8-2009

Two essays on financial sector performance in Latin America

Omar M. Al Nassar
University of Texas-Pan American

TWO ESSAYS ON FINANCIAL SECTOR PERFORMANCE IN LATIN AMERICA

A Dissertation

by

Omar M. Al Nasser

Submitted to the Graduate School of the
University of Texas-Pan American
In partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2009

Major Subject: Business Administration / Finance

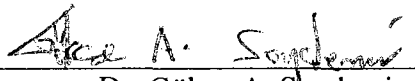
TWO ESSAYS ON FINANCIAL

SECTOR PERFORMANCE

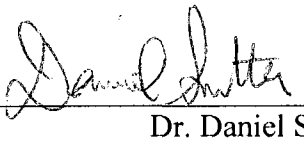
IN LATIN AMERICA

A Dissertation
by
Omar M. Al Nasser

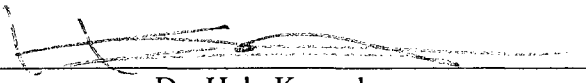
Approved as to style and content by:



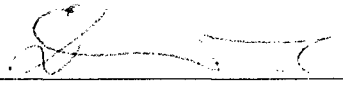
Dr. Gökçe A. Soydemir
Chair of Committee



Dr. Daniel Sutter
Committee Member



Dr. Hale Kaynak
Committee Member



Dr. Damian Damianov
Committee Member

August 2009

ABSTRACT

Al Nasser, Omar M., Two Essays on Financial Sector Performance in Latina America. Doctor of Philosophy in Business Administration/Finance, August 2009, 136 pages, 22 tables, 9 figures, 144 references.

This dissertation consists of two essays on financial sector performance in Latin America. These two essays complement each other so that, when placed together, they are expected to provide policymakers with guidelines on how to design appropriate financial sector reform strategies in an attempt to promote long-term economic development, and thus to attract more foreign direct investment (FDI) inflows not only for Latin American countries, but also for developing countries in general.

Chapter one investigates the extent to which the short and the long-run relationship between financial development and economic growth exists in Latin America. It focuses on two major aspects of financial development that can enhance growth: stock market and banking sector. Specifically, what role does the financial sector play in the economic growth process? What effect, positive, negative or zero, has financial development exerted on economic growth? Have the stock market and banking sector development indicators jointly entered the growth regression significantly? What type of causality, uni-directional or bi-directional, exists in the finance-growth nexus? Utilizing panel data methods and applying Granger causality tests within a framework of panel cointegration and error correction model, we attempt to answer the above questions

empirically and shed some light on the roles of financial development as well as other conditional variables in determination of economic growth.

There is a big debate over the ways financial and real variables interact and whether financial development causes growth or vice versa in a Granger causality sense. The question is an important one and has clear policy implications for Latin American countries since countries in this region experienced improvements in their financial sectors, but they are comparatively underdeveloped. While the question of causality may be approached from both theoretical and empirical perspectives, much literature, in essence, takes the latter approach. Chapter one seeks to be instructive and complementary to the empirical literature on the finance-growth nexus.

In the past three decades numerous studies have examined the causal relationships between financial development and economic growth. The support of the existence of a growth–finance relationship is strong; however, no clear consensus has been reached on the direction of causality. From a theoretical perspective, economists hold different views on the existence and direction of causality between financial development and economic growth. First, there are those who argue that a well-developed financial sector will channel the limited resources from surplus units to deficit units, raising the savings rate and consequently the investment rate. In other words, financial development leads to higher economic growth (Schumpeter, 1911 and King and Levine, 1993).

By contrarily, there are those who argue that when an economy grows, more financial institutions and financial products emerge in the markets in response to higher demand of financial services. According to this perspective, financial development simply follows economic growth (Robinson, 1952 and Ang and McKibbin, 2007).

Moreover, some opine that finance and growth may expand simultaneously contributing to the developments of each other, which points to bi-directional causality between the two (Demetrides and Hussein, 1996 and Hondroyiannis et al., 2005).

Chapter one aims at filling a gap in the research devoted solely to investigating the relationship between financial development and economic growth in 14 Latin American countries from 1978 to 2007. The results suggest that the direction of causality between financial development and economic growth is sensitive to the choice of measurement for financial development in Latin American countries. In particular, when banking sector development indicators are used as proxies for financial development, the empirical results show that there is evidence of uni-directional causality from economic growth to banking sector development not only in the long-run, but also in the short-run.

Chapter one, therefore, recommends that the real sector of Latin American economies should be developed further in order to sustain the development of the banking sector. On the other hand, the empirical results suggest that there is considerable evidence of bi-directional causality between stock market development and economic growth when stock market development indicators are used as proxies for financial development. Based on these results, government policies designed to enhance the efficiency of the stock markets and economic growth will be mutually beneficial in Latin America and other regions at the same stage of financial development such as East Asia, Africa, and Eastern Europe.

Chapter two examines the domestic and international determinants of FDI in Latin America. In particular, what factors led to the upsurge in FDI into the region? Why are some countries more successful than others in attracting FDI? Whether factors that

affect FDI in developing countries affect countries in Latin America differently. Whether countries with well-developed financial markets attract more FDI inflows. Whether FDI flows to developing countries are determined by domestic and/or international factors. This chapter attempts to answer the above questions based on the experience of 14 Latin American countries from 1978 to 2007.

Following the debt crisis in the 1980s and close integration of the world economy, Latin American countries have changed their attitude towards FDI because it is believed that FDI can contribute to economic development of a country. Due to the growth benefits FDI seems to convey, most countries in Latin America have pursued active policies to attract FDI that include both fiscal and financial incentives to attract FDI. While FDI played and still can play a crucial role in the economic development process in Latin American countries, the disappointing trend of FDI inflows in recent years has become a major concern of researchers and policymakers. Unfortunately, there has been little attention paid to the understanding of what determines FDI in Latin America. Hence, an important policy question is what key forces stimulate FDI in Latin America. An in-depth analysis of the factors determining FDI inflows is needed, not only to understand the reasons why some countries are more successful in attracting FDI, but also to provide policymakers with guidelines on how to attract more FDI inflows and hence economic growth.

The emerging literature on FDI now argues that the positive impact of FDI on economic growth may depend on local conditions which can limit the potential benefits generated by FDI when there are sufficient absorptive capacities in the host country (Alfaro et al., 2004). Prime among these capacities is financial development. In this

chapter, we focused, in particular, on the role of financial development. We believe that the lack of development of local financial markets can adversely limit an economy's ability to take advantage of potential FDI benefits.

The empirical findings in this chapter show that both domestic and international factors have been important determinants of FDI inflows to Latin America. Therefore, chapter two recommends that emphasis in the short and medium term should be focus on reforming investment regulatory framework to remove or reduce FDI restrictions, implementing policies that promote macroeconomic economic stability, and improving the educational and physical infrastructure. While, in the long-run, more FDI can be attained by persisting support for FDI liberalization through bilateral or multilateral means, continuing of the privatization process, and implementing appropriate monetary and fiscal policies for economic reforms and international integration with the world economy, thereby improving the attractiveness of a nation as a destination for FDI. Further analyzing the relationship between FDI and financial development, the empirical findings provide supporting evidence that a well-developed financial sector can represent a source of absorptive capacity in the host country which may enable these countries to absorb the positive impact of FDI. Therefore, the evidence suggests that Latin American countries should continue to stimulate and improve financial sector development in the economy to make it more attractive for foreign investors.

The Granger causality results show that the causal link between FDI and banking sector development is uni-directional, suggesting that the development of banking sector in Latin American countries can attract more FDI. We also provide evidence that the link between FDI and stock market development indicators is bi-directional. Therefore, the

evidence suggests that Latin American countries should continue to stimulate and improve financial sector development in the economy to make it more attractive for foreign investors.

DEDICATION

The completion of my doctoral studies would not have been possible without the love and support of my family. My father, Maher Al Nasser, my mother, Asma Al Nasser, my aunt, Basma Al Nasser, and my brother and sisters, Mohammad, Abeer, Najwa, and Lina, who have inspired, motivated and supported me by all means throughout my entire education, and more importantly, this dissertation. They never knew how important it was to me to have their support, and I cannot say thank you enough. I. share this accomplishment with them.

ACKNOWLEDGEMENTS

All praise and thanks due to Allah, Lord of the Worlds, for His innumerable bounties and favors. This dissertation would not have been accomplished without the will of Allah and then help of many people.

I wish to express my sincere gratitude and appreciation to my committee chair, Professor Gökçe Soydemir, for his support, valuable suggestions, and encouragement during the writing of this dissertation. I absolutely could never have done this dissertation without his help. I also wish to express my grateful to Professor Daniel Sutter for his timely assistance and insightful advice. I am extremely thankful to Professors Hale Kaynak and Damian Damianov not only for serving on my qualifying committee and participation in this dissertation, but also for offering constructive suggestions and comments.

Finally, I am eternally indebted to my parents and family for their endless prayers and words of encouragement; I owe them a debt of gratitude I can never repay.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: EVIDENCE FROM LATIN AMERICAN COUNTRIES

1.1 Introduction

Economic growth has been the ultimate goal of all economies and has been the primary focus of a vast number of economic studies (King and Levine, 1993). Several factors are identified as potential determinants in ascertaining economic growth. Among these factors, the role of financial systems in the growth process has received significant attention in theoretical and empirical literature. The development of endogenous growth theory in recent years has offered the opportunity to define and explain the link between financial development and economic growth. The theoretical foundation of this relationship can be traced to the work of Schumpeter (1911) and later to Mckinnon (1973) and Shaw (1973).

The relationship between financial development and economic growth has been a subject of great interest among economists for many years. However, there remains much disagreement over the ways financial and real variables interact and the extent to which financial development can promote economic growth. The debate has traditionally revolved around two issues. The first relates to whether financial development results in faster economic growth. The second relates to how financial development affects

economic growth. A large body of literature has emerged, both at the theoretical and empirical level, attempting to answer the above questions. No clear consensus has been reached on either issue. Relative to the first issue, two opposing views have emerged from the theoretical literature. There are those who argue that financial development is an essential element in promoting economic growth. They emphasize that the existence of a well-developed financial sector will channel the limited resources from surplus units to deficit units, raising the savings rate and consequently the investment rate. In other words, financial development leads to higher economic growth. By contrarily, there are those who argue that when an economy grows, more financial institutions and financial products emerge in the markets in response to higher demand of financial services. According to this perspective, financial development simply follows economic growth.

Previous empirical studies on the relationship between financial development and economic growth have concentrated primarily on a broad cross-section of countries, with little work on the finance-growth nexus in Latin America. The purpose of this chapter is to investigate the extent to which the short and the long-run relationship between financial development and economic growth exists in 14 Latin American countries from 1978 to 2007. Specifically, what role does the financial sector play in the economic growth process? What effect, positive, negative or zero, has financial development exerted on economic growth? Have the stock market and bank indicators jointly entered the growth regression significantly? What type of causality, uni-directional or bi-directional, exists in the finance-growth nexus?

Utilizing panel data methods and applying Granger causality tests within a framework of a panel cointegration and error correction model, we attempt to answer the

above questions empirically and shed some light on the roles of financial development as well as other conditional variables in determination of economic growth. Pooling only Latin American countries in the analysis is appropriate because empirical evidence has shown that financial development has varying effects on economic growth in countries with different income levels and different levels of financial development.[1]

Furthermore, evidence on the direction of causation between financial development and economic growth may provide important insights for policymakers, investors, and other developing countries. The results obtained from this chapter may provide policymakers in Latin America a better understanding of the role played by financial systems in the growth process. The results may also help policymakers design appropriate financial sector reform strategies in an attempt to achieve higher levels of economic growth. Furthermore, our findings should provide significant benefits for investors. As the financial systems develop, more choices are offered to investors, allowing them to allocate resources in more productive activities and to improve their portfolio performance. In addition, our findings could have a great deal of interest to other developing countries in the same stage of financial development, such as East Asian, African, and Eastern European countries that are reforming their financial systems.

In recognition of the positive link between financial development and economic growth, a large number of developing countries implemented significant and deep reforms in order to foster their financial markets in the 1990s. These reform efforts

[1] Rioja and Valev (2004) show that financial development has different effects on growth in countries with different income levels and different levels of financial development. Arestis et al., (2001) show that the effect of financial development on economic growth varies across countries and that not all countries can be pooled in to the same sample.

include financial liberalization, privatization programs, the establishment of stock exchanges and bond markets, and the development of regulatory and supervisory frameworks (Braun and Hausmann, 2002). Since the last part of 1980s and the beginning of the 1990s, most Latin American countries have taken significant and deep reforms in order to improve their macroeconomic conditions and foster their financial markets. There has been a marked decline in the rate of inflation and a recovery of positive rates of growth in most countries. In addition, the financial aspects of the region were heavily emphasized. These efforts have included not only comprehensive stabilization programs aimed at improving the underlying macroeconomic conditions in the region, but also other programs designed to liberalize and improve the efficiency of their financial markets. These reforms, together with improved macroeconomic fundamentals, were expected to lead to financial development and thereby higher economic growth.

Despite these reform efforts, the performance of domestic financial markets, especially stock markets, in many developing countries has been disappointing. Some developing countries, such as those in East Asia, experienced growth of their financial markets, while other countries experienced an actual deterioration of their domestic financial markets, particularly in Latin America. The 1980s became appropriately known in Latin America as "The Lost Decade." In this decade, the government kept interest rate controls, allocated credit arbitrarily, and deterred the expansion of securities markets and the creation of new financial institutions (Edwards, 1999). Although Latin American countries experienced significant financial reforms in the 1990s that promoted financial deregulation and the expansion of the stock market, financial development indicators show that the region remained financially underdeveloped (Garcia et al., 2002).

Policymakers in Latin American countries held high expectations about financial market development in the region. These expectations, when compared to markets in East Asia, Eastern Europe, and developed countries, were unmet in many Latin American countries (Braun and Hausmann, 2002). Stock markets in most Latin American countries remain smaller and shallower than G-7 (Canada, France, Germany, Italy, Japan, United Kingdom, and United States of America) countries and East Asian countries. At the end of 2004, stock market capitalization in this region—a measure of a country's stock market development—reached 42.3 percent of GDP, compared to 93.6 and 147.1 percent in G-7 and East Asian countries, respectively. Also, value traded in domestic stock markets—a measure of a country's stock market liquidity—stood at 6.1 percent of GDP in Latin America in 2004, while it reached 92.2 percent in G-7 countries and 104.5 percent in East Asia (World Bank, 2005). Therefore, the lack of financial depth may be a barrier to better economic performance in Latin America.

The modest recovery of Latin America, after a period of stabilization aimed at correcting macroeconomic imbalances and related reforms that followed the 1980s debt crisis, has shed some light on the roles of policies and specifically financial development in the economic growth process. Theoretical and empirical analyses support the positive effects of financial development on economic growth, and there is evidence that countries with high GDP per capita tend to have more developed financial systems. Therefore, it is important for policymakers in Latin America to determine whether they should first pursue financial development or economic growth, or whether they should pursue both financial development and economic growth concurrently.

This study contributes to the existing knowledge on the finance–growth nexus in several distinct ways. First, although the existence of a relationship between financial development and economic growth is now widely recognized, the empirical results offer conflicting predictions about the direction of causality and the separate role of banks and stock markets in promoting economic growth. We believe that the present study could be instructive and complementary to the existing literature on the finance-growth nexus.

Second, we distinguish between the short-run and the long-run causality relationship between financial development and economic growth. Darrat (1999) states "*most of the benefits of higher levels of financial development could be realized in the short-run while in the long run as the economy grows and becomes mature these effects slowly disappear*" (p. 23). Thus, testing only for long-run causality would lead to the wrong conclusion, namely absence of any casual relationship between financial development and economic growth. To this end, we use the Granger-causality test within an error correction model to examine the short-run and the long-run causality between the two variables.

Third, we test the robustness of our results by using six different measures of financial development to capture the variety of channels through which stock market and banking sector development can affect economic growth. More and varied indicators may give policymakers better information about which areas of financial development are most important to focus on. Finally, we control for other economic factors that may affect the finance-growth relationship to determine the sensitivity of the results to changes in the conditioning information set.

The remainder of the chapter is organized as follows. Section 1.2 broadly reviews the theoretical models and the literature on financial development and economic growth, and presents an overview on financial development in Latin America. Section 1.3 describes the data used in the empirical analysis as well as the data sources. Section 1.4 outlines the econometric methodology based on Granger causality tests within a framework of a panel cointegration and error correction model. Section 1.5 presents the empirical results, and Section 1.6 summarizes the major findings and offers some policy implications.

1.2 The Finance–Growth Link and the Latin America Case

1.2.1 Financial Development and Economic Growth

Theoretical models, in general, assume that financial development affects economic growth via two channels. First, financial development leads to an increase in the savings rate, thereby increasing the resources available to finance investments. Second, financial development results in efficient allocation of savings, hence enhancing the productivity of investment. The former effect is strongly emphasized by McKinnon (1973) and Shaw (1973). McKinnon and Shaw argue that one of the major and important roles of financial systems is saving mobilization. Financial systems lower the cost of mobilizing savings by reducing informational asymmetries and transaction costs by providing a variety of saving instruments for savers. By increasing the size of savings, financial systems channel a larger fraction of savings to finance a greater number of innovative projects. This increases the technological innovation and economic growth (King and Levine, 1993).

In addition, financial systems facilitate portfolio diversification by providing opportunities to investors to diversify and hedge risks, thereby inducing individuals to invest in riskier but more productive investment alternatives. According to Levine (1997), financial systems promote investment by identifying good business opportunities, mobilize savings, monitor the performance of managers, hedge risk, and facilitate the exchange of goods and services. These financial functions influence savings and investment decisions, and hence economic growth.

A large body of literature exists that highlights the role of financial development as a growth-enhancing factor.[2] One question, however, which has remained unanswered in the literature, whether the policymakers should first pursue financial development or economic growth, or whether they should pursue both financial development and economic growth concurrently. In other words, there is still an ongoing debate on the causal relationship between financial development and economic growth that has both theoretical and policy implications.

From a theoretical perspective, economists hold different views on the existence and direction of causality between financial development and economic growth. The first is the "supply-leading" view advanced by Schumpeter (1911). He opined that the existence of a well-developed financial sector will channel the limited resources from surplus units to deficit units and that it will raise the savings rate and thus the investment rate. In other words, by increasing the size of savings and improving the efficiency of investment, financial development leads to higher economic growth. The supply-leading view has received considerable support from recent empirical studies (e.g., King and

[2] See Levine (1997, 2005) for surveys of the theoretical literature.

Levine, 1993; Levine and Zervos, 1998; Rousseau and Wachtel, 2000; Levine and Beck, 2002; and Hondroyiannisa et al., 2004).

The second view, "demand-pulling" advanced by Robinson (1952), conversely states that financial development follows economic growth. According to this phenomenon, when an economy grows, more financial institutions and financial products emerge in the markets in response to higher demand of financial services, thereby leading to financial development. Studies by Ang and McKibbin (2007), Shan et al., (2001), and Claessens and Laeven (2003) are consistent with the demand-pulling view.

Third, the "feedback" view suggests a two-way causality between financial development and economic performance. It is asserted that a country with a well-developed financial system could promote high economic growth through technological changes, product, and services innovation (Schumpeter, 1912). This, in turn, will create high demand on the financial products and services (Levine, 1997). As banking institutions effectively respond to these demands, then these changes will stimulate a higher economic performance. Therefore, both financial development and economic growth are positively interdependent and their relationship could lead to feedback causality. Studies by Demetrides and Hussein (1996), Luintel and Khan (1999), Hondroyiannis et al., (2005), and Al-Yousif (2002) are supportive of this view.

The last view, "Finance does not matter" advanced by Lucas (1988), which argues that financial development and economic growth are not causally related. He argues that studies overstressed the role of financial development in the economic growth process.

This debate has important policy implications for both developed and developing countries. Levine (1997) notes that evidence concerning the causality between financial

development and economic growth could assist governments to determine what priority should be given to reforms of their financial sectors.

In recent years, several empirical studies have provided strong theoretical and empirical support for the hypothesis that financial development fosters economic growth (King and Levine, 1993; Levine and Zervos, 1998; Levine, 2002; and Beck and Levine, 2004).

King and Levine (1993) test whether financial indicators have a robust effect on economic growth. To test this relationship, King and Levine construct several financial ratios, which proxy for specific characteristics of the financial sector. The study shows that the size of the financial sector relative to GDP, the importance of banks relative to the central bank, the percentage of credit allocated to private firms, and the ratio of credit issued to private firms to GDP have a significant and robust effect on economic growth in a sample of more than 80 countries.

Levine and Zervos (1998) assess the relationship between economic growth and financial development using both banks and stock markets indicators for a sample of 42 countries from 1976 to 1993. They find that the initial level of stock market and banking sector development is positively and significantly associated with long-run economic growth, productivity growth, and capital accumulation. They also find stock markets size, as measured by market capitalization divided by GDP, does not correlate with growth indicators.

Rousseau and Wachtel (2000) and Beck and Levine (2004) extend the Levine and Zervos (1998) approach of stock markets, banks, and growth by using GMM techniques. Rousseau and Wachtel (2000) use annual data and the difference estimator. Beck and

Levine (2004) use data averaged over five-year periods and the system estimator to reduce potential biases related to the difference estimator, and extend the sample through 1998. Both studies are in line with supply-leading views that stressed the important positive role for financial development in the process of economic growth.

