause FDI	11.86(0.1577)
Costa Rica	FDI does not Granger-cause B1, Growth	5.01(0.0817)**
	B1, Growth does not Granger-cause FDI	0.43(0.8055)
	FDI does not Granger-cause B2.Growth	2.32(0.3135)
	B2, Growth does not Granger-cause FDI	3.85(0.1456)
El Salvador	FDI does not Granger-cause B1, Growth	2.99(0.2238)
	B1, Growth does not Granger-cause FDI	0.16(0.9210)
	FDI does not Granger-cause B2, Growth	3.22(0.2000)
	B2, Growth does not Granger-cause FDI	0.68(0.7119)
Ghana	FDI does not Granger-cause B1, Growth	6.50(0.5911)
	B1, Growth does not Granger-cause FDI	11.57(0.1712)
	FDI does not Granger-cause B2, Growth	1.60(0.4492)
	B2, Growth does not Granger-cause FDI	4.81(0.0868)**
Guatemala	FDI does not Granger-cause B1, Growth	4.45(0.8145)
	B1, Growth does not Granger-cause FDI	33.75(0.0001)*
	FDI does not Granger-cause B2, Growth	30.75(0.0002)*
	B2, Growth does not Granger-cause FDI	42.39(0.0001)*
Honduras	FDI does not Granger-cause B1, Growth	18.66(0.0168)*
	B1, Growth does not Granger-cause FDI	22.99(0.0034)*
	FDI does not Granger-cause B2, Growth	10.02(0.2639)
	B2, Growth does not Granger-cause FDI	12.33(0.1370)
India	FDI does not Granger-cause B1, Growth	20.41(0.0089)*
	B1, Growth does not Granger-cause FDI	9.20(0.3259)
	FDI does not Granger-cause B2, Growth	24.47(0.0019)*
	B2, Growth does not Granger-cause FDI	9.97(0.2668)
Indonesia	FDI does not Granger-cause B1, Growth	6.55(0.5856)
	B1, Growth does not Granger-cause FDI	10.72(0.2180)
	FDI does not Granger-cause B2, Growth	7.43(0.0244)*
	B2, Growth does not Granger-cause FDI	2.34(0.3103)

Table 4.5 (continued)

Country (1)	Null hypothesis (2)	Wald Statistics (3)
Israel	FDI does not Granger-cause B1, Growth	11.42(0.1790)
	B1, Growth does not Granger-cause FDI	9.25(0.3219)
	FDI does not Granger-cause B2, Growth	18.88(0.0155)*
	B2, Growth does not Granger-cause FDI	10.81(0.2127)
Jamaica	FDI does not Granger-cause B1, Growth	11.58(0.0031)*
	B1, Growth does not Granger-cause FDI	3.61(0.1642)
	FDI does not Granger-cause B2, Growth	14.50(0.0059)*
	B2, Growth does not Granger-cause FDI	5.53(0.2374)
Kenya	FDI does not Granger-cause B1, Growth	1.69(0.4300)
	B1, Growth does not Granger-cause FDI	0.11(0.9484)
	FDI does not Granger-cause B2, Growth	1.99(0.3704)
	B2, Growth does not Granger-cause FDI	0.25(0.8832)
Malaysia	FDI does not Granger-cause B1, Growth	11.64(0.1681)
	B1, Growth does not Granger-cause FDI	33.55(0.0001)*
	FDI does not Granger-cause B2, Growth	11.34(0.1829)
	B2, Growth does not Granger-cause FDI	35.79(0.0001)*
Mauritania	FDI does not Granger-cause B1, Growth	3.54(0.1702)
	B1, Growth does not Granger-cause FDI	1.53(0.4663)
	FDI does not Granger-cause B2, Growth	4.00(0.1355)
	B2, Growth does not Granger-cause FDI	1.50(0.4724)
Mauritius	FDI does not Granger-cause B1, Growth	10.50(0.2319)
	B1, Growth does not Granger-cause FDI	15.88(0.0442)*
	FDI does not Granger-cause B2, Growth	13.06(0.1098)
	B2, Growth does not Granger-cause FDI	10.09(0.2585)
Mexico	FDI does not Granger-cause B1, Growth	15.25(0.0581)**
	B1, Growth does not Granger-cause FDI	4.92(0.7664)
	FDI does not Granger-cause B2, Growth	20.22(0.0095)*
	B2, Growth does not Granger-cause FDI	7.92(0.4412)
Morocco	FDI does not Granger-cause B1, Growth	6.88(0.0321)*
	B1, Growth does not Granger-cause FDI	4.59(0.1009)
	FDI does not Granger-cause B2, Growth	4.17(0.1241)
	B2, Growth does not Granger-cause FDI	2.53(0.2827)
Nigeria	FDI does not Granger-cause B1, Growth	12.45(0.1322)
	B1, Growth does not Granger-cause FDI	8.55(0.3813)
	FDI does not Granger-cause B2, Growth	19.51(0.0124)*
	B2, Growth does not Granger-cause FDI	35.96(0.0001)*
Pakistan	FDI does not Granger-cause B1, Growth	3.11(0.5396)
	B1, Growth does not Granger-cause FDI	11.02(0.0263)*
	FDI does not Granger-cause B2, Growth	3.28(0.5120)
	B2, Growth does not Granger-cause FDI	11.46(0.0218)*
Panama	FDI does not Granger-cause B1, Growth	4.12(0.8463)
	B1, Growth does not Granger-cause FDI	16.13(0.0405)*
	FDI does not Granger-cause B2, Growth	50.94(0.0001)*
	B2, Growth does not Granger-cause FDI	15.16(0.0562)**
Paraguay	FDI does not Granger-cause B1, Growth	21.56(0.0058)*
	B1, Growth does not Granger-cause FDI	19.14(0.0141)*
	FDI does not Granger-cause B2, Growth	8.56(0.3807)
	B2, Growth does not Granger-cause FDI	15.58(0.0488)*

Table 4.5 (continued)

Country (1)	**Null hypothesis** (2)	**Wald Statistics** (3)
Peru	FDI does not Granger-cause B1, Growth	9.67(0.2889)
	B1, Growth does not Granger-cause FDI	9.87(0.2743)
	FDI does not Granger-cause B2, Growth	5.56(0.6959)
	B2, Growth does not Granger-cause FDI	6.61(0.5789)
Philippines	FDI does not Granger-cause B1, Growth	41.05(0.0001)*
	B1, Growth does not Granger-cause FDI	27.60(0.0006)*
	FDI does not Granger-cause B2, Growth	1.70(0.4283)
	B2, Growth does not Granger-cause FDI	3.55(0.1699)
Singapore	FDI does not Granger-cause B1, Growth	60.49(0.0001)*
	B1, Growth does not Granger-cause FDI	14.51(0.0694)**
	FDI does not Granger-cause B2, Growth	12.23(0.1412)
	B2, Growth does not Granger-cause FDI	8.98(0.3443)
South Africa	FDI does not Granger-cause B1, Growth	15.00(0.0591)**
	B1, Growth does not Granger-cause FDI	18.26(0.0193)*
	FDI does not Granger-cause B2, Growth	11.92(0.1547)
	B2, Growth does not Granger-cause FDI	11.23(0.1861)
Sri Lanka	FDI does not Granger-cause B1, Growth	12.41(0.1339)
	B1, Growth does not Granger-cause FDI	20.27(0.0094)*
	FDI does not Granger-cause B2, Growth	5.89(0.6591)
	B2, Growth does not Granger-cause FDI	14.15(0.0780)*
Thailand	FDI does not Granger-cause B1, Growth	3.63(0.1626)
	B1, Growth does not Granger-cause FDI	3.58(0.1666)
	FDI does not Granger-cause B2, Growth	15.87(0.0004)*
	B2, Growth does not Granger-cause FDI	7.26(0.0265)*
Tunisia	FDI does not Granger-cause B1, Growth	0.16(0.9248)
	B1, Growth does not Granger-cause FDI	7.02(0.0298)*
	FDI does not Granger-cause B2, Growth	14.41(0.0716)**
	B2, Growth does not Granger-cause FDI	16.18(0.0399)*
Venezuela	FDI does not Granger-cause B1, Growth	1.57(0.4558)
	B1, Growth does not Granger-cause FDI	7.59(0.0224)*
	FDI does not Granger-cause B2, Growth	0.73(0.6945)
	B2, Growth does not Granger-cause FDI	7.06(0.0294)*
Zambia	FDI does not Granger-cause B1, Growth	3.25(0.1967)
	B1, Growth does not Granger-cause FDI	1.51(0.4711)
	FDI does not Granger-cause B2, Growth	2.79(0.2475)
	B2, Growth does not Granger-cause FDI	1.03(0.5973)

Note: * *Significant at 5 percent levels*

** *Significant at 10 percent levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In all regressions, variable trade openness has been included in the estimation.

4.5.2 Multivariate Causality between FDI, Stock Market Development and Economic Growth

Table 4.6 presents the Wald statistics for testing the direction of causal relationships between FDI and a group of variables consist of stock market development indicators and economic growth. From the Wald statistics in Table 4.6, we find that FDI and a set of variable, S1 and G are causally related in all cases being investigated. Furthermore, in all cases, the direction of causality between these two groups of variable is bi-directional except in Nigeria where the causality runs from S1 and G as a group to FDI. With regard to the causality between FDI and a set of variables, S2 and G, this study finds that the direction of causality is bi-directional in all cases except for Chile and Venezuela. In Chile and Venezuela, this study finds that the direction of causality is unidirectional running from set of variables, S1 and G to FDI.

Table 4.6: Granger-Causality Tests between FDI, and Stock Market Development and Economic Growth as a Group: The VECM Approach

Country (1)	**Null hypothesis** (2)	**Wald Statistics** (3)
Argentina	FDI does not Granger-cause S2, Growth	21.06(0.0070)*
	S2, Growth does not Granger-cause FDI	20.80(0.0077)*
Chile	FDI does not Granger-cause S1, Growth	35.76(0.0001)*
	S1, Growth does not Granger-cause FDI	14.36(0.0729)**
	FDI does not Granger-cause S2, Growth	11.05(0.1991)
	S2, Growth does not Granger-cause FDI	46.70(0.0001)*
Colombia	FDI does not Granger-cause S1, Growth	77.02(0.0001)*
	S1, Growth does not Granger-cause FDI	26.28(0.0009)*
	FDI does not Granger-cause S2, Growth	16.79(0.0002)*
	S2, Growth does not Granger-cause MDI	8.58(0.0137)*
India	FDI does not Granger-cause S2, Growth	616.33(0.0001)*
	S2, Growth does not Granger-cause FDI	37.96(0.0001)*
Malaysia	FDI does not Granger-cause S1, Growth	243.00(0.0001)*
	S1, Growth does not Granger-cause FDI	30.25(0.0002)*
	FDI does not Granger-cause S2, Growth	196.30(0.0001)*
	S2, Growth does not Granger-cause FDI	13.67(0.0908)**
Mexico	FDI does not Granger-cause S1, Growth	98.60(0.0001)*
	S1, Growth does not Granger-cause FDI	36.90(0.0001)*
	FDI does not Granger-cause S2, Growth	87.64(0.0001)*
	S2, Growth does not Granger-cause FDI	47.19(0.0001)*
Nigeria	FDI does not Granger-cause S1, Growth	9.02(0.3403)
	S1, Growth does not Granger-cause FDI	80.49(0.0001)*
	FDI does not Granger-cause S2, Growth	122.12(0.0001)*
	S2, Growth does not Granger-cause FDI	18.63(0.0170)*

Table 4.6 (continued)

Country (1)	Null hypothesis (2)	Wald Statistics (3)
Peru	FDI does not Granger-cause S2, Growth	19.47(0.0126)*
	S2, Growth does not Granger-cause FDI	205.53(0.0001)*
Philippines	FDI does not Granger-cause S1, Growth	17.73(0.0233)*
	S1, Growth does not Granger-cause FDI	86.08(0.0001)*
	FDI does not Granger-cause S2, Growth	20.29(0.0093)*
	S2, Growth does not Granger-cause FDI	73.14(0.0001)*
Singapore	FDI does not Granger-cause S2, Growth	27.04(0.0007)*
	S2, Growth does not Granger-cause FDI	32.76(0.0001)*
South Africa	FDI does not Granger-cause S1, Growth	34.71(0.0001)*
	S1, Growth does not Granger-cause FDI	36.93(0.0001)*
	FDI does not Granger-cause S2, Growth	22.68(0.0038)*
	S2, Growth does not Granger-cause MDI	36.80(0.0001)*
Thailand	FDI does not Granger-cause S1, Growth	16.69(0.0012)*
	S1, Growth does not Granger-cause FDI	11.31(0.0035)*
	FDI does not Granger-cause S2, Growth	76.26(0.0001)*
	S2, Growth does not Granger-cause FDI	37.43(0.0001)*
Venezuela	FDI does not Granger-cause S2, Growth	2.58(0.6307)
	S2, Growth does not Granger-cause FDI	69.65(0.0001)*

Note: * *Significant at 5 percent levels*
** *Significant at 10 percent levels*
Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In all regressions, variable trade openness has been included in the estimation.

4.5.3 Discussion

The multivariate causality tests based on the VECM approach show that banking sector development (B1 or B2) and economic growth jointly affect FDI in 22 out of 37 countries being studied (see Table 4.5). Comparing the findings in Table 4.4 and the findings in Table 4.5, we find that in Brazil, Colombia, Honduras, Malaysia, Mauritius, Nigeria, Pakistan, Paraguay, Singapore, Sri Lanka, Thailand, and Venezuela, economic growth alone has no effect on FDI, but economic growth together with banking sector development significantly cause FDI. Meanwhile (see Table 4.2), in Algeria, Barbados, Congo Republic, Ghana, Mauritius, Panama, Singapore, South Africa, Sri Lanka, and Tunisia, we find that the banking development individually has no effect on FDI, but as a group, banking development and economic growth significantly affect FDI. The finding indicates that, first, higher economic growth or the developed banking sector individually may not be a factor to determine FDI. Second, foreign investors are more attracted to invest in countries

that have both, better economic growth and developed domestic banking sector. Meanwhile, the reverse causality from FDI to banking development and economic growth as a group was found significant in 24 countries, Algeria, Barbados, Bolivia, Brazil, Central Africa, Colombia, Congo Republic, Costa Rica, Guatemala, Honduras, India, Indonesia, Israel, Jamaica, Mexico, Morocco, Nigeria, Panama, Paraguay, Philippines, Singapore, South Africa, Thailand, and Tunisia. The finding indicates that, in these countries, FDI simultaneously affects economic growth and the development of the domestic banking sector.

With regard to the joint causality of stock market development and economic growth, this study finds that stock markets development (S1 or S2) and economic growth are jointly effects FDI in all countries being studied (Argentina, Chile, Colombia, India, Malaysia, Mexico, Nigeria, Peru, Philippines, Singapore, South Africa, Thailand, and Venezuela). In these countries, stock markets development can also affect FDI individually (see Table 4.3) but, economic growth alone does not affect FDI except in the case of South Africa and the Philippines. This indicates that economic growth together with better-developed domestic stock markets is the main factor in attracting FDI into these countries. Meanwhile, the reverse causality shows that, in all countries being studied, FDI can affect economic growth and the development of stock markets simultaneously except in Venezuela.

4.6 Conclusion

This study investigates the causal relationship between foreign direct investment, financial sector development, and economic growth. The causality tests have been conducted by first checking the stationarity properties of the variables and the cointegration relationship between variables. This is followed by testing the direction of bivariate causality between FDI and financial development indicators, and FDI and economic growth. The main objective of this study, however, is to investigate the multivariate causality between set of variables, financial development and economic growth and FDI. This is to examine whether financial development and economic growth jointly affect the inflow of FDI, and vice versa. For this purpose, the financial development has been investigated from two aspects; credit market (measured by the ratio of liquid liabilities to GDP, and the ratio of credit to private sector to GDP), and

equity market (measured by the ratio of market capitalisation to GDP, and the ratio of value traded to GDP). The studies have been carried out in 37 developing countries (in the case of banking development), however, in the case of equity markets, the sample is 13 countries. The selection of countries is based on the availability of the data. For estimation purposes, we used annual data from the period of 1970 to 1999, however, in the case of stock markets development; the data are from 1975 to 1999.

The major findings of this study were, first, the bivariate causality tests between FDI and banking development, and FDI and economic growth produced mixed results. Only in some countries, we find evidence that FDI causes the development of banking sector or economic growth. Similarly, only in some countries, we find evidence of reverse causality that runs from banking development or economic growth to FDI. In most of the cases, bivariate causality tests show that FDI and banking development, and FDI and economic growth are not causally related. In contrast, we find a strong support of the existence of causal relationship that runs from FDI to the stock market development, and vice versa. In many cases, the results from multivariate causality tests between set of variables, banking development indicators and economic growth, and FDI are consistent with the findings from bivariate causality tests. In some countries, however, we find that banking development and economic growth are jointly causes FDI. Meanwhile, in certain cases, we find that the development of banking sector helps to improve the effect of economic growth on FDI. Finally, the empirical evidences strongly support that stock market development alone or together with economic growth Grangerly causes FDI.

In conclusion, the results from bivariate causality tests give little support on the hypothesis that the inflows of FDI can contribute to the development of domestic banking sector or economic growth in the developing countries. The effects of FDI on the domestic banking sector or economic growth also differ from country to country. However, in the majority of developing countries, this study finds that FDI has no effect on the development of the domestic banking sector or economic growth. Only in some developing countries, FDI was found significantly to affect the development of domestic banking sector or economic growth. This study also finds little support for the argument that the development of the domestic banking sector causes FDI. This indicates that the development of the domestic banking sector alone

is not a main factor in determining the inflows of FDI to developing countries. Similarly, this study finds little support for the hypothesis that FDI goes to countries with high economic growth, suggesting that economic growth alone is also not a main determinant in attracting FDI into the developing countries. In contrast, we find strong support that FDI can affect the development of the domestic stock markets in the developing countries, and vice versa. Meanwhile, the significant reverse causality from stock markets development to FDI indicates that the existence of better-developed stock markets is essential in attracting FDI.

Meanwhile, from the multivariate causality tests, this study finds that the joint effect of banking development and economic growth will help to improve the individual effect of banking development or economic growth on FDI in some developing countries. The finding suggests the countries that have both higher economic growth and developed banking sector are more attractive to FDI. Meanwhile, in some countries, causality tests indicate that FDI can simultaneously affect the domestic banking sector development and economic growth. This indicates that the existence of better-developed domestic banking sector has improved the effect of FDI on economic growth, or the existence of higher economic growth could help to increase the effect of FDI on banking development. This is consistent with the finding from other literature that found the development of domestic banking sector or economic growth is a pre-condition for FDI to affect economic growth or banking development. Finally, this study finds strong support that stock market development together with economic growth or individually can affect FDI.

Chapter 5

Summary and Conclusion

In 1912 Schumpeter argued that services provided by financial intermediaries are essential for technological innovation and economic development. Studies by Goldsmith (1969), McKinnon (1973), and Shaw (1973) found that financial intermediaries play a key role in economic activity. In their view, differences in the quantity and quality of services provided by financial intermediaries could partly explain why countries grew at different rates. Since these pioneering contributions, numerous studies have dealt with different aspects of this relation at both the theoretical and empirical levels. Several studies have attempted to establish whether financial deepening leads to improved growth performance (for example, study by King and Levine, 1993a, 1993b; Arestis and Demetriades, 1996; and Neusser and Kugler, 1998). Meanwhile, other studies have focused on identifying the channels of transmission from financial intermediation to growth (for example, study by Greenwood and Jovanovic, 1990; and Roubini and Sala-I-Martin, 1992). Studies on the relationship between financial development and growth have also been extended to other aspects of the financial sector such as stock markets (for example, study by Rousseau and Wachtel, 2000; and Kassimatis and Spyrou, 2001) and financial structures (for example, study by Beck and Levine, 2000; Rajan and Zingales, 2001; and Levine, 2002), and the relationship between financial development with other macroeconomic activities. Another strand of research, however, rejects this view and regards financial development as a supplement to the development of the real sector (Robinson, 1952). In between these views, lie those who believe that the relationship is badly 'overstressed' (Lucas, 1988) or those who do not associate the two at all (Stern, 1989).

This thesis has analysed the relationship between financial development, financial structures and economic growth by using different methodologies and making a further contribution to the growing empirical literature on the subject matter. In Chapter 2, which is the first empirical study in this thesis, we investigate the role of banks and stock market development either individually or together on economic growth. In addition, we also investigate the impact of financial structures on economic growth, providing further clarification on the aspects that have been neglected by previous empirical studies, that the impact of financial structures on growth could be different between countries with different level of income. To achieve these objectives, we use two indicators of banking development and two indicators of stock market development. The indicators for banking development are the ratio of liquid liabilities to GDP and the ratio of domestic private credit to GDP. The indicators for stock market development are the market capitalization ratio and the ratio of value traded to GDP. An indicator to measure both development in the banking sector and the stock markets was constructed to measure the Overall Size and Overall Activities of the financial sector in the economy. Financial structure indicators that measure the relative importance of stock markets and banking sector in the economy were also constructed. Economic growth is measured by real per capita GDP growth and the study also uses investment per GDP. In line with latest development in this subject, we used a panel data approach generated from 88 countries for the period 1960-1999. The panel data for stock market development cover the period from 1975 to 1997 and consist of 45 countries. In the estimation process, we use the latest econometric method for analysing dynamic panel data; the GMM-SYSTEM that was developed by Arellano and Bover (1995), and Blundell and Bond (1998).

There are four main findings in the empirical study in the Chapter 2. First, none of the banking sector development indicators is significantly related with economic growth. However, both indicators of banking sector development are significantly related with investment per GDP. This suggests that investment is the channel through which banking sector development may have an effect on economic growth. Meanwhile, in the case of stock markets development, we find that both indicators are significantly related with economic growth. We also find that market capitalisation ratio is positively and significantly related with investment. This finding suggests

that stock market development has a positive impact on economic growth. However, in the long run, the negative effects of stock market development on GDP per capita growth and investment could suggest that the development of stock markets has a destabilising effect on economic growth.

Second, in investigating the overall impact of financial sector development on economic growth and investment, it was found that overall development of financial sectors is important for economic growth and the level of investment. The regression results show that the Overall Size not significantly related with GDP per capita growth but, Overall Activity has a positive and significant relationship with GDP per capita growth. This finding could indicate that an increase in overall financial activities will positively affect economic growth but not an increase in the overall size of financial sector. However, more importantly this finding provides evidence to support the argument both banks and stock markets play a complementary role in economic growth. This finding is in line with Levine (1997) who argued that the overall financial development is important for economic growth. The estimation results also show that the impact of the Overall Activity of financial sector on GDP per capita growth is higher than the impact on investment. This finding suggests that the overall activity of the financial sector will promote growth largely through its impact on investment efficiency.

Third, in investigating the impact of financial structure on economic growth and investment, three out of four indicators of financial structures used in this study we found to be significantly and positively related with GDP per capita growth. This may indicate the importance of financial structure on economic growth. However, after taking into account the negative wealth effects on GDP per capita growth, we find that financial structure has a mixed effect on economic growth. In addition, none of financial structure indicators significantly affect investments which could imply that to have a more market-based financial system does not matter for investment. In addition, we constructed two indicators for Overall Structure, and find a mixed effect of these indicators on economic growth. Overall Structures are also not related with investment per GDP. The fact that financial structures could have a positive impact on GDP per capita growth but not on investment per GDP indicates that the market-

based financial structure will improve the investment efficiency but not the level of investment.

Fourth, in investigating the relationship between financial structures, economic growth and investment in the case of developed and developing countries, the estimation results show that Overall Structure indicator is positive and significantly related with economic growth in developed countries. Meanwhile in the developing countries the effect is negative. This could suggest that a market-based financial structure will promote better growth in the high-income countries. Meanwhile, in middle- and low income countries, to have a more market-based financial structure could hurt economic growth. This finding suggests that a market-based financial structure can promote growth in a country that has an efficient stock market and also a developed banking sector. This finding seems in line with Rajan and Zingales (2001) who conjectured that market-based systems are probably more likely to dominate in time of great industrial change, while bank-based systems may have an advantage when the other institutions in an economy are highly underdeveloped. However, we find that financial structure significantly affects investment only in the case of developed countries. This effect is negative, indicating that a market-based financial structure could also hurt the level of investment in these countries. This finding provides evidence that the effect of financial structures on investment depends on the level of income of the country.

The objective of the analysis in Chapter 3 is to investigate the relationship between countries' legal structure and the performance of monetary policy. The study investigates whether the strength of the effect of monetary policy on output, investment and consumption amongst countries is related to the difference in their financial structures across countries, which in turn depends on their legal structures. This argument draws from the work of La Porta et al. (1997, 1998) who show that variations in financial structures across countries are related to differences in the countries' legal systems. Financial structures in the common-law countries have been found to be more market-based, while French civil-law countries have been found to be more bank-based. Given the importance of banks in the monetary policy transmission mechanism as suggested by the credit view, this implies that monetary policy will have a greater effect on firms in civil-law countries which mostly depend

on bank loans compared with firms in common-law countries which have better access to the credit market via stock and bond markets. In this study, the effectiveness of monetary policy actions between these two groups of countries is examined by using impulse response functions that were generated from the first difference VAR model and VECM approaches. The impacts of monetary policy on output, investment and consumption have been evaluated based on the size of the impact and the speed of adjustment of these variables following to a positive shock in the interest rate.