Using the vector autoregressive model (VAR), Hondroyiannisa et al., (2004) examine empirically the relationship between the development of the banking system and the stock market and economic performance for the case in Greece over the period 1986–1999. The empirical results show that both bank and stock market financing can promote economic growth in the long-run, although their effect is small. Apergis et al. (2007) investigate the causal linkages between financial development and economic growth in a large sample of 65 countries from 1975 to 2000. They find a strong support for the positive impact of financial development on economic growth.

1.2.2. Financial Development in Latin America

Following the debt crisis in the 1980s, Latin American countries have been undergoing important reform efforts that include both fiscal and financial incentives. In addition to the documented successes in inflation stabilization, trade and capital account liberalization, and social security reform, improvements in financial market reform figured notably in the reform agenda. Latin American countries privatized public banks, eliminated interest rate controls, and improved the regulation and supervision of capital adequacy requirements (Braun and Hausmann, 2002). Although, these policy changes

have improved both the banking sector and stock markets, Latin American financial systems are still largely bank-based, with stock markets mostly small and illiquid.[3]

In the banking system, financial reform has led to greater depth in banking and more active participation of the private sector in both allocating and receiving credit. Figures 1.1, 1.2, and 1.3 demonstrate different banking sector development indicators for our sample of Latin American countries from 1978 to 2007. In particular, these figures present data on private credit by deposit money banks and other financial institutions, deposit money bank assets, and liquid liabilities as a share of GDP. These figures show significant fluctuation in the levels of financial development in the banking system. The three indicators were lower in the 1970s than in the 1990s, dropped in the 1980s, and reached the highest point in the early 2000s.

Figures 1.4 and 1.5 show stock market capitalization over GDP and value traded domestically over GDP for Latin American countries from 1978 to 2007. These figures depict that stock markets in Latin America have grown considerably. In this regard, Latin American countries evidenced noteworthy improvement since 1990s. The average domestic stock market capitalization in terms of GDP more than tripled between 1990 and 2007. Value traded in domestic stock markets also increased significantly during this period, from an average of 1.5 percent of GDP in 1978 to 7.5 percent in 2007.

Although the financial sector in Latin America has grown substantially since 1990s, its financial sector has lagged behind, not only relative to developed countries, but also compared to emerging economies in other regions such as East Asia (World Bank, 2005). Latin America performs poorly in terms of bank credit to the private sector when

[3] Garcia Herrero et al., (2002) mention that the stock market in Latin America is only one fourth of Asia's in terms of capitalization, even after the Asian crisis.

compared with Asia. In the 1990s, the average level of credit to the private sector in Latin America was only 28 percent of GDP. This average level of private credit indicates underdevelopment in the financial sector in Latin America since it was 72 percent of GDP in Asia (Braun and Hausmann, 2002). Latin America experienced a collapse in private credit because of the debt crises, but the liberalization process of the 1990s led to a relatively rapid growth in private credit even if the level is still low.

The development of stock markets in Latin America falls far behind G-7 (Canada, France, Germany, Italy, Japan, United Kingdom, and U.S.A.) and East Asian countries. De la Torre et al. (2007) note that at the end of 2004, stock market capitalization in this region reached 42.3 percent of GDP, compared to 93.6 and 147.1 percent in G-7 and East Asian countries, respectively. They also mention that value traded in domestic stock markets stood at 6.1 of GDP in Latin America in 2004 compared to 92.2 percent in G-7 countries and 104.5 percent in East Asia.

The evidence on financial sector performance in Latin America presented in the previous section suggests that the high expectations of the early 1990s concerning financial market development in the region have not been met.[4] The underdevelopment of the financial sector generally and the small banking sector specifically imply that one of the major problems faced by businesses in Latin America is limited access to credit. In countries where credit constraints are tighter, firms are unable to grow and expand, and this is reflected in the overall growth rate of the economy (Garcia Herrero et al., 2002). Underdeveloped banking sectors relate not only to lower amounts of credit, but also to higher interest rate spreads, which represent the difference between the interest rate

4 Galindo et al. (2007) argue that, although the region has experienced a significant financial liberalization, the financial sector in Latin America has not been able to catch up with other emerging regions.

charged to borrowers and the rate paid to depositors, and therefore higher lending rates and lower returns to savings (Calvo, 2005).

The underdevelopment of the financial sector in Latin America is attributed to strong government intervention in the sector throughout the 1970s and 1980s (Garcia et al., 2002). During these decades, Latin American governments used the banking sector to finance their budget deficits with borrowing and implicit taxation. Governments also used the banking sector to finance and administer sectoral development projects (Mas, 1995).[5] Additionally, Latin America is a region with the highest credit volatility, reflected in the highest average number of crises per country (Braun and Hausmann, 2002).

Although the structural reforms implemented in Latin America during the 1990s have promoted the participation of the private sector in financial institutions, these reforms did not make financial markets in Latin America more efficient. De la Torre et al. (2006) argue that the financial sectors in Latin America have moved toward a more market-based system with less government intervention. However, some areas require improvement. They suggest that reforms in the financial sector should focus on increasing the access to credit the small and medium enterprises (SMEs) in Latin America since there are not enough loanable funds available to SMEs.[6]

The disappointing performance of financial markets in Latin America has left policymakers without clear guidance on how to revise the reform agenda. Therefore, because of the significant changes the financial section experienced in the late 1990s and

---

[5] Mas (1995) argue that government intervention in the banking sector in Latin America in the 1980s created the wrong incentives by allowing unprofitable banks to continue raising deposits even if they were insolvent. He notes that policies in the banking sector changed in the 1990s due to bank privatization.

[6] Hosono and Nishijima (2002), in a comparative analysis of the financial sectors in Latin American and East Asian countries, provide support for De la Torre's (2006) argument. He finds that firm's access to capital is limited in Latin America.

early 2000s, it is important to utilize current data to analyze the relationship between financial development and economic growth. Furthermore, our findings may provide significant lessons for the financial market reform agenda that may apply to emerging economies in other regions.

1.3 Measurement and Data Sources

This section provides a brief description of the variables used in this study. We investigate the short-run and the long-run relationship between financial development and economic growth in a panel of 14 Latin American countries from 1978 to 2007. The countries included in the sample are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Paraguay, Peru, Uruguay, and Venezuela.[7] The sample period allows me to capture the pre- and post-reform years. The dataset used in this study are obtained from *Financial Structure and Economic Development Database* (FSEDD) and the *World Development Indicator* (WDI) published by the World Bank. Table 1.1 provides a detailed description of all variables used and their sources.

1.3.1. Measures of Financial Development

Following standard practice, we use the growth of real per capita GDP as our measure of economic growth (EG). In addition, we employ six different measures of financial development to capture the variety of channels through which stock market and

[7] The choice of the sample countries is dictated by the availability of long-run time series data. Other Latin American countries that belong to the same group were excluded from the sample due to the significant amount of missing observations for the financial development indicators, and other variables.

banking sector development can affect economic growth. The literature usually defines financial development as the improvement in quantity, quality, and efficiency of financial intermediary services. This process involves the combination of many activities and institutions. Thus, financial development cannot be captured by a single measure.

To measure banking sector development, studies traditionally use measures of the overall size of the banking sector by dividing the stock of broad money (M2) by GDP. King and Levine (1993) and Levine and Zervos (1998) argue that this indicator does not measure whether the liabilities are those of banks, the central bank, or other financial intermediaries. Thus, we follow King and Levine (1993) and Boyd et al., (2001), and employ three proxies to measure banking sector development. The first measure is the ratio of liquid liabilities (LIQ) of the financial sector to GDP. This ratio equals the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. This indicator measures the size of the banking sector in relation to the economy as a whole and has been found to be strongly associated to the real GDP per capita (King and Levine, 1993).

As noted by King and Levine (1993), this measure may not be closely related to other financial services such as risk management and information processing. Consequently, our second measure is bank assets (BA), which equals the ratio of total assets of deposit money banks (commercial banks and other deposit taking banks) as a percentage of GDP. Boyd et al. (2001) point out that this ratio reflects the overall level of development of the banking sector as it measures the importance of deposit money banks, as reflected in their total assets relative to the economy.

Since the above two measures do not consider the allocation of capital between the private and public sector (King and Levine (1993), and in order to obtain a more direct measure of financial depth, the private credit (PC) is our third measure of banking sector development. This measure equals the value of loans made by banking institutions to the private sector as a percentage of GDP. The primary advantage of this measure is that, by isolating credit to the private sector, it measures more precisely the contribution of financial institutions in funding private sector investment (Levine and Zervos, 1998; Rousseau and Wachtel, 2000; Boyd et al., 2001; and Beck and Levine, 2004).

Stock market development measures are also included in the model specification. In order to capture the relative size and the level of development of the stock market, the first measure is total stock market capitalization as a percentage of GDP (SMC). This measure is computed as the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy. Studies frequently use SMC as an indicator of stock market development (Levine and Zervos, 1998; Andres et al., 1999; Boyd et al., 2001).

The second and third measures of stock market development are frequently used in the literature as indicators of market liquidity. Value traded (VT) equals the value of the trades of domestic shares on domestic exchanges divided by GDP. VT measures trading volume as a share of national output and should therefore positively reflect liquidity on an economy wide basis (Levine and Zervos, 1998). As noted by Boyd et al. (2001), VT complements SMC because it reflects the actual volume of market transactions along with the overall size of the market.

Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares. Thus, TR measures trading volume relative to the size of the market. This ratio complements the SMC. A large but inactive market will have a large market capitalization ratio, but a small turnover ratio (Boyd et al., 2001). TR also complements the total VT since value traded captures trading relative to the size of the economy and TR measures trading relative to the size of the market (Garcia and Liu, 1999). Consequently, a small liquid market will have high turnover, but small value traded.

1.3.2 Other Variables

We regress each of our measures of stock market and bank development on economic growth, plus a set of variables in order to control for other potential determinants of economic growth that may affect the finance-growth relationship. In the simple control variables set, we include the logarithm of the secondary school enrollment (SCH), measured by the proportion of the population of the age group who officially corresponds to the duration of general secondary schooling, to control for the level of human capital. This measure has been widely used by several studies to assess the host government's improvements in education in order to enhance economic growth (Borensztein et al, 1998; Li and Liu, 2005). We expect the coefficient on SCH to be positive. Abramovitz (1986) and Lucas (1993), among others, argue that a better-educated population augments a country's ability to absorb and adopt new technologies and to innovate. Therefore, it is an important factor of growth.

In addition, we use the ratio of exports plus imports to GDP (OP) to capture the degree of openness of an economy. A large body of studies has found positive and significant effects of OP on economic growth (Tyler, 1981; Moschos, 1989; Levine et al. 2000; Apergis et al, 2007). As discussed by Edwards (1993), the literature on endogenous growth argue that economies that are more open to international trade can grow more rapidly by expanding their markets and becoming more efficient. Therefore, the estimated coefficient on OP is expected to be positive.

Additional conditioning variables include the ratio of government expenditure to GDP (GOV) and inflation rate (IR) as indicators of macroeconomic stability. Empirical studies produce mixed evidence regarding the impact of GOV on the long-run economic growth as it depends on the nature of government spending. Some studies suggest that GOV has a significant positive role in determining the level of economic growth when government spending is productive such as spending on education and infrastructure (Tang, 2006; Aslan, 2008). Further, other studies suggest a negative relationship between the two variables when government spending is nonproductive, in which government transfers resources from the productive activities to nonproductive activities which uses them less efficiently (Fischer, 1993; Easterly and Rebelo, 1993; Bruno and Easterly, 1998).

Barro and Sala-i-Martin (1995) point out, the GOV variable is intended to capture public expenditures that do not directly affect productivity, but will entail distortions on private decisions. However, the mixed evidence regarding the impact of GOV economic growth differ by country, method employed, and the form of public expenditure (i.e.,

productive and unproductive expenditure).[8] Thus, the coefficient associated to this variable is not determined a priori.

IR is measured by the percentage change in the consumer price index (CPI). The relationship between inflation and economic growth is found in the literature to be negative and significant, especially in the cases of high inflation (Fischer, 1993; Barro, 1996; Bruno and Easterly, 1998). A negative relationship is expected between IR and economic growth.

1.3.3 Highlights from the Data

Table 1.2 presents descriptive statistics for all the variables used in the analysis. Table 1.3 provides some indications concerning the empirical correlations between economic growth and financial development indicators. Four correlations are worth highlighting. First, there are positive correlations between economic growth and financial development indicators except for BA. Second, the positive correlations between SMC and VT as well as TR signify a positive relationship between the size and the liquidity of stock markets. Third, PC is highly correlated with the LIQ (0.773). Finally, an interesting result concerns the positive correlation between stock markets development and banking system development. Such result is also confirmed for the correlation between SMC and either PC or LIQ (0.26 and 0.14, respectively).

[8] See Barro (1991).

1.4 The Econometric Methodology

1.4.1. Panel Data Methodology

In order to analyze the link between financial development and economic growth in Latin American countries, we use panel data methodology. The use of panel data in the analysis allows us to measure how the change in financial development over time may affect economic growth among these countries (Levine et al., 2000). Furthermore, panel data estimation techniques, in this context, offer some advantages over cross-section or time series.

According to Hsiao (1986), the use of panel data methodology enables country heterogeneity to be controlled, which under other circumstances might cause serious misspecification problems. Eventually, the result is more informative data, less collinearity among the variables, more degrees of freedom, and of course more efficiency. Panel data allows more complicated behavioral models to be constructed and tested than cross-section or time-series models. In this analysis, a specific set of countries is being investigated, i.e., Latin American countries. Inference in this case is conditional on the particular countries that are observed. In pooled cross-country and time-series data, unobservable fixed effects may be correlated with the included explanatory variables to create omitted variable biases. To correct them, we employ panel estimation with country-specific fixed effects. The fixed-effects model is therefore the most appropriate specification. Specifically, we estimate:

$$EG_{it} = \alpha_i + \beta\, FD_{it} + \gamma\, Z_{it} + \varepsilon_{it}, \qquad i = 1,\ldots, N, \qquad t = 1,\ldots, T \tag{1.1}$$

where the subscript i represents Latin American countries and subscript t represents time from 1978 to 2007. EG_{it} is the level of economic development, measured by the growth

of real per capita GDP in the *i*th country for the time-period, which is our measure of economic growth. FD_{it} denotes the measures of financial development, which includes measures of stock markets and banking sector development variables. Z_{it} represents a set of variables that controls for other factors associated with economic growth. The error term is ε_{it}.

1.4.2 Panel Unit Root Tests

Many economic time series are non-stationary, and regressions between such data are generally spurious (Granger and Newbold, 1974). Traditionally, Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), and Philips-Perron (PP) tests have been used to test for the presence of unit roots in time series data. However, it is commonly accepted now in time series analysis that DF, ADF, and PP tests suffer from low power in rejecting the null of a non-stationary series. Since most panel data sets have a time dimension, it is natural to test for unit roots in panel data and to apply panel data unit root tests.

Panel unit root tests are similar, but not identical, to unit root tests carried out on a single series. However, recent literature suggests that panel-based unit root tests have higher power than unit root tests based on individual time series like DF, ADF, and PP tests (Levin and Lin, 1992). The primary motivation for panel data unit root tests as opposed to traditional unit root tests is to take advantage of the additional information provided by pooled cross-section time series to increase test power. Moreover, in contrast to individual unit root tests, which have complicated limiting distributions, panel unit root tests lead to statistics with a normal distribution in the limit (Baltagi, 2005).

One of the most widely used panel unit root tests is the Im, Peseran, and Shin (2003) test, hereafter denoted as IPS. Consider a following AR(1) process:

$$Y_{it} = \alpha_i Y_{i,t-1} + \varepsilon_{it} \tag{1.2}$$

where $i = 1,2,..., N$ cross-section units or series that are observed over periods $t = 1,2,..., T_i$; α_i are the autoregressive coefficients, and the errors ε_{it} are assumed to be independently and normally distributed with zero means and potentially heterogeneous variances for all countries and years. If $|\alpha_i| < 1$, Y_t is said to be weakly stationary. On the other hand, if $|\alpha_i| = 1$, then Y_t contains a unit root, which means that Y_{t-1} will provide no relevant information in predicting Y_t. For purposes of testing, there is one natural assumption that we can make about α_i. One can assume that the persistence parameters vary freely across cross-sections. The IPS test is of this form. The IPS is based on specifying a separate ADF regression for each cross section as follows:

$$\Delta Y_{it} = \gamma_i + \delta_i t + \alpha_i Y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta Y_{i,t-j} + \varepsilon_{it} \tag{1.3}$$

where Δ is the difference operator; γ_i is the intercept; $\delta_i t$ is the deterministic time trend; and p_i is the number of lags in the ADF regression. The lag order of $\alpha_i's$ as well as $\beta_i's$ are allowed to vary across countries. A simple average of the individual countries is taken to calculate the t-statistics. Hence, the null hypothesis of non-stationary to be tested is:

$$H_0 : \alpha_i = 0, \ for \ all \ i \tag{1.4}$$

against the alternative hypothesis:

$$H_1: \begin{cases} \alpha_i = 0 & \text{for some } i\text{'s.} \\ \alpha_i < 0 & \text{for at least one } i \end{cases} \tag{1.5}$$

This formulation of alternative hypothesis allows α_i to vary across groups. It allows for some (but not all) of the individual series to have unit roots under the alternative hypothesis. Essentially, the IPS test averages the ADF individual unit root test statistics that are obtained from estimating (1.3) for each *i*; that is:

$$\tilde{t}_{NT} = \frac{1}{N} \sum_{i=1}^{N} \tilde{t}_{i\,Ti}(p_i) \tag{1.6}$$

where $\tilde{t}_{i\,Ti}$ is the ADF t-statistics. In the case where the lag order is always zero ($p_i = 0,\ for\ all\ i$),, simulated critical values for $\tilde{t}_{NT}$ are provided in the IPS for different numbers of cross sections *N*, series lengths *T*, and for test equations containing either intercepts, or intercepts and linear trends. Using Monte Carlo simulations, IPS shows that the *t*-bar is normally distributed under the null hypothesis. In the general case where the lag order in (x) may be non-zero for some cross-sections, IPS shows that a properly standardized $\tilde{t}_{NT}$ has an asymptotic standard normal distribution.

They then use estimates of its mean and variance to convert t-statistics into a standard normal z-statistic so that conventional critical values can be used to evaluate its significance. The z test statistic is defined as:

$$z_{tNT} = \frac{\sqrt{N}\,(t_{NT} - N^{-1} \sum_{i=1}^{N} E[t_{iT}\,\rho_i = 0])}{\sqrt{N^{-1} \sum_{i=1}^{N} \mathrm{var}[t_{iT}\,\rho_i = 0]}} \rightarrow N(0,1) \tag{1.7}$$

where $\tilde{t}$ is as defined before, and $E[t_{iT}\ \rho_i = 0]$ and $\text{var}[t_{iT}\ \rho_i = 0]$ are the mean and variance of t_{it}. The IPS test statistic requires specification of the number of lags and the specification of the deterministic component for each cross-section ADF equation. To determine the optimal lag length, we use Akaike Information Criterion (AIC). When testing for panel unit roots at levels, we take the individual constant and trend terms as in equation (1.3). If in no case we reject the null hypothesis that every country has a unit root for the series in levels, we then test for a unit root in first differences. The IPS unit root test is used in this chapter to test for stationarity of the panel data obtained for Latin American countries.

1.4.3 Panel Cointegration Tests

The concept of cointegration was first introduced into the literature by Granger (1980). Cointegration implies the existence of a long-run relationship between economic variables. The principle of testing for cointegration is to test whether two or more integrated variables deviate significantly from a certain relationship. In other words, if the variables are cointegrated, they move together over time so that short-run disturbances will be corrected in the long-run. This means that if two or more series move closely together in the long-run, the difference between them is constant.

According to Granger (1981), when the series becomes stationary only after being differenced once (integrated of order one), they might have linear combinations that are stationary without differencing. In the literature, such series are said to be cointegrated. Once the order of integration has been defined, the next step is to apply cointegration analysis to assess the long-run relationship among the set of the integrated variables in

question. Traditional tests of cointegration include the simple two-step test by Engle and Granger (1987) and Johansen (1988). Although these tests have commonly employed in the literature to test for the long-run relationship among a set of variables, both tests are useful in conducting individual cointegration tests, but do not address cointegration tests in panel settings, thus suffering from severe size distortion when applied (Leybourne and Newbold, 2003).

To overcome these problems, the next step of our empirical work is to apply panel cointegration methodology to investigate the long-run relationship between financial development and economic growth.[9] We adopt the approach developed by Pedroni (1999). The Pedroni methodology extends the Engle-Granger and Johansen frameworks to test for the long-run relationship involving panel data. Thus, it represents an improvement over the traditional cointegration tests by overcoming the problem of small samples. In addition, this methodology allows different individual cross-section effects by allowing for heterogeneous intercepts and trend coefficients across cross-sections. Pedroni's method includes seven residual-based statistics for the test of the null of no cointegration against the alternative of cointegration. These different statistics are based on a model which assumes that cointegration relationships are heterogeneous across cross-sections.