There are two major findings of this paper, first, the effects of an interest rate shock on output are relatively stronger, respond more quickly and take longer to die out in civil-law countries compared with common-law countries. This finding indicates that monetary policy is relatively more effective in influencing output, investment and consumption in civil-law countries than in common-law countries. This finding is in line with the earlier prediction that monetary policy is generally less effective in the common-law countries than in civil-law countries. Finding from this study is consistent with the finding from Cecchetti (1999) who investigated the same issue in 11 European Union countries. The finding that monetary policy in civil-law countries is also more effective in influencing investment and consumption provides extra support to the conclusion that monetary policy is more effective in civil-law countries than in common-law countries. However, this finding could also indicate that output, investment and consumption are more stable in common-law countries compared with civil-law countries. Second, in both groups of countries, this paper finds that the impact of interest rate shocks on investment is relatively higher than the impact on consumption. This finding suggests that investment is a major channel through which the effects of monetary policy shocks were transmitted to output. This indicates that monetary policy, in both groups of countries, has more impact on firms' spending compared with households' spending.

The empirical study in Chapter 4 investigates the causal relationship between financial sector development, foreign direct investment and economic growth. This is in line with the studies that have highlighted the role of FDI on economic growth of the host country, which found that the level of development of the domestic financial system partly determines the positive effect of FDI on economic growth (for example,

study by Alfaro et al. 2004). They argue that the existence of financial intermediaries could motivate domestic firms to upgrade their existing technology or to adopt new technologies introduced by foreign firms. If that positive impact of FDI on economic growth depends on the level of financial development, it is legitimate to ask whether FDI itself could contribute to financial development. Thus, the main objective of Chapter 4 is to examine the causality relationship between FDI, financial development and economic growth. The current approach of causality studies is extended in this chapter by examining the multivariate causality between FDI and a set of variables (financial development and economic growth). This will allow an investigation of whether financial development alone could lead to a better inflow of FDI or whether financial development and economic growth jointly cause FDI, and vice versa. The indicators for the financial development used in this study can be classified into two broad categories: those relating to the banking sector and those relating to the stock market. The study was conducted in 37 developing countries, although in the case of stock markets development the restricted availability of the data limits the sample to 13 countries. This study uses Granger causality tests in the framework of first differences VAR model and VECM approach.

There are three major findings of Chapter 4. First, the bivariate causality tests between FDI and banking development, and FDI and economic growth produced mixed results. The results from bivariate causality tests give little support on the hypothesis that the inflows of FDI can contribute to the development of domestic banking sector or economic growth in developing countries. In the majority of developing countries, this paper finds that FDI has no effect on the development of the domestic banking sector or economic growth. Similarly, this paper finds little support for the hypothesis that FDI goes to the country with high economic growth or a more developed banking sector, suggesting that economic growth or banking sector development alone is not a main determinant in attracting FDI into the developing countries. In contrast, we find strong evidence that FDI causally affects the development of the domestic stock markets, and vice versa. This indicates that FDI can contribute to the development of stock markets in developing countries. Meanwhile, the significant reverse causality from stock market development to FDI indicates that the existence of better-developed stock market is essential in attracting FDI.

Second, in some developing countries, evidence is found that the joint effect of banking development and economic growth will help to improve the individual effect of banking development or economic growth on FDI. This finding gives some support to the argument that FDI will go to countries that have both higher economic growth and a developed banking sector. Meanwhile, for some other countries, evidence is found that FDI can simultaneously affect domestic banking sector development and economic growth. This finding gives support to the argument that the existence of better-developed domestic banking sector will improve the effect of FDI on economic growth, or that the existence of higher economic growth could helps to increase the effect of FDI on banking development. This is consistent with the finding from the cross-country study by Alfaro et al. (2004) who found that a developed domestic banking sector is a pre-condition for FDI to affect economic growth. Third, this paper finds strong support that stock market development either together with economic growth or individually can affect FDI. This finding clearly indicates that FDI will go to countries with a better developed stock market whether those countries have strong growth performance or not.

The evidence reported in this thesis has several implications for development strategies and policy. With regard to the relationship between financial sector development and economic growth, although stock markets provide better prospect for economic growth, it was found that banks and stock markets play complementary roles in economic growth. Thus, for long-term growth strategies, the finding strongly recommended that countries should develop their overall financial sectors rather than focusing on a specific financial sector (banks or stock markets). In this context, policies that encourage the presence of both a better developed banking sector and stock markets could help the accumulation of the capital that is necessary to finance projects with large fixed costs. The absence of both well developed banking sectors and stock markets can severely affect a country's long-term growth prospects.

The analysis also suggests that more effort should be given to the increase in banking sector and stock market activities instead of concentrating on the size. For banks, this can be implemented by giving savers a wider range of investment and borrowing opportunities and giving companies more alternative sources of funding. For stock

markets, effort should be devoted to increasing the liquidity and efficiency of the market. With regard to financial structures, it was found that a market-based financial structure helps to promote growth for developed countries but not for the developing countries. For developing countries with a market-based financial structure, this finding implies that in order to gain an advantage from their financial structure, effort should also be devoted to developing their banking sector as well as to increasing the efficiency of their stock markets. These two factors could be a reason why having a market-based financial structure has not affected economic growth in developing countries. Several policy implications could also be derived from the study of the relationship between legal structures and the effectiveness of monetary policy.

With respect to the findings that macroeconomic variables in civil-law countries are more sensitive to the shocks, improvements in regulations that strengthen investors' protection and that increase the quality of enforcement of the law could help to reduce this instability. Since the legal structure is closely related with the financial structure, instability of macroeconomic variables in the civil-law countries could also be reduced by having a more market-oriented financial structure. This is because the market-based financial structure was found to be more efficient in absorbing shocks compared with a bank-based financial structure. However, from the monetary policy point of view, the finding was that monetary policy in civil law countries is very effective in controlling the movement of macroeconomic variables. In other words, monetary policy in these countries is more capable of achieving the macroeconomic targets set by the policy makers. With regard to the finding that monetary policy is less effective in the common law countries, the implication is that policy makers in these countries should also be looking for alternative policies (e.g. fiscal policy) in order to improve the prospects of achieving their macroeconomic targets.

The findings of the study on the causality between FDI, financial development, and economic growth also have several implications for policy. To have better-developed stock markets will attract FDI, but banking sector development is not a main determinant of FDI. FDI also contributes to the development of the stock market in the host country. With regard to this, policies and incentives should be given to encourage more transactions and higher liquidity in the stock markets of developing

countries. FDI and economic growth are not causally related, which implies that growth is not a determinant for FDI, and that FDI does not contribute to better economic growth. However, the findings that economic growth together with banking sector development significantly causes FDI indicate that FDI is more attractive to countries that have both better economic growth and a developed domestic banking sector. Conversely, in some countries, this study finds that FDI significantly causes growth and banking sector as a group. This justified the current policies that have been implemented by many governments of developing countries toward FDI which offers many incentives to encourage more foreign investors into the countries. The study clearly indicates that to have a developed banking sector is a pre-condition for FDI to affect economic growth. Thus, to maximize the benefits from FDI, developing countries need to have a certain level of development of their domestic financial markets.

In conclusion, empirical studies in this thesis find evidence that financial sector development (particularly stock markets) plays an important role in economic growth. This thesis also finds evidence that the effectiveness of monetary policy is related to the legal structures of the countries. Finally, this thesis finds strong support that stock market development does affect FDI, and vice versa. However, more empirical studies are needed in order to give a more comprehensive picture of the issue being investigated. For example, the impact of overall development on economic growth should be expanded to include capital markets as well as the banking sector and stock markets. This probably would give a more accurate representation of the overall development of the financial sector in the economies. On the causality between financial development and FDI, future researches should also look at the possibility that FDI is causality related with a set of broader factors, for example, human capital, financial development and economic growth. This is based on the fact that foreign investors regard all these factors as a package and not individually. With regard to the relationship between legal structures and monetary policy effectiveness, future studies with a larger sample and using panel data are recommended to provide a better picture.

APPENDICES

Appendix 2.1: List of Countries: Banks, Stock Markets and Economic Growth

Lower Income Countries	Middle Income Countries		High Income Countries
Bangladesh	Algeria	Argentina[a]	Austria[a]
Benin	Bolivia	Barbados	Australia[a]
Central African Republic	Colombia[a]	Botswana	Belgium[a]
Chad	Egypt[a]	Brazil	Canada[a]
Congo Democratic Republic	Fiji	Chile[a]	Denmark[a]
Congo Republic	Guatemala	Costa Rica	Finland[a]
Cote d'Ivoire[a]	Guyana	Dominica	France[a]
Ghana[a]	Honduras	Malaysia[a]	Greece[a]
Haiti	Jamaica[a]	Malta	Iceland
India[a]	Morocco[a]	Mauritius	Ireland
Indonesia[a]	Paraguay	Mexico[a]	Israel[a]
Kenya[a]	Peru[a]	Panama	Italy[a]
Madagascar	Philippines[a]	Saudi Arabia	Japan[a]
Malawi	South Africa[a]	Trinidad	Kuwait
Mauritania	El Salvador	Uruguay[a]	Netherlands[a]
Myanmar	Sri Lanka[a]	Venezuela[a]	Norway[a]
Nepal	Syria	Korea[a]	New Zealand[a]
Nicaragua	Thailand[a]		Portugal[a]
Nigeria[a]	Tunisia		Singapore[a]
Niger	Turkey		Spain[a]
Pakistan[a]			Sweden[a]
Rwanda			Switzerland[a]
Senegal			United kingdom[a]
Sudan			USA[a]
Togo			
Uganda			
Zambia			

Note: *[a]Countries that included in the panel data to study the link between stock markets and economic growth*

Appendix 3.1: Unit Root Tests: Legal Structure and Monetary Policy

a. Civil-Law Countries

Argentina

Statistics	*y*		
	Levels	FD	SD
ADF	0.326404	-2.832161	-1.830194
Critical	-2.900137	-2.900137	-2.900137
PP	-1.055330	-2.328273	-1.947947
Critical	-2.900137	-2.900137	-2.900137
	P		
	Levels	FD	SD
ADF	-1.005521	-2.775537	-8.629641*
Critical	-2.900137	-2.900137	-2.900137
PP	-0.570061	-3.333797*	-9.454906*
Critical	-2.900137	-2.900137	-2.900137
	r		
	Levels	FD	SD
ADF	-5.287209*	-9.209834*	-5.677818*
Critical	-2.901217	-2.901779	-2.906210
PP	-5.241637*	-25.73033*	-47.00626*
Critical	-2.900670	-2.901217	-2.901779
	x		
	Levels	FD	SD
ADF	-0.406895	-6.336015*	-5.348534*
Critical	-2.900137	-2.900137	-2.900137
PP	-0.362905	-5.321211*	-35.21665*
Critical	-2.900137	-2.900137	-2.900137
	cr		
	Levels	FD	SD
ADF	0.775667	-6.356933*	-5.303141*
Critical	-2.900137	-2.900137	-2.900137
PP	0.701924	-5.332492*	-29.31208*
Critical	-2.900137	-2.900137	-2.900137
	inv		
	Levels	FD	SD
ADF	-1.211183	-2.270259	-2.713332
Critical	-2.900137	-2.900137	-2.900137
PP	-1.551422	-2.317036	-1.428465
Critical	-2.900137	-2.900137	-2.900137
	con		
	Levels	FD	SD
ADF	0.169845	-3.140386*	-2.156316
Critical	-2.900137	-2.900137	-2.900137
PP	-1.143943	-2.442066	-1.993367
Critical	-2.900137	-2.900137	-2.900137

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Chile

Statistics	*y*		
	Levels	FD	SD
ADF	-0.313638	-2.109470	-5.776704*
Critical	-2.894716	-2.894716	-2.894716
PP	1.089393	-2.596414	-4.035638*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-2.380735	-1.275199	-5.368197*
Critical	-2.895109	-2.895109	-2.895109
PP	0.399579	-4.899273*	-25.08220*
Critical	-2.892200	-2.892536	-2.583553
	r		
	Levels	FD	SD
ADF	-1.110895	-6.853782*	-6.491300*
Critical	-2.894716	-2.894716	-2.896779
PP	-3.127428*	-20.41464*	-74.52058*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-0.747195	-3.289573*	-12.14597*
Critical	-2.893589	-2.893589	-2.893589
PP	-0.246393	-10.30959*	-46.76553*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	-2.923633*	-5.382411*	-7.851556*
Critical	-2.892200	-2.893589	-2.893956
PP	-2.920972*	-9.532196*	-59.17702*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-0.626011	-2.346297	-4.325397*
Critical	-2.896346	-2.896346	-2.896346
PP	-0.060844	-3.302631*	-3.975453*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	0.272883	-1.737839	-4.941516*
Critical	-2.896346	-2.896346	-2.894716
PP	0.804373	-3.934590*	-4.879438*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Colombia

Statistics	*y*		
	Levels	FD	SD
ADF	-0.649489	-2.158849	-6.246198*
Critical	-2.896346	-2.896346	-2.896346
PP	-0.868013	-3.047525*	-2.910754*
Critical	-2.896346	-2.896346	-2.896346
	p		
	Levels	FD	SD
ADF	-0.083646	-1.306146	-2.787969
Critical	-2.896346	-2.896346	-2.896346
PP	3.951245	-5.378188*	-14.97146*
Critical	-2.896346	-2.896346	-2.896346
	r		
	Levels	FD	SD
ADF	-1.513692	-7.284654*	-5.447486*
Critical	-2.897223	-2.897223	-2.901217
PP	-1.433866	-7.284654*	-31.2178*
Critical	-2.896779	-2.897223	-2.897678
	x		
	Levels	FD	SD
ADF	2.900554	-1.829253	-5.509810*
Critical	-2.896346	-2.896346	-2.897223
PP	3.615345	-8.365072*	-43.34956*
Critical	-2.896346	-2.896346	-2.896346
	cr		
	Levels	FD	SD
ADF	0.754914	-1.477860	-4.640600*
Critical	-2.901217	-2.901779	-2.901779
PP	2.239354	-6.819984*	-31.06780*
Critical	-2.896346	-2.896346	-2.896779
	inv		
	Levels	FD	SD
ADF	-1.549439	-2.163646	-2.885092
Critical	-2.896346	-2.896346	-2.896346
PP	-1.142228	-2.773550	-4.081853*
Critical	-2.896346	-2.896346	-2.896346
	con		
	Levels	FD	SD
ADF	-0.518984	-3.148452*	-5.120378*
Critical	-2.896345	-2.896779	-2.896346
PP	-0.752896	-3.874032*	-3.907028*
Critical	-2.896346	-2.896346	-2.896346

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

France

Statistics	*y*		
	Levels	FD	SD
ADF	-0.205568	-3.655121*	-1.801258
Critical	-2.896346	-2.896346	-2.896779
PP	0.421172	-2.177283	-4.097801*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-2.404324	-2.287000	-2.953217
Critical	-2.896346	-2.896779	-2.896779
PP	-7.890545*	-4.040257*	-33.28360*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.290156	-8.828269*	-6.420861*
Critical	-2.892536	-2.892536	-2.895924
PP	-1.003728	-8.817766*	-56.63857*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.563443	-8.627089*	-5.600696*
Critical	-2.892879	-2.892879	-2.896779
PP	-1.277625	-10.21757*	-56.75174*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	0.505143	-6.385216*	-7.181387*
Critical	-2.892536	-2.892536	-2.893956
PP	0.708963	-6.385216*	-31.91749*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	0.081146	-2.728915	-3.420920*
Critical	-2.896346	-2.896346	-2.896779
PP	-0.351740	-2.391807	-3.198705*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.996977	-0.836422	-1.194175
Critical	-2.896346	-2.896779	-2.896779
PP	-0.006040	-16.10634*	-10.44021*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Indonesia

Statistics	*y*		
	Levels	FD	SD
ADF	-0.493665	-2.764183	-6.173657*
Critical	-2.895512	-2.895512	-2.894716
PP	-0.447279	-3.124564*	-3.743592*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	2.617802	-3.460427*	-6.376851*
Critical	-2.893230	-2.893589	-2.894716
PP	2.569715	-4.169083*	-14.64634*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-2.260800	-6.638942*	-10.07274*
Critical	-2.892536	-2.892536	-2.893230
PP	-2.117713	-6.711115*	-18.52902*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-0.233081	-5.391270*	-6.151701*
Critical	-2.894332	-2.894332	-2.896346
PP	-1.014417	-9.329585*	-45.81283*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	2.744141	-4.406787*	-6.591281*
Critical	-2.893589	-2.893956	-2.895924
PP	1.303033	-9.605809*	-35.02598*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-1.179716	-2.176548	-4.552605*
Critical	-2.896346	-2.896346	-2.896346
PP	-1.432539	-3.078491*	-3.782655*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	0.414999	-3.111672*	-5.165031*
Critical	-2.895109	-2.895109	-2.894716
PP	0.015600	-4.105892*	-4.808100*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Italy

Statistics	*y*		
	Levels	FD	SD
ADF	-0.907110	-2.751581	-8.453306*
Critical	-2.894716	-2.894716	-2.894716
PP	-0.610528	-2.732724	-3.683548*
Critical	-2.894716	-2.894716	-2.894716
	p		
	Levels	FD	SD
ADF	-2.177758	-2.090840	-3.051001*
Critical	-2.894716	-2.896779	-2.897223
PP	-4.040048*	-4.935888*	-24.85624*
Critical	-2.894716	-2.894715	-2.894716
	r		
	Levels	FD	SD
ADF	-1.291261	-4.356110*	-5.793067*
Critical	-2.896779	-2.896779	-2.897223
PP	-0.899371	-6.453746*	-20.64830*
Critical	-2.895109	-2.895512	-2.895924
	x		
	Levels	FD	SD
ADF	-2.757989	-3.961106*	-6.208347*
Critical	-2.895512	-2.894716	-2.895512
PP	-1.793479	-7.085293*	-21.74566*
Critical	-2.894716	-2.894716	-2.894716
	cr		
	Levels	FD	SD
ADF	-1.561747	-10.18669*	-7.161337*
Critical	-2.894716	-2.894716	-2.894716
PP	-1.539267	-10.18639*	-94.61327*
Critical	-2.894716	-2.894716	-2.894716
	inv		
	Levels	FD	SD
ADF	-0.375776	-3.018010*	-4.105219*
Critical	-2.895109	-2.895512	-2.896346
PP	-0.399899	-3.350638*	-2.924934*
Critical	-2.894716	-2.894716	-2.894716
	con		
	Levels	FD	SD
ADF	-1.878042	-1.411909	-6.235219*
Critical	-2.894716	-2.895512	-2.895512
PP	-0.792031	-2.833590	-3.714410*
Critical	-2.894716	-2.894716	-2.894716

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Mexico

Statistics	*y*		
	Levels	FD	SD
ADF	0.034329	-2.069180	-6.819786*
Critical	-2.894716	-2.894716	-2.894716
PP	0.864660	-3.372792*	-3.839079*
Critical	-2.894716	-2.894716	-2.894716
	p		
	Levels	FD	SD
ADF	0.800770	-2.372819	-5.302481*
Critical	-2.894716	-2.894716	-2.894716
PP	2.207993	-3.390628*	-26.12059*
Critical	-2.894716	-2.894716	-2.894716
	r		
	Levels	FD	SD
ADF	-1.848940	-4.950227*	-7.707987*
Critical	-2.896346	-2.896346	-2.897223
PP	-1.735831	-8.693839*	-36.09346*
Critical	-2.895109	-2.895512	-2.895924
	x		
	Levels	FD	SD
ADF	0.179063	-4.194730*	-7.767103*
Critical	-2.894716	-2.894716	-2.894716
PP	0.378711	-8.483643*	-26.23333*
Critical	-2.894716	-2.894716	-2.894716
	cr		
	Levels	FD	SD
ADF	2.884745	-11.53383*	-6.368709*
Critical	-2.894716	-2.894716	-2.895109
PP	2.131718	-11.34012*	-22.05975*
Critical	-2.894716	-2.894716	-2.894716
	inv		
	Levels	FD	SD
ADF	-0.964254	-2.337505	-5.396527*
Critical	-2.896346	-2.896346	-2.896346
PP	-0.841298	-3.218860*	-3.883546*
Critical	-2.894716	-2.894716	-2.894716
	con		
	Levels	FD	SD
ADF	0.338072	-2.147620	-6.423091*
Critical	-2.894716	-2.894716	-2.894716
PP	0.946553	-3.078094*	-3.854011*
Critical	-2.894716	-2.894716	-2.894716

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Netherlands

Statistics	*y*		
	Levels	FD	SD
ADF	-1.107393	-2.526558	-3.083964*
Critical	-2.895109	-2.895109	-2.895109
PP	0.705659	-1.603124	-3.003206*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.652816	-2.521254	-5.827386*
Critical	-2.893956	-2.893956	-2.893956
PP	0.234098	-6.838295*	-30.74796*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.535711	-6.047285*	-9.250110*
Critical	-2.892536	-2.892536	-2.893230
PP	-1.476057	-5.999117*	-19.79963*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-2.825561	-5.406811*	-5.832142*
Critical	-2.893230	-2.892879	-2.896346
PP	-3.433827*	-9.787412*	-44.17980*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	2.608565	-9.084697*	-7.653577*
Critical	-2.893956	-2.894716	-2.898145
PP	2.855685	-9.095790*	-56.21984*
Critical	-2.893956	-2.894716	-2.895512
	inv		
	Levels	FD	SD
ADF	0.816634	-3.063818*	-2.909508*
Critical	-2.894716	-2.894716	-2.894716
PP	-0.057727	-2.406353	-3.821805*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-0.979250	-1.487257	-3.423419*
Critical	-2.896346	-2.896346	-2.896346
PP	0.130814	-13.65570*	-9.672525*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Peru

Statistics	*y*		
	Levels	FD	SD
ADF	-0.068610	-3.522007*	-3.923811*
Critical	-2.895512	-2.895924	-2.896346
PP	-0.141327	-2.805385	-3.685992*
Critical	-2.894716	-2.894716	-2.894716
	p		
	Levels	FD	SD
ADF	-0.711798	-2.018471	-4.486746*
Critical	-2.894716	-2.894716	-2.894716
PP	0.129359	-2.323174	-11.89422*
Critical	-2.894716	-2.894716	-2.894716
	r		
	Levels	FD	SD
ADF	-5.338317*	-8.094911*	-7.158722*
Critical	-2.895109	-2.896346	-2.898145
PP	-5.325943*	-32.51172*	-57.78853*
Critical	-2.895109	-2.895512	-2.895924
	x		
	Levels	FD	SD
ADF	-0.025613	-3.404157*	-5.869916*
Critical	-2.894716	-2.894716	-2.895109
PP	0.208264	-8.109539*	-27.17287*
Critical	-2.894716	-2.894716	-2.894716
	cr		
	Levels	FD	SD
ADF	-1.619276	-10.86655*	-5.068523*
Critical	-2.894716	-2.894716	-2.896779
PP	-1.418339	-11.04311*	-60.92505*
Critical	-2.894716	-2.894716	-2.894716
	inv		
	Levels	FD	SD
ADF	-1.091289	-2.734805	-4.345929*
Critical	-2.895109	-2.895109	-2.896346
PP	-1.154741	-3.050705*	-3.791541*
Critical	-2.894716	-2.894716	-2.894716
	con		
	Levels	FD	SD
ADF	-0.343336	-3.069621*	-5.004553*
Critical	-2.895512	-2.895512	-2.894716
PP	-0.343935	-2.571212	-3.655269*
Critical	-2.894715	-2.894716	-2.894716

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Philippines

Statistics	*y*		
	Levels	FD	SD
ADF	-1.107393	-2.526558	-3.083964*
Critical	-2.895109	-2.895109	-2.895109
PP	0.705659	-1.603124	-3.003206*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.861155	-4.339203*	-5.791695*
Critical	-2.893230	-2.893230	-2.895109
PP	1.328881	-5.877739*	-20.91915*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-2.550121	-6.758608*	-7.697117*
Critical	-2.892536	-2.892536	-2.893956
PP	-2.134811	-6.699080*	-43.02859*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	1.599246	-5.289088*	-5.631452*
Critical	-2.894332	-2.894332	-2.897223
PP	1.284807	-9.774552*	-53.94879*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	1.401930	-2.999218*	-10.70305*
Critical	-2.892536	-2.893589	-2.893589
PP	1.581776	-7.537415*	-38.54560*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-2.386427	-2.850606	-6.372581*
Critical	-2.896346	-2.896779	-2.896346
PP	-2.948679*	-3.728253*	-4.514312*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	2.419288	-4.533089*	-3.442734*
Critical	-2.896345	-2.896779	-2.897223
PP	3.927444	-3.812507*	-4.057158*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Spain

Statistics	*y*		
	Levels	FD	SD
ADF	1.763803	-3.194244*	-6.903771*
Critical	-2.896346	-2.896346	-2.893230
PP	1.826375	-1.971233	-3.875212*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-1.954455	-2.372726	-14.10890*
Critical	-2.893589	-2.893589	-2.893589
PP	-2.869966	-11.64109*	-67.89565*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.031753	-4.287054*	-7.780295*
Critical	-2.893230	-2.896779	-2.897223
PP	-0.865829	-14.36053*	-87.02456*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.614640	-7.433081*	-5.860403*
Critical	-2.892879	-2.892536	-2.895512
PP	-1.811004	-7.427049*	-29.78198*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	-1.608046	-10.09310*	-7.173796*
Critical	-2.892200	-2.892536	-2.894332
PP	-1.590713	-10.09310*	-99.86756*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-0.565790	-2.391918	-4.510890*
Critical	-2.893589	-2.893589	-2.893589
PP	0.132208	-2.241736	-3.372950*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.565776	-2.091648	-1.945871
Critical	-2.894716	-2.896779	-2.896779
PP	1.076597	-6.476951*	-5.742207*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Venezuela

Statistics	*y*		
	Levels	FD	SD
ADF	-1.877005	-1.455392	-5.585354*
Critical	-2.898145	-2.898145	-2.898145
PP	-1.732486	-2.891413	-3.296961*
Critical	-2.898145	-2.898145	-2.898145
	p		
	Levels	FD	SD
ADF	2.831762	-1.007326	-7.111086
Critical	-2.898145	-2.898145	-2.898145
PP	7.921447	-0.518051	-7.077586
Critical	-2.898145	-2.898145	-2.898145
	r		
	Levels	FD	SD
ADF	-1.968244	-8.470210*	-6.782043*
Critical	-2.898623	-2.899115	-2.903566
PP	-2.014057	-8.469657*	-45.23408*
Critical	-2.898623	-2.899115	-2.899619
	x		
	Levels	FD	SD
ADF	3.213358	-3.285775*	-5.645311*
Critical	-2.898145	-2.898145	-2.898145
PP	2.920904	-7.083816*	-20.14542*
Critical	-2.898145	-2.898145	-2.898145
	cr		
	Levels	FD	SD
ADF	-2.090878	-9.658352*	-5.944502*
Critical	-2.898145	-2.898145	-2.898145
PP	-2.057152	-9.662969*	-71.11776*
Critical	-2.898145	-2.898145	-2.898145
	inv		
	Levels	FD	SD
ADF	-2.400670	-2.664091	-5.073310*
Critical	-2.898145	-2.898145	-2.898145
PP	-2.023355	-3.194955*	-3.369151*
Critical	-2.898145	-2.898145	-2.898145
	con		
	Levels	FD	SD
ADF	-1.778858	-0.891554	-4.522126*
Critical	-2.898145	-2.898145	-2.898145
PP	-1.614117	-2.106902	-3.318621*
Critical	-2.898145	-2.898145	-2.898145

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

b. Common-Law Countries

Australia

Statistics	*y*		
	Levels	FD	SD
ADF	1.133284	-2.852354	-3.428459*
Critical	-2.894716	-2.894716	-2.896346
PP	2.151657	-3.019385*	-4.380069*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-1.659832	-4.002116*	-11.04475*
Critical	-2.892879	-2.892879	-2.893230
PP	-1.793069	-7.269719*	-24.56701*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-0.556185	-5.496957*	-5.573547*
Critical	-2.895109	-2.895109	-2.897223
PP	-1.569733	-5.708741*	-20.79105*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.619111	-10.23981*	-4.487714*
Critical	-2.892200	-2.892536	-2.897223
PP	-1.619111	-10.23981*	-80.21795*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	2.408751	-6.188144*	-8.094546*
Critical	-2.893956	-2.893956	-2.895109
PP	3.102164	-6.237973*	-24.55602*
Critical	-2.893589	-2.893956	-2.894332
	inv		
	Levels	FD	SD
ADF	0.173499	-2.923358*	-6.788463*
Critical	-2.896346	-2.896779	-2.896346
PP	-1.061958	-3.836543*	-4.532305*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.743225	-1.060230	-1.701013
Critical	-2.896346	-2.896779	-2.896779
PP	2.140093	-8.051663*	-6.268262*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Canada

Statistics	*y*		
	Levels	FD	SD
ADF	-1.184391	-2.538983	-4.911083*
Critical	-2.894716	-2.894716	-2.893589
PP	1.337831	-2.800936	-3.836518*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-3.246136*	-6.001906*	-6.713748*
Critical	-2.892536	-2.892536	-2.894716
PP	-3.896737*	-5.896290*	-48.24654*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.414007	-10.16194*	-17.51293*
Critical	-2.892536	-2.892536	-2.893230
PP	-1.801858	-10.12746*	-18.91222*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.281328	-8.054562*	-11.08142*
Critical	-2.892200	-2.892879	-2.2893589
PP	-1.290195	-9.617147*	-51.63915*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	0.201902	-5.961139*	-9.263350*
Critical	-2.895109	-2.895109	-2.896779
PP	0.356651	-9.717498*	-52.81049*
Critical	-2.893589	-2.894332	-2.895109
	inv		
	Levels	FD	SD
ADF	-0.755511	-2.561705	-4.526532*
Critical	-2.896346	-2.895512	-2.895109
PP	-0.438234	-3.039675*	-4.438723*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.170320	-2.941312*	-3.676486*
Critical	-2.894716	-2.894716	-2.896346
PP	0.583017	-10.90495*	-8.148246*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

India

Statistics	*y*		
	Levels	FD	SD
ADF	4.405279	0.659730	-2.532820
Critical	-2.896346	-2.896779	-2.897223
PP	6.280727	-0.653298	-3.016015*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	1.020376	-1.622541	-5.247467*
Critical	-2.895924	-2.896779	-2.896779
PP	2.207840	-8.288686*	-26.57537*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-2.223883	-8.453589*	-7.278625*
Critical	-2.892536	-2.892536	-2.893956
PP	-2.190134	-8.499979*	-42.74635*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	0.514982	-10.97226*	-7.133870*
Critical	-2.892536	-2.892536	-2.895109
PP	0.504561	-10.98284*	-65.84050*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	3.061045	0.044177	-5.904640*
Critical	-2.895924	-2.895109	-2.895109
PP	14.08871	-7.805379*	-36.17523*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	1.960124	1.517165	-1.666324
Critical	-2.895109	-2.894716	-2.895109
PP	3.929935	0.629744	-2.371206
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.263567	-1.554571	-5.102751*
Critical	-2.894716	-2.894716	-2.894716
PP	2.140177	-2.724613	-3.625492*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Ireland

Statistics	*y*		
	Levels	FD	SD
ADF	-4.258161*	-2.805951	0.049882
Critical	-2.893230	-2.896346	-2.897223
PP	4.344095	-1.565391	-2.438889
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.865476	-3.224101*	-4.503826*
Critical	-2.895512	-2.895512	-2.895512
PP	-2.346315	-7.242330*	-29.91094*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.217305	-10.25749*	-6.073246*
Critical	-2.892879	-2.892879	-2.896779
PP	-1.267994	-11.05916*	-39.96284*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-0.924008	-4.852515*	-11.24855*
Critical	-2.893589	-2.893589	-2.893589
PP	-1.798172	-10.82318*	-74.07180*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	3.942238	-1.951640	-10.31601*
Critical	-2.892536	-2.893589	-2.893589
PP	5.010333	-5.684714*	-33.84321*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-1.208121	-2.530179	-3.591086*
Critical	-2.894716	-2.896346	-2.894716
PP	0.728913	-2.124200	-3.547596*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	1.386998	-1.397190	-4.017234*
Critical	-2.896346	-2.896779	-2.896346
PP	1.730216	-6.267304*	-6.524445*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Malaysia

Statistics	*y*		
	Levels	FD	SD
ADF	-0.101142	-1.867004	-7.236131*
Critical	-2.894716	-2.894716	-2.894716
PP	1.002651	-3.334510*	-4.008633*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.018576	-2.956969*	-12.43752*
Critical	-2.893589	-2.893589	-2.893589
PP	-0.582964	-7.369839*	-31.07136*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-2.819923	-11.25101*	-7.873356*
Critical	-2.894716	-2.892536	-2.895109
PP	-3.556586*	-11.93672*	-26.38346*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-0.126964	-9.962224*	-6.079819*
Critical	-2.892200	-2.892536	-2.895109
PP	-0.165898	-9.963512*	-46.35702*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	1.179424	-3.900488*	-10.86868*
Critical	-2.892879	-2.892879	-2.893230
PP	1.743439	-7.024836*	-26.48809*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-1.310281	-2.013647	-4.643300*
Critical	-2.896346	-2.896346	-2.896346
PP	-1.302248	-3.283482*	-3.001175*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	0.731217	-2.951589*	-3.719072*
Critical	-2.895512	-2.895512	-2.896346
PP	0.789811	-3.294936*	-3.959708*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

New Zealand

Statistics	*y*		
	Levels	FD	SD
ADF	0.279574	-1.918821	-4.524684*
Critical	-2.894716	-2.894716	-2.894716
PP	1.638656	-2.494895	-3.488183*
Critical	-2.894716	-2.894716	-2.894716
	p		
	Levels	FD	SD
ADF	-2.308725	-3.482258*	-9.163956*
Critical	-2.894716	-2.894716	-2.894716
PP	-3.156863	-5.338580*	-21.81794*
Critical	-2.894716	-2.894716	-2.894716
	r		
	Levels	FD	SD
ADF	-1.739630	-3.550890*	-7.103724*
Critical	-2.894716	-2.894716	-2.894716
PP	-1.500478	-9.285294*	-28.68898*
Critical	-2.894716	-2.894716	-2.894716
	x		
	Levels	FD	SD
ADF	-2.338174	-9.973452*	-6.822839*
Critical	-2.894716	-2.894716	-2.895109
PP	-2.344913	-9.964682*	-43.10688*
Critical	-2.894716	-2.894716	-2.894716
	cr		
	Levels	FD	SD
ADF	3.444333	-1.666883	-8.909437*
Critical	-2.897223	-2.900137	-2.900137
PP	3.470190	-7.883239*	-22.17874*
Critical	-2.896346	-2.897223	-2.898145
	inv		
	Levels	FD	SD
ADF	-1.433829	-2.869846	-3.144990*
Critical	-2.895109	-2.895109	-2.895109
PP	-0.361098	-2.915220*	-3.263344*
Critical	-2.894716	-2.894716	-2.894716
	con		
	Levels	FD	SD
ADF	-1.366099	-1.258418	-3.411759*
Critical	-2.895512	-2.895512	-2.895512
PP	1.16749	-2.514873	-2.179066
Critical	-2.894716	-2.894716	-2.894716

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Pakistan

Statistics	*y*		
	Levels	FD	SD
ADF	1.337138	-0.584083	-3.463022*
Critical	-2.896346	-2.896346	-2.896346
PP	0.775070	-2.640991	-2.373838
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.366165	-1.591863	-6.034785*
Critical	-2.895924	-2.895924	-2.895109
PP	2.112390	-4.481949*	-14.84229*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-0.526739	-10.33298*	-7.580814*
Critical	-2.893230	-2.893230	-2.895109
PP	-3.855003*	-17.22085*	-58.10703*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	1.190545	-1.920607	-5.280539*
Critical	-2.896345	-2.896779	-2.896779
PP	2.732588	-11.94761*	-50.43631*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	1.158556	-2.759403	-11.08662*
Critical	-2.893589	-2.893589	-2.893589
PP	2.241237	-11.43879*	-94.65655*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	0.331448	-1.366096	-2.164465
Critical	-2.895109	-2.895109	-2.895109
PP	-1.340594	-2.590519	-3.112850*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.466970	-1.735127	-7.450519*
Critical	-2.894716	-2.894716	-2.894716
PP	0.313853	-3.502718*	-4.525338*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Singapore

Statistics	*y*		
	Levels	FD	SD
ADF	-0.925329	-1.586881	-2.108412
Critical	-2.895924	-2.895924	-2.895924
PP	0.640450	-3.136804*	-3.783308*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-1.371460	-3.366641*	-5.855740*
Critical	-2.893589	-2.893879	-2.895924
PP	-2.268429	-5.713515*	-44.89259*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-2.159268	-6.735358*	-6.376187*
Critical	-2.892536	-2.892879	-2.896346
PP	-1.716337	-9.115085*	-15.28603*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.962179	-3.860795*	-5.132165*
Critical	-2.894332	-2.894332	-2.894716
PP	-2.726678	-8.679914*	-28.62378*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	0.326154	-9.315370*	-3.178117*
Critical	-2.892200	-2.892536	-2.897223
PP	0.401462	-9.308267*	-49.27879*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-1.158042	-2.638041	-6.617551*
Critical	-2.896346	-2.896779	-2.896346
PP	-1.961415	-3.810788*	-4.528422*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	0.585936	-2.915151*	-3.375577*
Critical	-2.896346	-2.896346	-2.897223
PP	1.138238	-3.215429*	-3.379514*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

South Africa

Statistics	*y*		
	Levels	FD	SD
ADF	1.551730	-2.924619*	-5.136939*
Critical	-2.895512	-2.895512	-2.896346
PP	0.113264	-3.318162*	-4.103694*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	2.297190	-1.821864	-6.266215*
Critical	-2.893589	-2.895109	-2.895109
PP	2.941073	-4.144058*	-10.47909*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-3.556468*	-5.349284*	-7.677960*
Critical	-2.892536	-2.892536	-2.893589
PP	-2.895192*	-5.356645*	-19.05694*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	3.055271	-5.130262*	-5.159421*
Critical	-2.895924	-2.893589	-2.897223
PP	-0.673434	-8.236911*	-14.71582*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	4.599454	-7.678765*	-8.235935*
Critical	-2.892200	-2.892536	-2.894332
PP	5.829850	-7.727243*	-52.17074*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-2.350038	-2.051134	-4.466791*
Critical	-2.894716	-2.894716	-2.894716
PP	-1.412469	-2.879689	-3.122884*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	0.543124	-3.047894*	-4.477734*
Critical	-2.895512	-2.895924	-2.895512
PP	1.280476	-6.705762*	-6.076734*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

Thailand

Statistics	*y*		
	Levels	FD	SD
ADF	-0.503780	-2.080018	-5.121155*
Critical	-2.894716	-2.894716	-2.894716
PP	-0.041489	-2.650340	-3.780099*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	0.056770	-6.386388*	-6.203548*
Critical	-2.892536	-2.892536	-2.894716
PP	-0.404711	-6.422544*	-22.93946*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.137141	-5.317410*	-11.48166*
Critical	-2.892879	-2.892879	-2.893230
PP	-0.946550	-8.788113*	-20.14877*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	0.267318	-5.747196*	-5.698237*
Critical	-2.894332	-2.894332	-2.897223
PP	-0.432068	-11.18889*	-98.89373*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	-0.443214	-2.507091	-3.280019*
Critical	-2.900670	-2.900670	-2.899619
PP	-0.297414	-7.584245*	-39.73000*
Critical	-2.892879	-2.893589	-2.894332
	inv		
	Levels	FD	SD
ADF	-1.728256	-2.794395	-4.751061*
Critical	-2.893589	-2.893589	-2.894716
PP	-1.514201	-2.574913	-3.529441*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-0.124837	-1.990143	-4.955699*
Critical	-2.894716	-2.894716	-2.894716
PP	0.404360	-2.783626	-3.918331*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

United Kingdom

Statistics	*y*		
	Levels	FD	SD
ADF	1.115797	-2.874873	-3.138953*
Critical	-2.896346	-2.896346	-2.896779
PP	1.216344	-2.658977	-3.438666*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-1.070489	-2.297027	-4.017767*
Critical	-2.895924	-2.896779	-2.896779
PP	-2.043912	-10.37615*	-47.09647*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.850470	-8.835562*	-6.737770*
Critical	-2.892200	-2.892536	-2.894716
PP	-1.925451	-8.834230*	-52.16535*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-2.246035	-8.485765*	-7.852724*
Critical	-2.892200	-2.892536	-2.894716
PP	-2.259703	-8.441920*	-46.46111*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	3.452452	-2.605933	-10.06591*
Critical	-2.892200	-2.893589	-2.893589
PP	2.501802	-7.668057*	-60.47691*
Critical	-2.892200	-2.892536	-2.892879
	inv		
	Levels	FD	SD
ADF	-0.367411	-2.537904	-4.535266*
Critical	-2.894716	-2.894716	-2.894716
PP	-0.466728	-2.708693	-3.696489*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.571258	-1.820029	-1.139355
Critical	-2.894716	-2.896779	-2.896779
PP	1.193206	-9.253016*	-6.850216*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.1 (continued)

USA

Statistics	*y*		
	Levels	FD	SD
ADF	-0.293324	-3.330610*	-4.980587*
Critical	-2.894716	-2.894716	-2.894716
PP	1.564377	-3.330906*	-4.260506*
Critical	-2.892200	-2.892536	-2.892879
	p		
	Levels	FD	SD
ADF	-0.864379	-3.786305*	-5.253167*
Critical	-2.893230	-2.893230	-2.894716
PP	-1.925926	-6.473997*	-28.13695*
Critical	-2.892200	-2.892536	-2.892879
	r		
	Levels	FD	SD
ADF	-1.962031	-9.220064*	-5.898370*
Critical	-2.892536	-2.892536	-2.896779
PP	-1.934711	-9.215752*	-23.68509*
Critical	-2.892200	-2.892536	-2.892879
	x		
	Levels	FD	SD
ADF	-1.603866	-3.380388*	-11.24321*
Critical	-2.893589	-2.893589	-2.893589
PP	-1.203179	-9.266994*	-59.08705*
Critical	-2.892200	-2.892536	-2.892879
	cr		
	Levels	FD	SD
ADF	2.011243	-2.433398	-6.400609*
Critical	-2.894332	-2.893956	-2.895109
PP	3.500602	-8.417988*	-41.85082*
Critical	-2.892536	-2.892879	-2.893230
	inv		
	Levels	FD	SD
ADF	-1.569319	-1.472484	-3.584913*
Critical	-2.895512	-2.895512	-2.895512
PP	-0.233466	-3.316469*	-4.120686*
Critical	-2.892200	-2.892536	-2.892879
	con		
	Levels	FD	SD
ADF	-1.788718	-0.309669	-1.028658
Critical	-2.896346	-2.896779	-2.896779
PP	1.514189	-8.557467*	-6.113687*
Critical	-2.892200	-2.892536	-2.892879

Note: *ADF* - *Augmented Dickey-Fuller*
PP - *Phillips-Perron*
FD - *First Differences*
SD - *Second Differences*
* - *Significant at 5% levels*

Appendix 3.2: Johansen Cointegration Trace Tests (Variables: *y, p, r, cr, x*)

a. Civil-Law Countries

Argentina			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	163.8233	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	103.7951	47.85613	
At most 2*	47.54809	29.79707	
At most 3*	19.57575	15.49471	
At most 4*	0.085332	3.841466	
Chile			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	167.7641	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	90.55935	47.85613	
At most 2*	46.09685	29.79707	
At most 3	10.10210	15.49471	
At most 4	3.399074	3.841466	
Colombia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	101.8999	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	40.51572	47.85613	
At most 2	19.70308	29.79707	
At most 3	7.282465	15.49471	
At most 4	0.258347	3.841466	
France			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	90.66584	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	33.48853	47.85613	
At most 2	12.99189	29.79707	
At most 3	6.458744	15.49471	
At most 4	0.865502	3.841466	
Indonesia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	75.76445	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	43.66686	47.85613	
At most 2	23.64509	29.79707	
At most 3	8.312550	15.49471	
At most 4	3.073497	3.841466	
Italy			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	92.99111	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	50.61107	47.85613	
At most 2*	30.86927	29.79707	
At most 3	14.59620	15.49471	
At most 4*	4.794725	3.841466	
Mexico			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	84.76338	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	50.01952	47.85613	
At most 2	27.81479	29.79707	
At most 3	11.01580	15.49471	
At most 4	3.593014	3.841466	

Appendix 3.2 (continued)

Netherlands			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	121.8892	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	57.98555	47.856613	
At most 2	28.11016	29.79707	
At most 3	11.18825	15.49471	
At most 4	0.016717	3.841466	
Peru			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	164.7048	69.81889	Trace test indicates 4 cointegrating equations at the 0.05 levels
At most 1*	75.54664	47.85613	
At most 2*	38.10662	29.79707	
At most 3*	18.22930	15.49471	
At most 4	1.968174	3.841466	
Philippines			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	96.14521	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	43.79776	47.85613	
At most 2	15.01095	29.79707	
At most 3	5.171115	15.49471	
At most 4	1.610559	3.841466	
Spain			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	106.0125	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	56.46590	47.85613	
At most 2	21.89253	29.79707	
At most 3	9.171774	15.49471	
At most 4	2.214163	3.841466	
Venezuela			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	75.22733	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	46.77848	47.85613	
At most 2	23.50193	29.79707	
At most 3	10.95223	15.49471	
At most 4	0.319618	3.841466	

b. Common-Law Countries

Australia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	148.8066	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	89.79693	47.85613	
At most 2*	37.28749	29.79707	
At most 3	8.197137	15.49471	
At most 4	0.286585	3.841466	

Appendix 3.2 (continued)

Canada			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	111.0443	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	67.39813	47.85613	
At most 2	27.84686	29.79707	
At most 3	13.70323	15.49471	
At most 4	0.833236	3.841466	
India			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	82.62935	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	39.57635	47.85613	
At most 2	21.47154	29.79707	
At most 3	10.08850	15.49471	
At most 4	0.067952	3.841466	
Ireland			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	111.0573	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	51.41551	47.85613	
At most 2	15.92800	29.79707	
At most 3	5.40477	15.49471	
At most 4	0.032128	3.841466	
Malaysia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	112.8431	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	46.76964	47.85613	
At most 2	26.52201	29.79707	
At most 3	10.43795	15.49471	
At most 4	2.715995	3.841466	
New Zealand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	109.1533	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	49.93265	47.85613	
At most 2	18.03493	29.79707	
At most 3	3.196866	15.49471	
At most 4	0.028758	3.841466	
Pakistan			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	134.0274	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	67.96282	47.85613	
At most 2*	33.65653	29.79707	
At most 3	14.22216	15.49471	
At most 4	0.493609	3.841466	
Singapore			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	107.0685	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	65.25945	47.85613	
At most 2	27.59205	29.79707	
At most 3	7.148175	15.49471	
At most 4	2.241330	3.841466	

Appendix 3.2 (continued)

South Africa			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	94.54735	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	49.86459	47.85613	
At most 2	16.39632	29.79707	
At most 3	6.748453	15.49471	
At most 4	0.173145	3.841466	
Thailand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	119.6803	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	63.50404	47.85613	
At most 2	21.34877	29.79707	
At most 3	3.904133	15.49471	
At most 4	0.644235	3.841466	
United Kingdom			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	118.8859	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	70.10052	47.85613	
At most 2	26.88243	29.79707	
At most 3	12.03850	15.49471	
At most 4	2.046119	3.841466	
USA			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	120.1987	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	75.36826	47.85613	
At most 2*	39.08101	29.79707	
At most 3	13.16652	15.49471	
At most 4*	5.025129	3.841466	

Appendix 3.3: Johansen Cointegration Trace Tests (*variables: inv, p, r, cr, x*)

a. Civil Law Countries

Argentina			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	177.9281	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	111.4513	47.85613	
At most 2*	55.37437	29.79707	
At most 3*	15.83211	15.49471	
At most 4*	6.963600	3.841466	
Chile			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	119.4486	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	69.31620	47.85613	
At most 2	29.14070	29.79707	
At most 3	10.06481	15.49471	
At most 4	3.145453	3.841466	
Colombia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	100.6289	69.81889	Trace test indicates 3 cointegrating equation at the 0.05 levels
At most 1*	52.57509	47.85613	
At most 2*	29.84822	29.79707	
At most 3	14.34349	15.49471	
At most 4	2.173864	3.841466	
France			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	89.10274	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	44.67533	47.85613	
At most 2	18.88539	29.79707	
At most 3	5.276390	15.49471	
At most 4	0.019904	3.841466	
Indonesia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	74.50599	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	42.59680	47.85613	
At most 2	14.45286	29.79707	
At most 3	6.770252	15.49471	
At most 4	2.279688	3.841466	
Italy			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	92.44954	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	63.47045	47.85613	
At most 2*	36.09870	29.79707	
At most 3	13.77170	15.49471	
At most 4*	5.548182	3.841466	
Mexico			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	97.95428	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	52.77942	47.85613	
At most 2*	30.65858	29.79707	
At most 3	13.26264	15.49471	
At most 4	3.507069	3.841466	

Appendix 3.3 (continued)

Netherlands			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	85.51743	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	44.37301	47.856613	
At most 2	18.65386	29.79707	
At most 3	1.198881	15.49471	
At most 4	0.162470	3.841466	
Peru			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	153.5077	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	85.01827	47.85613	
At most 2*	44.31002	29.79707	
At most 3	11.47453	15.49471	
At most 4	1.734933	3.841466	
Philippines			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	96.01260	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	39.95746	47.85613	
At most 2	17.80111	29.79707	
At most 3	5.338126	15.49471	
At most 4	0.640873	3.841466	
Spain			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	112.4669	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	62.81007	47.85613	
At most 2	23.86397	29.79707	
At most 3	9.612248	15.49471	
At most 4	2.284809	3.841466	
Venezuela			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	73.72765	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	44.59934	47.85613	
At most 2	27.26787	29.79707	
At most 3	13.35014	15.49471	
At most 4	1.292199	3.841466	

b. Common Law Countries

Australia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	115.6204	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	68.68794	47.85613	
At most 2*	37.99994	29.79707	
At most 3*	19.30622	15.49471	
At most 4*	5.584089	3.841466	
Canada			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	105.1075	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	63.93419	47.85613	
At most 2	28.13126	29.79707	
At most 3	12.79319	15.49471	
At most 4	3.579397	3.841466	