The first four test statistics are known as panel cointegration statistics and are based on the "within" dimension approach. It includes the panel v-statistics, panel rho (r-statistics), panel non-parametric (pp-statistics), and panel parametric (adf-statistics) statistics. The last three statistics are group panel cointegration statistics and are based on

[9] Panel cointegration tests are proposed by Kao (1999), Larsson et al. (2001), Pedroni (1999), and McCoskey and Kao (1999).

a "between" dimension approach. The "between" dimension tests include the group-rho, group-pp, and group-adf statistics.[10] All of the seven tests are based on the following panel regression:

$$Y_{i,t} = \alpha_i + \delta_i t + \beta_{1\,i,t} X_{1\,i,t} + \ldots + \beta_{M\,i,t} X_{M\,i,t} + \varepsilon_{i,t} \tag{1.8}$$

where $i = 1,\ldots, N$ cross-section units in the panel that are observed over periods $t = 1,\ldots, T$, and $m = 1,\ldots, M$ is the number of regression variables. The variables Y and X are assumed to be integrated of order one, e.g., I(1). The parameters $\beta_{1\,i}, \ldots, \beta_{M\,i}$ are the slope coefficients, α_i is the member-specific intercept or fixed effects parameter, and $\delta_i t$ is the deterministic time trend, which is specific to cross-section units of the panel.

Under the null hypothesis of no cointegration, the residuals $\varepsilon_{i,t}$ will be I(1). The general approach is to obtain residuals from equation (1.8) and then to test whether residuals are I(1) by running the auxiliary regression,

$$\varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + u_{it} \tag{1.9}$$

where $\varepsilon_{i,t}$ are the estimated residuals from the long-run regression. Pedroni describes various methods of constructing statistics for testing for null hypothesis of no cointegration ($\rho_i = 1$). There are two alternative hypotheses: the homogenous alternative, $(\rho_i = \rho) < 1$ for all i (within-dimension test), and the heterogeneous alternative, $\rho_i < 1$ for all i (between-dimension test). Thus, the between-dimension test is less restrictive and allows for heterogeneity across members. In the case of the within-dimension test, a common value for all cross sections is imposed, i.e., $\rho_i = \rho$. Pedroni shows that the seven

[10] See Pedroni (1999) for details and mathematical representations of the tests.

panel test statistics, under appropriate standardization, is distributed asymptotically as a normal distribution and expressed as follows:

$$\frac{\theta_{NT} - \mu\sqrt{N}}{\sqrt{v}} \rightarrow N(0,1) \tag{1.10}$$

where μ and v are the mean and variance respectively of the underlying individual series. The statistics can be compared to appropriate critical values, and if the calculated test statistics exceed the critical value, then the null hypothesis of no-cointegration is rejected implying that a long-run relationship between financial development and economic growth exists. Following the methodology employed by Pedroni (1999), the cointegration relationship we estimate is specified as follows:

$$EG_{it} = \alpha_i + \delta_i t + \beta_i FD_{it} + \varepsilon_{it}, \quad i = 1,..., N, \quad t = 1,..., T \tag{1.11}$$

where the subscript i represents country i and subscript t represents time. EG is the growth of real per capita GDP and FD denotes the measure of financial development. α_i is the country-specific effect, $\delta_i t$ is the deterministic time trend, and $\varepsilon_{i,t}$ are the estimated residuals.

1.4.4 Panel Granger Causality Tests

If EG and FD are cointegrated, this implies a long-run linear relationship between the two variables. However, although cointegration does not indicate the direction of causality between the variables. Our final step consists of investigating the

direction of causation between financial development and economic growth using the Granger-causality test within an error correction model (ECM).

The standard Granger causality test measures the ability of a variable FD to explain the current value of another variable EG. Furthermore, EG is said to be Granger-caused by FD if EG can be predicted better from the past values of both EG and FD than from the past values of EG alone. In other words, the lagged values of FD are statistically significant. For a simple bivariate model, we can test if EG is Granger-caused by FD by estimating equation (1.12) and test the null hypothesis that FD does not Granger-cause EG in equation (1.13).

$$EG_t = a_0 + \sum_{j=1}^{p} a_{1i}\ ED_{t-j} + \sum_{j=1}^{p} a_{2i}\ FD_{t-j} + u_t \tag{1.12}$$

$$\begin{aligned} H_0 &: a_{2i} = 0 \quad for \quad j = 1,\ldots, p \\ H_1 &: a_{2i} \neq 0 \quad for\ at\ least\ one\ j, \end{aligned} \tag{1.13}$$

where a_0 is a constant, u_t is a white noise error process, and p is the number of lagged variables. FD is said to Granger-cause variable FDI if we reject the null hypothesis in (1.13), where a_{2i} is the vector of the coefficients of the lagged values of FD. Similarly, we can test if EG causes FD by replacing EG for FD and vice versa in equation (1.12) as follows:

$$FD_t = b_0 + \sum_{j=1}^{p} b_{1i}\ FD_{t-j} + \sum_{j=1}^{p} b_{2i}\ ED_{t-j} + v_t \tag{1.14}$$

$$\begin{aligned} H_0 &: b_{2i} = 0 \quad for \quad j = 1,\ldots, p \\ H_1 &: b_{2i} \neq 0 \quad for\ at\ least\ one\ j, \end{aligned} \tag{1.15}$$

where b_0 is a constant and v_t is a white noise error process. EG is said to Granger-cause variable FD if we reject the null hypothesis in (1.15) where b_{2i} is the vector of the coefficients of the lagged values of EG.

The standard Granger causality test developed by Granger (1969), however, requires that the variables used in a given model be stationary and the errors have a zero mean and a finite variance. In general, most variables in economics and business are I(1) variables, which means they are non-stationary in the levels but are stationary in the first differences. However, converting the data to stationary series, although desirable, eliminates the long-run information included in the original form of the variables. Thus, if a model with stationary variables is estimated, but without regard to possible cointegration between them, then this model is inappropriate due to an omission-of-variable bias (Harris, 1995).

According to Engle and Granger (1987), one problem with the standard Granger causality tests is the possibility of finding no causal relationship between two variables that are cointegrated. Hence, if two or more variables are found to be cointegrated, the lagged error-error correction term (ECT), derived from the cointegration equation, must be incorporated into the model to reintroduce the long-run information lost in the differencing process.

Engel and Granger (1987) show that in the presence of cointegration, there always exists a corresponding error correction representation, captured by the ECT. This means that changes in the dependent variable are a function of the level of disequilibrium in the cointegration relationship, captured by the ECT, as well as by changes in the independent variables. The ECT captures the long-run adjustment of cointegration variables. As such,

in addition to the direction of causality, the incorporation of ECT allows us to detect both the short-run and the long-run causal relationship between the variables.

In general, the ECM is formed by adding an ECT as another regressor to the model with the stationary variables. This term is the lagged-once residuals that are generated from the long-run relationship between the variables in the model.[11] To investigate the causal relationship between financial development and economic growth, we estimate the following bivariate ECM as follows:

$$\Delta EG_{it} = \alpha_0 + \sum_{j=1}^{p} \alpha_{1i} \Delta EG_{it-j} + \sum_{j=1}^{p} \alpha_{2i} \Delta FD_{it-j} + \alpha_3 \; ECT_{t-1} + u_{1it} \tag{1.16}$$

$$\Delta FD_{it} = \beta_0 + \sum_{j=1}^{p} \beta_{1i} \Delta FD_{it-j} + \sum_{j=1}^{p} \beta_{2i} \Delta EG_{it-j} + \beta_3 \; ECT_{t-1} + u_{2it} \tag{1.17}$$

where Δ is the difference operator; p denotes the lag length; and u_{1t} and u_{2t} are white-noise error terms. ECT_{t-1} is one period lagged error correction term derived from the long-run relationship in equation (1.11). The principle behind this model is that there often exists a long-run equilibrium relationship between two economic variables. In the short-run, however, there may be disequilibrium in response to short-run shocks. With the error correction mechanism, a proportion of the disequilibrium is corrected in the next period.

The term ECT_{t-1} in equations (1.16) and (1.17) represents the extent of the disequilibrium between the levels of EG and FD in the previous period. The coefficients of the ECT (α_3 and β_3) describe how quickly and in which direction EG and FD converge back to this equilibrium. Thus, the ECT assumes that changes in the

[11] See detail discussion in Masih and Masih (1996).

dependent variable not only depend on the changes of the independent variables and its own past value, but on the extent of the disequilibrium between the levels of EG and FD captured by the ECT.

Granger causality implies testing the significance of the hypotheses $H_0 : \alpha_{2i} = 0,\ and\ or\ \alpha_3 = 0$ and $H_0 : \beta_{2i} = 0,\ and\ or\ \beta_3 = 0$. From equation (1.16), we say that ΔFD Granger causes ΔEG if α_{2i}'s and/or α_3 is statistically significant. Likewise, from equation (1.17), ΔEG Granger causes ΔFD if β_{2i}'s and/or β_3 is statistically significant. In addition to indicating the direction of causality amongst variables, the ECM enables us to distinguish between the short-run and the long-run causality. The significance of α_{2i} and β_{2i} indicate short-run causality, while the significance of α_3 and β_3 coefficients indicate long-run causality between the two variables. Hence, movements along this path are considered permanent. The F-test of the explanatory variables indicates short-run causal effects, whereas the long-run causal relationship is implied through the significance of the t-test of the lagged error-correction term. Of course, if the two variables were not cointegrated, the ECT will not appear in the above equation, in which case we test only for the short-run causality.

If H_0 in equation (1.16) is rejected ($H_0 : \alpha_{2i} = 0,\ \alpha_3 = 0$), it shows that FD Granger causes EG. In this scenario, financial development causes economic growth (supply-leading view). In this situation, a well-developed financial sector proceeds and helps in the development of the economy's real sector through transferring and channeling limited resources to the more productive sectors. Rejection of H_0 ($H_0 : \beta_{2i} = 0,\ \beta_3 = 0$) in equation (1.17) means that the causality runs from EG to FD

as postulated by the demand-pulling view. According to this scenario, when an economy grows, more financial institutions and financial products emerge in the markets in response to higher demand of financial services and thereby leads to financial development.

If none of the null hypotheses are rejected, it means that *FD* does not Granger cause *EG* and *EG* also does not Granger cause *FD* in both the short-run (i.e. α_{2i}'s and β_{2i}'s) and the long-run (α_3 and β_3). This indicates that the two variables are independent of each other. According to this proposition, financial development and economic growth are caused by other factors that have a role in their development. Finally, if all the null hypotheses are rejected, there is bi-directional causality between financial development and economic growth in both the short-run and the long-run (feedback hypothesis). In this scenario, economic growth causes financial development and financial development causes economic growth. According to this proposition, economic growth stimulates and permits financial development and, in turn, this financial development results in accelerated economic growth.

2.7 Empirical Results

1.5.1 Panel Unit Root Results

The variables of economic growth (*EG*), measures of financial development (LIQ, BA, PC, SMC, VT, TR), and all control variables (GOV, OP, SCH, IR) are tested for unit root both in levels and in first differences. The results from the IPS unit root test are presented in Table 1.4 and are reported with a trend. As can be inferred from this table, we cannot reject the unit root hypothesis when the variables are taken in levels, but when

first differences are used, the hypothesis of unit root is rejected at the 1% significance level. Therefore, our series are well characterized as an I(1) process. These results allow us to test for cointegration among the variables in consideration.

1.5.2 Panel Cointegration Results

Having established that economic growth and financial development series are integrated of the first order, the second step is to test for the cointegration relationship between the two variables. To achieve this, as explained earlier, we use the Pedroni panel cointegration test. Tables 1.5 and 1.6 report the panel cointegration test results for stock markets and banking sector development measures.

Tables 1.5 and 1.6 present seven test statistics: (i) v-statistics, (ii) panel rho-statistics, (iii) panel ADF-statistics, (iv) panel PP-statistics, (v) Group rho-statistics, (vi) Group ADF-statistics, and (vii) Group PP-statistics. It can be seen from the test results in both tables that Pedroni's statistics significantly reject the null of no cointegration at 1% significance level in all cases and for the six indicators of financial development. This implies a long-run co-movement between financial development and economic growth. That is, there is a long-run steady-state relationship between financial development and economic growth for the panel of Latin American countries. Given the variables in Tables 1.5 and 1.6 are cointegrated, the long-run relationship can be estimated.

1.5.3 Panel Estimation Results

The next step is to estimate equation (1.1) using the ordinary least squares (OLS) technique. This study mainly focuses on the effects of two major aspects of financial

development on economic growth: stock market and banking sector. The use of panel data in the analysis allows us to measure how the change in financial development over time may affect economic growth among these countries (Levine et al., 2000). The fixed effects model is constructed to take into account the country-specific and time effects.

Table 1.7 provides the estimation results. The benchmark equation omits the financial development indicators. All variables in the benchmark equation have the right sign and are statistically significant. GOV exhibits a statistically significant negative coefficient. This points to a low efficiency of government spending in Latin American countries. Furthermore, a positive impact of SCH on economic growth is also reported in our estimations, although its coefficient becomes less insignificant after the entry of VT. The coefficient of OP carries the expected sign and is statistically significant. This implies that openness to trade has stimulated economic growth in Latin America. The results also show that IR has the potential to inhibit economic growth as indicated by a statistically negative coefficient.

The first three columns report the estimation results of the same equation with one of the three banking sector development indicators (BA, LIQ, PC) as an additional explanatory variable. The coefficients of BA are negative and insignificant in all cases, thus proving that there is no enough evidence to reject the null hypothesis of exogenous effect of BA on economic growth. Column (2) shows that financial development, as measured by the LIQ variable, has a positive and significant impact on economic growth. In particular, a 1% increase in the LIQ increases economic growth by 0.065%. In addition, the coefficients of PC are positive and significant in all regressions, which

suggest that an increase in banking credits to the private sector will effectively stimulate economic growth in Latin America.

The last three columns report the estimation results for equation (1.1) using stock market variables as the proxy for financial development. The coefficients of all three indicators of stock market development (SMC, VT, TR) are positive and significant, implying that the depth of the stock market has an impact on the growth rate. When SMC, for example, is used as a proxy for financial development, significantly positive coefficients suggest that the size of stock markets increases the growth rate. Alternative measures of stock market development tell the same story. For instance, VT and TR are also good forecasters of economic growth. These two measures of liquidity show that countries with more liquid stock markets tend to grow faster. The results are consistent with the findings of Levine and Zervos (1998). They find that the liquidity of the stock market is a robust predictor of economic growth.

The estimated coefficients of all control variables are robust with respect to the choice of financial development indicators. In particular, GOV, OP, and IR retain their original signs and remain significant in explaining economic growth. Overall, the results summarized in Table 1.7 suggest that financial development, measured either by stock markets or by banking sector indicators, had a significant and positive impact on economic growth in Latin America from 1978–2007. These results support previous empirical evidence on the positive relationship between financial development and economic growth.[12] Furthermore, the results show that both stock markets and banking sector development indicators enter the growth regression significantly, regardless of the control variables. This indicates that banks and stock markets work together in Latin

[12] See King and Levine (1993b), and Levine (1997).

American countries, implying that a well-functioning stock market enables entrepreneurs to make more productive investments because they have access to longer-term sources of funds (Levine, 1997).

In Table 1.8, we estimate equation (1.1) by employing the random effect method, which assumes that the individual effects are uncorrelated with the other regressors in the model, thus intercepts follow a normal distribution. The estimated results are similar to those reported in Table 1.7 and, consequently, we do not discuss them in detail. The choice between random effects and fixed effects is determined by the Hausman test, which tests for misspecification in the random effects model. At the bottom of Table 1.8, the Hausman test is presented as a means to investigate the null of the random effects versus the alternative of the fixed-effects. The Hausman test rejects the null of the random effects for four out of six cases. The rejection of the random effect indicates the appropriate use of fixed-effects in the regressions.

1.5.4 Panel Causality Results

Our empirical analysis thus far has focused on different aspects of the long-run relationships between economic growth and financial development in Latin American countries. As discussed previously, financial development and economic growth exhibit a robust cointegration relationship across Latin American countries. However, the presence of a cointegration relationship does not provide information on which of these variables drive the long-run relationships. In this section, we shift attention to the nature of causal relationships between economic growth and financial development measures. In particular, does a well-developed financial sector lead to higher economic growth as the

supply-leading view hypothesizes? Alternatively, does financial development follow economic growth as the demand-pulling view hypothesizes? These alternative causality linkages have quite different policy implications. Therefore, it is important to examine the direction of the causal relationships between economic growth and financial development in Latin American countries, a task we perform in this section.

The empirical results from the Granger causality between banking sector development indicators and economic growth are presented in Table 1.9. The results of the Granger causality tests are consistent with the cointegration results based on the idea that if two or more variables are cointegrated, then at least one-way causality must exist in the system to take it toward equilibrium. In Table 1.9, the Granger causality tests show that the null hypothesis that economic growth does not causes financial development is rejected not only in both in the long-run, but also in the short-run. Therefore, there is an evidence of one-way causality running from economic growth to BA, LIQ, and PC, as the error correction terms are significant at the 1% level, 10%, and 1% level respectively.

Furthermore, there is no evidence that BA and LIQ have an effect on economic growth in the short-run. However, there is short-run Granger causality running from PC to economic growth at the 10% level. Thus, there is a bi-directional relationship between PC and economic growth, which is consistent with earlier studies suggesting that bank credit to the private sector stimulates economic growth through improving efficiency (King and Levine, 1993).

The evidence of one-way causality running from economic growth to financial development, as measured by banking sector development indicators, gives support to the idea that financial development may be a result of economic growth or demand-pulling

phenomenon. Robinson (1952) argues that strong economic growth results in higher demand for various types of financial services. Hence, more financial institutions, products, and services emerge in the markets to meet the increased demand.

Overall, the results of the Granger causality tests, along with the panel cointegration tests, suggest that there is evidence of long-run linkages between banking development and economic growth in Latin America. However, it seems that the role of banking development may not be crucial for economic development in the region but, instead, it reacts to economic development. Therefore, the conclusion of King and Levine (1993) that "finance seems importantly to lead economic growth" (p.730), is not supported by our research findings. This is not to say that banking sector development does not promote economic growth, because both banking development and economic growth appear to have two-way causality when PC is used as a measure of banking sector development.

These findings suggest that the banking sector is not developed in the region sufficiently to support sustained economic development. Although Latin American countries have made very significant and deep reform efforts to their banking sectors, these efforts were not as successful in leading to a better functioning banking sector, and thus enhancing economic growth. The main reasons behind this result could be the numerous financial crises the Latin American countries have experienced, government intervention in that sector through the 1970s and 1980s to finance their budget deficits

with borrowing and implicit taxation, and tighter credit constraints (Braun and Hausmann, 2002).[13]

Table 1.10 summarizes the Granger causality results between stock market development indicators and economic growth. The results show bi-directional relationships between the three indicators and economic growth. As evident from Table 1.10, the null hypotheses that SMC, VT, and TR do not cause economic growth are rejected in both the short-run and the long-run. The results also show the presence of short-run and long-run causality from economic growth to stock market development. These results reveal strong bi-directional causality relationships between stock market development and economic growth in Latin America. The ECTs in Table 10 indicate that there exist mechanisms in correcting the disequilibrium between stock market development indicators and economic growth. They have the right sign and are significant even though some are at 10%. The significant negative sign of the ECT indeed supports the cointegration relationship between stock market development and economic growth.

The bi-directional causality relationships between stock market development and economic growth suggest that economic growth initially stimulates and permits financial development and, in turn, financial development results in accelerated economic growth. In general, our findings provide some support for the argument that financial development will originally grow in response to services that is directed to the financial systems by the economic growth. Once this stage is reached, the direction of causality is

[13] Braun and Hausmann (2002) note that "in many Latin American countries, the quality of bank capital is low, asset classifications are not sufficiently conservative, and consolidation of off-shore activities remains problematic. As a result, some banking systems in the region remain underdeveloped. "

reversed and financial development directly stimulates economic growth. That is, the evolution of the financial sector (specifically the stock market) tends to be more likely to stimulate and promote economic growth.

Our finding of strong long-run causality between stock market development and economic growth is consistent with Levine and Zervos (1998) and Rousseau and Wachtel (2000), which suggest a strong and statistically significant relationship between stock market development and economic growth. In general, the results from Table 1.10 suggest that policymakers in Latin America should encourage stock market development through an appropriate mix of taxes, legal, and regulatory policies to remove barriers to stock market operation and thus stimulate economic growth.

1.6 Conclusions and Policy Implications

This chapter examines the relationship between financial development and economic growth for 14 Latin American countries from 1978 to 2007 using panel data methods and applying Granger causality tests within a framework of a panel cointegration and error correction model. This chapter improves upon the existing literature by utilizing current data from Latin American countries in order to analyze the relationship and the direction of causality between financial development and economic growth. It departs from earlier work and complements recent evidence in several aspects.

First, this chapter re-examines the relation between financial development and economic growth from a time-series perspective using recently developed econometric techniques. We overcome the problems encountered by previous time-series work on this issue by: (a) using panel unit root tests to examine the stationarity properties of the data.

The use of panel-based tests is necessary because the power of standard time-series unit root tests may be quite low given the sample sizes and time spans typically available in economics; (b) applying panel cointegration methodology developed by Pedroni (1999) to investigate the long-run relationship between financial development and economic growth. The Pedroni methodology extends the Engle-Granger and Johansen frameworks to test for the long-run relationship involving panel data. Thus, it represents an improvement over the traditional cointegration tests by overcoming the problem of small samples.