Appendix 3.3 (continued)

India			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	86.92895	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	48.02647	47.85613	
At most 2	29.24054	29.79707	
At most 3	11.58917	15.49471	
At most 4	1.672179	3.841466	
Ireland			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	108.2408	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	45.72510	47.85613	
At most 2	25.15463	29.79707	
At most 3	9.194942	15.49471	
At most 4	0.078856	3.841466	
Malaysia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	101.2451	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	40.17205	47.85613	
At most 2	19.18126	29.79707	
At most 3	4.835212	15.49471	
At most 4	1.354410	3.841466	
New Zealand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	93.89065	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	49.43290	47.85613	
At most 2	22.75178	29.79707	
At most 3	8.885167	15.49471	
At most 4	0.972790	3.841466	
Pakistan			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	150.7493	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	77.11190	47.85613	
At most 2*	32.46656	29.79707	
At most 3	8.553964	15.49471	
At most 4	0.001016	3.841466	
Singapore			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None	58.63106	69.81889	Trace test indicates no cointegration at the 0.05 levels
At most 1	35.74919	47.85613	
At most 2	16.40757	29.79707	
At most 3	4.166706	15.49471	
At most 4	1.125473	3.841466	
South Africa			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	92.77647	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	38.13350	47.85613	
At most 2	18.98685	29.79707	
At most 3	10.81045	15.49471	
At most 4	2.739830	3.841466	

Appendix 3.3 (continued)

Thailand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	105.9602	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	47.61232	47.85613	
At most 2	20.45878	29.79707	
At most 3	4.090243	15.49471	
At most 4	0.509819	3.841466	
United Kingdom			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	95.53147	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	47.06448	47.85613	
At most 2	20.86439	29.79707	
At most 3	8.697326	15.49471	
At most 4	2.470988	3.841466	
USA			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	135.8752	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	86.99716	47.85613	
At most 2*	57.33906	29.79707	
At most 3*	31.51734	15.49471	
At most 4*	12.39027	3.841466	

Appendix 3.4: Johansen Cointegration Trace Tests (variables: *con, p, r, cr, x*)

a. **Civil-Law Countries**

Argentina			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	166.2909	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	103.3075	47.85613	
At most 2*	48.12436	29.79707	
At most 3*	20.16322	15.49471	
At most 4*	6.137341	3.841466	
Chile			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	192.6731	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	78.83195	47.85613	
At most 2	28.80615	29.79707	
At most 3	8.013698	15.49471	
At most 4	0.666590	3.841466	
Colombia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	115.2469	69.81889	Trace test indicates 3 cointegrating equation at the 0.05 levels
At most 1*	65.06102	47.85613	
At most 2*	33.13543	29.79707	
At most 3	10.22592	15.49471	
At most 4	0.593278	3.841466	
France			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	150.9521	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	55.98150	47.85613	
At most 2	22.07429	29.79707	
At most 3	8.278707	15.49471	
At most 4	0.819870	3.841466	
Indonesia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	113.2534	69.81889	Trace test indicates 2 cointegrating equation at the 0.05 levels
At most 1*	50.66441	47.85613	
At most 2	22.59513	29.79707	
At most 3	10.87696	15.49471	
At most 4	2.251538	3.841466	
Italy			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	87.13432	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	51.87377	47.85613	
At most 2*	30.48978	29.79707	
At most 3	13.09737	15.49471	
At most 4	1.206177	3.841466	
Mexico			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	88.86596	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	49.16684	47.85613	
At most 2	21..57744	29.79707	
At most 3	10.47052	15.49471	
At most 4	2.799267	3.841466	

Appendix 3.4 (continued)

Netherlands			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	103.8801	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	57.42988	47.856613	
At most 2	22.37765	29.79707	
At most 3	6.317487	15.49471	
At most 4	0.405946	3.841466	
Peru			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	168.4815	69.81889	Trace test indicates 4 cointegrating equations at the 0.05 levels
At most 1*	71.44604	47.85613	
At most 2*	38.33533	29.79707	
At most 3*	20.29395	15.49471	
At most 4	3.432590	3.841466	
Philippines			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	116.0822	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	61.98974	47.85613	
At most 2	24.84662	29.79707	
At most 3	4.798049	15.49471	
At most 4	0.011067	3.841466	
Spain			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	109.3279	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	59.42963	47.85613	
At most 2*	35.37302	29.79707	
At most 3	11.89506	15.49471	
At most 4	2.392890	3.841466	
Venezuela			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	73.48953	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	45.48607	47.85613	
At most 2	23.96196	29.79707	
At most 3	9.941003	15.49471	
At most 4	0.182396	3.841466	

b. Common-Law Countries

Australia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	119.7263	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	63.95649	47.85613	
At most 2	20.10126	29.79707	
At most 3	8.675975	15.49471	
At most 4	0.902355	3.841466	
Canada			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	113.1542	69.81889	Trace test indicates 3 cointegrating equations at the 0.05 levels
At most 1*	67.08830	47.85613	
At most 2*	31.82451	29.79707	
At most 3	13.82451	15.49471	
At most 4	3.660119	3.841466	

Appendix 3.4 (continued)

India			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	103.2354	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	63.14066	47.85613	
At most 2*	35.59212	29.79707	
At most 3*	19.53242	15.49471	
At most 4*	7.126483	3.841466	
Ireland			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	123.9515	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	68.60313	47.85613	
At most 2	19.25947	29.79707	
At most 3	6.991917	15.49471	
At most 4	0.026898	3.841466	
Malaysia			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	101.7897	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	55.25257	47.85613	
At most 2	20.74484	29.79707	
At most 3	5.638597	15.49471	
At most 4	0.773701	3.841466	
New Zealand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	83.16903	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	34.24561	47.85613	
At most 2	17.23211	29.79707	
At most 3	5.773879	15.49471	
At most 4	1.334193	3.841466	
Pakistan			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	104.7691	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1*	41.96505	47.85613	
At most 2	18.68544	29.79707	
At most 3	4.398096	15.49471	
At most 4	0.665802	3.841466	
Singapore			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	98.62960	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	45.16309	47.85613	
At most 2	16.52082	29.79707	
At most 3	3.753474	15.49471	
At most 4	1.746350	3.841466	
South Africa			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	81.68409	69.81889	Trace test indicates 1 cointegrating equation at the 0.05 levels
At most 1	39.23409	47.85613	
At most 2	15.55541	29.79707	
At most 3	6.532761	15.49471	
At most 4	0.189064	3.841466	

Appendix 3.4 (continued)

Thailand			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	111.0412	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	63.23061	47.85613	
At most 2	26.88700	29.79707	
At most 3	4.997458	15.49471	
At most 4	0.239576	3.841466	
United Kingdom			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	106.7364	69.81889	Trace test indicates 2 cointegrating equations at the 0.05 levels
At most 1*	63.16930	47.85613	
At most 2	26.44696	29.79707	
At most 3	9.430239	15.49471	
At most 4	3.374238	3.841466	
USA			
Null Hypothesis	Trace Statistics	Critical Value	Conclusion
None*	135.2969	69.81889	Trace test indicates 5 cointegrating equations at the 0.05 levels
At most 1*	76.57171	47.85613	
At most 2*	41.84911	29.79707	
At most 3*	18.94941	15.49471	
At most 4*	7.802117	3.841466	

Appendix 3.5: List of Countries and Classification of Legal Structures

Civil-Law Countries	Data Period	Common Law-Countries	Data Period
Argentina	1985:1-2003:4	Australia	1980:1-2003:4
Chile	1980:1-2003:4	Canada	1980:1-2003:4
Colombia	1983:1-2003:4	India	1980:1-2003:4
France	1980:1-2003:4	Ireland	1980:1-2003:4
Indonesia	1980:1-2003:4	Malaysia	1980:1-2003:4
Italy	1982:1-2003:4	New Zealand	1982:1-2003:4
Mexico	1982:1-2003:4	Pakistan	1980:1-2003:4
Netherlands	1980:1-2003:4	South Africa	1980:1-2003:4
Peru	1982:1-2003:4	Singapore	1980:1-2003:4
Philippines	1980:1-2003:4	Thailand	1980:1-2003:4
Spain	1980:1-2003:4	United Kingdom	1980:1-2003:4
Venezuela	1984:1-2003:4	United States of America	1980:1-2003:4

In this study, the classification whether a country legal structures is civil-law or common-law follows the classification used by La Porta et al. (1997, 1998), which in turn rely on Reynolds and Flores (1989). In general, legal families come from two broad traditions: common-law, which is English in origin, and civil-law, which is derives from Roman law. The common-law family includes the law of England and those laws modelled on English law. The common-law is formed by judges who have to resolve specific disputes. Precedents from judicial decisions shape common-law. The common-law, as well as civil-law tradition, has spread around the world through a combination of conquest, imperialism, outright borrowing, and more subtle imitation. The resulting laws reflect both the influence of their families and the revisions specific to individual countries. Common law has spread to the British colonies, including the United States, Canada, Australia, India, and many other countries (La Porta et al. 1998). In this paper, there are 12 common-law countries being studied. The list of countries is as above.

Meanwhile, the civil-law uses statutes and comprehensive codes as a primary means of ordering legal material, and relies heavily on legal scholars to ascertain and formulates its rules (Merryman, 1969). In general, there are three common families of civil-law tradition: French, German, and Scandinavian. This paper, however, only focus on French civil-law tradition due to the fact that French civil-law is the most widely distributed around the world. The French Commercial Code was written under Napoleon in 1807 and brought by his armies to Belgium, the Netherlands, and part of Poland, Italy, and Western regions of Germany. In

the colonial era, France extended its legal influence to the Near East and Northern and Sub-Saharan Africa, Indochina, Oceania, and French Caribbean islands. French legal influence has been significant as well in Luxembourg, Portugal, Spain, some of Swiss cantons, and Italy (Glendon et al. 1994). When the Spanish and Portuguese empires in Latin America dissolved in the nineteenth century, it was mainly the French civil-law that the lawmakers of the new nations looked to for inspiration (La Porta et al. 1998). There are 12 French civil-law countries being studied in this paper.

In most cases, classification of country legal structure that based on legal origin is uncontroversial. In a few cases, however, although the origin of laws is clear, laws have been amended over time to incorporate influences from other families. For example, Thailand's first laws were based on common-law but have received enormous French influence; and Italy is a French-civil-law country with some German influence. In these and several other cases, La Porta et al. (1998) have classified a country legal structure based on the origin of the initial law it adopted rather than on the revisions. In the case of United States (U.S) where every state has their own laws, La Porta et al. (1998) relied on Delaware law because a significant fraction of large U.S companies are incorporated in Delaware law. Meanwhile, in case of Canada, classification is based on Ontario laws, even though Quebec has a system based on French civil law. Thus, La Porta et al. (1998) have classified the legal structure of U.S and Canada as common-law.

Appendix 3.6: Lag Lengths Determination (variables: *y, p, r, cr, x*)

Country	Statistics	Lag			
		t-1	t-2	t-3	t-4
Argentina	AIC	-3.602816	-5.922910	-7.652062	-10.30358
	SC	-2.639175	-4.142100	-5.040877	-6.848462
	LL	156.0985	259.3404	340.1701	450.1699
Australia	AIC	-26.80046	-28.31378	-29.12366	-29.30079
	SC	-25.96719	-26.77585	-26.87154	-26.32469
	LL	1236.021	1314.963	1361.441	1379.584
Canada	AIC	-26.19756	-27.78639	-28.57448	-28.63685
	SC	-25.35870	-26.22748	-26.27551	-25.57687
	LL	1195.792	1263.708	1294.415	1293.429
Chile	AIC	-14.15347	-16.07257	-17.22907	-17.33788
	SC	-13.27297	-14.43492	-14.81193	-14.11779
	LL	610.2924	697.9027	751.9336	763.8394
Colombia	AIC	-22.82135	-25.17747	-26.25762	-27.24966
	SC	-21.66309	-23.01240	-23.04577	-22.99193
	LL	589.1231	646.6705	670.7964	704.4925
France	AIC	-30.86569	-32.08807	-33.15752	-33.27345
	SC	-29.98518	-30.43845	-30.70411	-29.97845
	LL	1295.493	1322.479	1339.986	1319.481
India	AIC	-25.45828	-27.04560	-27.75738	-27.66184
	SC	-24.64659	-25.54783	-25.56452	-24.76470
	LL	1226.539	1312.621	1356.839	1363.614
Indonesia	AIC	-18.89017	-20.62400	-21.67666	-21.92392
	SC	-18.07848	-19.12623	-19.48380	-19.02677
	LL	917.8379	1014.016	1077.126	1102.538
Ireland	AIC	-22.57234	-24.08510	-25.38595	-25.35021
	SC	-21.76065	-22.58733	-23.19309	-22.45306
	LL	1090.900	1174.957	1247.754	1258.434
Italy	AIC	-29.63856	-31.34877	-32.01788	-32.14553
	SC	-28.72539	-29.64928	-29.50779	-28.79931
	LL	1171.085	1230.579	1248.653	1246.166
Malaysia	AIC	-22.38075	-24.88609	-25.64556	-26.04299
	SC	-21.56906	-23.38832	-23.45270	-23.14584
	LL	1081.895	1212.203	1259.695	1289.956
Netherlands	AIC	-31.06273	-32.89309	-33.20687	-33.31690
	SC	-30.21818	-31.32345	-30.89181	-30.23512
	LL	1396.760	1469.403	1474.689	1470.993
New Zealand	AIC	-24.66706	-26.44649	-27.42118	-27.63695
	SC	-23.78655	-24.80884	-25.00404	-24.41686
	LL	1041.349	1112.860	1149.426	1155.204
Pakistan	AIC	-23.73290	-25.01993	-26.32173	-26.29875
	SC	-22.92121	-23.52216	-24.12887	-23.40160
	LL	1145.446	1216.427	1290.799	1301.593
Peru	AIC	-4.950523	-7.827940	-9.436282	-9.909596
	SC	-4.094355	-6.247401	-7.121219	-6.849617
	LL	242.8725	387.6875	476.3238	516.2482
Philippines	AIC	-21.97634	-23.69565	-24.16559	-24.00695
	SC	-21.16465	-22.19788	-21.97273	-21.10980
	LL	1062.888	1156.848	1191.617	1197.316
Singapore	AIC	-26.22453	-27.66152	-28.58383	-28.54751
	SC	-25.41284	-26.16375	-26.39097	-25.65037
	LL	1262.553	1341.261	1394.856	1403.912
South Africa	AIC	-21.29608	-23.09105	-23.66303	-23.38433
	SC	-20.43991	-21.49944	-21.31501	-20.25792
	LL	945.7314	1024.824	1050.184	1040.373

Appendix 3.6 (continued)

Spain	AIC	-22.13741	-23.93131	-24.42258	-24.79591
	SC	-21.30966	-22.40365	-22.18561	-21.84000
	LL	1037.252	1131.909	1166.805	1196.020
Thailand	AIC	-23.81148	-25.16166	-25.72144	-25.86828
	SC	-22.98372	-23.62374	-23.45394	-22.85089
	LL	1113.422	1174.694	1198.883	1204.402
United Kingdom	AIC	-26.43491	-28.08589	-28.71813	-29.70874
	SC	-25.62322	-26.58812	-26.52527	-26.81160
	LL	1272.441	1360.994	1401.034	1456.748
United State	AIC	-29.59322	-31.79882	-32.96131	-32.89271
	SC	-28.77625	-30.29122	-30.75396	-29.97627
	LL	1406.085	1517.746	1579.739	1585.172
Venezuela	AIC	-10.40331	-11.87490	-12.39606	-12.65227
	SC	-9.496881	-10.20075	-9.942658	-9.407790
	LL	435.7290	512.1836	551.0503	579.4602

Note: *AIC - Akaike information criterion*
SC - Schwarz criterion
LL - Log likelihood

Appendix 3.7: Lag Lengths Determination (variables: *inv, p, r, cr, x*)

Country	Statistics	Lag			
		t-1	t-2	t-3	t-4
Argentina	AIC	-1.576505	-3.943746	-5.629544	-8.211628
	SC	-0.612864	-2.162936	-3.018358	-4.756513
	LL	85.17767	191.0592	271.4045	380.0895
Australia	AIC	-18.86688	-18.97447	-19.08596	-19.09882
	SC	-18.03361	-17.43654	-16.83384	-16.12272
	LL	879.0097	899.3637	919.7822	935.7985
Canada	AIC	-24.02324	-25.34784	-26.13323	-26.03328
	SC	-23.18438	-23.78893	-23.83426	-22.97330
	LL	1099.034	1157.631	1190.662	1186.381
Chile	AIC	-11.50977	-13.38443	-14.45625	-14.76189
	SC	-10.62926	-11.74679	-12.03912	-11.54180
	LL	501.9007	590.3771	643.7939	665.9518
Colombia	AIC	-18.18003	-20.53840	-20.82182	-21.03929
	SC	-17.06477	-18.43517	-17.67264	-16.82375
	LL	511.7708	568.4600	569.3129	578.3841
France	AIC	-28.80886	-30.18679	-31.02025	-31.20345
	SC	-27.92836	-28.53718	-28.56684	-27.90896
	LL	1211.163	1247.378	1258.769	1243.926
India	AIC	-24.15020	-25.91322	-26.55554	-26.46669
	SC	-23.33851	-24.41545	-24.36268	-23.56954
	LL	1165.059	1259.965	1301.555	1309.234
Indonesia	AIC	-17.65706	-19.67799	-20.48594	-20.72132
	SC	-16.84537	-18.18021	-18.29308	-17.82417
	LL	859.8817	970.0265	1022.353	1047.820
Ireland	AIC	-20.69904	-22.35229	-23.60092	-23.70849
	SC	-19.88735	-20.85452	-21.40806	-20.81135
	LL	1002.855	1094.381	1165.642	1183.736
Italy	AIC	-26.50903	-28.08865	-28.88328	-29.25554
	SC	-25.59586	-26.38916	-26.37318	-25.90932
	LL	1050.598	1108.324	1134.240	1143.572
Malaysia	AIC	-19.57017	-22.12135	-22.76039	-23.17503
	SC	-18.75848	-20.62357	-20.56753	-20.27788
	LL	949.7982	1083.643	1126.978	1159.464
Netherlands	AIC	-28.47790	-30.52733	-30.92744	-31.12476
	SC	-27.63335	-28.95768	-28.61237	-28.04298
	LL	1283.028	1367.675	1378.952	1381.115
New Zealand	AIC	-21.87066	-23.84387	-24.47561	-24.67316
	SC	-20.99015	-22.20622	-22.05847	-21.45307
	LL	926.6970	1008.755	1034.549	1042.580
Pakistan	AIC	-21.21599	-22.99192	-24.07131	-24.23169
	SC	-20.40430	-21.49415	-21.87845	-21.33455
	LL	1027.151	1124.124	1187.280	1207.542
Peru	AIC	-2.651998	-5.407232	-6.979029	-7.444791
	SC	-1.795831	-3.826692	-4.663966	-4.384812
	LL	144.0359	284.8073	373.1192	413.9588
Philippines	AIC	-13.35674	-14.63244	-14.92019	-15.11954
	SC	-12.54505	-13.13466	-12.72733	-12.22239
	LL	657.7669	735.4082	766.3286	792.9391
Singapore	AIC	-18.94330	-19.02122	-19.00195	-19.09340
	SC	-18.13161	-17.52345	-16.80909	-16.19626
	LL	920.3353	939.4870	954.0898	973.7499

Appendix 3.7 (continued)

South Africa	AIC	-20.16225	-21.94067	-22.65453	-22.37341
	SC	-19.30608	-20.34906	-20.30651	-19.24700
	LL	896.9766	976.5080	1008.836	999.9365
Spain	AIC	-19.57440	-21.42196	-22.06565	-22.44544
	SC	-18.74664	-19.89430	-19.82868	-19.48953
	LL	920.6351	1018.988	1061.922	1092.599
Thailand	AIC	-21.07420	-22.37240	-22.89689	-23.10274
	SC	-20.24644	-20.83448	-20.62939	-20.08535
	LL	988.8761	1050.572	1076.015	1086.866
United Kingdom	AIC	-23.32130	-24.91893	-25.58041	-26.68690
	SC	-22.50961	-23.42116	-23.38755	-23.78976
	LL	1126.101	1213.730	1256.699	1319.254
United State	AIC	-26.41908	-28.89088	-30.13026	-30.13165
	SC	-25.60211	-27.38329	-27.92291	-27.21520
	LL	1258.487	1383.981	1450.927	1460.924
Venezuela	AIC	-8.401128	-9.976369	-10.37131	-10.61007
	SC	-7.494702	-8.302222	-7.917904	-7.365588
	LL	357.6440	439.0902	474.1097	502.8777

Note: *AIC - Akaike information criterion*
SC - Schwarz criterion
LL - Log likelihood

Appendix 3.8: Lag Lengths Determination (variables: *con, p, r, cr, x)*

Country	Statistics	Lag			
		t-1	t-2	t-3	t-4
Argentina	AIC	-3.383342	-5.779761	-7.562932	-10.40178
	SC	-2.419702	-3.998951	-4.951746	-6.946669
	LL	148.4170	254.4017	337.1397	453.4598
Australia	AIC	-26.43712	-28.05751	-28.98305	-29.03274
	SC	-25.58681	-26.48787	-26.68409	-25.99422
	LL	1180.015	1261.473	1311.780	1324.375
Canada	AIC	-25.41618	-27.14269	-28.45847	-28.44487
	SC	-24.57732	-25.58378	-26.15951	-25.38489
	LL	1161.020	1235.707	1289.485	1285.462
Chile	AIC	-13.05058	-15.03780	-16.56873	-16.72923
	SC	-12.17007	-13.40015	-14.15159	-13.50914
	LL	565.0736	656.5188	726.1804	740.7109
Colombia	AIC	-19.38027	-21.83002	-21.81428	-22.10408
	SC	-18.26501	-19.72679	-18.66510	-17.88854
	LL	543.5772	600.7504	592.6357	602.3419
France	AIC	-27.88613	-29.56112	-30.53002	-32.10806
	SC	-27.00563	-27.91150	-28.07662	-28.81356
	LL	1173.331	1222.664	1240.141	1276.944
India	AIC	-25.40474	-27.21662	-27.87239	-27.87805
	SC	-24.59305	-26.71885	-25.67953	-24.98090
	LL	1224.023	1320.573	1362.130	1373.451
Indonesia	AIC	-16.27619	-19.21305	-19.91667	-19.92613
	SC	-15.46450	-17.71528	-17.72381	-17.02898
	LL	794.9807	948.4070	996.1669	1011.639
Ireland	AIC	-21.83762	-24.16935	-25.57973	-25.44171
	SC	-21.02593	-22.67158	-23.38687	-22.54457
	LL	1056.368	1178.875	1256.667	1262.598
Italy	AIC	-28.85091	-30.31721	-31.39328	-31.60153
	SC	-27.93774	-28.61772	-28.88319	-28.25531
	LL	1140.760	1191.895	1225.855	1226.854
Malaysia	AIC	-21.75005	-24.46329	-25.38237	-25.78558
	SC	-20.93836	-22.96551	-23.18951	-22.88843
	LL	1052.253	1192.543	1247.589	1278.244
Netherlands	AIC	-29.34361	-31.14452	-31.50491	-31.72416
	SC	-28.49906	-29.57488	-29.18984	-28.64239
	LL	1321.119	1394.215	1403.206	1405.691
New Zealand	AIC	-24.30665	-26.17958	-27.20487	-27.23235
	SC	-23.42614	-24.54194	-24.78773	-24.01225
	LL	1026.573	1102.183	1140.990	1139.829
Pakistan	AIC	-21.44255	-23.23948	-24.18403	-24.21719
	SC	-20.63086	-21.74171	-21.99117	-21.32004
	LL	1037.800	1135.636	1192.465	1206.882
Peru	AIC	-5.427567	-8.278023	-10.06248	-10.57407
	SC	-4.571399	-6.697484	-7.747417	-7.514087
	LL	263.3854	406.8160	502.6242	543.8238
Philippines	AIC	-20.52775	-21.87762	-22.95128	-23.03389
	SC	-19.71606	-20.37984	-20.75842	-20.13674
	LL	994.8040	1072.309	1135.759	1153.042
Singapore	AIC	-25.77775	-27.52405	-28.53512	-28.71386
	SC	-24.96606	-26.02628	-26.34226	-25.81672
	LL	1241.554	1334.869	1392.616	1411.481
South Africa	AIC	-21.61584	-23.63943	-24.36239	-24.14963
	SC	-20.75967	-22.04782	-22.01437	-21.02322
	LL	959.4812	1047.856	1078.858	1070.985

Appendix 3.8 (continued)

Spain	AIC	-21.02814	-22.59457	-23.43683	-23.86888
	SC	-20.20038	-21.06691	-21.19986	-20.91296
	LL	986.7804	1071.756	1122.939	1155.231
Thailand	AIC	-23.41240	-24.87918	-25.73718	-25.94124
	SC	-22.58465	-23.34126	-23.46968	-22.92385
	LL	1095.264	1162.123	1199.567	1207.503
United Kingdom	AIC	-24.39300	-25.85810	-26.89466	-28.08206
	SC	-23.58131	-24.36032	-24.70180	-25.18492
	LL	1176.471	1257.402	1317.154	1382.734
United State	AIC	-29.51486	-31.24549	-32.70636	-32.80179
	SC	-28.69789	-29.73790	-30.49901	-29.88534
	LL	1402.441	1492.293	1568.140	1581.080
Venezuela	AIC	-10.75542	-12.12793	-12.78198	-12.98001
	SC	-9.848996	-10.45378	-10.32858	-9.735523
	LL	449.4615	521.9592	565.7154	591.7502

Note: *AIC - Akaike information criterion*
SC - Schwarz criterion
LL - Log likelihood

Appendix 4.1: Causality, Unit Root Tests, and Cointegration Tests

1.0 Introduction

In this paper, the relationship among foreign direct investment (FDI), financial development indicators and economic growth will be examined by using Granger causality tests within an error correction model (VECM) framework. These tests require that the variables used in a given model be stationary, that is, their stochastic properties are time invariant. The standard Granger tests are also only valid if the original time series are not cointegrated. Thus, the time series analysis that is appropriate for this study includes unit root tests to test the stationary properties of the series, cointegration test, error correction representation, and causality tests. This section gives a brief explanation of these tests and their appropriateness for this study. The discussion will start with the concept of causality, and then explain the unit root and cointegration tests.