Second, while previous empirical studies evaluate the impact of either stock market or banking sector development on economic growth, we examine the relation between financial development and economic growth by using six different measures of financial development which may provide more information about the financial system than if one uses only a single indicator. Therefore, our empirical evidence improves upon existing work by taken together different measures of stock market and banking sector development to capture the variety of channels through which stock market and banking sector development can affect economic growth. More and varied indicators may provide policymakers in the region with better information about which areas of financial development are most important to focus on in an attempt to achieve higher levels of economic growth.

Third, although many empirical studies have investigated the relationship between financial development and economic growth, the results are ambiguous. The empirical evidence from cross-section and time-series studies offers conflicting predictions about the existence of the relationship between financial development and economic growth.

Our empirical results provide clear evidence that financial development has a significant positive impact on economic growth in Latin American countries even after controlling for other determinants of economic growth.

Fourth, empirical studies give contradictory results about the direction of causality between financial development and economic growth. In this context, our findings provide show that direction of causality is sensitive to the choice of proxy used to measure the level of financial development in Latin American countries. Finally, previous empirical studies on the relationship between financial development and economic growth have concentrated primarily on a broad cross-section of countries, with little work on the finance-growth nexus in Latin America. We provide evidence on this topic for Latin American countries which may provide policymakers in Latin America a better understanding of the role played by financial systems in the growth process and help them to design appropriate financial sector reform strategies in order to achieve higher economic growth.

Fifth, a large number of empirical studies have assumed that financial development is important for economic growth, and therefore leads to economic growth (supply-leading view). However, little has been discussed about the converse, where economic growth can also drive the development of the financial sector (demand-pulling view). The empirical results show that economic growth leads to financial development as measured by banking sector development indicators. Therefore, the evidence from the first chapter provides support for both the supply-leading and demand-pulling views.

The empirical findings and their policy implications can be summarized as follows. First, our findings suggest that the direction of causality between financial

development and economic growth is sensitive to the choice of proxy utilized in the study to measure the level of financial development in Latin American countries.

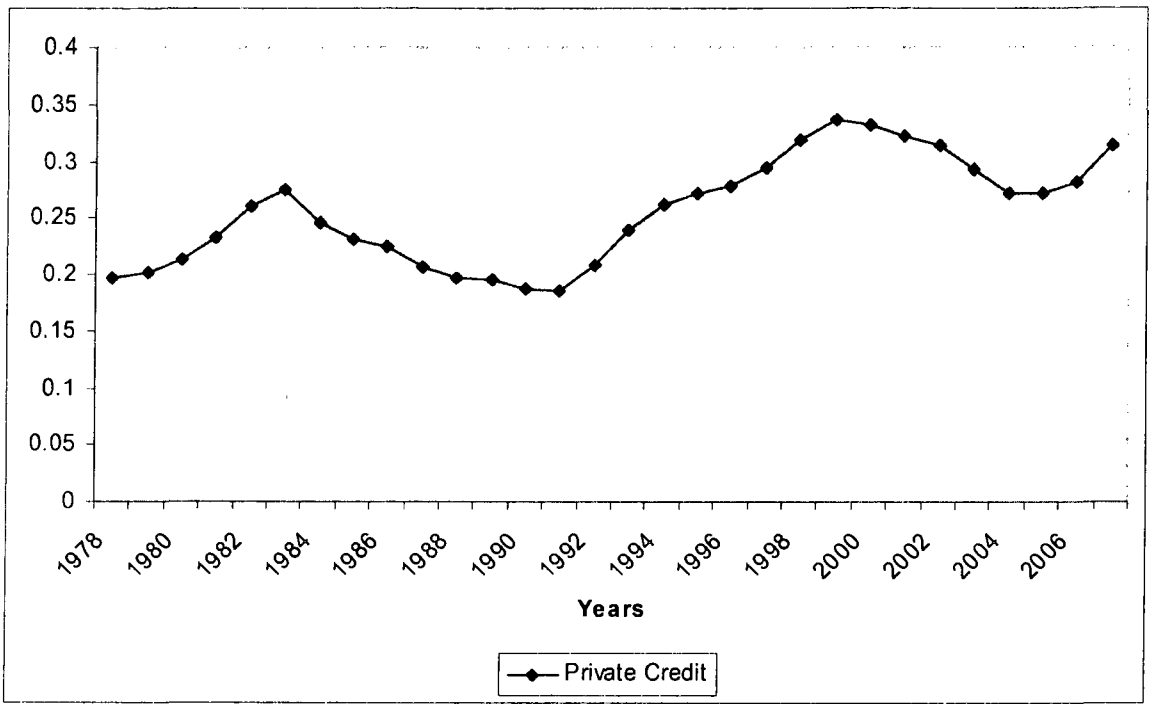
Second, when banking sector development indicators are used as proxies for financial development, the empirical results show that there is evidence of uni-directional causality from economic growth to banking sector development. One could argue that in the case of demand-pulling view more emphasis should be placed on growth-enhancing policies such as macroeconomic stability, increased openness to trade with other countries through more trade agreements, more investment in human capital and more government spending towards productive activities such as education and infrastructure.

Furthermore, policymakers should improve the banking sector by taking essential measures to improve banks supervision and regulation such as restricting government involvement in the banking sector, resolving weak or failed banks, and increasing competition among banks by introducing greater variety of financial instruments.

Third, the findings indicate a strong bi-directional causality between stock market development and economic growth when stock market development indicators are used as proxies for financial development. The bi-directional causality relationships between stock market development and economic growth suggest that economic growth initially stimulates and permits financial development and, in turn, financial development results in accelerated economic growth. The implication is that government policies aiming at enhancing the efficiency of the stock markets and economic growth will be mutually beneficial in Latin America. Policymakers should remove impediments to stock market operations, such as tax, legal, and regulatory barriers and continue improving the regulation of their stock markets. Finally, policies that foster macroeconomic stability,

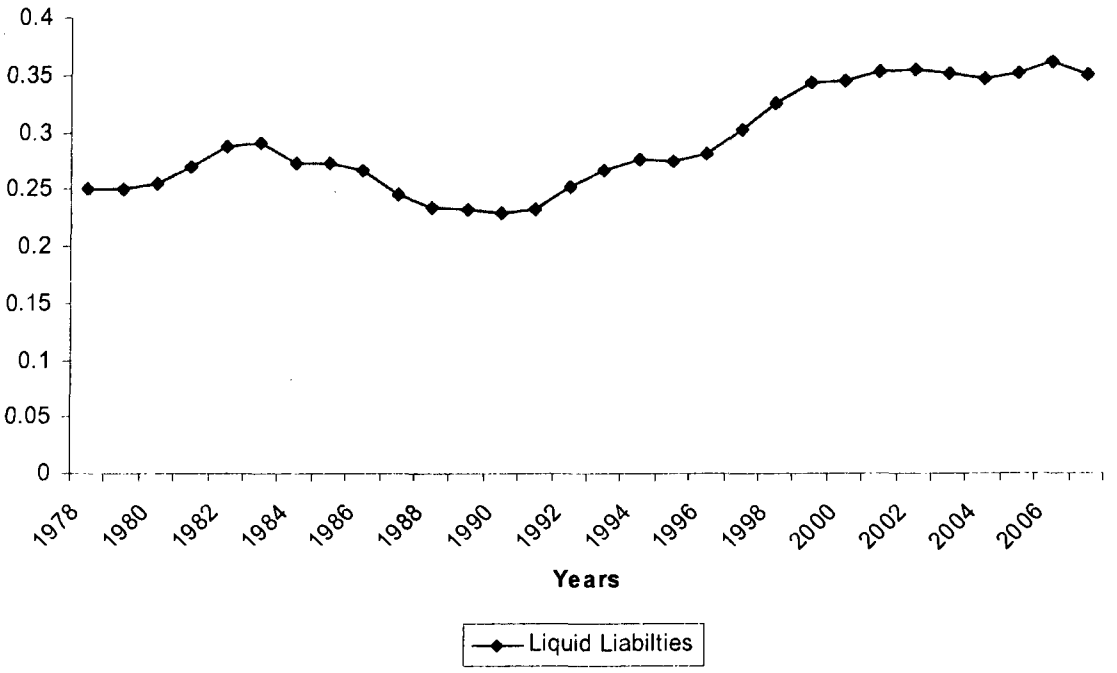
increased openness, investment in human capital and productive government spending, and therefore improve economic growth, would also have an important effect on economic growth in the long-run.

Figure 1.1 Private Credit, 1978-2007.



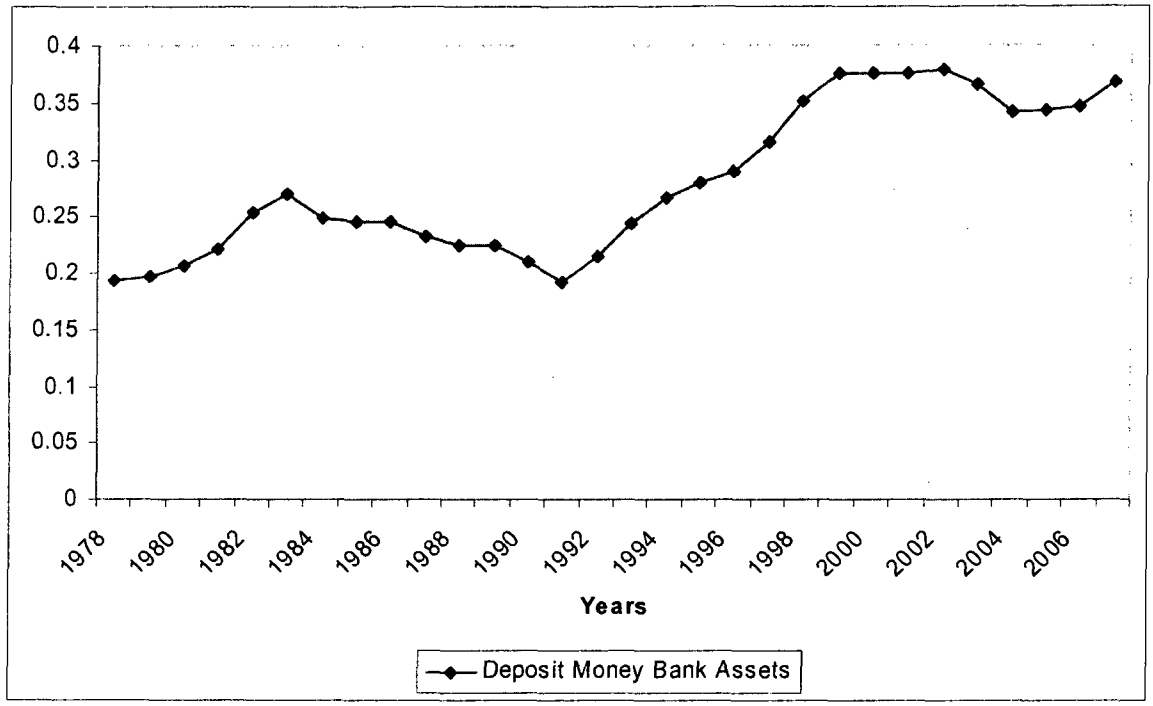
Source: Financial Structure Database (2008).

Figure 1.2 Liquid Liabilities, 1978-2007.



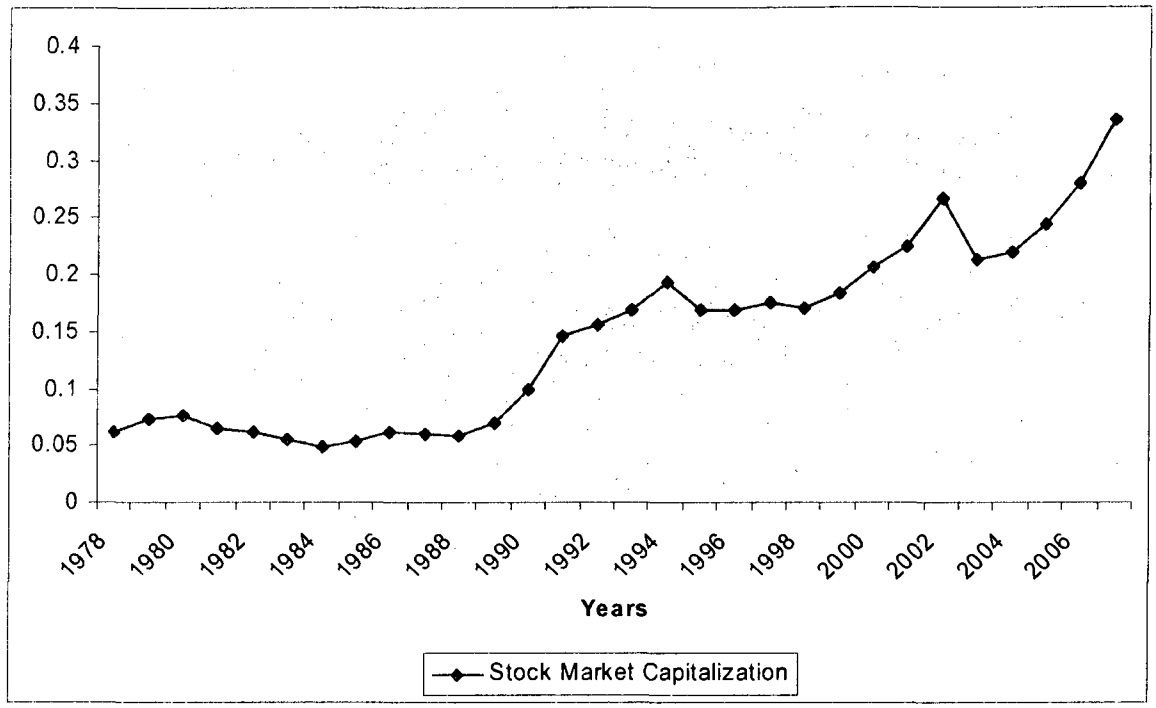
Source: Financial Structure Database (2008).

Figure 1.3 Deposit Money Bank Assets, 1978-2007.



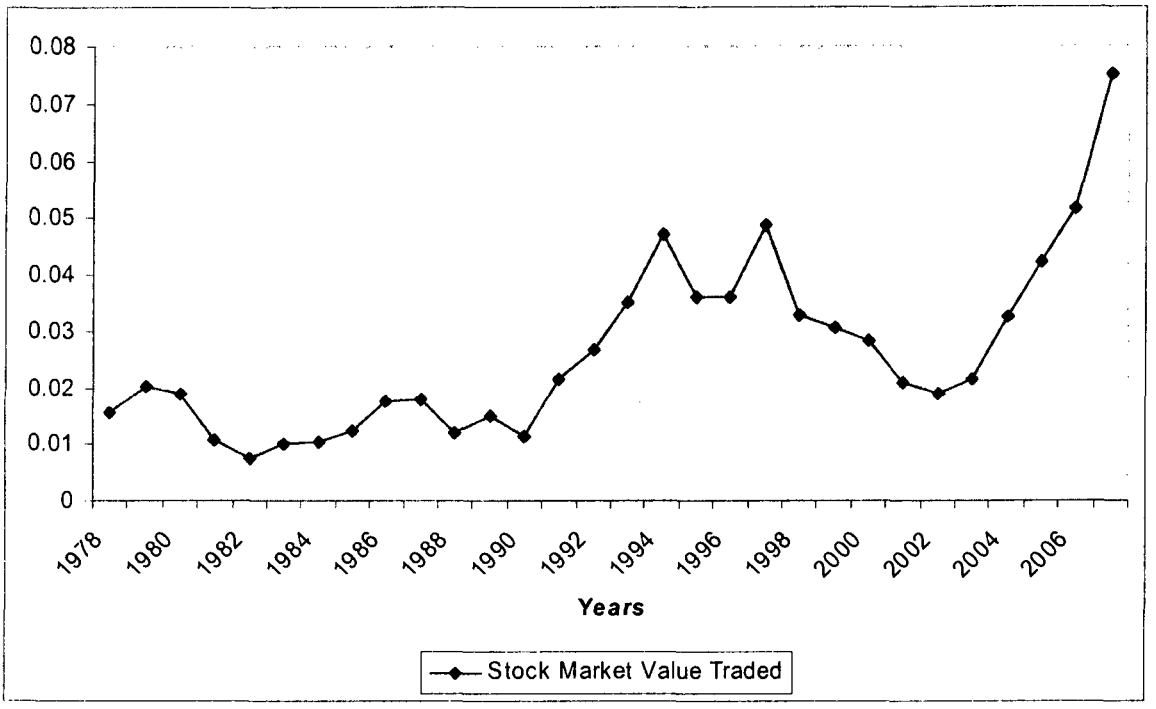
Source: Financial Structure Database (2008).

Figure 1.4 Stock Markets Development, 1978-2007.



Source: Financial Structure Database (2008).

Figure 1.5 Stock Market Value Traded, 1978-2007.



Source: Financial Structure Database (2008).

Table 1.1 Definition of Variables

Variable	Definition	Source
Growth of real per capita GDP	Annual growth of per capita real GDP	WDI
Stock Market Capitalization	Total market value of all listed shares / GDP	FSEDD
Stock Market Turnover Ratio	Value of trades of shares over market capitalization	FSEDD
Stock Market Value Traded	Value of trades of domestic stocks / GDP	FSEDD
Private Credit	Private Credit by Deposit Banks and Other Fin.Inst / GDP	FSEDD
Liquid Liabilities	Liquid Liabilities / GDP	FSEDD
Bank Assets	Deposit Money Bank Assets / GDP	FSEDD
Government Consumption	Government final consumption expenditure / GDP	WDI
Inflation	Percentage change of the Consumer Price Index (CPI)	WDI
Openness	Total amount of exports and imports / GDP	WDI
School Enrollment	Secondary school enrollment rate	WDI

Table 1.2 Descriptive Statistics

	EG	GOV	SCH	OP	IR	BA	LIQ	PC	SMC	VT	TR
Mean	1.14	1.04	1.77	1.63	1.31	0.27	0.29	0.25	0.14	0.02	0.17
Std. Dev.	4.41	0.13	0.15	0.20	0.60	0.14	0.1191	0.14	0.20	0.04	0.21
Observations	420	420	420	420	420	420	420	420	420	420	420

Note: Economic growth is the growth of real per capita GDP (EG). Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares. Government expenditure (GOV) is government consumption as a percentage of GDP. School (SCH) is the secondary school enrollment. Openness (OP) equals the ratio of exports plus imports to GDP. Inflation rate (IR) equals the percentage change in the consumer price index.

Table 1.3 Correlations Between Economic Growth and Financial Development Indicators

	EG	BA	LIQ	PC	SMC	VT	TR
EG	1						
BA	-0.00775	1					
LIQ	0.052127	0.762148	1				
PC	0.036108	0.819273	0.773467	1			
SMC	0.127992	0.29396	0.141617	0.261136	1		
VT	0.082307	0.016546	-0.23233	-0.08207	0.668276	1	
TR	0.076086	-0.19156	-0.40553	-0.31248	0.224919	0.658966	1

Notes: Calculations are done for 14 Latin American countries from 1978-2007. Economic growth is the growth of real per capita GDP (EG). Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares.

Table 1.4 Panel Unit Root Tests

	Levels	First differences
EG	**-1.42**	-3.39***
SMC	**-1.36**	-5.87***
TR	**-2.31**	-9.57***
VT	**-1.90**	-8.42***
PC	**-1.20**	-3.64***
LIQ	**-0.83**	-4.10***
BA	**0.74**	-6.26***
GOV	**1.10**	-4.24***
IR	**-1.73**	-8.62***
OP	**-0.71**	-9.01***
SCH	**0.23**	-9.79***

Note: Panel unit root tests are estimated based on Im, Peseran and Shin (2003) test. The Critical Values are -2.68, -2.53, and -2.4 at 1%, 5%, and 10% statistical levels, respectively. Boldface values denote sampling evidence in favor of unit roots. ***signifies rejection of the unit root hypothesis at the 1% level. Economic growth is the growth of real per capita GDP (EG). Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares. Government expenditure (GOV) is government consumption as a percentage of GDP. School (SCH) is the secondary school enrollment. Openness (OP) equals the ratio of exports plus imports to GDP. Inflation rate (IR) equals the percentage change in the consumer price index.

Table 1.5 Panel Cointegration Tests (Stock Market Data Set: 1978-2007)

	SMC	*VT*	*TR*
Panel v-Statistic	-3.84***	-3.86***	-3.86***
Panel rho-Statistic	-9.24***	-8.37***	-8.84***
Panel PP-Statistic	-34.25***	-36.67***	-36.05***
Panel ADF-Statistic	-19.11***	-19.24***	-17.79***
Group rho-Statistic	-6.88***	-6.21***	-6.62***
Group PP-Statistic	-37.63***	-38.20***	-39.83***
Group ADF-Statistic	-20.81***	-19.33***	-18.69***

Note: The cointegration tests were undertaken with different measures of stock market development, indicated by SMC, VT, and TR. Panel v is a nonparametric variance ratio statistic. Panel rho and panel PP are analogous to the nonparametric Phillips-Perron *p* and *t* statistics respectively. Panel ADF is a parametric statistic based on the augmented Dickey-Fuller ADF statistic. Group rho is analogous to the Phillips-Perron p statistic. Group pp and group ADF are analogous to the Phillips-Perron *t* statistic and the augmented Dickey- Fuller ADF statistic respectively. The models have been specified with deterministic intercept and trend. ***Signifies rejection of null hypothesis of no cointegration at 1% level.