1.1 Granger Causality

In order to test the causality issue empirically, it is common to apply the Granger causality test that was initially introduced by Granger (1969). In a bivariate framework, the variable y_{1t} is said to cause the variable y_{2t} in the Granger sense if the forecast for y_{2t} improves when lagged variables y_{1t} are taken into account in the equation. In general, conventional Granger causality can be represented by the following bivariate system.

$$y_{1t} = \delta_1 + \sum_{i=1}^{m} \beta_i y_{1t-i} + \sum_{i=1}^{n} \alpha_i y_{2t-i} + \varepsilon_{1t} \quad (1)$$

$$y_{2t} = \delta_2 + \sum_{i=1}^{q} \pi_i y_{1t-i} + \sum_{i=1}^{r} \phi_i y_{2t-i} + \nu_t \quad (2)$$

where, δ_1 and δ_2 are drifts. The coefficient α_is are relevant for testing Granger causality running from y_{2t} to y_{1t} while the coefficient π_is are appropriate for Granger causality test running in the opposite direction. Four findings are possible in a Granger causality test. First, neither variable Granger causes the other. In other words, independence is suggested when the set of y_{1t} and y_{2t} coefficients are not statistically significant in both regressions. Second, unidirectional causality from y_{2t} to y_{1t}, which means y_{2t} causes y_{1t} but not vice versa. Third,

unidirectional causality from y_{1t} to y_{2t} that means y_{1t} causes y_{2t} but not vice versa. Fourth, bilateral causality between two variables, which means y_{1t} and y_{2t} Granger cause each other (feedback effect). According to the above equations, the null hypothesis that y_{2t} does not Granger cause y_{1t} is rejected if the coefficients of α_is in equation (1) are jointly significant. The null hypothesis that y_{1t} does not Granger cause y_{2t} is rejected if the π_is are jointly significant in equation (2). If both some $\alpha_i \neq 0$ and some $\pi_i \neq 0$ then there is feedback between y_{1t} and y_{2t}. Usually, the standard F-test has been used to determine the joint significant and hence the causal relationship between variables.

The studies applying the standard causality tests, however, suffer from two methodological deficiencies. First, the standard tests do not examine the basic time series properties of the variables. The standard Granger causality test assumes stationarity of the time series being examined. Therefore, if variables are nonstationary, the implications drawn from the test are invalid. Many studies have shown that models with nonstationary variables tend to produce spurious regressions and make the usual test statistics (e.g. F-test) unreliable (Granger and Newbold, 1974; Stock and Watson, 1989). To solve this problem, many empirical studies have turned the series stationary mechanically by differencing the variables. This process, however, will eliminate the long-run information embodied in the original levels form of the variables. Second, standard Granger tests are only valid if the original time series are not cointegrated. If the variables are cointegrated, a model incorporating differenced variables will be misspecified (Granger, 1986).

In this regard, the technique pioneered by Engle and Granger (1987) makes a significant contribution towards testing causality. Engle and Granger demonstrate that once a number of variables are cointegrated there always exists a corresponding error-correction representation. This implies that changes in the dependent variable are a function of the levels of disequilibrium in the cointegration relationship that is captured by the error-correction term, as well as changes in other explanatory variables. A consequence of cointegration is that either Δy_{1t} or Δy_{2t} or both must be caused by the lagged error-correction term which itself is a function of y_{1t-I}, y_{2t-1}. In general, the relationship between y_{1t} and y_{2t} can be written in vector-error correction model (VECM) form as:

$$\Delta y_{1t} = \delta_1 + \sum_{i=1}^{m} \gamma_{1i} \Delta y_{1t-i} + \sum_{i=1}^{n} \beta_{1i} \Delta y_{2t-i} + \sum_{i=1}^{r} \alpha_{1i} ECM_{r,t-1} + \mu_{1t} \quad (3)$$

$$\Delta y_{2t} = \delta_1 + \sum_{i=1}^{m} \gamma_{2i} \Delta y_{1t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta y_{2t-i} + \sum_{i=1}^{r} \alpha_{2i} ECM_{r,t-1} + \mu_{2t} \quad (4)$$

where, Δ denotes the first-difference of a non-stationary variable. In the VECM, the sources of causation can be exposed through the statistical significance of three different tests. First, from a joint test that is applied to the sum of the lags of each explanatory variable. Second, by a t-test on the lagged ECM term, that is the weak exogeneity test. Thirdly, by a joint test that is applied to the sum of each explanatory variable and the lagged ECM terms (the strong exogeneity test). For instance, the null hypothesis that y_{2t} does not Granger cause y_{1t} is rejected if the β_{1i}s are jointly significantly different from zero. The same null hypothesis is also rejected if α_{1i} is significant or if β_{1i}s and α_{1i} are jointly significant from zero.

It is necessary to address the issue of long run and short-run causality implicit in the error correction models represented by equations (3) and (4). Granger (1986) suggested that the ECM approach should lead to better short-run prediction, and integrate the short-run variations with the long-run equilibrium. In this regard, some researchers have suggested that the lagged changes in the independent variable represent the short-run causal impact while the ECM term indicates the long-run causality. More recently, Luintel and Khan (1999) have shown that long-run causality can be examined by testing the cointegrating vectors in the Johansen system for weak exogeneity.

1.2 Unit Root Tests

The purpose of unit root tests is to establish the stationarity properties of the time series. Existence of unit roots in a variable denotes that a series is not stationary. A number of alternative tests are available for testing whether a series is stationary. In this paper, the unit root tests will be performed using the Augmented Dickey-Fuller (ADF) tests. The ADF test for unit roots indicates whether an individual series is stationary by running an OLS regression on the following regression equation.

$$\Delta y_{i,t} = \alpha_i y_{i,t-1} + \sum_{i=1}^{m} \beta_{ij} \Delta y_{i,t-i} + \delta_i + \varepsilon_{it} \tag{5}$$

In the ADF tests, the null hypothesis H_o:$\alpha_i = 0$, is to test that the series contains a unit root and is therefore non-stationary. If the t-statistic associated with the estimated coefficient α_i is greater than the critical values, we reject the null hypothesis of a unit root in favour of stationarity. The optimal lag lengths of the process will be chosen by the Akaike Information Criteria (AIC) described in Pantula et al. (1994). However, according to Charemza and Deadman (1997) the potential presence of structural breaks makes the ADF test unreliable for testing stationarity. A structural break will tend to bias the ADF test toward non-rejection of

the null hypothesis of a unit root. As an alternative, this paper will also use the Phillips-Perron (PP) test that suggested by Phillips and Perron (1988). The use of PP test is justified by the fact that liberalisation policy implemented by many developing countries starting from mid-1980 had a significant impact on the flows of FDI into these countries.

If differenced appropriately, a non-stationary variable can also achieve stationarity (Granger, 1986). The appropriate number of differencing is called the order of integration. If a time series y_t becomes stationary after being differenced d times, y_t is integrated of order d and denoted by y~I(d). The orders of integrations have several implications on causality testing. For instance, If a series is I(0), then the series is a stationary process and causality tests can be performed in levels. If a series is I(1), the process is non-stationary and causality tests can be performed in first difference filter. If two processes were I(1) and cointegrated then there must be Granger causality in at least one direction (Granger, 1986). Meanwhile, $\{y_{it}\}$ is said to be cointegrated of order one, if each of its components is integrated of order one (Engle and Granger, 1987), which implies that, two variables, y_{1t} and y_{2t} are only cointegrated, if they were integrated at the same order.

1.3 Cointegration Tests

A cointegration test can be applied to determine the existence of a long-run relationship between economic variables. From a statistical point of view, a long-term relationship means that the variables move together over time so that short-term relationship disturbances from the long-term trend will be corrected (Manning and Andrianacos, 1993). The basic idea behind cointegration is that, if in the long-run two or more series move closely together, even though the series themselves are trended, the difference between them is constant. It is possible to regard these series as a long-run equilibrium relationship, as the difference between them is stationary. Meanwhile, a lack of cointegration suggests that such variables have no long-run relationship: In principal, they can wander arbitrarily far away from each other (Dickey at el. 1991). There are two tests for cointegration usually used in empirical studies; the single equation based Engle/Granger (1987) test, and the systems based Johansen (1988) tests.

The Engle and Granger (1987) two-step procedure for modelling the relationship between cointegrated variables has received a great deal of attention in recent years. This approach is attractive because it reduces the number of coefficients to be estimated, thus reduces the problem of multicollinearity. Furthermore, the first step can be estimated by ordinary least squares (Holden and Thomson, 1992). The procedure used to establish the existence of a

cointegrating relationship is as follows: first, the long-run relationship ($y_{1t} = \beta_1 + \beta_2 y_{2t} + \varepsilon_t$) is estimated by OLS. This is called the cointegrating regression. Second, the residuals ($\mu = y_{1t} - \beta_1^{OLS} - \beta_2^{OLS} y_{2t}$) from this regression are retained and the ADF/PP test is applied to the residual as follows.

$$\Delta\mu_t = \theta\mu_{t-1} + \sum_{i=1}^{m} \phi_i \Delta\mu_{i-1} + \nu_t \tag{6}$$

In ADF tests, the null hypothesis H_o: $\theta = 0$ is tested against the alternative H_a:$\theta < 0$ using the appropriate critical value (MacKinnon, 1991). The null hypothesis of the cointegration test is that the series formed by the residuals of each of the cointegrating regressions is not stationary. In other words, if there exists cointegration between y_{1t} and y_{2t}, the residual μ_t is a I(0) process. Meanwhile, if there is not cointegration between y_{1t} and y_{2t}, μ_t is a unit root process. Thus, whether y_{1t} and y_{2t} are cointegrated corresponds to whether μ_t follows a unit root process or not.

If there are more than two variables in the system, it will be difficult to apply the method we discussed above unless we know the number of cointegration relations in the system. The system method based on the maximum likelihood estimation suggested by Johansen (1988) enables us to determine the number of cointegration relations and estimate them by Maximum Likelihood Estimation in a unified framework. Specifically, Johansen (1988) provides a multivariate alternative approach, which tests for multiple cointegrating vectors and examines long run causality between variables. It relies on the relationship between the rank of a matrix and its characteristic roots (eigenvalues). Specifically, if the system has *r* independent cointegrating relations, the test for the number of characteristic roots that are not significantly different from unity is given by $\lambda_{trace}(r) = -T\sum\ln(1-\lambda_j)$. The Johansen trace tests for cointegration is testing the null that there are less then or equal to *h* cointegrating relations ($r \leq h$) against the alternative hypothesis that there are more than *h* cointegrating relations ($r > h$). Meanwhile, the maximum Eigen value test statistic $\lambda_{max(r,r+1)} = -T\ln(1-\lambda_{it+1})$ can be used to test the null that the number of cointegrating vectors is $r \leq h$ against the alternative that $r = h + 1$, where, λ_i is the number of estimated values of the characteristic roots and T is the number of usable observations. Since, the trace test is more robust than the maximum Eigen value test, as pointed out by Cheung and Lai (1993); this paper will use the trace statistic.

Appendix 4.2: List of countries: FDI, Financial Development, and Economic Growth

1. Algeria**
2. Argentina*
3. Barbados**
4. Bolivia**
5. Brazil**
6. Central Africa**
7. Chile*
8. Colombia*
9. Congo Republic**
10. Costa Rica**
11. El Salvador**
12. Ghana**
13. Guatemala**
14. Honduras**
15. India*
16. Indonesia**
17. Israel**
18. Jamaica**
19. Kenya**
20. Malaysia*
21. Mauritania**
22. Mauritius**
23. Mexico*
24. Morocco**
25. Nigeria*
26. Pakistan**
27. Panama**
28. Paraguay**
29. Philippines*
30. Peru*
31. Singapore*
32. South Africa*
33. Sri Lanka**
34. Thailand*
35. Tunisia**
36. Venezuela*
37. Zambia**

Note: ** *Credit markets only*
* *Credit markets and stock markets*

Appendix 4.3: Dynamic Correlation between FDI and Banks, Stock Market and Economic Growth

Country		Lag			
		t-1	t-2	t-3	t-4
Algeria	BI	-0.00635 (0.9739)	-0.13978 (0.4781)	-0.21330 (0.2854)	-0.2534 (0.2115)
	B2	0.19172 (0.3191)	0.11661 (0.5546)	-0.04194 (0.8355)	-0.12969 (0.5278)
	G	0.00564 (0.9768)	0.67651 (0.0001)*	-0.17537 (0.3816)	0.33451 (0.0949)**
Argentina	B1	0.13493 (0.4953)	0.01472 (0.9407)	-0.15558 (0.4384)	-0.28661 (0.1557)
	B2	0.08577 (0.6582)	0.01124 (0.9547)	-0.01203 (0.9525)	-0.11729 (0.5683)
	S2	0.49138 (0.0173)*	0.74962 (0.0001)*	0.29793 (0.1896)	0.30722 (0.1876)
	G	0.14670 (0.4476)	0.22549 (0.2486)	0.1231 (0.5404)	-0.05942 (0.7731)
Barbados	B1	-0.10174 (0.5995)	-0.14836 (0.4512)	-0.01360 (0.9463)	0.12803 (0.5331)
	B2	0.20854 (0.2777)	0.29504 (0.1275)	0.32777 (0.0951)**	0.40923 (0.0379)*
	G	0.14801 (0.4435)	0.26209 (0.1779)	0.05783 (0.7745)	0.04177 (0.8394)
Bolivia	B1	0.87213 (0.0001)*	0.90565 (0.0001)*	0.92230 (0.0001)*	0.90069 (0.0001)*
	B2	0.84531 (0.0001)*	0.87729 (0.0001)*	0.88637 (0.0001)*	0.89035 (0.0001)*
	G	0.31085 (0.1007)	0.35893 (0.0607)**	0.34977 (0.0737)**	0.32947 (0.1003)
Brazil	B1	-0.1714 (0.3739)	-0.14539 (0.4604)	-0.01310 (0.9483)	0.21953 (0.2812)
	B2	-0.38087 (0.0415)*	-0.35899 (0.0606)**	-0.17766 (0.3753)	0.12120 (0.5553)
	G	0.08267 (0.66991)	0.11723 (0.5524)	0.18733 (0.3495)	0.17307 (0.3978)
Central Africa	B1	0.14585 (0.4503)	0.20879 (0.2863)	0.20766 (0.2988)	0.09126 (0.6575)
	B2	0.39888 (0.0321)*	0.26611 (0.1711)	0.13292 (0.5086)	0.45232 (0.0203)*
	G	0.17554 (0.3624)	0.21940 (0.2620)	0.02667 (0.8950)	-0.01278 (0.9506)
Chile	B1	0.59779 (0.0006)*	0.56713 (0.0016)*	0.58403 (0.0014)*	0.59222 (0.0014)*
	B2	0.42465 (0.0217)*	0.39024 (0.0401)*	0.37599 (0.0533)**	0.35835 (0.0722)**
	S1	0.69106 (0.0003)*	0.76100 (0.0011)*	0.80736 (0.0001)*	0.86584 (0.0001)*
	S2	0.65673 (0.0007)*	0.76901 (0.0001)*	0.79659 (0.0001)*	0.89631 (0.0001)*
	G	0.30487 (0.1078)	0.37166 (0.0515)**	0.26257 (0.1858)	0.37390 (0.0594)**

Appendix 4.3 (continued)

Country		Lag			
		t-1	t-2	t-3	t-4
Colombia	BI	0.62567 (0.0003)*	0.67840 (0.0001)*	0.65306 (0.0002)*	0.59550 (0.0013)*
	B2	0.41185 (0.0264)*	0.45485 (0.0150)*	0.35262 (0.0712)**	0.28225 (0.1624)
	S1	0.54470 (0.0088)*	0.61298 (0.0031)*	0.56627 (0.0092)*	0.55783 (0.0131)*
	S2	0.31981 (0.1368)	0.47547 (0.0253)*	0.70548 (0.0004)*	0.61670 (0.0038)*
	G	-0.46035 (0.0120)*	-0.33605 (0.0804)**	-0.19304 (0.3347)	-0.18604 (0.3628)
Congo Republic	B1	-0.18610 (0.3328)	-0.24615 (0.2067)	-0.15805 (0.4311)	0.00250 (0.9903)
	B2	-0.01042 (0.95723)	-0.03531 (0.8584)	-0.06241 (0.7571)	-0.06222 (0.7627)
	G	0.39927 (0.0319)*	0.36998 (0.0526)**	0.25208 (0.2046)	0.19080 (0.3503)
Costa Rica	B1	-0.02774 (0.8864)	0.07479 (0.7052)	0.01227 (0.9516)	0.06470 (0.7535)
	B2	-0.39164 (0.0356)*	-0.52635 (0.0040)*	-0.61296 (0.0007)*	-0.67519 (0.0002)*
	G	0.26699 (0.1615)	0.19326 (0.3245)	0.14647 (0.4660)	0.36282 (0.0685)**
El Salvador	B1	0.38474 (0.0393)*	0.40050 (0.0347)*	0.37644 (0.0529)**	0.48131 (0.0128)*
	B2	0.45155 (0.0139)*	0.42366 (0.0247)*	0.43198 (0.0244)*	0.30338 (0.1319)
	G	0.00749 (0.9692)	0.03431 (0.8624)	-0.03295 (0.8704)	0.01304 (0.9496)
Ghana	B1	0.04304 (0.8246)	0.05944 (0.7638)	-0.10802 (0.5917)	-0.21670 (0.2876)
	B2	0.16188 (0.4015)	0.08445 (0.6692)	0.19322 (0.3342)	0.27319 (0.1769)
	G	0.32229 (0.0882)**	0.10763 (0.5857)	0.13852 (0.4908)	0.29893 (0.1380)
Guatemala	B1	-0.19445 (0.3096)	0.19604 (0.3174)	0.25137 (0.2054)	-0.01188 (0.9541)
	B2	-0.13960 (0.4702)	-0.09094 (0.6454)	0.25664 (0.1963)	0.18866 (0.3561)
	G	0.32110 (0.0894)**	-0.00895 (0.9640)	-0.01156 (0.9544)	-0.08900 (0.6655)
Honduras	B1	0.76459 (0.0001)*	0.79479 (0.0001)*	0.61441 (0.0007)*	0.55996 (0.0029)*
	B2	0.27913 (0.1425)	0.15138 (0.4419)	-0.06636 (0.7422)	-0.07209 (0.7263)
	G	-0.02043 (0.9162)	-0.00358 (0.9856)	-12116 (0.5472)	-0.11651 (0.5709)

Appendix 4.3 (continued)

Country		Lag			
		t-1	t-2	t-3	t-4
India	BI	-0.06358 (0.7479)	-0.00259 (0.9898)	0.08339 (0.6855)	0.16179 (0.4398)
	B2	-0.00560 (0.9774)	0.00807 (0.9681)	0.11074 (0.5902)	0.14809 (0.4799)
	S2	0.39400 (0.0629)**	0.10441 (0.6438)	-0.08744 (0.7063)	0.04407 (0.8536)
	G	0.28642 (0.2258)	0.20444 (0.3064)	0.23317 (0.2516)	0.18292 (0.3815)
Indonesia	B1	0.10643 (0.5827)	0.12803 (0.5162)	0.21016 (0.2927)	0.20217 (0.3220)
	B2	0.22358 (0.2437)	0.17489 (0.3734)	0.22422 (0.2609)	0.16268 (0.4272)
	G	0.58943 (0.0008)*	0.32201 (0.0947)**	0.00459 (0.9819)	-0.03033 (0.8831)
Israel	B1	-0.10501 (0.5877)	-0.11076 (0.5747)	-0.01229 (0.9515)	0.02102 (0.9188)
	B2	0.02229 (0.9086)	0.04617 (0.8155)	0.18685 (0.3507)	0.29629 (0.1416)
	G	0.38519 (0.0391)*	0.33582 (0.0806)**	0.18092 (0.3665)	0.12551 (0.5413)
Jamaica	B1	-0.05840 (0.7635)	0.22792 (0.2434)	0.43183 (0.0245)*	0.63928 (0.0004)*
	B2	0.08829 (0.6488)	0.14679 (0.4560)	0.24369 (0.2206)	0.26396 (0.1926)
	G	0.48386 (0.0078)*	0.33239 (0.0840)**	0.32517 (0.0979)**	0.22070 (0.2786)
Kenya	B1	0.15135 (0.4332)	0.17709 (0.3673)	0.16221 (0.4189)	0.34495 (0.0844)**
	B2	0.21104 (0.2718)	0.18077 (0.3573)	0.05331 (0.7917)	-0.00104 (0.9960)
	G	-0.14541 (0.4517)	-0.02292 (0.9078)	0.10420 (0.6050)	0.05570 (0.7870)
Malaysia	B1	-0.09819 (0.6132)	-0.10026 (0.6117)	0.03501 (0.8624)	0.24394 (0.2298)
	B2	0.13753 (0.4768)	0.07956 (0.6874)	0.10779 (0.5926)	0.19889 (0.3300)
	S1	0.30317 (0.1816)	0.07517 (0.7528)	-0.05709 (0.8164)	-0.13678 (0.5984)
	S2	0.23462 (0.2812)	0.00802 (0.9718)	-0.01662 (0.9430)	-0.06852 (0.7741)
	G	0.51570 (0.0042)*	0.49800 (0.0070)*	0.22378 (0.2618)	-0.03329 (0.8717)

Appendix 4.3 (continued)

Country		Lag			
		t-1	t-2	t-3	t-4
Mauritania	BI	0.02727 (0.8883)	0.01815 (0.9270)	0.00940 (0.9629)	0.02938 (0.8867)
	B2	0.22691 (0.2365)	0.17990 (0.3596)	0.07644 (0.7047)	0.12184 (0.5532)
	G	-0.25601 (0.1801)	-0.17838 (0.3638)	0.29990 (0.1286)	-0.23835 (0.2410)
Mauritius	B1	0.51286 (0.0044)*	0.51379 (0.0052)*	0.39450 (0.0417)*	0.29953 (0.1371)
	B2	0.43195 (0.0193)*	0.47929 (0.0099)*	0.41541 (0.0312)*	0.33758 (0.0917)**
	G	0.13403 (0.4882)	0.27975 (0.1494)	0.21993 (0.2703)	0.02147 (0.9171)
Mexico	B1	-0.06459 (0.7392)	-0.10196 (0.6057)	-0.16679 (0.4057)	-0.20306 (0.3198)
	B2	0.14215 (0.4620)	0.19077 (0.3309)	0.18764 (0.3486)	0.09382 (0.6485)
	S1	0.71284 (0.0003)*	0.82111 (0.0001)*	0.82081 (0.0001)*	0.71189 (0.0009)*
	S2	0.80080 (0.0001)*	0.80553 (0.0001)*	0.81110 (0.0001)*	0.75256 (0.0001)*
	G	-0.18029 (0.3493)	-0.25819 (0.1847)	-0.35394 (0.0701)**	-0.47092 (0.0152)*
Morocco	B1	0.40359 (0.0332)*	0.33596 (0.0867)**	0.25971 (0.2001)	0.21023 (0.3131)
	B2	0.23449 (0.2297)	0.06930 (0.7312)	-0.15207 (0.4583)	-0.3722 (0.0669)**
	G	-0.212498 (0.2777)	-0.11553 (0.5661)	0.15677 (0.4444)	-0.00789 (0.9702)
Nigeria	B1	-0.19179 (0.3189)	-0.02987 (0.8800)	0.16950 (0.3980)	0.22843 (0.2617)
	B2	-0.15034 (0.4363)	-0.07128 (0.7185)	0.16742 (0.4039)	0.14781 (0.4712)
	S1	0.42970 (0.0519)**	0.37962 (0.0988)**	0.41509 (0.0772)**	0.16017 (0.5255)
	S2	0.16768 (0.4444)	0.15084 (0.5028)	0.21248 (0.3551)	0.44659 (0.0484)*
	G	0.17274 (0.3702)	0.07241 (0.7142)	0.07439 (0.7132)	0.09266 (0.6526)
Pakistan	B1	0.17189 (0.3726)	0.19843 (0.3114)	0.08875 (0.6598)	-0.10788 (0.5999)
	B2	0.32619 (0.0842)**	0.40275 (0.0336)*	0.40515 (0.0360)*	0.36456 (0.0671)**
	G	-0.22796 (0.2343)	-0.17858 (0.3632)	-0.20437 (0.3065)	-0.06188 (0.7640)
Panama	B1	0.61182 (0.0004)*	0.60750 (0.0006)*	0.61228 (0.0007)*	0.59209 (0.0014)*
	B2	0.42957 (0.0200)*	0.38920 (0.0406)*	0.24712 (0.2140)	0.09441 (0.6464)
	G	0.09719 (0.6160)	-0.04879 (0.8053)	0.02426 (0.9044)	0.08822 (0.6682)

Appendix 4.3 (continued)

Country		Lag			
		t-1	t-2	t-3	t-4
Paraguay	BI	0.28853 (0.1290)	0.18585 (0.3437)	0.03476 (0.8634)	-0.05911 (0.7742)
	B2	0.45185 (0.0139)	0.40189 (0.0340)*	0.40251 (0.0374)*	0.36208 (0.0691)**
	G	0.13914 (0.4716)	0.11438 (0.5622)	0.02167 (0.9145)	-0.13441 (0.5127)
Peru	B1	0.05150 (0.7908)	-0.20195 (0.3027)	-0.36168 (0.0638)**	-0.20497 (0.3152)
	B2	0.21760 (0.2568)	-0.03674 (0.8527)	-0.32984 (0.0929)**	-0.46537 (0.0166)*
	S2	0.87698 (0.0001)*	0.70620 (0.0002)*	0.56498 (0.0076)*	0.41442 (0.0693)**
	G	0.32424 (0.0862)**	0.30353 (0.1164)	0.12533 (0.5334)	-0.11323 (0.5818)
Philippines	B1	0.61186 (0.0004)*	0.51422 (0.0051)*	0.52852 (0.0046)*	0.54199 (0.0042)*
	B2	0.04797 (0.8084)	-0.17155 (0.3827)	-0.29832 (0.1307)	-0.34269 (0.0866)**
	S2	0.62985 (0.0013)*	0.55219 (0.0077)*	0.29894 (0.1880)	0.38668 (0.0922)**
	G	0.14628 (0.4490)	-0.04420 (0.8233)	-0.40624 (0.0355)*	-0.40902 (0.0380)*
Singapore	B1	0.54132 (0.0024)*	0.46860 (0.0119)*	0.41299 (0.0323)*	0.38910 (0.0495)*
	B2	0.46996 (0.0101)*	0.38971 (0.0404)*	0.40416 (0.0365)*	0.50657 (0.0083)*
	S2	0.24827 (0.2421)	-0.16083 (0.4635)	-0.16607 (0.4585)	-0.26503 (0.2456)
	G	-0.04041 (0.8351)	-0.22814 (0.2430)	-0.22795 (0.2528)	-0.48984 (0.0111)*
South Africa	B1	-0.12716 (0.5191)	-0.25822 (0.1935)	-0.33015 (0.0995)**	-0.33381 (0.1029)
	B2	0.39915 (0.0354)*	0.45566 (0.0169)*	0.41980 (0.0328)*	0.28373 (0.1693)
	S1	0.63776 (0.0011)*	0.67855 (0.0005)*	0.57741 (0.0061)*	0.39115 (0.0881)**
	S2	0.56880 (0.0037)*	0.52753 (0.0097)*	0.64416 (0.0012)*	0.52595 (0.0143)*
	G	0.27898 (0.1505)	0.08293 (0.6809)	0.10577 (0.6071)	-0.06241 (0.7670)
Sri Lanka	B1	0.62745 (0.0003)*	0.59208 (0.0009)*	0.48927 (0.0096)*	0.36059 (0.0703)**
	B2	0.68535 (0.0001)*	0.67298 (0.0001)*	0.57293 (0.0018)*	0.47985 (0.0131)*
	G	0.25689 (0.1786)	0.35304 (0.0654)**	0.30996 (0.1156)	0.32902 (0.1007)

Appendix 4.3 (continued)

Country		Lag			
		t-1	t-2	t-3	t-4
Thailand	BI	0.75362 (0.0001)*	0.68644 (0.0001)*	0.67245 (0.0001)*	0.69861 (0.0001)*
	B2	0.73337 (0.0001)*	0.74169 (0.0001)*	0.76635 (0.0001)*	0.78974 (0.0001)*
	S1	0.24471 (0.2604)	0.44492 (0.0380)*	0.64564 (0.0016)*	0.78686 (0.0001)*
	S2	0.13850 (0.5286)	0.15447 (0.4925)	0.28735 (0.2065)	0.49930 (0.0250)*
	G	-0.47802 (0.0087)*	-0.16783 (0.3933)	0.15242 (0.4479)	0.20416 (0.3171)
Tunisia	B1	-0.16890 (0.3811)	-0.35744 (0.0618)**	-0.27612 (0.1633)	-0.31926 (0.1119)
	B2	-0.23627 (0.2172)	-0.38828 (0.0412)*	-0.37949 (0.0509)**	-0.37944 (0.0559)**
	G	-0.05688 (0.7695)	0.59451 (0.0008)*	0.28044 (0.1565)	0.06176 (0.7644)
Venezuela	B1	-0.54667 (0.0022)*	-0.38385 (0.0437)*	-0.26249 (0.1859)	-0.13212 (0.5200)
	B2	-0.64190 (0.0002)*	-0.56173 (0.0019)*	-0.48468 (0.0104)*	-0.38643 (0.0512)**
	S2	0.50902 (0.0111)*	0.23860 (0.2729)	0.27477 (0.2159)	0.45964 (0.0361)*
	G	0.02366 (0.9030)	-0.11691 (0.5526)	-0.13478 (0.5027)	-0.03329 (0.8717)
Zambia	B1	-0.39773 (0.0326)*	-0.43531 (0.0206)*	-0.47197 (0.0129)*	-0.57977 (0.0019)*
	B2	-0.44112 (0.0166)*	-0.49587 (0.0073)*	-0.49381 (0.0089)*	-0.51271 (0.0074)*
	G	0.01466 (0.9398)	0.24665 (0.2058)	-0.14872 (0.4591)	-0.13649 (0.5061)

Note: * *Indicates that the coefficient is significant at 5 % levels*
** *Indicates that the coefficient is significant at 10% levels*
Figures in parentheses are p-value

Appendix 4.4: Unit Root Tests: FDI, Financial Sector Indicators, and Economic Growth

Country	Variables	Levels		First Differences	
		ADF	PP	ADF	PP
(1)	(2)	(3)	(4)	(5)	(6)
Algeria	FDI	-4.8972(5)*	-4.9327(5)*	-	-
	B1	-1.6578(1)	-1.3077(1)	-3.7491(1)*	-3.7005(1)*
	B2	-0.7048(1)	-0.5659(1)	-3.4568(1)*	-4.0831(1)*
	G	-2.7577(2)	-7.1045(1)*	-	-
Argentina	FDI	2.1771(1)	2.3629(1)	-2.5770(1)	-4.1350(1)*
	B1	-2.2690(1)	-2.2690(1)	-4.1492(1)*	-4.1492(1)*
	B2	-2.8122(1)	-3.3342(1)*	-	-
	S2	-0.6645(5)	-2.3011(5)	-1.5189(4)	-7.5821(4)*
	G	-4.5577(1)*	-4.9401(1)*	-	-
Barbados	FDI	-5.2249(5)*	-2.5044(5)	-3.8105(7)*	-7.6284(7)*
	B1	0.8646(5)	-0.5492(5)	-3.3697(3)*	-7.4132(3)*
	B2	1.1536(5)	-0.7085(5)	-3.1943(3)*	-3.8377(3)*
	G	-4.2757(3)*	-4.2658(3)*	-	-
Bolivia	FDI	1.2248(1)	-1.1880(1)	-3.2964(1)*	-7.1004(1)*
	B1	0.3719(1)	0.5082(1)	-3.3258(1)*	-4.7996(1)*
	B2	0.8539(1)	1.0422(1)	-3.3341(1)*	-4.6095(1)*
	G	-1.8904(1)	-2.3041(1)	-3.9219(1)*	-10.0453(1)*
Brazil	FDI	-1.1915(4)	0.3295(4)	0.2481(3)	-4.3342(3)*
	B1	-1.6031(3)	-3.1263(3)*	-	-
	B2	-2.6688(2)	-3.4349(2)*	-	-
	G	-2.2546(1)	-3.0524(1)*	-	-
Central Africa	FDI	-3.2225(1)*	-3.8422(1)*	-	-
	B1	-2.7360(1)	-2.9516(1)	-4.2053(1)*	-2.9516(1)**
	B2	-0.9385(3)	-1.6322(3)	-5.5855(2)*	-6.5196(2)*
	G	-3.8389(1)*	-6.1482(1)*	-	-
Chile	FDI	2.4381(2)	1.9487(2)	-2.2051(3)	-7.2599(3)*
	B1	-0.9145(2)	-1.1413(2)	-5.0482(1)*	-4.7446(1)*
	B2	-1.8657(2)	-1.2916(2)	-2.1093(1)	-4.8089(1)*
	S1	-2.7066(5)	-3.4672(5)*	-	-
	S2	-1.2153(1)	-1.1876(1)	-4.3472(2)*	-4.4616(2)*
	G	-3.2014(1)*	-3.6512(1)*	-	-
Colombia	FDI	-0.6159(2)	-2.3396(2)	-6.2129(1)*	-4.4192(1)*
	B1	-1.4132(1)	-1.3828(1)	-3.4354(4)*	-5.1011(4)*
	B2	-1.6822(1)	-1.7340(1)	-2.7217(1)	-3.5389(1)*
	S1	-1.8102(1)	-1.1228(1)	-3.7410(1)*[a]	-5.3652(1)*[a]
	S2	-1.4424(1)	-1.8272(1)	-3.3584(1)*	-5.6981(1)*
	G	-1.7711(1)	-2.1703(1)	-3.7554(1)*	-5.4177(1)*
Congo Republic	FDI	-3.6429(4)*	-3.9301(4)*	-	-
	B1	-3.6138(5)*	-2.3515(5)	-	-
	B2	-3.1006(1)*	-2.4724(1)	-	-
	G	-2.1649(1)	-2.5387(1)	-3.7292(1)*	-6.3067(1)*

Appendix 4.4 (continued)

Country	Variables	Levels		First Differences	
		ADF	PP	ADF	PP
(1)	(2)	(3)	(4)	(5)	(6)
Costa Rica	FDI	0.6095(1)	-0.1839(1)	-3.5531(1)*	-8.0209(1)*
	B1	-1.9767(1)	-2.2565(1)	-3.9694(1)*	-8.6411(1)*
	B2	-1.3837(1)	-1.3794(1)	-4.5978(1)*	-5.1438(1)*
	G	-3.0094(1)*	-3.2008(1)*	-	-
El Salvador	FDI	-1.9299(1)	-4.4333(1)*	-	-
	B1	-0.4838(1)	-0.4734(1)	-3.0364(1)*	-4.7447(1)*
	B2	-0.6837(1)	-0.5311(1)	-2.7988(1)**	-4.3246(1)*
	G	-4.3658(1)*	-6.9339(1)*	-	-
Ghana	FDI	-2.6613(1)	-3.9452(1)*	-	-
	B1	-1.6422(1)	-1.6433(1)	-4.2103(1)*	-5.2842(1)*
	B2	-1.1421(1)	-1.1302(1)	-2.0354(2)	-4.8388(2)*
	G	-3.6613(1)*	-3.9948(1)*	-	-
Guatemala	FDI	-3.8223(1)*	-4.6863(1)*	-	-
	B1	-2.2378(2)	-3.7095(2)*	-	-
	B2	-1.3384(1)	-1.2566(1)	-3.8260(1)*	-4.9921(1)*
	G	-2.1085(1)	-2.2496(1)	-4.8299(1)*	-5.5849(1)*
Honduras	FDI	0.3148(1)	0.0751(1)	-4.2092(1)*	-6.0739(1)*
	B1	0.9050(1)	0.8855(1)	-2.5277(1)	-4.0624(1)*
	B2	-2.6103(2)	-1.4732(2)	-4.4507(1)*[a]	-7.3234(1)*[a]
	G	-3.7012(1)*	-3.7448(1)*	-	-
India	FDI	-2.8142(3)	-1.1166(3)	-4.0673(4)*	-5.2486(4)*
	B1	-3.5894(1)*	-5.2094(1)*	-	-
	B2	-1.9899(1)	-2.1160(1)	-2.4611(1)	-3.5727(1)*
	S2	1.4967(1)	2.0542(1)	-4.9634(1)*[a]	-7.1429(1)*[a]
	G	-3.3745(1)*	-5.4226(1)*	-	-
Indonesia	FDI	-2.3309(3)	-1.7894(3)	-2.4677(3)	-3.4225(3)*
	B1	0.9449(1)	1.3027(1)	-3.1749(1)*	-4.0819(1)*
	B2	-2.0587(1)	-1.5911(1)	-3.6836(1)*[a]	-4.4302(1)*[a]
	G	-2.0497(1)	-3.4837(1)*	-	-
Israel	FDI	-0.2094(2)	-0.3460(2)	-1.1732(5)	-4.8873(5)*
	B1	-2.0681(1)	-1.9218(1)	-4.2554(1)*	-4.5861(1)*
	B2	-0.6837(1)	-1.5238(1)	-4.0225(1)*	-4.4829(1)*
	G	-4.5105(2)*	-3.1804(2)*	-	-
Jamaica	FDI	-1.0812(2)	-2.5683(2)	-2.9282(3)	-4.6498(3)*
	B1	-1.8705(1)	-1.8965(1)	-4.0842(1)*	-5.2066(1)*
	B2	-3.0251(1)*	-2.3886(1)	-	-
	G	-2.4855(I)	-4.1535(1)*	-	-
Kenya	FDI	-2.6053(1)	-3.9489(1)*	-	-
	B1	-1.7708(1)	-1.8072(1)	-4.1787(1)*	-5.5629(1)*
	B2	-2.6868(1)	-2.7476(1)**	-	-
	G	-3.3997(1)*	-4.4307(1)*	-	-

Appendix 4.4 (continued)

Country	Variables	Levels		First Differences	
		ADF	PP	ADF	PP
(1)	(2)	(3)	(4)	(5)	(6)
Malaysia	FDI	-2.4472(1)	-2.0775(1)	-2.5472(4)	-4.1112(4)*
	B1	-1.2958(1)	-1.3379(1)	-4.3716(3)*	-5.4937(3)*
	B2	-0.1158(1)	-0.1518(1)	-3.7505(3)*	-5.3638(3)*
	S1	-0.6775(4)	-1.3987(4)	-2.8336(3)	-3.1960(3)*
	S2	-1.5366(3)	-2.1038(3)	-5.9239(1)*	-5.4497(1)*
	G	-3.0999(1)*	-3.8876(1)*	-	-
Mauritania	FDI	-3.2258(1)*	-3.9903(1)*	-	-
	B1	-1.9518(1)	-1.8168(1)	-3.9856(1)*	-5.6847(1)*
	B2	-2.8738(2)	-2.1130(2)	-3.0447(4)*	-4.7127(4)*
	G	-2.4480(4)	-9.8772(4)*		
Mauritius	FDI	-2.1971(1)	-2.5367(1)	-4.8168(1)*	-5.7170(1)*
	B1	0.7189(1)	0.5712(1)	-3.1622(1)*	-7.0639(1)*
	B2	2.3620(4)	1.9561(4)	-1.1839(4)	-5.8739(4)*
	G	-3.6165(1)*	-5.2249(1)*	-	-
Mexico	FDI	-1.4556(1)	-1.4411(1)	-4.4265(1)*	-5.1313(1)*
	B1	-2.3574(1)	-2.8229(1)	-5.2355(1)*	-6.9540(1)*
	B2	-1.8462(1)	-1.7439(1)	-3.8579(1)*	-4.9370(1)*
	S1	-2.0226(1)	-1.2508(1)	-2.9561(1)**[a]	-4.0294(1)*[a]
	S2	-1.4587(1)	-1.6012(1)	-3.6879(1)*	-5.4389(1)*
	G	-2.9731(1)*	-3.7425(1)*	-	-
Morocco	FDI	-2.3708(1)	-2.0927(1)	-3.3521(1)*	-4.4981(1)*
	B1	0.1118(1)	0.2008(1)	-3.6669(1)*	-7.0229(1)*
	B2	0.0873(4)	-0.7698(4)	-3.8752(3)*	-5.2693(3)*
	G	-3.0704(2)*	-8.9689(2)*	-	-
Nigeria	FDI	-2.0736(1)	-3.0003(1)*	-	-
	B1	-1.5454(1)	-1.4037(1)	-2.9119(1)**	-4.2226(1)*
	B2	-1.5662(1)	-1.4926(1)	-3.1066(1)*	-4.8878(1)*
	S1	-1.2238(1)	-2.1118(1)	-3.4530(2)*	-4.4712(2)*
	S2	2.3906(3)	0.5598(3)	-5.4237(2)*[a]	-2.3691(2)[a]
	G	-1.9467(4)	-4.2000(4)*	-	-
Pakistan	FDI	0.1529(3)	-2.6883(3)*	-	-
	B1	-2.3423(3)	0.7619(3)	-6.3654(1)*	-3.9807(1)*
	B2	-2.2302(1)	0.5529(1)	-7.1388(1)*[a]	-8.1003(1)*[a]
	G	-3.2694(1)*	-3.9421(1)*	-	-
Panama	FDI	-3.1162(1)*	-2.8289(1)**	-	-
	B1	0.4953(1)	0.9002(1)	-2.9285(1)**	-3.9807(1)*
	B2	-0.4895(2)	0.1251(2)	-3.9112(1)*[a]	-9.5038(1)*[a]
	G	-4.1643(1)*	-3.9421(1)*	-	-
Paraguay	FDI	-2.6074(1)	-3.4356(1)*		
	B1	-0.3556(1)	-0.2825(1)	-3.2946(1)*	-4.2654(1)*
	B2	-1.5330(2)	-0.5131(2)	-2.6078(1)	-4.3126(1)*
	G	-2.7734(1)	-2.2632(1)	-5.5050(1)*	-4.8398(1)*

Appendix 4.4(continued)

Country	Variables	Levels		First Differences	
		ADF	PP	ADF	PP
(1)	(2)	(3)	(4)	(5)	(6)
Peru	FDI	-1.2641(1)	-1.7567(1)	-3.6066(1)*	-7.6091(1)*
	B1	-2.0572(1)	-2.2029(1)	-4.2942(2)*	-5.9461(2)*
	B2	-2.6274(5)	-0.9569(5)	-3.5369(2)*	-3.9862(2)*
	S2	-1.6098(1)	-1.0107(1)	-3.787(1)*[a]	-4.8108(1)*[a]
	G	-3.7819(1)*	-3.7004(1)*	-	-
Philippines	FDI	-1.6257(1)	-2.7743(1)**	-	-
	B1	1.5217(1)	1.6196(1)	-2.7232(1)	-5.0202(1)*
	B2	-3.2129(2)*	-1.6364(2)	-	-
	S1	-1.5508(1)	-1.0322(1)	-3.5117(1)*	-2.6869(1)**
	S2	-0.2652(1)	-0.2995(1)	-2.6892(3)	-5.1942(3)*
	G	-3.1975(1)*	-3.1182(1)*	-	-
Singapore	FDI	-2.7599(1)	-3.0403(1)*	-	-
	B1	-0.7100(1)	-0.7068(1)	-3.7907(1)*	-4.4279(1)*
	B2	-1.4908(1)	-1.4808(1)	-2.8269(1)	-4.3624(1)*
	S2	-1.5532(1)	-1.8300(1)	-4.6227(1)*	-5.4451(1)*
	G	-3.4895(1)*	-3.1798(1)*	-	-
South Africa	FDI	-2.7061(1)	-4.0221(1)*	-	-
	B1	-1.2221(1)	-1.2455(1)	-4.3141(1)*	-5.3293(1)*
	B2	1.6678(1)	2.1222(1)	-3.347(2)*[a]	-3.7902(2)*[a]
	S1				
	S2	2.6542(1)	4.9424(1)	-4..926(1)*[a]	-6.8126(1)*[a]
	G	-4.1861(1)*	-4.5248(1)*	-	-
Sri Lanka	FDI	-1.1826(2)	-2.7868(2)**	-	-
	B1	-1.9757(1)	-1.9646(1)	-4.5198(1)*	-5.1236(1)*
	B2	-1.2256(2)	-1.3493(2)	-6.2824(2)*[a]	-11.2291(2)*[a]
	G	-4.4242(2)*	-4.9195(2)*	-	-
Thailand	FDI	-0.9616(1)	-1.0228(1)	-3.1762(1)*	-5.3121(1)*
	B1	1.5350(2)	1.7481(2)	-3.9800(1)*	-3.7355(1)*
	B2	-2.0606(1)	-0.2887(1)	-2.2555(1)[a]	-4.6663(1)*[a]
	S1	-0.8559(2)	-1.4329(2)	-3.711(1)*[a]	-2.774(1)**[a]
	S2	-1.7822(1)	-1.4731(1)	-2.8003(1)	-2.8518(1)**
	G	-3.0793(1)*	-3.0695(1)*	-	-
Tunisia	FDI	-3.1561(1)*	-4.6115(1)*	-	-
	B1	-2.8982(2)	-1.9469(2)	-4.6918(1)*	-6.7805(1)*
	B2	-1.7930(2)	-1.5213(2)	-5.0525(1)*	-5.4701(1)*
	G	-1.8144(3)	-4.8748(3)*	-	-

Appendix 4.4 (continued)

Country	Variables	Levels		First Differences	
		ADF	PP	ADF	PP
(1)	(2)	(3)	(4)	(5)	(6)
Venezuela	FDI	-1.2510(1)	-2.2397(1)	-3.6148(5)*	-9.8569(5)*
	B1	-1.0836(1)	-0.9890(1)	-2.9471(1)**	-4.5576(1)*
	B2	-0.7937(1)	-0.6481(1)	-2.9661(1)*	-4.3263(1)*
	S2	-2.3907(1)	-2.1611(1)	-4.2837(1)*	-4.1456(1)*
	G	-3.3149(1)*	-4.4677(1)*	-	-
Zambia	FDI	-2.1812(1)	-8.7897(1)*	-	-
	B1	-1.4693(1)	-1.5952(1)	-3.4185(1)*	-6.1047(1)*
	B2	-1.8955(1)	-1.8202(1)	-3.8559(1)*	-4.3176(1)*
	G	-4.2471(1)*	-7.1686(1)*	-	-

Note: * *Indicates rejection of the null hypothesis at the 5% levels of significance.*

** *Indicates rejection of the null hypothesis at the 10% levels of significance.*

[a] *Test statistics are from second differences*

Tests are based on Mckinnon critical values for rejection of hypothesis of a unit root. Figures in parentheses are lag length, and has been determine according to the Akaike Information Criteria (AIC). The equation contains intercept without trend.