Table 1.6 Panel Cointegration Tests (Banking Sector Data Set: 1978-2007)

	LIQ	*BA*	*PC*
Panel v-Statistic	-2.85***	-2.98***	-3.51***
Panel rho-Statistic	-8.75***	-9.66***	-9.99***
Panel PP-Statistic	-36.05***	-31.51***	-29.15***
Panel ADF-Statistic	-19.20***	-18.62***	-19.84***
Group rho-Statistic	-6.76***	-7.14***	-7.46***
Group PP-Statistic	-37.53***	-34.90***	-32.96***
Group ADF-Statistic	-19.91***	-19.65***	-20.77***

Note: The cointegration tests were undertaken with different measures of banking sector development, indicated by LIQ, BA, and PC. Panel v is a nonparametric variance ratio statistic. Panel rho and panel PP are analogous to the nonparametric Phillips-Perron *p* and *t* statistics respectively. Panel ADF is a parametric statistic based on the augmented Dickey-Fuller ADF statistic. Group rho is analogous to the Phillips-Perron p statistic. Group pp and group ADF are analogous to the Phillips-Perron *t* statistic and the augmented Dickey- Fuller ADF statistic respectively. The models have been specified with deterministic intercept and trend. ***Signifies rejection of null hypothesis of no cointegration at 1% level.

Table 1.7 Panel Regression Results: The Impact of Financial Development on Economic Growth 1978–2007.

Independent Variables	Benchmark	1	2	3	4	5	6
GOV	-0.114	-0.112	-0.113	-0.111	-0.095	-0.092	-0.099
	(-6.04)***	(-5.76)***	(-5.87)***	(-5.41)***	(-4.03)***	(-3.89)***	(-3.97)***
SCH	0.03	0.033	0.027	0.034	0.036	0.028	0.057
	(3.61)**	(3.88)**	(2.82)**	(4.09)**	(3.84)**	(0.86)	(1.67)
OP	0.032	0.031	0.029	0.028	0.018	0.021	0.018
	(5.50)***	(5.43)***	(4.76)***	(4.69)***	(1.80)*	(2.07)**	(5.75)**
IR	-0.076	-0.084	-0.047	-0.040	-0.084	-0.095	-0.078
	(-4.54)***	(-3.29)***	(-3.05)***	(-2.80)***	(-3.29)***	(-2.89)***	(-4.76)***
BA		-0.36	-1.43	-0.79	-1.27	-1.25	-0.95
		(-0.24)	(-0.85)	(-0.48)	(-0.74)	(-0.73)	(-0.50)
LIQ			0.065	0.021	0.014	0.019	0.018
			(4.19)**	(4.87)**	(3.21)**	(4.24)**	(3.93)**
PC				0.074	0.062	0.089	0.058
				(2.39)**	(1.92)*	(3.32)***	(5.84)***
SMC					0.025	0.025	0.011
					(6.10)**	(5.31)**	(2.96)**
VT						0.010	0.009
						(4.34)**	(4.01)**
TR							0.012
							(3.22)**
Adj R-squared	0.28	0.29	0.35	0.31	0.31	0.31	0.35
Durbin-Watson	2.06	2.22	1.82	2.04	2.01	2.15	2.23

Notes: All models are estimated using a fixed effects model. The dependent variable is the growth of real per capita GDP (EG). Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand, and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares. Government expenditure (GOV) is government consumption as a percentage of GDP. School (SCH) is the secondary school enrollment. Openness (OP) equals the ratio of exports plus imports to GDP. Inflation rate (IR) equals the percentage change in the consumer price index. Durbin-Waston is the test statistics for serial correlation under the null hypothesis of no serial correlation. Values in parentheses are t-statistics. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 1.8 Impact of Financial Development on Economic Growth 1978–2007.

Independent Variables	Benchmark	1	2	3	4	5	6
GOV	-0.080	-0.09	-0.132	-0.128	-0.108	-0.132	-0.117
	(-2.4)**	(-1.75)**	(-3.52)**	(-3.82)**	(-3.18)**	(-3.54)**	(-3.64)**
SCH	0.036	0.033	0.035	0.046	0.043	0.035	0.038
	(2.52)**	(2.88)**	(2.14)**	(2.97)**	(2.81)**	(2.11)**	(2.61)**
OP	0.047	0.040	0.098	0.136	0.102	0.085	0.098
	(3.05)***	(2.80)***	(3.53)***	(3.54)***	(3.53)***	(3.33)***	(3.53)***
IR	-0.067	-0.051	-0.073	-0.098	-0.085	-0.078	-0.086
	(-2.30)**	(-1.65)*	(-2.52)**	(-3.60)**	(-2.95)**	(-2.67)**	(-3.09)**
BA		-0.153	-1.256	-0.845	-1.342	-1.323	-0.987
		(-1.34)	(-0.76)	(-0.52)	(-0.94)	(-0.74)	(-0.56)
LIQ			0.030	0.028	0.034	0.026	0.033
			(3.61)**	(3.27)**	(4.09)**	(2.73)**	(3.88)**
PC				0.076	0.131	0.124	0.118
				(2.26)**	(3.80)**	(3.97)**	(3.25)**
SMC					0.018	0.016	0.006
					(4.89)**	(4.04)**	(1.80)*
VT						0.080	0.009
						(3.53)**	(3.04)**
TR							0.018
							(5.75)**
Adj R-squared	0.13	0.15	0.12	0.12	0.13	0.12	0.15
Durbin-Watson	2.13	1.98	1.78	2.03	2.00	1.90	2.11
Hausman test	12.66**	15.74**	8.140	12.27**	7.820	11.76**	13.47**
p-value	(0.03)	(0.01)	(0.15)	(0.03)	(0.17)	(0.04)	(0.02)

Notes: Notes: All models are estimated using a fixed effects model. The dependent variable is the growth of real per capita GDP (EG). Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand, and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares. Government expenditure (GOV) is government consumption as a percentage of GDP. School (SCH) is the secondary school enrollment. Openness (OP) equals the ratio of exports plus imports to GDP. Inflation rate (IR) equals the percentage change in the consumer price index. Durbin-Waston is the test statistics for serial correlation under the null hypothesis of no serial correlation. Hausman test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. If correlated (the null hypothesis is rejected), a random effect model produces biased estimators, thus, a fixed effect model is preferred. Values in parentheses are t-statistics. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 1.9 Panel Granger Causality Tests (Banking Development Indicators)

Null Hypothesis	**Short run** *F*-statistics (*p*-value)	**Long run** ECT_{t-1} (*t*-statistics)
BA does not Granger cause EG	1.19	-0.06
	(0.31)	(-0.67)
EG does not Granger cause BA	3.09*	-0.60***
	(0.06)	(-4.52)
LIQ does not Granger cause EG	2.45	-0.31
	(0.10)	(-1.57)
EG does not Granger cause LIQ	4.54**	-0.25*
	(0.02)	(-1.91)
PC does not Granger cause EG	2.07*	-0.68***
	(0.08)	(-2.88)
EG does not Granger cause PC	4.24***	-0.66***
	(0.00)	(-3.34)

Note: In the short-run, dynamics asterisks indicate rejection of the $H_0 : \alpha_{2i}, \beta_{2i} = 0$ that there is short-run non-causal relationship between the two variables. In the long-run, dynamics asterisks indicate rejection of the $H_0 : \alpha_3$, $\beta_3 = 0$ that there is long-run non-causal relationship between the two variables. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 1.10 Panel Granger Causality Tests (Stock Market Development Indicators)

Null Hypothesis	**Short run** *F*-statistics (*p*-value)	**Long run** ECT_{t-1} (*t*-statistics)
SMC does not Granger cause EG	3.41**	-0.19*
	(0.00)	(-2.02)
EG does not Granger cause SMC	2.44*	-0.35*
	(0.06)	(-1.80)
VT does not Granger cause EG	4.26***	-0.14***
	(0.00)	(-2.90)
EG does not Granger cause VT	2.49***	-0.38***
	(0.00)	(-4.42)
TR does not Granger cause EG	4.87***	-0.37***
	(0.00)	(-5.18)
EG does not Granger cause TR	3.41**	-0.46*
	(0.00)	(-1.81)

Note: In the short-run, dynamics asterisks indicate rejection of the $H_0 : \alpha_{2i}, \beta_{2i} = 0$ that there is short-run non-causal relationship between the two variables. In the long-run, dynamics asterisks indicate rejection of the $H_0 : \alpha_3$, $\beta_3 = 0$ that there is long-run non-causal relationship between the two variables. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

CHAPTER II

DOMESTIC AND INTERNATIONAL DETERMINANTS OF FOREIGN DIRECT INVESTMENT IN LATIN AMERICA

2.1 Introduction

Foreign direct investment (FDI) can be defined as an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor. The role of FDI has been widely recognized as a growth-enhancing factor in developing countries. FDI can promote economic growth in the host country through many different channels by providing incentives to competition, innovation, and economic development.

Furthermore, FDI often leads to transfer of managerial skills and technological knowledge. Technological advances implemented by multinationals may spill over to the rest of the economy, giving rise to beneficial externalities and encouraging domestic private activity (Borensztein et al., 1998). UNCTAD (2006) asserts that FDI has the potential to increase local market competition, raise productivity, increase employment opportunities and improve working conditions, increase global market access through the interaction of multinational firms with domestic suppliers and customers, and enhance living and environmental standards, all of which should ultimately contribute to the long-term economic development of the world's developing countries.[1]

[1] See De Mello (1997) for a survey of the literature on FDI and economic growth. For recent survey on FDI and technology spillover to host countries, see Pack and Saggi (1997) and Blomstrom and Kokko (1998).

Recognizing that FDI can contribute to economic development, developing countries have generally erased restrictions on the inflow of foreign capital since the early 1980s. The world economy has witnessed a surge in FDI since the early 1980s as results of close integration of the world economy and liberalization of the economies in many developing countries, with an increase in the annual inflow of FDI from approximately $60 billion in 1985 to $315 billion in 1995 (UNCTAD, 2002).[1] Many developing countries have policies aimed at creating stronger incentives for foreign investors who are potentially capable of providing FDI flows. Moreover, FDI inflows as a percentage of gross domestic capital formation in the world rose from 2.3% in 1980 to 11.1% in 1998.

To a certain extent, these liberalization moves have contributed to the expansion of FDI in developing countries. Historically, FDI flows in developing countries followed an uneven path at the outset of the 1980s and then started rising in the subsequent periods. The annual FDI inflows to developing countries increased from $35 billion in 1990 to about $283 billion in 2004 (UNCTAD, 2006). The volume of FDI inflows varied significantly across countries in 2004. Specifically, it ranged from a maximum of 31% of the total FDI received by China, to 13% received by Brazil, and 3% received by India and Venezuela.

Similar to other developing countries, FDI in Latin America is widely considered as an important vehicle for economic growth. Latin American countries have introduced a wide range of incentives to increase FDI as a source of capital, technology, managerial skills, and market access needed for sustained economic development. Since the 1980s, most countries in Latin America implemented significant reforms to attract more FDI, including economic reforms,

[1] According to the World Investment Report of the UNCTAD (2002), 100 countries had made 208 changes in legislation governing FDI between 1991 and 1996. Of these changes, 194 (93%) involved liberalizing a country's foreign investment regulations to make it easier for foreign companies to enter the markets.

privatization, deregulation of economic activity, and the adoption of bilateral investment treaties (Porzecanski and Gallagher, 2007).

During the late 1990s, Latin America experienced strong growth among the distribution of world FDI inflows between developing countries. Latin American countries received a great deal of FDI, with a record $104 billion in 1999. However, there has been a persistent decline in FDI inflows in recent years, dropping from $98 billion in 2000 to $46 billion in 2003. The ratio of FDI inflows to GDP has also declined since the early 2000s (Figure 2.1). In addition, FDI inflows have been largely confined to a small group of countries, primarily Brazil, Mexico, Argentina, Chile, and Venezuela.

While FDI played and still can play a crucial role in the economic development process in Latin American countries, the disappointing trend of FDI inflows in recent years has become a major concern of researchers and policymakers. Unfortunately, there has been little attention paid to the understanding of what determines FDI in Latin America. Hence, an important policy question is what key forces stimulate FDI in Latin America. An in-depth analysis of the factors determining FDI inflows is needed, not only to understand the reasons why some countries are more successful in attracting FDI, but also to provide policymakers with guidelines on how to attract more FDI inflows and hence economic growth.

This chapter examines the domestic and international determinants of FDI in 14 Latin American countries from 1978 to 2007. Specifically, what factors led to the upsurge in FDI into the region? Why are some countries more successful than others in attracting FDI? Do those factors that affect FDI in developing countries affect countries in Latin America differently? Do countries with well-developed financial markets attract more FDI inflows? Are FDI flows to

developing countries determined by domestic and/or international factors? This chapter investigates above questions on Latin American experience.

Although there is sizeable research on the determinants of FDI, empirical studies on FDI in developing countries, such as those in Latin America, are relatively scarce. Previous empirical studies on the determinants of FDI in Latin America relied more on collection of survey data using managerial perceptions for measuring the explanatory factors (De Gregorio, 1992; Trevino et al., 2002; and Bengoa and Sanchez-Robles; 2003). However, there exists little empirical work drawing on econometric approaches using secondary data. Given the rapid growth of FDI and its increasing importance as a growth-enhancing factor, it is critical for both the multinational enterprises (MNEs) and policymakers to have a understanding of the domestic and international determinants of FDI.

FDI has played a critical role in the modernization of economies, yet the factors explaining why global firms enter the region remain the subject of debate. Understanding the determining factors of FDI inflows in Latin America and unveiling the reasons why some countries are more successful in attracting FDI may provide policymakers with useful guidance for future policy prescription. Therefore, it is important to identify the determinants of FDI in Latin America for several reasons. First, Latin America is a useful region for our study because the region received a significant portion of FDI flows to developing countries during the 1990s. Second, these countries exhibit positive attitudes and changes of the host governments toward FDI in terms of improving their macroeconomic conditions and liberalizing foreign investment regulations to make it easier for foreign companies to enter the markets. Third, since FDI contributes to the economic development process, it is important to know the factors that affect FDI flows to the region. Fourth, to the extent that FDI to Latin America is driven by different

factors, policies that have been successful in other regions may not be equally successful in Latin America. Indeed, the results may explain the difference in the FDI performance among countries and explain why some countries in the region are more successful in attracting FDI.

FDI has assumed increasing importance over time. However, its determinants have become a prime concern for policymakers and a trendy debatable topic for researchers (Chakrabarti, 2001 and Moosa, 2002). Although a number of theories and literature have been developed to identify the determinants of FDI inflows, theories and empirical literature are not only extensive but controversial as well. Results in the literature lack a consensus over the conclusions reached by the wide range of empirical studies in the sense that there is no widely accepted set of explanatory variables that can be regarded as the "true" determinants of FDI (Chakrabarti, 2001). What complicates matters is that the underlying theory does not provide a definite prediction for the importance of the potential determinants of FDI (statistical significance) and the direction of the impact of a particular variable on FDI.

This chapter contributes to the existing literature in three distinct ways. First, this study provides an in-depth analysis of the determinants of FDI in Latin America using a large array of variables. Such analysis of the factors determining FDI inflows is important to grasp a better understanding of the FDI determinants in Latin America, predict future patterns of FDI into the region and provide policymakers with guidelines on how to attract more FDI inflows, and thus promote long-term economic development. The research focus of this chapter is therefore relevant not only for Latin America, but also for developing countries in general.

Second, it examines the direct link between FDI and financial sector development. The emerging literature on FDI now argues that the positive impact of FDI on economic growth may depend on local conditions and FDI spillovers (competition, new technologies and managerial

skills) when there are sufficient absorptive capacities in the host country (Alfaro et al., 2004). Some studies argue that the adoption of new technologies and management skills requires the availability of skilled workers which can significantly boost the international competitiveness of a host country. Therefore, technological spillover is possible only when there is a certain level of development human capital (Root and Ahmed, 1979; Schneider and Frey, 1985; Lucas, 1990; and Elmawazini et al., 2005).

The new growth literature on the growth effects of FDI shows that there may be several absorptive capacities of developing countries needed to capture the benefits associated with FDI. Most importantly among them is financial development. Although there is broad consensus that FDI has a positive impact on economic growth (Aitken et al., 1997; Borensztein et al., 1998; Zhang, 2001; and Bengoa and Sanchez-Robles, 2003), research is lacking on the relation between FDI and financial development. Furthermore, the empirical literature, drawing on endogenous growth theory, suggests that the level of financial sector development may influence FDI and its impact on the diffusion of technology in the host country, thereby increasing the rate of economic growth. Little attention, however, has been devoted to confirm the link between financial development and FDI in Latin America.

The development of the financial system of the recipient country is an important precondition for FDI to have a positive impact on economic growth. The financial system enhances the efficient allocation of resources and it improves the absorptive capacity of a recipient country in enjoying the benefits embodied in FDI inflows (Levine 1997). Therefore, it is expected that countries with higher levels of financial development should be more attractive for FDI, thus enhancing economic growth. In this chapter, we examine if a well functioning financial system affects the FDI flows in Latin American countries. As far as Latin America is

concerned, earlier studies (De Gregorio, 1992; Trevino et al., 2002; and Bengoa and Sanchez-Robles, 2003) have not included the financial sector development indicators in examining the potentials determinants of FDI, either in general or for the particular case of Latin America.

Finally, this study focus on both domestic and international determinants of FDI flows. There are many studies on the domestic determinants of FDI inflows. These studies have identified a number of variables, such as market size, macroeconomic stability, openness to international trade, financial liberalization, quality of infrastructure, human capital, etc. as key determinants of FDI. However, international factors, such as international interest rates, play an important role in determining FDI flows to developing countries. The role of international factors on determining FDI flows to developing countries has been confirmed by a number of studies (Chuhan et al., 1993; Calvo et al., 1996; Fernández-Arias, 1996; and the World Bank, 1997). Unfortunately, these studies don not make a clear distinction whether FDI flows to developing countries are being determined by domestic or international factors.

The remainder of this chapter is organized as follows. Section 2.2 provides an overview of the world and Latin America FDI. Section 2.3 presents a general theoretical background on extant FDI theories. Section 2.4 describes the potential domestic and international determinants of FDI. Section 2.5 describes the data used in the empirical analysis as well as the data sources. Section 2.6 presents the methodology of the study and section 2.7 summarizes the major findings and offers some policy implications.

2.2 An Overview of FDI Inflows

2.2.1 Global Trends in the FDI Inflows

FDI flows in the world economy have witnessed a substantial increase in the early 1990s, triggered by the removal of barriers on capital flows, the formation of regional free trade

arrangements, and close integration of the world economy. Table 2.1 shows that total FDI inflows increased by more than ninefold between 1990 and 2007, with inflows to developing countries experiencing the largest increase between 1991 and 2000, mostly resulting from cross-border mergers and acquisitions.

FDI inflows declined in 2001 by 16.45% to $214 billion because of a decline in the value and number of cross-border mergers and acquisitions, which is related to the slowdown in the world economy (UNCTAD, 2008). Sauvant (2005) reports the decline in FDI inflows in 2001 to the terrorist events of 11 September that resulted in the higher level of uncertainty, in particular due to increased political risk that induced some companies to put planned investments on hold until they gained a better comprehension of the longer-term impact of the events in the United States.

Conversely, the significant increase in FDI inflows between 2004 and 2007- by about 57% and 21%, respectively – were partly driven by stronger growth in the world economy and higher commodity prices. As to the Latin American countries, one can detect a mostly rising trend in FDI inflows, but the pattern is characterized by sharp fluctuations in FDI growth rates. Following four years of continuous decline, FDI flows to Latin America registered a significant upsurge in 2004, reaching $94 billion, 105% above the level attained in 2003. Several factors contributed to the unprecedented increase in FDI inflows to Latin American countries, among which were the increase in oil prices, along with stable macroeconomic conditions in several countries, coupled with economic reforms and improvements in business climate, and the privatization of state-owned enterprises in certain countries.

Figure 2.2 reinforced the results in Table 2.1 that illustrates the distribution of FDI inflows between developed and developing countries. It is evident from Figure 2.2 that

developing countries faced difficulties in attracting FDI as compared to developed countries. The inflows of FDI into developing countries grew by an average of 23% between 1990 and 2000, but declined by 16% to $214 billion in 2001. All of the major developed countries experienced a downturn in FDI inflows in 2002 and 2003, with inflows of $443 billion and $361 billion respectively.

2.2.2 FDI Inflows in Latin America

Since the early 1980s, nations in Latin America have been implementing a cluster of deep reforms to their economies. The reforms include policies intended to promote economic development by opening national economies to global market forces. Latin American countries have lifted controls on FDI, reduced or eliminated trade barriers and other protectionist measures, and privatized state-owned enterprises. Generally, Latin America has experienced three types of market-oriented reforms: microeconomic, macroeconomic, and institutional (Zhang, 2001).

Governments throughout Latin America have lowered trade barriers, reduced price controls, and relaxed capital account restrictions on companies' market entry and exit. Macroeconomic reforms, on the other hand, have mainly reduced inflation and stabilized exchange rates, while institutional reforms have changed the states' role from producer to facilitator, so that the private sector is encouraged and empowered to make investments (Trevino et al., 2002).

As is true for the world as a whole, Latin American countries' attitude toward FDI has become more positive since the 1980s. Figure 2.3 shows the FDI inflows into Africa, Asia, and Latin America from 1980 to 2007. The amount of FDI received varied greatly from region to region and from sub-period to sub-period. Latin America and Asia absorbed almost 90% of the

total FDI to developing countries in 1980, when most developing countries in Latin America and Asia started looking at FDI as a source of capital. They implemented many changes in legislation governing FDI by liberalizing their FDI regimes and strengthening standards of treatment of foreign investors in order to make it easier for foreign companies to enter the markets.

The 1990s was a period of unprecedented increases in the level of FDI in the world economy, reaching $1.6 trillion in the year 2000. Asia is viewed as the most attractive region for FDI. During the 1990s, FDI inflows into Asia have increased, on average, to $707 billion compared to $445 billion in Latin America. Although the amount of FDI flowing to developing countries increased remarkably in the 1990s, almost 80% of it flowed to just 10 countries. Five of those countries (Brazil, Mexico, Argentina, Chile, Colombia, and Venezuela) are in Latin America (UNCTAD, 2008). These six economies, together with Peru, received 97% of flows going to Latin America Integration Association (LAIA)[2] countries, which accounts for 90% of the total. The countries of Central America and the Caribbean, for their part, received among them approximately 10% of the total regional FDI inflows.

In 2000, Asia experienced an increase in FDI inflows, reaching $148 billion, about 33% above the level attained in 1999, while FDI inflows to Africa and Latin America actually declined by approximately 20% and 6%, respectively. FDI flows to Asia declined 23% in 2001 to $113 billion, down from $148 billion in 2000. Much of the downturn was due to a 60% drop in flows to Hong Kong, China, which had recorded massive inflows ($62 billion) in 2000 (UNCTAD, 2002). Similarly, FDI into Latin America in 2001 declined for the second subsequent year by

[2] LAIA members are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

about 17%. While there were wide variations among countries, the poor performance of some large economies dominated the regional picture.

FDI inflows to Asia reached $170 billion in 2004, a 32% increase over 2003, which can be attributed to the continued high economic growth in the region as it became more attractive to market-seeking FDI. Furthermore, it has become a hot spot for transnational corporation investments in financial services and high technology industries (UNCTAD, 2005). In Latin America, FDI inflows rose by 52% in 2004 to $94 billion, after four consecutive years of decline because of the economic stagnation in the region from 1999 through 2003. Africa received high record of FDI inflows in 2005 of $29 billion led by investment in natural resources and made easier by liberal FDI policies. By contrast, FDI inflows to Latin America declined by 19% in 2005. The decline was particularly pronounced in Latin America, where Greenfield FDI projects fell by about 30% in 2005 (UNCTAD, 2006).

There is no question that the region experienced an unprecedented amount of FDI since the reform period began in the 1980s. For some countries, it has been truly impressive. Figure 2.4 exhibits annual FDI inflows into Latin America and the top three countries in Latin America (Brazil, Mexico, and Argentina) that have received the highest amount of FDI during the period 1980 to 2007. In the 1990s, Latin American countries experienced a large increase in FDI inflows, reaching a record $104 billion in 1999. Throughout the 1990s, Brazil, Mexico, and Argentina were the largest recipients of FDI inflows, with average inflows of $10 billion, $9 billion, and $7 billion, respectively. The FDI boom in the late 1990s was driven mainly by economic recovery in the region, stronger growth in the world economy, and the privatization process in the region.

By the peak of 2000, FDI to the region had increased by a factor of six in real terms compared to 1980s. However, FDI inflows have recently declined in Latin America, between 2000 and 2003, by 58% and 20%, respectively. With the latest decline in 2003, which coincides with the Argentinean crisis in 2002, Latin America turned in the worst performance of any world region. In 2004, FDI inflows to Latin America rose by 105% in 2004, to $ 94 billion, after a period of economic stagnation in the region from 1999 through 2003. However, the increase was almost entirely attributable to investment in the region's offshore financial centers (UNCTAD, 2005).

Returning to the distribution of FDI inflows within the region, Figure 2.4 shows the increasing importance of Brazil as a recipient of FDI inflows during the 1990s. In 1996, Brazil took over from Mexico as the main recipient of FDI in Latin America. In 1997, Brazil received 26% of FDI flows to the region, followed by Argentina and Mexico, with 17% and 12%, respectively. However, the annual FDI inflows to Latin America have varied across countries of Latin America. For example, there were notable declines in Bolivia and Venezuela, mainly linked to uncertainty regarding legislation related to oil and gas production (Maniam, 2007). With the exception of the three major economies, Latin America's capacity to attract investments proves to be marginal as compared to Asian and other developed countries.

Table 2.2 lists the top 13 countries in Latin America that have received the highest amount of FDI inflows during the period of 1990 to 2007. The pattern of FDI inflows has been quite erratic, with Brazil, Mexico, Argentina, Chile, Colombia, and Venezuela receiving the bulk of FDI and other countries in the region still lagging behind.

2.3 Theoretical Background on FDI

The related theoretical literature can be broadly divided in two branches: one examines the impact of FDI in economic growth, and a second focuses on the determinants of FDI. The first branch of literature on FDI attempts to investigate the precise nature of the relationship between FDI and economic growth. There is a considerable body of literature emphasizing the positive impact of FDI on economic growth. FDI helps in increasing capital formation and economic growth by introducing innovative technologies such as new production techniques, managerial skills, ideas, and a variety of new capital goods (Levine, 1997).

Although a great deal of attention has been devoted to the impact of FDI on the host country's economic growth, the linkage between FDI and economic growth has been a topic for intense debate. According to the modernization hypothesis, FDI has supportive effects on the economic growth because: (i) FDI may enhance the flow of external capital and create more job opportunities, (ii) FDI may promote manufacturing exports, (iii) FDI may bring resources into a host country such as management skills, and (iv) FDI may result in technology transfers and spillover effects (Aitken et al., 1997; Borensztein et al., 1998; Bengoa and Sanchez-Robles, 2003; Li and Liu, 2005).

Contrary to the modernization hypothesis is the dependency hypothesis, which states that while the flows of FDI might have a short-term positive impact on economic growth, the long-term impact of FDI on economic growth might be deleterious. As FDI accumulates and foreign projects take hold, there will be a negative relationship between FDI and economic growth, given that FDI might actually lower domestic savings and investment and widen the income gap in the host country (Bornschier, 1980; Zhang, 2001).

Recent literature on the growth effects of FDI opines that developing countries need to have reached a certain level of development in technology, human capital, and infrastructure before being able to capture the benefits associated with FDI. Thus, in order to investigate the effects of FDI on growth, various spillover effects must therefore be specified and estimated in an appropriate manner (Saggi, 2000). Several studies point to the relevance of supportive host-country conditions, which are often lacking in developing countries. Li and Liu (2005) investigate whether FDI affects economic growth based on a panel of data for 84 countries from 1970 to 1999. They find the interaction of FDI with human capital to have a strong positive effect on economic growth in developing countries, while that of FDI with the technology gap has a significant negative impact. Bengoa and Sanchez-Robles (2003) explore the links between economic freedom, FDI, and economic growth in their panel data analysis for a sample of 18 Latin American countries over the period 1970–1999. Results show that FDI is positively correlated with economic growth in the host countries, but they argue that the host country requires an adequate human capital, economic stability, and liberalized markets to benefit from long-term capital flows.

Furthermore, Borensztein et al., (1998) address the technology-gap question by using a data set of FDI flows from industrialized countries to 69 developing countries. Findings show that FDI is an important vehicle for the transfer of technology, contributing relatively more to growth than domestic investment. In particular, they argue that FDI raises growth only in those countries where the labor force has achieved a minimum threshold of education. De Mello (1997) argues that the larger the technological gap between the host and the home country of FDI, the smaller the impact FDI will have on economic growth. Likewise, Xu (2000), using U.S. survey data on MNEs, argues that in order for developing countries to benefit from the

technology transfer of U.S. MNEs, a country needs to reach a certain level of human capital development threshold, and that most developing countries do not meet this standard. Kinoshita (1998), Kumar (2001), and Globerman and Shapiro (2002) investigate infrastructure influence on both economic growth and FDI inflows. On average, for most countries they find that economic growth and FDI respond positively to infrastructure availability.

The second branch of literature on FDI attempts to shed light on the determinants of FDI. It is well known that the growth of multinational enterprise (MNE) activity in the form of FDI has grown at a faster rate than most other international transactions, particularly trade flows between countries (Tuman and Emmert, 1999). The key question necessary to explain FDI is "what is the fundamental motivation for a firm to go abroad?" A number of economic models have been developed to explain the FDI decisions made by MNE. According to Shatz and Venables (2000), FDI flow to developing countries is often based on two broad goals. The first policy is to lower the cost by taking advantage of a lower factor-price and a lower assembly cost. In this case, FDI will not directly be affected by the size of the host country market. The second policy is where multinational firms try to increase the market size for their products (horizontal FDI or market seeking) by developing a local operation in the host country to serve its market or to serve a group of countries. In this case, FDI comes in as a replacement for exports when these markets are large.

A number of theories have been developed to explain the level and the pattern of FDI or MNE activity. Theories of FDI determinants can be classified into two broad categories: the micro-level theories and the macro-level ones. The micro level theories focus on the circumstances that lead firms to produce abroad whereas the macro-level theories attempt to find out what determines the level of FDI received by a country. Although there has been

considerable theoretical work on foreign direct investment (Hymer, 1960; Caves, 1982; Buckley and Casson, 1976), there is no agreed model providing the basis for empirical work. Rather, Dunning's (1988) OLI paradigm has provided a taxonomic framework for most estimating equations.

Dunning (1988) proposes that FDI is a function of ownership advantages (O) for firms to operate oversees, such as intangible assets, locational advantages to investment in the host rather than the donor country (L), and the benefits of internalization (I). The multinational firm must have both an ownership advantage and an internalization advantage, while the foreign market must offer a locational advantage. The ownership advantage or firm-specific advantage stems from the firm's ownership of intangible assets, such as technology, patents, and skilled management. The advantage either gives rise to higher revenues and/or lower costs that can offset the costs of operating at a distance in an abroad location.

Multinational firms also need an internalization advantage in the sense that the firm prefers internalizing its ownership advantages rather than externalizing them. This means that the firm is possessing internalization advantages if it is more profitable to exploit its ownership advantages itself in another country rather than to sell or license them to foreign firms. Finally, the firm enjoying an ownership advantage and an internalization incentive will produce abroad only if there are abroad location advantages such as factor prices, market size, and governmental regulations with respect to trade, exchange rates, capital flows, and institutional and political stability. The locational aspect of Dunning's theory has been used to explain inter-country differences in the level of FDI made by MNCs in various countries (Loree and Guisinger, 1995). While both ownership and internalization advantages are firm-specific, location advantages are host country-specific.

2.4 Potential Determinants of FDI Inflows

Building on the theoretical background review in the previous section, it is not at all surprising that a vast empirical literature has developed around the issue of determining FDI flows to developing countries (Agarwal, 1980; Gastanaga et. al., 1998; Chakrabarti, 2001; and Moosa, 2002). In this section, we will classify a set of domestic and international determinants of FDI. Domestic variables, consequently, are economic conditions and government policies of the host country, which open new and profitable investment opportunities in the domestic economy and improve country creditworthiness. Under this interpretation, if the host domestic policies are maintained, FDI will be sustained. We classify these variables in five broad categories: market potential, trade and openness, human capital public infrastructure, and financial development indicators.

International variables, on the other hand, refer to economic conditions that are outside of the host country (FDI-importing) and take place in countries that are capital suppliers (industrial countries). Growth rates, industrial production indexes, and interest rates in developed countries are good proxies for these types of variables.[3] Hence, these variables should be related to business cycles in developed countries (World Bank, 1997). While the international factors determine the totality of available resources, the domestic factors determine its allocation between countries.

2.4.1 Domestic Determinants of FDI

Generally, multinational corporations do not make investment decisions autonomously, nor are their investments wholly dependent on the planning and skills of corporate managers.

[3] See Levy-Yeyati et. al. (2002).

Foreign subsidiaries can be affected by the economic, institutional, political, and cultural factors of host countries, and the evolution of their investments is intimately linked to these factors (Chakrabarti, 2001).

The vital role played by FDI in the growth of developing countries has created considerable research interests. Several studies have identified a number of variables, such as market size, macroeconomic stability, openness to international trade, financial liberalization, quality of infrastructure, human capital, etc. as key determinants of FDI. However, the empirical results still fail to provide a satisfactory explanation to the relative importance and the direction of some potential determinants of FDI.

Table 2.3 presents the observed effect of seven potential determinants of FDI that have been widely used in the literature. Clearly, some of the results are conflicting, in particular for market size and labor cost. The lack of a consensus over the conclusions reached by empirical studies can be explained, to some extent, in terms of the wide differences in variables-selection, sample-selection, methodologies, and analytical tools (Chakrabarti, 2001). With this void in the literature, it is not surprising that the empirical evidence resulted in a diverse literature, where most investigators have encompassed some of these variables in formal hypotheses or theories of FDI, whereas others are suggested to establish a statistically significant relationship between FDI and a particular variable or a set of variables (Mossa and Cardak, 2006).[4] Therefore, there is a big question mark on the reliability of the results of existing studies, particularly the robustness of the results to model specification (the variables included in and excluded from the underlying regression equation) and other factors.

[4] Chakrabarti (2001) states that "while many potential determining variables may be found to be statistically significant in cross-sectional studies, the estimated relationships typically depend on which variables are included in the regression equation."

Market Potential

Several market characteristics have been found to influence FDI inflows. Market size has been the most important determinant of "market seeking" FDI, where the primary objective of MNCs is to serve the domestic market. The market-size hypothesis suggests that a large market is necessary for efficient utilization of resources and exploitation of economies of scale needed for production. The general implication is that developing countries with larger market size should provide higher sales and profits for MNCs and therefore will attract more FDI.

This impact of market size of FDI inflows has been tested in many empirical studies (Root and Ahmed, 1979; Kravis and Lipsey, 1982; Schneider and Frey, 1985; Wheeler and Mody, 1992; and Billington, 1999). However, the empirical evidence from studies comparing FDI flows to different emerging economies has been mixed (Trevino et al., 2002). On the one hand, Root and Ahmed (1979) and Tuman and Emmert (1999) used gross domestic product as a proxy for market size and found it to be insignificant in explaining FDI in Latin American countries. Kravis and Lipsey (1982) examine the common factors that influence the location of overseas manufacturing production by U.S. firms. They find the market size of the host country to be the most attractive FDI flows. Other studies, such as Daniels and Quigley (1980), Schneider and Frey (1985), Wheeler and Mody (1992), and Tsai (1994), have empirically confirmed the positive impact of market size on FDI for developing countries. Conversely, Edwards (1990) finds the effects to be negative, while Loree and Guisinger (1995) and Wei (2000) find the effects to be statistically insignificant.

Inflation rate is another macroeconomic stability factor of concern for foreign investors. The potential attractiveness of a market can also be determined by inflation as it indicates internal economic instability and inability of the host government to restrict money supply and

to balance the budget. For these reasons, companies will tend to avoid making investments in countries with high inflation. Trevino, et al (2002) examine the relationship between market reform and foreign direct investment in seven Latin American countries over the period of 1988-1992. The results indicate that when inflation is high, foreign investors may observe problems in making pricing decisions and reduce export sales from the country. Schneider and Frey (1985) find a negative relationship between inflation and FDI. Further, Bouoiyour (2003) found the same relationship.

Many empirical studies on the determinants of FDI inflows argue that government expenditures can affect FDI flows. However, the empirical evidence is mixed regarding the impact of government expenditures on FDI. High levels of government expenditures on nonproductive activities can deter FDI flows by crowding out private investment (including FDI) in critical sectors of the economy (Easterly and Rebelo, 1993; Bruno and Easterly, 1998). When government expenditures are directed to productive activities, such as spending on education and infrastructure, it scales up the productivity of economies making them more attractive to FDI flows (Tang, 2006; and Aslan, 2008).

Trade Openness and Current Account Balance

Trade orientation is another area to consider that might be an important precursor to FDI (Edwards, 1990). Foreign investors typically have favorable impressions of countries that are open to international trade. This is particularly important for companies that seek to shift labor-intensive assembly to their foreign subsidiaries, and then export finished products back to the parent firm (Akhter, 1993; Tuman and Emmert, 2004).

The empirical literature has ascertained that open economies attract more FDI flows than heavily protected economies. Kravis and Lipsey (1982) examine the location of overseas production and production for export by U.S. multinational firms. They demonstrate that openness is indicative of the ease of access of the host country to world markets for material inputs in which multinational firms can obtain the raw materials at a low price. Tuman and Emmert (2004) find openness to trade to have a positive and statistically significant coefficient, which suggests that openness is an important factor for firms that seek to use the recipient country as a base for intra-regional production and trade with the U.S. Moreover, Taylor (2000) investigates the relationship between FDI and government openness policies on both trade openness and investment. The empirical evidence shows that countries with more open policies attract larger amounts of FDI than the countries with less open policies.

Another set of variables that should be considered for FDI is the current account balance of the host country. It reflects a broader array of indicators of macroeconomic stability, commitments to liberalization, and market competitiveness. Chakrabarti (2001) asserts that current account deficit has often been referred to as being an important determinant of foreign investment. However, no consensus has been reached among researchers regarding the relationship between the two variables. Some researchers claim that there is a significant positive relationship between current account deficit and FDI inflow (Cluem, 1988; Trevino et al., 2002), while others argue that there is a negative relationship between the two variables (Schneider and Frey, 1985; Brouthers et al., 1996).

Trevino et al., (2002) find that larger current account deficits are associated with higher FDI inflows. They argue that MNCs may view deficits positively because it may create opportunities for companies to negotiate more favorable operating terms as host governments

encourage investment through different policies to attract the capital needed to finance the extant balance of current account deficit and to prevent outflows of their reserves.

Alternatively, Brouthers et al., (1996) examine the aggregate impact of firms' FDI strategies on the trade balances of host countries. The empirical evidence shows no direct relationship between FDI and current account balance for advanced industrialized and developing countries, but there is a negative relationship between the two variables for less developed countries. They argue a current account deficit is an indicator of macroeconomic instability, and then MNCs may view current account deficits negatively, because such deficits may lead to inflation and exchange rate variations. If this is the case, then an increase in the current account deficit may lead to a reduction in FDI inflows.

Human Capital

Availability of skilled workers can significantly boost the international competitiveness of a host country. MNCs are often attracted to developing countries by the abundance of skilled workforce. Higher level of human capital, both skill and education level of labor, is a good indicator of the availability of skilled workers, which can significantly boost the locational advantage of a host country and therefore increase both the volume of FDI inflows and the activities of a multinational firm in developing countries. Several governments have established different forms of incentives to promote and improve the level of human capital (Saggi, 2000). As a result, improvements in education and skill level are essential for attracting FDI because the host country's level of human capital determines how much FDI it can attract.

Elmawazini et al., (2005) argue that the weaknesses of human capital levels are the key challenges for developing countries to benefit from FDI. Deichmann et al., (2003) find human

capital to be an essential location decision for foreign investors in Turkey. Root and Ahmed (1979), Schneider and Frey (1985), and Lucas (1990) also find that the level of human capital is a significant determinant of the locational advantage of a host country and plays a key role in attracting FDI. Therefore, skill levels in the host county may be an important variable in the location decisions for multinational firms because these firms seek to gain in productivity and product quality by employing a relatively skilled labor force (Tuman and Emmert, 2004).

Public Infrastructure

Several studies associated with the determinants of FDI claim that the level of FDI inflow into the host country is also dependent upon the host governments' investments in providing efficient physical infrastructural facilities to improve the investment climate for FDI, thus creating favorable conditions for economic growth (Wheeler and Mody, 1992; Morisset, 2000; Kumar, 2001).

Availability and quality infrastructure (roads, highways, airports, seaports, electricity, telecommunication networks, etc.) should increase productivity and thereby boost the locational advantage of a host country. Therefore, foreign investors prefer a host country with a good infrastructure, which will facilitate communication, transportation, and distribution, while poor infrastructures increase the cost of doing business and reduces the rate of return on investment. Other things being constant, production costs are typically lower in countries with well-developed infrastructures than in countries with poor infrastructures.

Globerman and Shapiro (2002) assess infrastructure influence on FDI flows into and from host countries. On balance, they find both inflows and outflows respond positively to infrastructure availability for most countries. Wheeler and Mody (1992) examine the

manufacturing decisions by U.S. multinationals during the 1980s. The results indicate that infrastructure development is one of the most critical decisions for U.S. multinationals. In addition, Asiedu (2002) examines the determinants of FDI inflows in sub-Saharan Africa. Results show that infrastructure (measured by telephone lines) is a major catalyst for FDI inflows.