Appendix 4.5: Cointegration Tests: FDI, Financial Sector Indicators, and Economic Growth

Country	Cointegrating Vector	Null Hypothesis	Test Statistics	Conclusion
Algeria	FDI, B1	r=0	17.38**	c
		r≤ 1	3.38**	
	FDI, B2	r=0	13.75**	c
		r≤ 1	0.59	
	FDI, G	r=0	48.32*	c
		r≤ 1	6.89*	
Argentina	FDI, B1	r=0	6.9	nc
		r≤ 1	1.48	
	FDI, B2	r=0	10.63	nc
		r≤ 1	1.43	
	FDI, S2	r=0	17.3*	c
		r≤ 1	0.33	
	FDI, G	r=0	25.39*	c
		r≤ 1	4.31*	
Barbados	FDI, B1	r=0	18.49*	c
		r≤ 1	0.09	
	FDI, B2	r=0	26.47*	c
		r≤ 1	0.19	
	FDI, G	r=0	25.66*	c
		r≤ 1	9.73*	
Bolivia	FDI, B1	r=0	15.71*	c
		r≤ 1	0.63	
	FDI, B2	r=0	11.88	nc
		r≤ 1	0.01	
	FDI, G	r=0	9.97	nc
		r≤ 1	0.02	
Brazil	FDI, B1	r=0	21.41*	c
		r≤ 1	0.45	
	FDI, B2	r=0	24.68*	c
		r≤ 1	0.6	
	FDI, G	r=0	7.45	nc
		r≤ 1	0.17	
Central Africa	FDI, B1	r=0	18.91*	c
		r≤ 1	6.69**	
	FDI, B2	r=0	14.98**	c
		r≤ 1	1.04	
	FDI, G	r=0	23.49*	c
		r≤ 1	8.41*	
Chile	FDI, B1	r=0	5.67	nc
		r≤ 1	2.62	
	FDI, B2	r=0	5.31	nc
		r≤ 1	2.57	
	FDI, S1	r=0	10.32	nc
		r≤ 1	2.84*	
	FDI, S2	r=0	9.26	nc
		r≤ 1	1.62	
	FDI, G	r=0	14.34**	c
		r≤ 1	2.53	

Appendix 4.5 (continued)

Colombia	FDI, B1	r=0	18.64*	c
		r≤ 1	3.17**	
	FDI, B2	r=0	13.84**	c
		r≤ 1	5.33*	
	FDI, S1	r=0	16.09*	c
		r≤ 1	9.39*	
	FDI, S2	r=0	16.28*	c
		r≤ 1	2.56	
	FDI, G	r=0	14.5**	c
		r≤ 1	0.49	
Congo Republic	FDI, B1	r=0	15.44*	c
		r≤ 1	8.58*	
	FDI, B2	r=0	17.95*	c
		r≤ 1	8.58*	
	FDI, G	r=0	18.70*	c
		r≤ 1	5.59*	
Costa Rica	FDI, B1	r=0	5.43	nc
		r≤ 1	0.04	
	FDI, B2	r=0	13.12	nc
		r≤ 1	1.33	
	FDI, G	r=0	15.09*	c
		r≤ 1	0.59	
El Salvador	FDI, B1	r=0	10.03	nc
		r≤ 1	2.79**	
	FDI, B2	r=0	9.87	nc
		r≤ 1	0.81	
	FDI, G	r=0	22.26*	c
		r≤ 1	4.17*	
Ghana	FDI, B1	r=0	10.29	nc
		r≤ 1	2.57	
	FDI, B2	r=0	12.29	nc
		r≤ 1	5.59*	
	FDI, G	r=0	18.44*	c
		r≤ 1	6.49*	
Guatemala	FDI, B1	r=0	28.82*	c
		r≤ 1	10.79*	
	FDI, B2	r=0	15.84*	c
		r≤ 1	2.21	
	FDI, G	r=0	18.44*	c
		r≤ 1	4.35*	
Honduras	FDI, B1	r=0	19.90*	c
		r≤ 1	1.01	
	FDI, B2	r=0	9.66	nc
		r≤ 1	0.39	
	FDI, G	r=0	13.27	nc
		r≤ 1	0.21	
India	FDI, B1	r=0	11.96	nc
		r≤ 1	0.85	
	FDI, B2	r=0	4.38	nc
		r≤ 1	0.75	
	FDI, S2	r=0	39.52*	c
		r≤ 1	8.52**	
	FDI, G	r=0	12.87*	c
		r≤ 1	0.86	

Appendix 4.5 (continued)

Indonesia	FDI, B1	r=0	14.98**	c
		r≤ 1	4.24*	
	FDI, B2	r=0	19.27*	c
		r≤ 1	3.41	
	FDI, G	r=0	23.53*	c
		r≤ 1	9.13*	
Israel	FDI, B1	r=0	5.74	nc
		r≤ 1	0.03	
	FDI, B2	r=0	6.25	nc
		r≤ 1	0.12	
	FDI, G	r=0	9.4	nc
		r≤ 1	0.01	
Jamaica	FDI, B1	r=0	18.43*	c
		r≤ 1	3.73	
	FDI, B2	r=0	21.09*	c
		r≤ 1	7.72	
	FDI, G	r=0	16.04*	c
		r≤ 1	6.69*	
Kenya	FDI, B1	r=0	12.85	nc
		r≤ 1	2.72*	
	FDI, B2	r=0	12.92	nc
		r≤ 1	4.82*	
	FDI, G	r=0	25.91*	nc
		r≤ 1	7.17*	
Malaysia	FDI, B1	r=0	11.09	nc
		r≤ 1	4.28*	
	FDI, B2	r=0	11.09	nc
		r≤ 1	4.28*	
	FDI, S1	r=0	21.45*	c
		r≤ 1	3.76**	
	FDI, S2	r=0	19.80*	c
		r≤ 1	4.59*	
	FDI, G	r=0	17.66*	c
		r≤ 1	5.56*	
Mauritania	FDI, B1	r=0	17.24*	c
		r≤ 1	3.84*	
	FDI, B2	r=0	15.88*	c
		r≤ 1	5.79*	
	FDI, G	r=0	31.22*	c
		r≤ 1	8.95*	
Mauritius	FDI, B1	r=0	11.19	nc
		r≤ 1	0.67	
	FDI, B2	r=0	13.25*	c
		r≤ 1	4.73*	
	FDI, G	r=0	18.41*	c
		r≤ 1	4.67*	

Appendix 4.5 (continued)

Mexico	FDI, B1	r=0	7.45	nc
		r≤ 1	2.47	
	FDI, B2	r=0	6.82	nc
		r≤ 1	1.87	
	FDI, S1	r=0	17.16*	c
		r≤ 1	2.07	
	FDI, S2	r=0	12.05	nc
		r≤ 1	2.54	
	FDI, G	r=0	13.29	nc
		r≤ 1	2.89**	
Morocco	FDI, B1	r=0	16.71*	c
		r≤ 1	0.07	
	FDI, B2	r=0	8.58	nc
		r≤ 1	0.77	
	FDI, G	r=0	28.89*	c
		r≤ 1	6.49*	
Nigeria	FDI, B1	r=0	15.49*	c
		r≤ 1	4.33	
	FDI, B2	r=0	9.97	nc
		r≤ 1	3.27**	
	FDI, S1	r=0	13.06	nc
		r≤ 1	1.75	
	FDI, S2	r=0	17.26*	c
		r≤ 1	1.93	
	FDI, G	r=0	22.26*	c
		r≤ 1	3.62**	
Pakistan	FDI, B1	r=0	18.21*	c
		r≤ 1	0.67	
	FDI, B2	r=0	8.98	nc
		r≤ 1	1.23	
	FDI, G	r=0	15.61*	c
		r≤ 1	1.45	
Panama	FDI, B1	r=0	20.84*	c
		r≤ 1	0.19	
	FDI, B2	r=0	34.73*	c
		r≤ 1	0.29	
	FDI, G	r=0	26.06*	c
		r≤ 1	9.19*	
Paraguay	FDI, B1	r=0	11.57	nc
		r≤ 1	0.58	
	FDI, B2	r=0	11.58	nc
		r≤ 1	0.36	
	FDI, G	r=0	13.9**	c
		r≤ 1	6.31*	
Peru	FDI, B1	r=0	11.82	nc
		r≤ 1	3.46**	
	FDI, B2	r=0	13.97**	c
		r≤ 1	3.57**	
	FDI, S2	r=0	23.08*	c
		r≤ 1	3.07**	
	FDI, G	r=0	18.27*	c
		r≤ 1	1.95	

Appendix 4.5 (continued)

Philippines	FDI, B1	r=0	19.62*	c
		r≤ 1	0.06	
	FDI, B2	r=0	13.66**	c
		r≤ 1	5.51*	
	FDI, S1	r=0	11.08	nc
		r≤ 1	2.81**	
	FDI, S2	r=0	8.18	nc
		r≤ 1	0.31	
	FDI, G	r=0	11.96	nc
		r≤ 1	2.21	
Singapore	FDI, B1	r=0	15.3**	c
		r≤ 1	2.48**	
	FDI, B2	r=0	11.2	nc
		r≤ 1	0.88	
	FDI, S2	r=0	10.9	nc
		r≤ 1	1.67	
	FDI, G	r=0	24.04*	c
		r≤ 1	7.67*	
South Africa	FDI, B1	r=0	18.60*	c
		r≤ 1	4.15*	
	FDI, B2	r=0	15.09*	c
		r≤ 1	3.02*	
	FDI, S1	r=0	14.4*	c
		r≤ 1	4.27*	
	FDI, S2	r=0	15.80*	c
		r≤ 1	1.2	
	FDI, G	r=0	22.98*	c
		r≤ 1	6.55*	
Sri Lanka	FDI, B1	r=0	23.49*	c
		r≤ 1	4.57*	
	FDI, B2	r=0	23.51*	c
		r≤ 1	2.14	
	FDI, G	r=0	19.37*	c
		r≤ 1	7.67*	
Thailand	FDI, B1	r=0	12.13	nc
		r≤ 1	1.23	
	FDI, B2	r=0	7.81	nc
		r≤ 1	0.31	
	FDI, S1	r=0	15.14**	c
		r≤ 1	0.01	
	FDI, S2	r=0	19.24*	c
		r≤ 1	0.43	
	FDI, G	r=0	13.03**	c
		r≤ 1	0.65	
Tunisia	FDI, B1	r=0	16.63*	c
		r≤ 1	4.82*	
	FDI, B2	r=0	18.10*	c
		r≤ 1	3.86*	
	FDI, G	r=0	25.51*	c
		r≤ 1	6.14*	

Appendix 4.5 (continued)

Venezuela	FDI, B1	r=0	7.87	nc
		r≤ 1	1.25	
	FDI, B2	r=0	6.31	nc
		r≤ 1	0.16	
	FDI, S2	r=0	6.17	nc
		r≤ 1	0.45	
	FDI, G	r=0	13.84**	c
		r≤ 1	0.5	
Zambia	FDI, B1	r=0	17.71*	c
		r≤ 1	0.67	
	FDI, B2	r=0	21.54*	c
		r≤ 1	1.43	
	FDI, G	r=0	24.99*	c
		r≤ 1	4.57*	

Note: * *Significant at 5% levels*
** *Significant at 10% levels*
c – cointegrated
nc – not cointegrated

Appendix 4.6: Granger-Causality Tests between FDI and Banking Development Indicators: The First Differences VAR approach

Country	Null hypothesis	Wald Statistics	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Algeria	FDI does not Granger-cause B1	2.29(0.6825)	2.29(0.6825)
	B1 does not Granger-cause FDI	1.19(0.8797)	1.19(0.8797)
	FDI does not Granger-cause B2	1.26(0.8689)	1.26(0.8689)
	B2 does not Granger-cause FDI	1.78(0.7763)	1.78(0.7763)
Argentina	FDI does not Granger-cause B1	0.47(0.4937)	0.63(0.7295)
	B1 does not Granger-cause FDI	0.37(0.5409)	1.58(0.4546)
	FDI does not Granger-cause B2	1.04(0.3079)	1.19(0.2750)
	B2 does not Granger-cause FDI	0.05(0.8305)	0.08(0.7781)
Barbados	FDI does not Granger-cause B1	6.13(0.1893)	1.96(0.3757)
	B1 does not Granger-cause FDI	1.64(0.8011)	3.43(0.1796)
	FDI does not Granger-cause B2	7.53(0.1102)	14.56(0.0007)*
	B2 does not Granger-cause FDI	24.42(0.0001)*	2.33(0.3113)
Bolivia	FDI does not Granger-cause B1	0.96(0.3276)	0.96(0.3276)
	B1 does not Granger-cause FDI	0.15(0.6941)	0.15(0.6941)
	FDI does not Granger-cause B2	0.19(0.6652)	1.96(0.3761)
	B2 does not Granger-cause FDI	0.01(0.9053)	1.85(0.3958)
Brazil	FDI does not Granger-cause B1	12.58(0.0135)*	1.61(0.2039)
	B1 does not Granger-cause FDI	12.08(0.0168)*	0.72(0.3956)
	FDI does not Granger-cause B2	1.71(0.4261)	1.71(0.4261)
	B2 does not Granger-cause FDI	4.71(0.0942)	4.72(0.0942)**
Central Africa	FDI does not Granger-cause B1	5.03(0.0810)**	0.46(0.4989)
	B1 does not Granger-cause FDI	0.55(0.7579)	0.12(0.7319)
	FDI does not Granger-cause B2	2.64(0.6198)	2.64(0.6198)
	B2 does not Granger-cause FDI	12.47(0.0142)*	12.47(0.0142)*
Chile	FDI does not Granger-cause B1	0.12(0.9423)	0.04(0.8429)
	B1 does not Granger-cause FDI	0.95(0.6210)	0.11(0.7429)
	FDI does not Granger-cause B2	0.03(0.9839)	0.00(0.9923)
	B2 does not Granger-cause FDI	0.26(0.8776)	0.01(0.9212)
Colombia	FDI does not Granger-cause B1	1.30(0.5210)	1.30(0.5210)
	B1 does not Granger-cause FDI	1.83(0.3998)	1.83(0.3998)
	FDI does not Granger-cause B2	0.16(0.9241)	0.36(0.8338)
	B2 does not Granger-cause FDI	1.07(0.5849)	1.47(0.4791)
Congo Republic	FDI does not Granger-cause B1	0.95(0.3299)	0.95(0.3299)
	B1 does not Granger-cause FDI	0.06(0.8093)	0.06(0.8093)
	FDI does not Granger-cause B2	0.00(0.9659)	0.00(0.9659)
	B2 does not Granger-cause FDI	0.00(0.9900)	0.00(0.9900)
Costa Rica	FDI does not Granger-cause B1	0.90(0.3437)	0.90(0.3437)
	B1 does not Granger-cause FDI	11.10(0.0009)*	11.10(0.0009)*
	FDI does not Granger-cause B2	2.89(0.0894)**	2.89(0.0894)**
	B2 does not Granger-cause FDI	0.01(0.9285)	0.01(0.9285)
El Salvador	FDI does not Granger-cause B1	2.89(0.0894)**	0.31(0.5770)
	B1 does not Granger-cause FDI	0.01(0.9285)	0.08(0.7828)
	FDI does not Granger-cause B2	0.08(0.7725)	0.59(0.7461)
	B2 does not Granger-cause FDI	0.57(0.4515)	0.49(0.7835)

Appendix 4.6 (continued)

Ghana	FDI does not Granger-cause B1	0.06(0.8144)	0.63(0.7282)
	B1 does not Granger-cause FDI	0.67(0.4134)	2.10(0.3495)
	FDI does not Granger-cause B2	0.52(0.9143)	0.00(0.9975)
	B2 does not Granger-cause FDI	2.02(0.5687)	2.34(0.3106)
Guatemala	FDI does not Granger-cause B1	5.13(0.0768)**	5.13(0.0768)**
	B1 does not Granger-cause FDI	2.32(0.3135)	2.32(0.3135)
	FDI does not Granger-cause B2	1.62(0.6538)	0.15(0.9300)
	B2 does not Granger-cause FDI	16.07(0.0011)*	7.95(0.0187)*
Honduras	FDI does not Granger-cause B1	0.19(0.6665)	0.19(0.6665)
	B1 does not Granger-cause FDI	0.01(0.9065)	0.01(0.9065)
	FDI does not Granger-cause B2	0.00(0.9897)	0.00(0.9897)
	B2 does not Granger-cause FDI	0.33(0.5297)	0.39(0.5297)
India	FDI does not Granger-cause B1	0.24(0.6231)	0.35(0.5564)
	B1 does not Granger-cause FDI	0.36(0.5470)	0.41(0.5244)
	FDI does not Granger-cause B2	3.05(0.0807)**	0.19(0.6618)
	B2 does not Granger-cause FDI	0.08(0.7820)	0.00(0.9906)
Indonesia	FDI does not Granger-cause B1	2.50(0.1137)	2.47(0.2915)
	B1 does not Granger-cause FDI	1.89(0.1691)	0.66(0.7177)
	FDI does not Granger-cause B2	13.50(0.0037)*	13.50(0.0034)*
	B2 does not Granger-cause FDI	1.47(0.6884)	1.47(0.6884)
Israel	FDI does not Granger-cause B1	0.22(0.6393)	0.22(0.6393)
	B1 does not Granger-cause FDI	0.02(0.8976)	0.02(0.8976)
	FDI does not Granger-cause B2	0.70(0.4028)	0.70(0.4028)
	B2 does not Granger-cause FDI	0.10(0.7561)	0.10(0.7561)
Jamaica	FDI does not Granger-cause B1	1.73(0.4206)	5.80(0.2146)
	B1 does not Granger-cause FDI	0.01(0.9973)	4.03(0.4025)
	FDI does not Granger-cause B2	0.54(0.7632)	2.54(0.4684)
	B2 does not Granger-cause FDI	4.12(0.1272)	3.74(0.2910)
Kenya	FDI does not Granger-cause B1	0.00(0.9529)	3.18(0.3649)
	B1 does not Granger-cause FDI	0.04(0.8329)	4.30(0.2306)
	FDI does not Granger-cause B2	0.03(0.8730)	0.03(0.8770)
	B2 does not Granger-cause FDI	0.17(0.6788)	0.17(0.6788)
Malaysia	FDI does not Granger-cause B1	0.93(0.8177)	0.02(0.8893)
	B1 does not Granger-cause FDI	4.88(0.1807)	2.84(0.0922)**
	FDI does not Granger-cause B2	0.82(0.8457)	0.59(0.4430)
	B2 does not Granger-cause FDI	14.54(0.0023)*	1.82(0.1777)
Mauritania	FDI does not Granger-cause B1	1.00(0.3184)	30.40(0.0001)*
	B1 does not Granger-cause FDI	0.40(0.5211)	0.71(0.9496)
	FDI does not Granger-cause B2	0.01(0.9121)	0.03(0.9853)
	B2 does not Granger-cause FDI	1.20(0.2726)	1.34(0.5105)
Mauritius	FDI does not Granger-cause B1	0.24(0.6273)	0.32(0.8505)
	B1 does not Granger-cause FDI	0.60(0.4397)	2.84(0.2421)
	FDI does not Granger-cause B2	1.40(0.2373)	1.40(0.2377)
	B2 does not Granger-cause FDI	0.78(0.3777)	0.78(0.3777)
Mexico	FDI does not Granger-cause B1	1.57(0.2105)	4.22(0.0400)*
	B1 does not Granger-cause FDI	0.01(0.9238)	0.00(0.9784)
	FDI does not Granger-cause B2	2.57(0.1088)	5.39(0.0203)*
	B2 does not Granger-cause FDI	0.58(0.4471)	0.52(0.4693)
Morocco	FDI does not Granger-cause B1	6.10(0.0134)*	6.93(0.0085)*
	B1 does not Granger-cause FDI	4.11(0.0426)*	4.06(0.0438)*
	FDI does not Granger-cause B2	1.97(0.1600)	1.97(0.1600)
	B2 does not Granger-cause FDI	0.81(0.3673)	0.81(0.3673)

Appendix 4.6 (continued)

Nigeria	FDI does not Granger-cause B1	0.76(0.3836)	2.94(0.5684)
	B1 does not Granger-cause FDI	0.07(0.7964)	4.10(0.3931)
	FDI does not Granger-cause B2	0.14(0.7054)	3.86(0.2774)
	B2 does not Granger-cause FDI	0.37(0.5432)	10.77(0.0130)*
Pakistan	FDI does not Granger-cause B1	13.86(0.0078)*	1.74(0.4188)
	B1 does not Granger-cause FDI	11.81(0.0188)*	7.53(0.0231)*
	FDI does not Granger-cause B2	9.42(0.0514)**	9.42(0.0514)**
	B2 does not Granger-cause FDI	8.38(0.0786)**	8.38(0.0786)**
Panama	FDI does not Granger-cause B1	0.70(0.7047)	0.70(0.7047)
	B1 does not Granger-cause FDI	0.27(0.8731)	0.27(0.8731)
	FDI does not Granger-cause B2	11.67(0.0029)*	26.05(0.0001)*
	B2 does not Granger-cause FDI	2.32(0.3137)	1.11(0.8923)
Paraguay	FDI does not Granger-cause B1	0.43(0.5133)	0.43(0.5133)
	B1 does not Granger-cause FDI	1.10(0.2940)	1.10(0.2940)
	FDI does not Granger-cause B2	0.06(0.8083)	0.06(0.8083)
	B2 does not Granger-cause FDI	0.48(0.4871)	0.48(0.4871)
Peru	FDI does not Granger-cause B1	0.14(0.7041)	0.13(0.7208)
	B1 does not Granger-cause FDI	0.04(0.8498)	0.05(0.8260)
	FDI does not Granger-cause B2	0.09(0.7596)	0.05(0.8228)
	B2 does not Granger-cause FDI	0.05(0.8256)	0.07(0.7987)
Philippines	FDI does not Granger-cause B1	2.02(0.3636)	2.02(0.3636)
	B1 does not Granger-cause FDI	4.94(0.0847)**	4.94(0.0847)**
	FDI does not Granger-cause B2	0.16(0.6869)	2.94(0.2295)
	B2 does not Granger-cause FDI	0.63(0.4271)	5.46(0.0651)**
Singapore	FDI does not Granger-cause B1	2.76(0.0965)**	0.06(0.9962)
	B1 does not Granger-cause FDI	1.23(0.2703)	0.84(0.8398)
	FDI does not Granger-cause B2	7.17(0.0043)*	1.15(0.5625)
	B2 does not Granger-cause FDI	0.01(0.9104)	2.38(0.3039)
South Africa	FDI does not Granger-cause B1	6.29(0.0121)*	6.29(0.0121)*
	B1 does not Granger-cause FDI	1.60(0.2057)	1.60(0.2057)
	FDI does not Granger-cause B2	0.00(0.9935)	0.00(0.9920)
	B2 does not Granger-cause FDI	0.07(0.7880)	0.00(0.9674)
Sri Lanka	FDI does not Granger-cause B1	5.43(0.1432)	4.47(0.3460)
	B1 does not Granger-cause FDI	1.60(0.6601)	2.39(0.6637)
	FDI does not Granger-cause B2	0.65(0.9241)	0.61(0.9614)
	B2 does not Granger-cause FDI	1.53(0.4644)	1.99(0.7381)
Thailand	FDI does not Granger-cause B1	0.35(0.8409)	0.05(0.8251)
	B1 does not Granger-cause FDI	10.43(0.0054)*	3.08(0.0792)**
	FDI does not Granger-cause B2	13.68(0.0002)*	9.45(0.0508)**
	B2 does not Granger-cause FDI	6.10(0.0135)*	19.76(0.0006)*
Tunisia	FDI does not Granger-cause B1	0.10(0.7465)	1.61(0.8068)
	B1 does not Granger-cause FDI	2.59(0.1074)	7.36(0.1182)
	FDI does not Granger-cause B2	0.03(0.8519)	2.71(0.6069)
	B2 does not Granger-cause FDI	0.15(0.6980)	1.67(0.0762)**

Appendix 4.6 (continued)

Venezuela	FDI does not Granger-cause B1	0.86(0.9304)	0.85(0.3564)
	B1 does not Granger-cause FDI	4.69(0.3202)	4.19(0.0406)*
	FDI does not Granger-cause B2	0.05(0.8264)	6.53(0.0649)**
	B2 does not Granger-cause FDI	0.22(0.6401)	3.53(0.0608)**
Zambia	FDI does not Granger-cause B1	0.42(0.5171)	0.42(0.5171)
	B1 does not Granger-cause FDI	1.09(0.2967)	1.09(0.2967)
	FDI does not Granger-cause B2	0.00(0.9909)	0.00(0.9909)
	B2 does not Granger-cause FDI	0.69(0.4051)	0.69(0.4051)

Note: * *Indicates significant at 5% levels*

** *Indicates significant at 10% levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In the multivariate model, variables economic growth and trade openness have been included in the regressions.

Appendix 4.7: Granger-Causality Tests between FDI and Stock Market Development Indicators: The First Differences VAR Approach

Country	Null hypothesis	Wald Statistic	
		Bivariate	Multivariate
(1)	(2)	(3)	(4)
Argentina	FDI does not Granger-cause S2	1.89(0.4505)	1.35(0.8525)
	S2 does not Granger-cause FDI	9.40(0.0091)*	8.89(0.0640)**
Chile	FDI does not Granger-cause S1	0.01(0.9260)	0.02(0.8968)
	S1 does not Granger-cause FDI	0.07(0.7911)	0.03(0.8642)
	FDI does not Granger-cause S2	0.38(0.8290)	0.01(0.9086)
	S2 does not Granger-cause FDI	1.42(0.4919)	0.43(0.5129)
Colombia	FDI does not Granger-cause S1	0.01(0.9058)	2.31(0.6791)
	S1 does not Granger-cause FDI	2.01(0.1565)	5.12(0.2752)
	FDI does not Granger-cause S2	1.98(0.3712)	1.45(0.2281)
	S2 does not Granger-cause FDI	6.33(0.0422)*	4.65(0.0311)*
India	FDI does not Granger-cause S2	70.21(0.0001)*	70.21(0.0001)*
	S2 does not Granger-cause FDI	7.69(0.1035)	7.69(0.1035)
Malaysia	FDI does not Granger-cause S1	0.28(0.5963)	0.28(0.5963)
	S1 does not Granger-cause FDI	0.00(0.9525)	0.00(0.9525)
	FDI does not Granger-cause S2	5.47(0.0648)**	5.47(0.0648)**
	S2 does not Granger-cause FDI	1.24(0.5382)	1.24(0.5382)
Mexico	FDI does not Granger-cause S1	4.12(0.0423)*	4.12(0.0423)*
	S1 does not Granger-cause FDI	0.20(0.6543)	0.20(0.6543)
	FDI does not Granger-cause S2	3.06(0.2169)	2.66(0.1026)
	S2 does not Granger-cause FDI	0.05(0.9748)	0.60(0.4373)
Nigeria	FDI does not Granger-cause S1	0.00(0.9944)	0.88(0.8305)
	S1 does not Granger-cause FDI	0.01(0.9102)	7.33(0.0622)**
	FDI does not Granger-cause S2	0.19(0.6603)	21.70(0.0002)*
	S2 does not Granger-cause FDI	0.54(0.4642)	8.34(0.0799)**
Peru	FDI does not Granger-cause S2	1.48(0.2240)	9.24(0.0554)**
	S2 does not Granger-cause FDI	15.93(0.0001)*	66.10(0.0001)*
Philippines	FDI does not Granger-cause S1	2.82(0.0932)**	2.82(0.0932)**
	S1 does not Granger-cause FDI	0.53(0.4663)	0.53(0.4663)
	FDI does not Granger-cause S2	4.23(0.0396)*	4.23(0.0396)*
	S2 does not Granger-cause FDI	0.27(0.6014)	0.27(0.6014)
Singapore	FDI does not Granger-cause S2	3.19(0.0741)**	3.19(0.0741)**
	S2 does not Granger-cause FDI	5.13(0.0235)*	5.13(0.0235)*
South Africa	FDI does not Granger-cause S1	10.84(0.0044)*	10.84(0.0044)*
	S1 does not Granger-cause FDI	6.49(0.0390)*	6.49(0.0396)*
	FDI does not Granger-cause S2	0.09(0.7700)	0.09(0.7701)
	S2 does not Granger-cause FDI	0.00(0.9984)	0.00(0.9984)
Thailand	FDI does not Granger-cause S1	16.30(0.0026)*	3.81(0.0509)**
	S1 does not Granger-cause FDI	14.31(0.0064)*	9.76(0.0018)*
	FDI does not Granger-cause S2	2.17(0.1404)	2.17(0.1404)
	S2 does not Granger-cause FDI	2.73(0.0982)**	2.73(0.0982)**
Venezuela	FDI does not Granger-cause S2	0.24(0.8888)	0.01(0.9292)
	S2 does not Granger-cause FDI	0.12(0.9402)	0.00(0.9879)

Note: * *Indicates significant at 5% levels*

** *Indicates significant at 10% levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In the multivariate model, variables economic growth and trade openness have been included in the regressions.