Financial Development

Besides the traditional determinants of FDI, a better functioning financial market is critical for determining the amount of FDI inflows to a nation, and thus it is necessary along with traditional determinants for attracting foreign investors. As discussed in Chapter 1, an efficient financial system is essential to an economy because better financial services enable an economy to increase its GDP growth rate. In the last two decades, several studies have confirmed the role of financial development as a growth-enhancing factor.[5]

According to Levine (1997), a developed financial system mobilizes savings efficiently which, in turn, expand the amount of resources available to finance investment and monitors investment projects by reducing information acquisition costs. Financial development also speeds up adoption of new technologies by minimizing the risk associated with it. The development of the domestic financial system may also determine to what extent foreign firms will be able to borrow in order to expand their investment opportunities in foreign countries. Financial development also increases liquidity and, thus, facilitates trading of MNCs' financial instruments. Therefore, financial development may lead to greater FDI inflows as it affects the cost structure of investment activities.

[5] See Schumpeter (1911), King and Levine (1993), Levine (1997), Levine and Zervos (1998), among others.

There are two views on the relationship between FDI and financial development. The first view suggests a positive relationship between FDI and financial development. However, only few studies argued that financial development can act as a precondition for FDI to magnify its positive impact on economic growth. Claessens et al., (2001) examine the determinants of the growing migration of stock market activity to international financial centers for 77 countries from 1975 to 2000. They argue that FDI flows to countries with good institutions and fundamentals, helping develop the domestic financial system. The empirical results show that FDI is positively correlated with market capitalization and domestic value traded, suggesting that FDI is a complement and not a substitute of domestic stock market development. Agarwal and Mohtadi (2004) assess the role of financial development in the financing choice of firms in 21 developing countries over the period 1980-1997. They show that FDI, as a proportion of GDP and investment as a proportion of GDP, are positively correlated with both the stock market banking sector development indicators.

Jeffus (2004) also shows that stock market development and FDI are highly and positively correlated in four Latin American countries for the period 1988-2002. Recently, Alfaro et al., (2004) examines the various links among FDI, financial markets, and economic growth. They investigate whether countries with better financial systems can exploit FDI more efficiently. The results show that a 1% increase in FDI generates four times more growth for countries with deeper financial markets. They argue that a well-developed financial system may act as a mechanism in facilitating the adoption of new technologies in the domestic economy, therefore inducing spillover efficiency. Prasad et al., (2003) show the absorptive capacity, as measured by financial development, contributes positively to the process of technological diffusion associated with FDI, thus promoting economic growth.

The second view argues that there is a negative relationship between FDI and financial development. Hausmann and Fernández-Arias (2000) examine whether substantial FDI flows are really a sign of good health for a developing country. Empirical evidence shows that the share of FDI in total flows tends to be larger in countries that are riskier, financially underdeveloped, and institutionally weak. The evidence further shows that countries that have less developed capital markets tend to have higher levels of FDI. Under this view, FDI should be substituted for financial market development as FDI takes place to overcome the difficulties of investing through capital markets (Claessens et al., 2001).

2.4.2 International Determinants of FDI

International factors play an important role in determining FDI flows to developing countries, which has been confirmed by a number of studies such as Chuhan et al., (1993), Calvo et al., (1996), and Fernández-Arias (1996). The World Bank (1997) investigated portfolio investments for Latin American and East Asian countries from 1990 to 1993. Their results show that the downturn in U.S. interest rates contributed significantly to inflows during 1990-1993, suggesting a high degree of co-movement in the early flows that was related to movement in U.S. interest rates. Montiel and Reinhart (1999) confirm these finding in a group of emerging economies by suggesting that international factors can explain the size and timing of the inflows while domestic factors determine its allocation between countries. Furthermore, Albuquerque, Loayza, and Serven (2002) find a significant and negative relation between the yield of the U.S. T-Bill and FDI flows to industrialized and developing countries.

Calvo, et al., (1994) examines the evolution of capital flows to developing countries. Results show low international interest rates and recessions in major industrial economies

played important roles in attracting capital flows in the early 1990s. They conclude that although domestic factors are significant determinants of FDI flows, the main determinants were international factors. Chuhan et al., (1993) examines the domestic and international determinants of U.S. portfolio flows to Latin America and Asia. They find that the drop in interest rates and the slowdown in economic activity in industrial countries are important in determining capital flows to these economies.

In contrast, Hernández and Rudolph (1995) analyze capital inflows in developing countries during the 1990s. Their empirical results show that domestic factors play a more important role than international factors. Therefore, they conclude that policymakers in developing countries should aim to have sound fundamentals in order to attract capital flows. Claessens et al., (1998) confirm Hernández and Rudolph's findings by examining capital inflows in East and Central Europe countries from 1991-1997, in which their results show the importance of structural reforms as well as the country's creditworthiness as a major determinants of capital inflows.

In a recent paper, Levy-Yeyati et al., (2002) examine how business cycles (GDP growth rate) and interest rate cycles (International interest rates) in developed countries (U.S., Europe, and Japan) affect FDI flows to developing countries. The empirical results show that FDI flows to be countercyclical with respect to both output and interest rate cycles in developed countries, suggesting that FDI outflows tend to move in opposite directions during the cycles in developed countries.

2.5 Measurement and Data Sources

This section provides a brief description of the variables used in this study. We examine the domestic and international determinants of FDI for 14 Latin American countries from 1978 to 2007. As is standard in the literature, the dependent variable is FDI, which is defined as the net inflows of investment to acquire a lasting management interest of 10% or more of voting stock in an enterprise operating in an economy other than that of the investor. FDI is calculated as a percentage of GDP.

To measure the size of the potential market (GDP), we use GDP per capita, rather than total GDP, to minimize the problem of multicollinearity that may distort the results of our analysis (Tuman and Emmert, 1999). Based on the empirical literature discussed above that shows the importance of market size behind FDI inflows, we expect that the larger the host country GDP, the greater the host country inward FDI. Inflation, measured by the percentage change in the consumer price index, indicates internal economic instability and inability of host governments to restrict money supply and to balance the budget. For these reasons, companies may avoid making investments in countries with high inflation. A number of studies on the determinants of FDI inflows noted that inflation indicates internal economic instability (Schneider and Frey, 1985). Accordingly, we include the consumer price index as an indicator of inflation (IR) in our analysis to test the statistical validity of this observation. The expected impact of inflation is negative. Therefore, we expect a negative relationship between inflation and the inflow of FDI. The inflation data are logged to limit the effects of extreme value as some countries experienced hyperinflation during the timeframe of this study (Tuman and Emmert, 2004).

To measure the size of the government and the macroeconomic stability of host countries, we use the ratio of government expenditure to GDP (GOV). Previous empirical studies produced mixed evidence regarding the impact of GOV on FDI inflow as it depends on the nature of government spending (Easterly and Rebelo, 1993; Tang, 2006; Aslan, 2008). Therefore, the coefficient associated to this variable is not determined a priori.

In the literature, the ratio of total trade (imports plus exports) to GDP is often used as a measure of openness of an economy, denoted as OP. As discussed previously, there is mixed evidence regarding the impact of OP on FDI as it depends on the type of investment (market-seeking or export-oriented). FDI, for our sample, is less likely to be market-seeking and therefore we expect a positive relationship between OP and FDI. To assess the role of current account balance of the host country, we include current account deficits as a percentage of GDP, denoted as CA. We expect that the higher the current account deficits, the smaller the inflows of FDI (Schneider and Frey, 1985; Chakrabarti, 2001).

Following the literature, we use the secondary school enrollment (SCH) measured by the proportion of the population of the age group who officially correspond to the duration of general secondary schooling to control for the level of human capital.. The availability of skilled labor was found by several studies as one of the most important determinants of FDI inflows (Root and Ahmed, 1979; Schneider and Frey, 1985; Lucas, 1990). One would therefore expect that FDI inflows would be attracted to an economy where high quality labor is available. In addition, we use telephone mainlines (TELE) per 1,000 people to capture the level of investments by host governments in providing efficient physical infrastructural facilities, and thus the investment climate for FDI. A positive relationship is expected between FDI and infrastructure availability.

To investigate the link between FDI and financial development (FD), we use two models based on banking sector and stock market development. Based on the discussion in Chapter 1, we use the ratio of liquid liabilities (LIQ) of the financial sector to GDP as an indicator of the size of the banking sector, and private credit (PC) as an indicator of financial depth, to measure banking sector development. To measure stock market development, we use total stock market capitalization as a percentage of GDP (SMC) as an indicator of overall size of stock market, and value traded (VT) as an indicator of stock market liquidity.[6] In spite of mixed prior evidence on the relationship between FDI and FD, we expect FD indicators to have positive impacts on FDI inflow to Latin American countries.

It is difficult to point to a single dominant international factor that would determine FDI inflows. Although several measures have been proposed in the empirical literature for examining the impact of international factors on FDI flows, we focus on three variables proposed by Chuhan et al., (1993), Levy-Yeyati et al., (2002), and Amaya and Rowland (2004). These variables are U.S. GDP growth rate (U.S. GDPG), U.S. industrial production index (IPI), U.S. T-Bill, denoted as T-bill, and yield on 10 year U.S. Government Bonds (U.S. Bonds).[7]

The GDP growth rate and industrial production index of the U.S. are international factors that should be expected to cause FDI flows. However, the influence of both variables may be either positive or negative due to the presence of income and substitution effects. There are different channels through which GDP growth rate of the U.S. could affect FDI outflows to Latin America. On the one hand, during expansions (i.e., when output is positive and large),

[6] See chapter 1 for a detailed description of FD indicators.

[7] According to the International Monetary Fund (International Financial Statistics online), the industrial production index (IPI) measures real output and is expressed as a percentage of real output. IPI covers production output in mining, manufacturing and public utilities (electricity, gas and water), but excludes construction.

foreign firms typically have higher earnings to invest abroad. Through this income effect, we should expect an increase of FDI inflows. On the other hand, expansions should induce a substitution effect that may reduce FDI inflows to developing countries, as foreign investment prospects become relatively less attractive. This substitution is a simple consequence of expansions that should be associated with a relative increase in home-expected returns, thus reducing the attractiveness of FDI.

International interest rates, in particular the U.S. T-Bill and yield on 10 year U.S. Government Bonds, may also influence FDI flows to Latin American countries. There is a consensus in the FDI literature that low interest rates may possibly increase FDI inflows, which may lead to low returns in developed countries, and therefore induce foreign investors to invest abroad. Consequently, we expect a negative relationship between U.S. interest rates and FDI inflows to Latin American countries.

The dataset used in this study are obtained from different sources. Data for FDI are collected from United Nations Conference on Trade and Development (UNCTAD, various issues). For GDP, IR GOV, OP, CA, SCH, and TELE data are collected from the *World Development Indicator* (WDI) published by the World Bank, while data for LIQ, PC, SMC, and VT are obtained from *Financial Structure and Economic Development Database* (FSEDD). Data for U.S. GDPG, IPI, T-Bill, and U.S. Bonds are collected from *International Financial Statistics* (IFS) published by the International Monetary Fund. Table 2.4 provides a detailed description of all variables used and their sources.

2.6 The Econometric Methodology

2.6.1 Panel Data Methodology

The objective of this section is to outline the model used to identify the determinants of FDI. To analyze the relation between FDI and the domestic and international variables in 14 Latin American countries from 1978 to 2007, we apply the panel data estimation method. The panel data methodology combines information on the variation of the individual units, in this case Latin American countries, with information taking place over time.

This method is usually applied in the literature for analyzing the FDI determinants common to a group of countries for several reasons (Gujarati 2003, p.637). First, panel data methodology is among the most efficient techniques to analyze the impact of international variables across a group of countries. Second, it allows each country to have its own characteristics (country-specific effects), which can correlated or uncorrelated with the explanatory variables. Third, panel data technique is an appropriate method to reduce the effects of omitted variables that are correlated with explanatory variables. Fourth, this technique reduces some econometric problems by decreasing multicollinearity among the explanatory variables and increasing the degrees of freedom. Thus, providing efficiency in the parameter estimates produced (Baltagi, 2005; and Kennedy, 2003).

It is hypothesized that FDI inflows to Latin American countries is determined by the following ten factors: (1) market size, (2) exchange rate, (3) inflation rate, (4) government expenditures, (5) openness, (6) current account deficits, (7) human capital, (8) infrastructure, (9) financial development indicators and (10) international variables. The empirical estimation is based on the following general regression equation:

$$FDI_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}, \quad i = 1,..., N, \quad t = 1,..., T \tag{2.1}$$

where $i = 1,2,..., N$ cross-section units or series that are observed over periods $t = 1,2,..., T$; FDI_{it} is the dependent variable; α_i is the country specific constant which is assumed to be fixed [8], X_{it} is a set of domestic variables; β is a vector of slope coefficients, and the errors ε_{it} are assumed to be independently and normally distributed with zero means and potentially heterogeneous variances across i and over t.

To explain the impacts of international variables on FDI inflows to Latin America, equation (2.1) is rewritten as follows:

$$FDI_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it}, \tag{2.2}$$

where X_{it} is a set of domestic variables and Z_{it} is a set of international variables. One contribution of this chapter is to examine if a well functioning financial system affects the FDI inflows in Latin American countries. For this, we alter our regression equation (2.2) as follows:

$$FDI_{it} = \alpha_i + \beta X_{it} + \gamma Z_{it} + \delta FD_{it} + \varepsilon_{it}, \tag{2.3}$$

where X_{it} is a set of domestic variables, Z_{it} is a set of international variables and FD_{it} is a set of financial development indicators, which measures stock markets and banking sector development. Taking together, equations (2.1), (2.2) and (2.3), our model can be written as follows:

[8] In this analysis, a specific set of countries is being investigated, i.e., Latin American countries. Inference in this case is conditional on the particular countries that are observed. In pooled cross-country and time-series data, unobservable fixed effects may be correlated with the included explanatory variables to create omitted variable biases. To correct them, we employ panel estimation with country-specific fixed effects.

$$
\begin{aligned}
FDI_{it} = {} & \alpha_0 + \alpha_1 GDP_{it} + \alpha_2 IR_{it} + \alpha_3 GOV_{it} + \alpha_4 OP_{it} + \alpha_5 CA_{it} \\
& + \alpha_6 SCH_{it} + \alpha_7 TELE_{it} + \alpha_8 BA_{it} + \alpha_9 LIQ_{it} + \alpha_{10} PC_{it} \\
& + \alpha_{11} SMC_{it} + \alpha_{12} VT_{it} + \alpha_{13} TR_{it} + \alpha_{14} \text{U.S.GDPG}_{it} \\
& + \alpha_{15} IPI_{it} + \alpha_{16} \text{T-bill}_{it} + \alpha_{17} \text{U.S. Bonds}_{it} + \varepsilon_{it} ,
\end{aligned}
\tag{2.4}
$$

where the dependent variable FDI is the net inflows of foreign direct investment as a percentage of GDP, GDP per capita is a proxy of market size, IR is inflation rate, GOV is the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is current account deficits as a percentage of GDP, SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people, BA is the ratio of total assets of deposit money banks as a percentage of GDP, LIQ is the ratio of liquid liabilities of the financial sector to GDP, PC is the value of loans made by banking institutions to the private sector as a percentage of GDP, SMC is the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy, VT is the value of the trades of domestic shares on domestic exchanges divided by GDP, TR is the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares, U.S. GDPG is the U.S. GDP growth rate, IPI is the U.S. industrial production index, T-Bill is the U.S. T-Bill, and U.S. Bonds is the yield on 10 years U.S. Government Bonds.

2.6.2 Panel Unit Root Tests

The empirical estimation in this chapter begins with the unit root tests to avoid spurious regression. Since macroeconomic time-series data are usually non-stationary (Nelson and Plosser, 1982) and thus conducive to spurious regression, we test for stationarity of the data series before proceeding with panel data estimation. Furthermore, since panel data sets have a

time dimension, it is natural to test for unit roots in panel data. Performing unit root tests is therefore essential.

In time series analysis, it is commonly accepted now that Dickey-Fuller (DF), and Augmented Dickey-Fuller (ADF) tests suffer from low power in rejecting the null of a non-stationary series. To improve the power of the DF and ADF tests, panel based unit root tests have been advanced by Im, Pesaran, Shin (2003, IPS hereafter), to take advantage of extra information that can be derived from panel data (Baltagi, 2005).

IPS proposes the t-bar panel unit root test that allows for complete heterogeneity between individuals. In the IPS test, ADF equation is estimated separately for each cross section as follows:

$$\Delta Y_{it} = \gamma_i + \delta_i t + \alpha_i Y_{i,t-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta Y_{i,t-j} + \varepsilon_{it} \qquad (2.5)$$

where Y is the variable under consideration, Δ is the first difference operator, γ_i is the intercept; $\delta_i t$ is the deterministic time trend; p_i is the number of lags in the ADF regression, and ε_{it} is a random error. The lag order of $\alpha_i's$ as well as $\beta_i's$ are allowed to vary across countries.

As discussed in Chapter 1, the null hypothesis in IPS heterogeneous unit root test is that each series in the panel contains a unit root. While, the alternative is that at least one of the individual series in the panel is stationary. When testing for panel unit roots at levels, we take the individual constant and trend terms as in equation (2.5). If we cannot reject the null hypothesis $\alpha_i = 0$, then we conclude that the series under consideration has a unit root and is therefore non-stationary in levels.

2.6.3 Panel Granger Causality Tests: FDI and Financial Development

To explore this relationship further and to lend more support to the results in the first chapter, it is legitimate to ask whether financial development itself could contribute to FDI and, in so doing, improve its chances in stimulating economic growth. In this chapter, we proceed by examining the Granger causality between FDI and financial development, and to the best of our knowledge this has not been examined before.

In order to test for the causality between FDI and the six financial development indicators, we can test if FDI is Granger-caused by FD by estimating equation (2.6) and test the null hypothesis that FD does not Granger-cause FDI in equation (2.7).

$$FDI_t = a_0 + \sum_{j=1}^{p} a_{1i}\ FDI_{t-j} + \sum_{j=1}^{p} a_{2i}\ FD_{t-j} + u_t \tag{2.6}$$

$$\begin{aligned} H_0 &: a_{2i} = 0 \quad for \quad j = 1,..., p \\ H_1 &: a_{2i} \neq 0 \quad for\ at\ least\ one\ j, \end{aligned} \tag{2.7}$$

where FDI_t and FD_t are stationary time series sequences, a_0 is the respective intercept, u_t is white noise error terms, and p is the maximum lag length used in each time series. The optimal lag length to be introduced in the causality tests is based on Akaike Information Criterion (AIC). FD is said to Granger-cause variable FDI if we reject the null hypothesis in (2.7), where $\sum_{j=1}^{p} a_{2i}$ is significantly different from zero, then we conclude that FD Granger causes FDI.

Similarly, we can test if FDI causes FD by replacing FDI for FD and vice versa in equation (2.6) as follows:

$$FD_t = b_0 + \sum_{j=1}^{p} b_{1i}\ FD_{t-j} + \sum_{j=1}^{p} b_{2i}\ FDI_{t-j} + v_t \tag{2.8}$$

$$H_0 : b_{2i} = 0 \quad for \quad j = 1,..., p$$
$$H_1 : b_{2i} \neq 0 \quad for\ at\ least\ one\ j, \tag{2.9}$$

where b_0 is a constant and v_t is a white noise error process. FDI is said to Granger-cause variable FD if we reject the null hypothesis in (2.9) where $\sum_{j=1}^{p} b_{2i}$ is significantly different from zero, and then we conclude that FDI Granger causes FD. Granger causality in both directions is, of course, a possibility. If both $\sum_{j=1}^{p} a_{2i}$ and $\sum_{j=1}^{p} b_{2i}$ are significantly different from zero, this implies that FDI and FD cause each other, and a feedback relationship exists. If neither $\sum_{j=1}^{p} a_{2i}$ nor $\sum_{j=1}^{p} b_{2i}$ is significantly different from zero, this indicates that these variables are independent in the sense that they are not causally related.

2.7 Empirical Results

2.7.1 Statistical Properties

The analysis is started by testing the statistical properties of the data series used. Table 2.5 shows the summary statistics of FDI, domestic and international variables used in this study. Table 2.6 presents descriptive statistics for banking sector and stock market development indicators (BA, LIQ, PC, SMC, VT, TR).

The results of the Im, Pesaran, Shin (2003) panel unit root (IPS) test are reported in Table 2.7. The lag length used to compute the IPS panel unit root test statistics is based on using Akaike Information Criteria (AIC). The results from the IPS test indicate that GDP, CA, T-Bill, U.S. GDPG, IPI, and U.S. Bonds are statistically significant at their level, implying that they are integrated of order I (0). As can be inferred from this table, we cannot reject the unit

root hypothesis for most time series when the variables are taken in levels, but when first differences are used, the hypothesis of unit root is rejected at the 1% and 5% significance levels according to the IPS test results. Therefore, these variables are well characterized as an I(1) process. These results allow us to proceed with the panel data estimation method and the Granger causality tests between FDI and financial development variables in consideration.

2.7.2 Panel Estimation Results

In order to examine the domestic and international determinants of FDI in Latin America, the next step is to estimate equation (2.2) using the ordinary least squares (OLS) technique. The estimation results are presented in Table 2.8. All variables in the domestic model, except for GDP, have the right sign and are statistically significant at the 1% level, apart from GOV variable, which is statistically insignificant. Contrary to the hypothesis, the coefficient of GDP shows a negative sign, suggesting that market size is not considered yet as an attractive factor for foreign investors.