Appendix 4.8: Granger-Causality Tests between FDI and Economic Growth: The First Differences VAR Approach

Country	Null hypothesis	Wald Statistics		
		Bivariate	Multivariate (B1)	Multivariate (B2)
(1)	(2)	(3)	(4)	(5)
Algeria	FDI does not Granger-cause G	5.98(0.0502)**	5.98(0.0502)**	5.98(0.0502)*
	G does not Granger-cause FDI	78.06(0.0001)*	78.06(0.0001)*	78.06(0.0001)
Argentina	FDI does not Granger-cause G	0.02(0.8878)	1.33(0.5143)	0.02(0.8878)
	G does not Granger-cause FDI	0.56(0.4530)	0.70(0.7062)	0.56(0.4530)
Barbados	FDI does not Granger-cause G	1.40(0.8436)	0.34(0.8432)	0.34(0.8432)
	G does not Granger-cause FDI	0.89(0.9262)	4.22(0.1212)	4.22(0.1212)
Bolivia	FDI does not Granger-cause G	0.02(0.9024)	0.02(0.9024)	0.47(0.7907)
	G does not Granger-cause FDI	1.78(0.1821)	1.01(0.3147)	1.36(0.5079)
Brazil	FDI does not Granger-cause G	0.99(0.3204)	1.42(0.2326)	3.00(0.2234)
	G does not Granger-cause FDI	1.78(0.1821)	1.72(0.1860)	1.84(0.3984)
Central Africa	FDI does not Granger-cause G	2.82(0.2444)	1.36(0.2493)	3.02(0.5548)
	G does not Granger-cause FDI	1.12(0.5700)	0.06(0.8000)	2.73(0.6037)
Chile	FDI does not Granger-cause G	0.12(0.9429)	2.53(0.1115)	2.53(0.1115)
	G does not Granger-cause FDI	0.35(0.8387)	0.20(0.6580)	0.20(0.6580)
Colombia	FDI does not Granger-cause G	16.76(0.0001)*	18.07(0.0001)*	18.07(0.0001)*
	G does not Granger-cause FDI	4.05(0.0443)*	0.83(0.6620)	0.83(0.6620)
Congo Republic	FDI does not Granger-cause G	1.93(0.1645)	1.93(0.1645)	1.93(0.1645)
	G does not Granger-cause FDI	0.08(0.7816)	0.08(0.7816)	0.08(0.7816)
Costa Rica	FDI does not Granger-cause G	0.40(0.5260)	0.40(0.5266)	0.46(0.5260)
	G does not Granger-cause FDI	0.02(0.9005)	0.02((0.9005)	0.02(0.9005)
El Salvador	FDI does not Granger-cause G	2.74(0.0981)**	2.74(0.0981)**	4.39(0.1112)
	G does not Granger-cause FDI	0.07(0.7856)	0.07(0.7856)	0.23(0.8921)
Ghana	FDI does not Granger-cause G	1.97(0.3741)	1.97(0.3741)	1.97(0.3741)
	G does not Granger-cause FDI	3.03(0.2200)	3.03(0.2200)	3.03(0.2200)
Guatemala	FDI does not Granger-cause G	0.05(0.8151)	0.37(0.8292)	0.37(0.8292)
	G does not Granger-cause FDI	6.58(0.0103)*	7.08(0.0290)*	7.08(0.0290)*
Honduras	FDI does not Granger-cause G	0.52(0.8151)	0.52(0.4693)	0.52(0.4693)
	G does not Granger-cause FDI	0.03(0.8724)	0.03(0.8724)	0.03(0.8724)
India	FDI does not Granger-cause G	0.01(0.9167)	0.00(0.9782)	0.00(0.9782)
	G does not Granger-cause FDI	2.28(0.1310)	0.40(0.5246)	0.40(0.5246)
Indonesia	FDI does not Granger-cause G	1.59(0.6611)	0.02(0.8933)	1.59(0.6611)
	G does not Granger-cause FDI	7.03(0.0709)**	1.71(0.1904)	7.03(0.0709)**

Appendix 4.8 (continued)

Country	Null hypothesis	Wald Statistics		
		Bivariate	Multivariate (B1)	Multivariate (B2)
(1)	(2)	(3)	(4)	(5)
Israel	FDI does not Granger-cause G	1.86(0.1723)	1.86(0.1723)	1.36(0.1723)
	G does not Granger-cause FDI	5.40(0.0201)*	5.40(0.0201)*	5.40(0.0201)*
Jamaica	FDI does not Granger-cause G	0.37(0.9459)	0.43(0.9800)	0.37(0.9459)
	G does not Granger-cause FDI	3.52(0.3182)	0.93(0.9204)	3.52(0.3182)
Kenya	FDI does not Granger-cause G	4.15(0.2454)	4.15(0.2454)	1.29(0.2567)
	G does not Granger-cause FDI	0.63(0.8889)	0.63(0.8869)	0.06(0.8064)
Malaysia	FDI does not Granger-cause G	0.58(0.4460)	0.58(0.4460)	0.58(0.4460)
	G does not Granger-cause FDI	3.37(0.0666)**	3.37(0.0666)**	3.37(0.0666)**
Mauritania	FDI does not Granger-cause G	4.92(0.2952)	4.92(0.2952)	3.99(0.1362)
	G does not Granger-cause FDI	16.10(0.0029)*	16.10(0.0021)*	9.11(0.0105)*
Mauritius	FDI does not Granger-cause G	0.03(0.8714)	0.54(0.7627)	0.03(0.6714)
	G does not Granger-cause FDI	0.17(0.6761)	0.20(0.9048)	0.17(0.6761)
Mexico	FDI does not Granger-cause G	1.05(0.3055)	1.18(0.2780)	1.18(0.2780)
	G does not Granger-cause FDI	0.08(0.7733)	0.13(0.7140)	0.13(0.7140)
Morocco	FDI does not Granger-cause G	2.25(0.3242)	1.84(0.1745)	1.84(0.1745)
	G does not Granger-cause FDI	5.37(0.0584)**	1.76(0.1845)	1.76(0.1845)
Nigeria	FDI does not Granger-cause G	4.51(0.2111)	4.91(0.2969)	4.51(0.2111)
	G does not Granger-cause FDI	0.20(0.9769)	0.75(0.9449)	0.20(0.9769)
Pakistan	FDI does not Granger-cause G	1.49(0.6835)	2.21(0.3319)	1.32(0.8575)
	G does not Granger-cause FDI	3.75(0.2900)	3.63(0.1628)	6.63(0.1567)
Panama	FDI does not Granger-cause G	0.57(0.7506)	0.57(0.7506)	0.44(0.9791)
	G does not Granger-cause FDI	0.26(0.8762)	0.26(0.8762)	5.19(0.2079)
Paraguay	FDI does not Granger-cause G	0.02(0.8937)	0.02(0.8937)	0.02(0.8937)
	G does not Granger-cause FDI	0.18(0.6691)	0.18(0.6691)	0.18(0.6691)
Peru	FDI does not Granger-cause G	1.02(0.3133)	1.02(0.3133)	1.02(0.3133)
	G does not Granger-cause FDI	0.47(0.4939)	0.47(0.4934)	0.47(0.4934)
Philippines	FDI does not Granger-cause G	1.45(0.2287)	1.69(0.4293)	1.69(0.4293)
	G does not Granger-cause FDI	3.39(0.0655)**	7.51(0.0234)*	7.51(0.0234)*
Singapore	FDI does not Granger-cause G	0.07(0.7876)	1.99(0.7385)	0.77(0.6791)
	G does not Granger-cause FDI	0.36(0.5470)	2.79(0.5943)	0.75(0.6883)
South Africa	FDI does not Granger-cause G	3.35(0.0670)**	3.35(0.0670)**	3.35(0.0670)**
	G does not Granger-cause FDI	3.39(0.0657)**	3.39(0.0657)**	3.39(0.0657)**
Sri Lanka	FDI does not Granger-cause G	1.54(0.6722)	1.34(0.8545)	1.34(0.8545)
	G does not Granger-cause FDI	0.70(0.8737)	4.41(0.3535)	4.41(0.3535)
Thailand	FDI does not Granger-cause G	8.61(0.0034)*	4.16(0.0413)*	11.89(0.0182)*
	G does not Granger-cause FDI	1.75(0.1862)	0.16(0.6895)	2.54(0.6376)
Tunisia	FDI does not Granger-cause G	5.37(0.2515)	5.37(0.2515)	5.37(0.2515)
	G does not Granger-cause FDI	8.198(0.0850)**	8.19(0.0850)**	8.19(0.0850)**
Venezuela	FDI does not Granger-cause G	0.32(0.5693)	0.33(0.5637)	0.33(0.5637)
	G does not Granger-cause FDI	1.36(0.2442)	0.47(0.4941)	0.47(0.4941)
Zambia	FDI does not Granger-cause G	6.41(0.0933)**	1.98(0.1594)	1.98(0.1594)
	G does not Granger-cause FDI	4.00(0.2611)	0.36(0.5500)	0.36(0.5500)

Note:* *Indicates significant at 5% levels*

** *Indicates significant at 10% levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In the multivariate model, variable trade openness has been included in the regressions.

Appendix 4.9: Granger-Causality Tests between FDI, and Banking Sector Development and Economic Growth as a Group: The First Differences VAR Approach

Country	Null hypothesis	Wald statistics
Algeria	FDI does not Granger-cause B1, Growth	11.44(0.1780)
	B1, Growth does not Granger-cause FDI	9.63(0.2917)
	FDI does not Granger-cause B2, Growth	4.15(0.8433)
	B2, Growth does not Granger-cause FDI	5.02(0.7553)
Argentina	FDI does not Granger-cause B1, Growth	3.22(0.5225)
	B1, Growth does not Granger-cause FDI	1.67(0.7970)
	FDI does not Granger-cause B2, Growth	1.21(0.5463)
	B2, Growth does not Granger-cause FDI	0.56(0.7551)
Barbados	FDI does not Granger-cause B1, Growth	3.55(0.4702)
	B1, Growth does not Granger-cause FDI	9.83(0.0435)*
	FDI does not Granger-cause B2, Growth	16.02(0.0030)*
	B2, Growth does not Granger-cause FDI	7.22(0.1247)
Bolivia	FDI does not Granger-cause B1, Growth	1.42(0.4925)
	B1, Growth does not Granger-cause FDI	1.32(0.5172)
	FDI does not Granger-cause B2, Growth	2.12(0.7131)
	B2, Growth does not Granger-cause FDI	5.00(0.2872)
Brazil	FDI does not Granger-cause B1, Growth	2.23(0.3287)
	B1, Growth does not Granger-cause FDI	2.71(0.2575)
	FDI does not Granger-cause B2, Growth	5.61(0.2304)
	B2, Growth does not Granger-cause FDI	7.86(0.0970)**
Central Africa	FDI does not Granger-cause B1, Growth	5.46(0.0653)**
	B1, Growth does not Granger-cause FDI	0.15(0.9268)
	FDI does not Granger-cause B2, Growth	8.92(0.3490)
	B2, Growth does not Granger-cause FDI	19.17(0.0140)*
Chile	FDI does not Granger-cause B1, Growth	3.75(0.1531)
	B1, Growth does not Granger-cause FDI	0.37(0.8311)
	FDI does not Granger-cause B2, Growth	2.52(0.2836)
	B2, Growth does not Granger-cause FDI	0.19(0.9100)
Colombia	FDI does not Granger-cause B1, Growth	22.63(0.0002)*
	B1, Growth does not Granger-cause FDI	2.23(0.6932)
	FDI does not Granger-cause B2, Growth	14.76(0.0052)*
	B2, Growth does not Granger-cause FDI	1.66(0.7988)
Congo Republic	FDI does not Granger-cause B1, Growth	2.12(0.3472)
	B1, Growth does not Granger-cause FDI	0.11(0.9461)
	FDI does not Granger-cause B2, Growth	2.01(0.3664)
	B2, Growth does not Granger-cause FDI	0.08(0.9626)
Costa Rica	FDI does not Granger-cause B1, Growth	1.11(0.5751)
	B1, Growth does not Granger-cause FDI	10.67(0.0048)*
	FDI does not Granger-cause B2.Growth	2.67(0.2632)
	B2, Growth does not Granger-cause FDI	0.02(0.9906)
El Salvador	FDI does not Granger-cause B1, Growth	2.57(0.2771)
	B1, Growth does not Granger-cause FDI	0.14(0.9319)
	FDI does not Granger-cause B2, Growth	9.02(0.0607)**
	B2, Growth does not Granger-cause FDI	0.69(0.9528)

Appendix 4.9 (continued)

Country	Null hypothesis	Wald Statistics
Ghana	FDI does not Granger-cause B1, Growth	2.48(0.6486)
	B1, Growth does not Granger-cause FDI	4.57(0.3349)
	FDI does not Granger-cause B2, Growth	1.05(0.9025)
	B2, Growth does not Granger-cause FDI	4.01(0.4050)
Guatemala	FDI does not Granger-cause B1, Growth	10.38(0.0345)*
	B1, Growth does not Granger-cause FDI	9.10(0.0586)**
	FDI does not Granger-cause B2, Growth	3.50(0.4775)
	B2, Growth does not Granger-cause FDI	11.85(0.0185)*
Honduras	FDI does not Granger-cause B1, Growth	0.51(0.7760)
	B1, Growth does not Granger-cause FDI	0.03(0.9845)
	FDI does not Granger-cause B2, Growth	0.52(0.7717)
	B2, Growth does not Granger-cause FDI	0.42(0.8111)
India	FDI does not Granger-cause B1, Growth	0.27(0.8752)
	B1, Growth does not Granger-cause FDI	0.79(0.6729)
	FDI does not Granger-cause B2, Growth	0.04(0.9785)
	B2, Growth does not Granger-cause FDI	0.40(0.8170)
Indonesia	FDI does not Granger-cause B1, Growth	1.27(0.8669)
	B1, Growth does not Granger-cause FDI	5.95(0.2025)
	FDI does not Granger-cause B2, Growth	9.31(0.1571)
	B2, Growth does not Granger-cause FDI	12.88(0.0449)*
Israel	FDI does not Granger-cause B1, Growth	1.76(0.4145)
	B1, Growth does not Granger-cause FDI	5.55(0.0625)**
	FDI does not Granger-cause B2, Growth	9.31(0.1571)
	B2, Growth does not Granger-cause FDI	12.88(0.0449)*
Jamaica	FDI does not Granger-cause B1, Growth	9.92(0.2705)
	B1, Growth does not Granger-cause FDI	7.16(0.5193)
	FDI does not Granger-cause B2, Growth	5.56(0.4739)
	B2, Growth does not Granger-cause FDI	5.55(0.4752)
Kenya	FDI does not Granger-cause B1, Growth	14.32(0.0265)*
	B1, Growth does not Granger-cause FDI	4.49(0.6109)
	FDI does not Granger-cause B2, Growth	1.70(0.4269)
	B2, Growth does not Granger-cause FDI	0.21(0.8990)
Malaysia	FDI does not Granger-cause B1, Growth	0.51(0.7744)
	B1, Growth does not Granger-cause FDI	6.47(0.0393)*
	FDI does not Granger-cause B2, Growth	1.16(0.5588)
	B2, Growth does not Granger-cause FDI	5.04(0.0805)**
Mauritania	FDI does not Granger-cause B1, Growth	39.37(0.0001)*
	B1, Growth does not Granger-cause FDI	14.32(0.0763)**
	FDI does not Granger-cause B2, Growth	4.05(0.3988)
	B2, Growth does not Granger-cause FDI	8.75(0.0667)**
Mauritius	FDI does not Granger-cause B1, Growth	0.97(0.9141)
	B1, Growth does not Granger-cause FDI	5.68(0.2241)
	FDI does not Granger-cause B2, Growth	1.44(0.4874)
	B2, Growth does not Granger-cause FDI	0.79(0.6746)

Appendix 4.9 (continued)

Country	Null hypothesis	Wald Statistics
Mexico	FDI does not Granger-cause B1, Growth	4.82(0.0899)**
	B1, Growth does not Granger-cause FDI	0.13(0.9373)
	FDI does not Granger-cause B2, Growth	4.84(0.0888)
	B2, Growth does not Granger-cause FDI	0.56(0.7544)
Morocco	FDI does not Granger-cause B1, Growth	5.86(0.0534)**
	B1, Growth does not Granger-cause FDI	3.91(0.1417)
	FDI does not Granger-cause B2, Growth	3.56(0.1690)
	B2, Growth does not Granger-cause FDI	2.15(0.3409)
Nigeria	FDI does not Granger-cause B1, Growth	5.98(0.6498)
	B1, Growth does not Granger-cause FDI	4.11(0.8474)
	FDI does not Granger-cause B2, Growth	9.94(0.1273)
	B2, Growth does not Granger-cause FDI	10.73(0.0971)**
Pakistan	FDI does not Granger-cause B1, Growth	2.30(0.6801)
	B1, Growth does not Granger-cause FDI	8.16(0.0857)**
	FDI does not Granger-cause B2, Growth	9.46(0.3047)
	B2, Growth does not Granger-cause FDI	26.38(0.0009)*
Panama	FDI does not Granger-cause B1, Growth	2.31(0.6782)
	B1, Growth does not Granger-cause FDI	0.68(0.9536)
	FDI does not Granger-cause B2, Growth	24.45(0.0019)*
	B2, Growth does not Granger-cause FDI	7.28(0.5072)
Paraguay	FDI does not Granger-cause B1, Growth	0.42(0.8124)
	B1, Growth does not Granger-cause FDI	1.41(0.4945)
	FDI does not Granger-cause B2, Growth	0.08(0.9624)
	B2, Growth does not Granger-cause FDI	0.75(0.6886)
Peru	FDI does not Granger-cause B1, Growth	1.02(0.5995)
	B1, Growth does not Granger-cause FDI	0.82(0.6639)
	FDI does not Granger-cause B2, Growth	1.34(0.5105)
	B2, Growth does not Granger-cause FDI	0.45(0.7976)
Philippines	FDI does not Granger-cause B1, Growth	3.94(0.4135)
	B1, Growth does not Granger-cause FDI	12.33(0.0151)*
	FDI does not Granger-cause B2, Growth	8.21(0.0843)**
	B2, Growth does not Granger-cause FDI	9.49(0.0499)*
Singapore	FDI does not Granger-cause B1, Growth	29.03(0.0003)*
	B1, Growth does not Granger-cause FDI	6.97(0.5404)
	FDI does not Granger-cause B2, Growth	0.72(0.9486)
	B2, Growth does not Granger-cause FDI	3.90(0.4201)
South Africa	FDI does not Granger-cause B1, Growth	6.99(0.0304)*
	B1, Growth does not Granger-cause FDI	3.70(0.1574)
	FDI does not Granger-cause B2, Growth	3.04(0.2182)
	B2, Growth does not Granger-cause FDI	3.25(0.1966)
Sri Lanka	FDI does not Granger-cause B1, Growth	5.96(0.6522)
	B1, Growth does not Granger-cause FDI	9.73(0.2845)
	FDI does not Granger-cause B2, Growth	2.83(0.9446)
	B2, Growth does not Granger-cause FDI	6.79(0.5594)

Appendix 4.9 (continued)

Country	Null hypothesis	Wald Statistics
Thailand	FDI does not Granger-cause B1, Growth	3.11(0.2107)
	B1, Growth does not Granger-cause FDI	3.07(0.2152)
	FDI does not Granger-cause B2, Growth	10.45(0.2345)
	B2, Growth does not Granger-cause FDI	17.33(0.0268)*
Tunisia	FDI does not Granger-cause B1, Growth	8.29(0.4053)
	B1, Growth does not Granger-cause FDI	12.31(0.1377)
	FDI does not Granger-cause B2, Growth	6.92(0.5455)
	B2, Growth does not Granger-cause FDI	7.76(0.4568)
Venezuela	FDI does not Granger-cause B1, Growth	1.35(0.5100)
	B1, Growth does not Granger-cause FDI	6.51(0.0386)*
	FDI does not Granger-cause B2, Growth	0.62(0.7316)
	B2, Growth does not Granger-cause FDI	6.05(0.0486)*
Zambia	FDI does not Granger-cause B1, Growth	2.79(0.2481)
	B1, Growth does not Granger-cause FDI	1.29(0.5246)
	FDI does not Granger-cause B2, Growth	2.39(0.3021)
	B2, Growth does not Granger-cause FDI	0.88(0.6429)

Note: * *Indicates significant at 5% levels*

** *Indicates significant at 10% levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In all regressions, variable trade openness has been included in the estimation.

Appendix 4.10: Granger-Causality Tests between FDI, and Stock Market Development and Economic Growth as a Group: The First Differences VAR Approach

Country	Null hypothesis	Wald Statistics
Argentina	FDI does not Granger-cause S2, Growth	6.65(0.5749)
	S2, Growth does not Granger-cause FDI	6.57(0.5839)
Chile	FDI does not Granger-cause S1, Growth	0.70(0.7059)
	S1, Growth does not Granger-cause FDI	0.40(0.8169)
	FDI does not Granger-cause S2, Growth	0.09(0.9580)
	S2, Growth does not Granger-cause FDI	0.64(0.7255)
Colombia	FDI does not Granger-cause S1, Growth	21.39(0.0062)*
	S1, Growth does not Granger-cause FDI	7.30(0.5047)
	FDI does not Granger-cause S2, Growth	13.74(0.0010)*
	S2, Growth does not Granger-cause MDI	7.02(0.0299)*
India	FDI does not Granger-cause S2, Growth	194.63(0.0001)*
	S2, Growth does not Granger-cause FDI	11.99(0.1518)
Malaysia	FDI does not Granger-cause S1, Growth	1.07(0.5860)
	S1, Growth does not Granger-cause FDI	1.70(0.4268)
	FDI does not Granger-cause S2, Growth	6.34(0.1753)
	S2, Growth does not Granger-cause FDI	4.89(0.2984)
Mexico	FDI does not Granger-cause S1, Growth	4.95(0.0843)**
	S1, Growth does not Granger-cause FDI	0.25(0.8840)
	FDI does not Granger-cause S2, Growth	6.58(0.1599)
	S2, Growth does not Granger-cause FDI	0.23(0.9941)
Nigeria	FDI does not Granger-cause S1, Growth	1.84(0.9347)
	S1, Growth does not Granger-cause FDI	8.04(0.2351)
	FDI does not Granger-cause S2, Growth	38.56(0.0001)*
	S2, Growth does not Granger-cause FDI	5.88(0.6604)
Peru	FDI does not Granger-cause S2, Growth	6.15(0.6308)
	S2, Growth does not Granger-cause FDI	64.90(0.0001)*
Philippines	FDI does not Granger-cause S1, Growth	3.45(0.1782)
	S1, Growth does not Granger-cause FDI	2.91(0.2336)
	FDI does not Granger-cause S2, Growth	4.47(0.1072)
	S2, Growth does not Granger-cause FDI	2.85(0.2411)
Singapore	FDI does not Granger-cause S2, Growth	3.03(0.2199)
	S2, Growth does not Granger-cause FDI	5.33(0.0696)**
South Africa	FDI does not Granger-cause S1, Growth	12.05(0.0170)*
	S1, Growth does not Granger-cause FDI	7.26(0.1227)
	FDI does not Granger-cause S2, Growth	1.71(0.4263)
	S2, Growth does not Granger-cause MDI	0.10(0.9501)
Thailand	FDI does not Granger-cause S1, Growth	13.66(0.0011)*
	S1, Growth does not Granger-cause FDI	9.25(0.0098)*
	FDI does not Granger-cause S2, Growth	7.93(0.0189)*
	S2, Growth does not Granger-cause FDI	3.50(0.1734)
Venezuela	FDI does not Granger-cause S2, Growth	1.76(0.7802)
	S2, Growth does not Granger-cause FDI	47.49(0.0001)*

Note: * *Indicates significant at 5% levels*

** *Indicates significant at 10% levels*

Figures in parentheses are p-value. In all regressions, the lag lengths are determined by using AIC. In all regressions, variable trade openness has been included in the estimation.

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