IR appears to have a negative impact on FDI inflows. A high rate of inflation would discourage foreign investors to engage in FDI in Latin America as they view inflation as a sign of macroeconomic instability that discourages FDI outflows to Latin American countries. Although the GOV variable is not statistically significant, the results may indicate low efficiency of government spending in Latin American countries, which is a result of high levels of government expenditures on nonproductive activities that can deter FDI inflows (Easterly and Rebelo, 1993; Bruno and Easterly, 1998).

The positive coefficient on OP is consistent with the FDI theory, in that OP is indicative of the ease of access of the host country to world markets for material inputs, so the

multinational firms can obtain the raw materials at a low price (Kravis and Lipsey, 1982). The attractiveness of the host country market also affects the FDI inflows positively and significantly, confirming the theoretical arguments. This indicates that openness to international trade is important to foreign firms that seek to use Latin American countries as a base for intra-regional production and trade with the world markets. The finding is in line with that of Chakrabarti (2001) and Asiedu (2002). Hence, the result implies that greater liberalization of the trade sector may be conducive to FDI inflows.

The negative and significant coefficient on CA supports the argument made by Trevino et al. (2002) and Brouthers et al. (1996), that potential investors may view current account deficits negatively and as an indicator of macroeconomic instability because it may increase inflation and exchange rate variation. The human capital variable (SCH) has a positive and significant coefficient. It suggests that a higher level of SCH is a good indicator of the availability of skilled workers, which can significantly boost the locational advantage of a host country and, therefore, increase both the volume of FDI inflows and the activities of a multinational firm in Latin American countries (Tuman and Emmert, 2004). Furthermore, the positive coefficient on TELE is consistent with our hypothesis, suggesting that the availability of physical infrastructural facilities is an effective tool for stimulating FDI inflows. The result may indicate that the availability of infrastructural support could raise the productivity of capital and improve the investment climate for FDI (Wheeler and Mody, 1992).

The first four columns report the estimation results of the same equation with one of the four international factors (U.S. GDPG, U.S. IPI, T-bill, and U.S. Bonds) as an additional explanatory variable. The coefficient for U.S. GDPG is positive, but its effects are small and insignificant in all cases. Column (2) shows that the coefficients on IPI are positive and

significant. The positive coefficient implies income effects, suggesting that foreign firms typically have higher earnings to invest abroad during expansions (when industrial output is positive and large). Therefore, better economic conditions and industrial output in developed countries may increase the funds available for investments in Latin America.

U.S. T-Bill also has a surprising and strong positive impact on FDI, which is against the standard theory (low interest rates may possibly increase FDI inflows and therefore induce foreign investors to invest abroad). It is difficult to rationalize this observation; however, Levy-Yeyati et al. (2002) argue that an increase in the U.S. interest rate is usually associated with a boom in the economy. As a result, the Federal Reserve increases interest rates to stabilize the economy. Therefore, a high interest rate may reflect that FDI inflows to Latin America are highly related to the economic boom in the U.S. By contrast, the negative sign of U.S. Bonds is in line with our expectation and confirms the prevalence of the substitution effect, suggesting that a high interest rate should be associated with a relative increase in home-expected returns, thus reducing the attractiveness of FDI in Latin America.

Besides the domestic and international determinants of FDI, the development of the financial system of the recipient country may be an important precondition for FDI to have a positive impact on economic growth. Table 2.9 shows the estimation results of equation 2.3 based on banking sector development indicators. Column (2) shows that the coefficients of BA are positive and significant in all cases. In particular, a 1% increase in the BA increases FDI by 3.15%, while column (3) shows that financial development, as measured by the LIQ variable, has a negative and significant impact on FDI. In addition, the coefficients of PC in column (4) are positive and significant in all regressions, which suggest that an increase in banking credits to the private sector will effectively attract more FDI inflows to Latin America.

As to stock market development indicators, Table 2.10 reports the results for SMC, VT, and TR. The results in Table 2.10 mirror to a large degree those obtained for the banking sector measures, SMC and TR being positive and significant. The positive coefficients of SMC imply that the size of a stock market is correlated positively and significantly with FDI. When we include the VT in column (3), the coefficient is positive and insignificant. To look more closely at the impact of stock market development on FDI, we also include TR in column (4). The coefficient on TR is positive and significant at 10% level.

Overall, the results obtained from Table 2.9 and 2.10 show that FDI inflows to Latin America is positively correlated with financial development indicators, suggesting that the development of the financial system of the recipient country may be an important precondition for FDI to have a positive impact on economic growth. Therefore, we can conclude that besides the domestic and international determinants of FDI, a better functioning financial market is critical for determining the amount of FDI inflows to Latin American countries. Consequently, it is necessary, along with traditional determinants, for attracting foreign investors.

2.7.3 Panel Granger Causality Results: FDI and Financial Development

To explore this relationship further, we proceed by examining the Granger causality between FDI and financial development.[9] In particular, do countries with well-developed financial markets attract more FDI inflows? Table 2.11 shows the Granger causality results when financial development is measured by banking sector development indicators. The results suggest the null hypotheses that BA, LIQ, and PC do not cause FDI are rejected, irrespective of

[9] We use two lag structures to detect the causal relationship between financial development and FDI in both models.

the choice of lag. The results, however, show that the null hypotheses that FDI does not cause BA, LIQ, and PC cannot be rejected and, therefore, FDI does not stimulate financial development in the banking sector. Interestingly, the results reveal that the direction of causality is from banking sector development to FDI and not the reverse. Therefore, the causal link between FDI and banking sector indicators is uni-directional, suggesting that the development of financial institutions in Latin American countries can attract more FDI.

The empirical results from the Granger causality between stock market development indicators and FDI are presented in Table 2.12. The results show that FDI responds to changes in SMC, VT, and TR, suggesting that financial development has stimulated more FDI in Latin America. The results also show the presence of causality from FDI to stock market development. These results reveal that there is evidence of bi-directional causality relationships between stock market development and FDI in Latin America.

The bi-directional causality relationships between stock market development and FDI suggest that FDI seems to be a predictor of continued stock market development as MNCs' may seek to raise additional equity through the local stock market which will effectively lead to higher stock market development (Jeffus, 2004). It seems, then, that stock market development attracts more FDI inflows through more equity-based investments and more liquid stock markets, thus, facilitating trading of MNCs' financial instruments. Therefore, financial development may lead to greater FDI inflows as it affects the cost structure of investment activities.

Considering the significant effect of stock market development on FDI and the significant effect of stock market development on economic growth, we conclude that stock market development may also influence economic growth indirectly in Latin American countries by

attracting FDI inflows. The evidence of bi-directional causality relationships between stock market development and FDI lend more support to the results in the first chapter, which suggest that financial development itself, as measured by stock market development indicators, could contribute to FDI and therefore improve its chances in stimulating economic growth in Latin America.

2.8 Conclusions and Policy Implications

Although many empirical studies examines the determinants of FDI, given the recent change in the region's economic reform policies combined with the disappointing trend of FDI inflows in recent years, four key questions and concerns arise. First, what factors led to the upsurge in FDI inflows to the region? Second, whether factors that affect FDI in developing countries affect countries in Latin America differently. Third, whether countries with well-developed financial markets are able to attract more FDI inflows. Fourth, whether FDI flows to developing countries are determined by domestic and/or international factors. Therefore, it is important to answer the above questions based on the experience of Latin American countries. This chapter re-examines the domestic and international determinants of FDI for Latin American countries for 14 Latin American countries from 1978 to 2007.

This chapter differs and improves upon the existing literature in several ways. First, we re-examine the determinants of FDI for Latin American countries using a new database which may represent more valid estimations of the determinants of FDI to Latin American countries and other developing countries than the data used in relevant studies before. Second, previous empirical studies have mainly focused on the domestic determinants of FDI inflows. Little attention, however, has been devoted to examine role of international factors on determining

FDI flows to developing countries. Furthermore, empirical studies in the FDI literature do not make a clear distinction whether FDI flows to developing countries are being determined by domestic or international factors. This chapter focuses on both domestic and international determinants of FDI flows. to provide policymakers with a better understanding of the FDI determinants not only for Latin American countries, but also for developing countries in general.

Third, while the new growth literature on the growth effects of FDI shows that the development of domestic financial system of the recipient country is an important precondition for FDI to have a positive impact on economic growth, research is lacking on the direct links between FDI and financial sector development. This chapter examines if a well-developed financial system affects FDI flows to Latin American countries. As far as for Latin American countries, earlier studies have not included the financial sector development indicators in examining the potentials determinants of FDI.

The empirical findings in this chapter show that both domestic and international factors have been important determinants of FDI inflows to Latin America. However, the main determinants for Latin American countries were the domestic factors. In particular, we find that various domestic factors such as openness to trade, availability of skilled workers and efficient physical infrastructural facilities boost the FDI inflow to Latin America, while lack of macroeconomic instability as a result of high rate of inflation and greater current account deficit causes the contrary. While these results are generally consistent with the current FDI literature, the negative and significant coefficient of GDP suggest that market size is not considered yet as an attractive factor for foreign investors. In general terms the results estimated in this chapter regarding the domestic determinants suggest that those Latin

American countries with greater trade openness, higher level of availability of skilled workers, and better quality of infrastructure will be more successful in attracting FDI inflows.

When it comes to the international factors, i.e. variables outside of the recipient country, play an important role in the case of FDI. Although the U.S. GDPG turn out as an insignificant explanatory variable, the effect of the U.S. industrial production index (IPI) is positive and significant, indicating the dominance of a substitution effect, whereby FDI flows to Latin American countries may benefit from a boom in industrial countries as foreign firms typically have higher earnings to invest abroad during expansions. Therefore, better economic conditions and industrial output in developed countries may increase the funds available for investments in Latin America.

Furthermore, the effect U.S. T-Bill has a strong positive impact on FDI, which indicates that an increase in the U.S. interest rate is usually associated with a boom in the economy. Therefore, a high interest rate may reflect that FDI inflows to Latin America are highly related to the economic boom in the U.S. However, the negative effect of U.S. Bonds confirms the prevalence of the substitution effect, suggesting that a high interest rate should be associated with a relative increase in home-expected returns, thus reducing the attractiveness of FDI in Latin America.

Further analyzing the relationship between FDI and financial development, the empirical findings provide supporting evidence that a well-developed financial sector can represent a source of absorptive capacity in the host country which may enable these countries to absorb the positive impact of FDI, and thus promoting economic performance (Classens et al., 2001). Therefore, we can conclude that besides the domestic and international determinants of FDI, a

better functioning financial market is critical for determining the amount of FDI inflows to Latin American countries.

To explore the relationship between FDI and financial development further and to lend more support to the regression results, we examine the Granger causality between FDI and financial development. Our empirical evidence shows that the direction of causality is from banking sector development indicators to FDI and not the reverse. Therefore, the causal link between FDI and banking sector development is uni-directional, suggesting that the development of banking sector in Latin American countries can attract more FDI.

We also provide evidence that the link between FDI and stock market development indicators is bi-directional, which indicate that FDI initially could enhance and permit stock market development because of the investment opportunities that FDI-related spillover effects usually generate and, in turn, stock market development could attract more FDI. Considering the significant effect of stock market development on FDI and the significant effect of stock market development on economic growth, our evidence suggests that stock market development can act as a precondition for FDI to magnify its positive impact on economic growth. This indicates that a well-developed financial system acts as a mechanism in facilitating the adoption of new technologies in an economy, therefore inducing spillover efficiency that may contribute positively to the process of technological diffusion associated with FDI, thus promoting economic growth (Claessens et al., 2001).

The important question is to know what Latin American countries can do to encourage the inflows of FDI. Based on the findings of this chapter, there are some important policy implications which are necessary to understand the determinants of FDI in order to implement any appropriate future policies towards attracting additional flows.

First, the evidence indicates that policies should be designed at the national, regional, and international levels to help attract long-term flows. In particular, emphasis in the short and medium term should be focus on reforming investment regulatory framework to remove or reduce FDI restrictions, continuing the economic reforms efforts and reducing political instability. Additionally, since the empirical evidence show that he level of schooling and physical infrastructure show to be an important determinant of FDI. Therefore, policies aiming at increasing the level of education and providing efficient physical infrastructure facilities may attract more FDI flows.

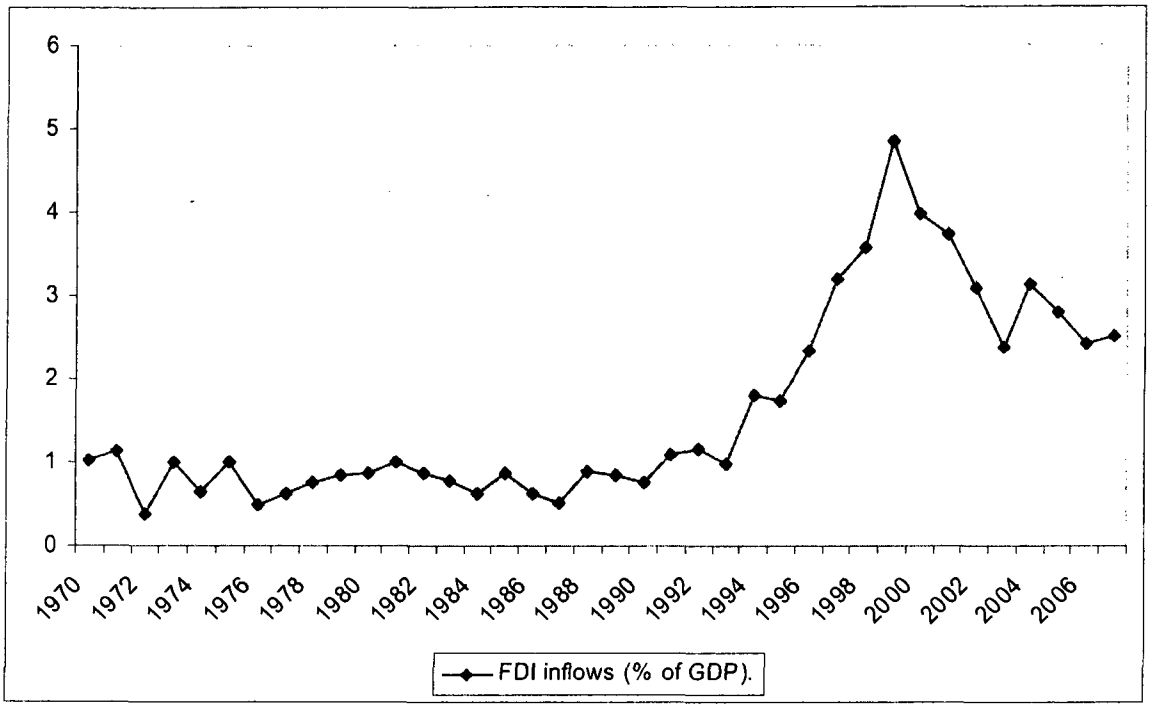
While, in the long-run, more FDI can be attained by persisting support for FDI liberalization through bilateral or multilateral means, continuing of the privatization process, and implementing appropriate monetary and fiscal policies for economic reforms and international integration with the world economy, thereby improving the attractiveness of a nation as a destination for FDI.

Second, in the context of the effects of financial development on FDI, the evidence indicates that FDI is not directed into risky countries that are financially underdeveloped and institutionally weak, but FDI is positively correlated with both stock markets banking sector development in Latin America. Therefore, the evidence suggests that Latin American countries should continue to stimulate and improve financial sector development in the economy to make it more attractive for foreign investors.

Finally, although financial development is not an easy task to accomplish because it depends on regulatory capacity, investment culture and ownership structure of firms, Levine and Zervos (1998) note that liberalizing international capital flow restrictions can affect the functioning of emerging stock markets by enhancing the integration with the world capital

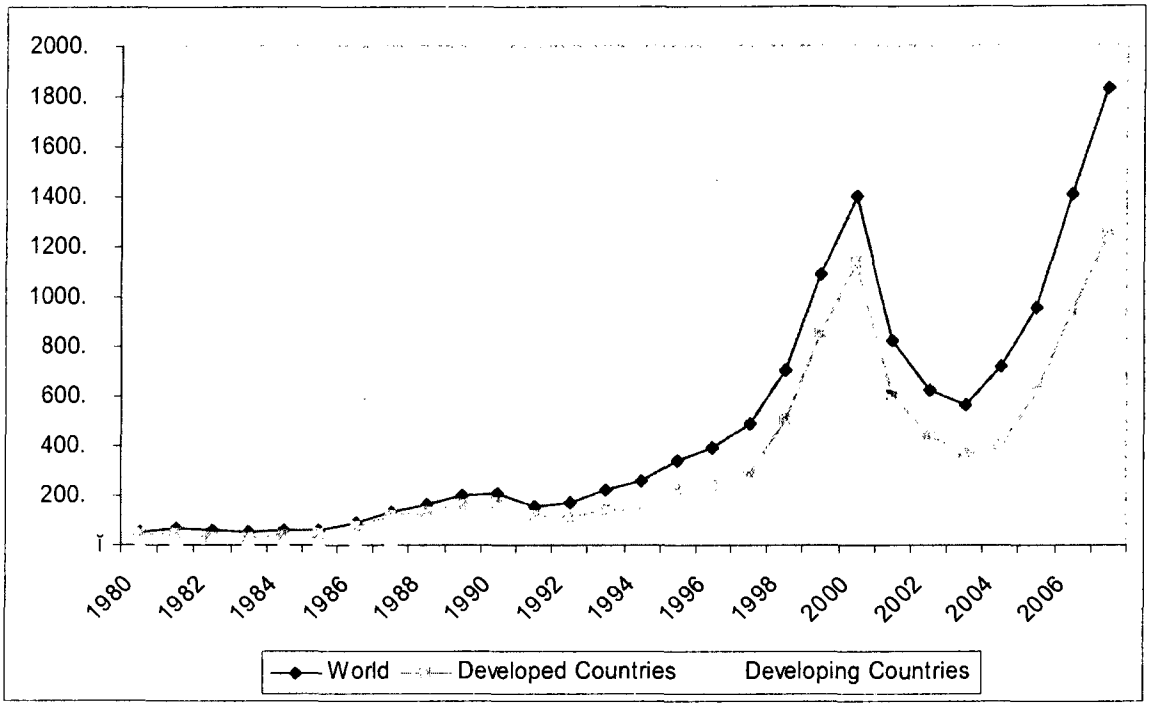
markets. This in turn may encourage emerging markets to modify legal financial systems to support more trading and introduce greater variety of financial instruments. Therefore, it could be easier for Latin American countries in the short and medium term to attract more FDI if financial development is supplemented by macroeconomic stability and open trade policies, together with a liberalized environment (Omran and Bolbol, 2003).

Figure 2.1 FDI inflows (% of GDP) in Latin America, 1978-2007.



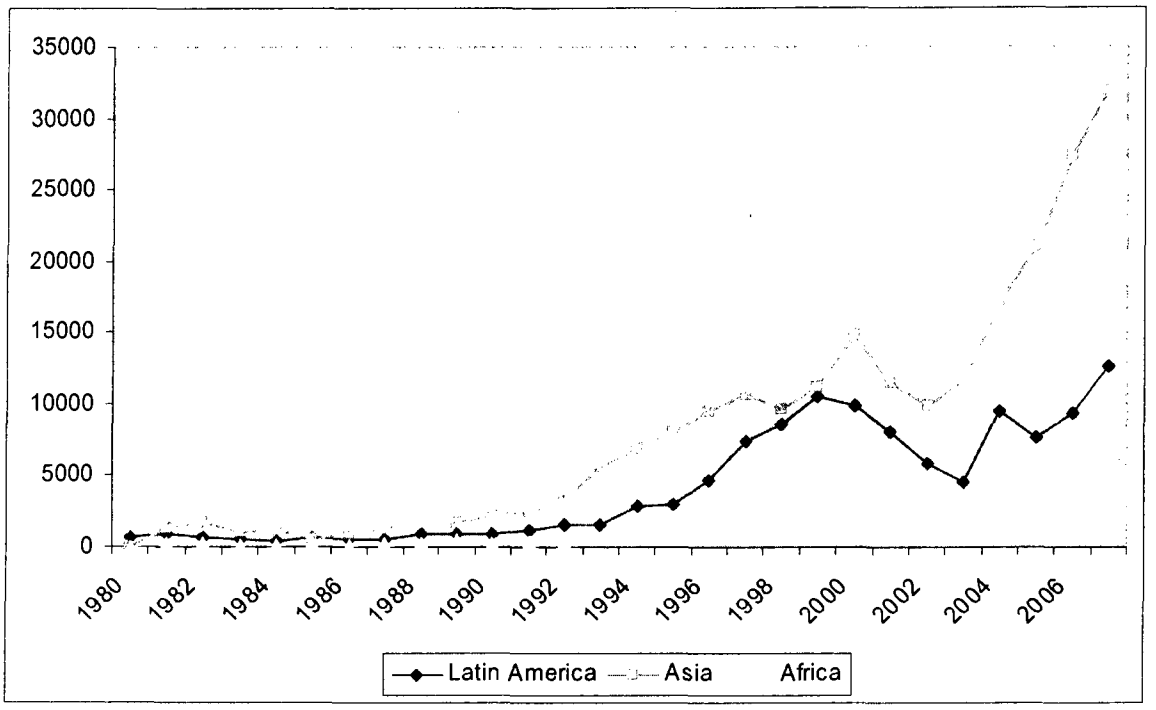
Source: UNCTAD, World Investment Report (various issues).

Figure 2.2 FDI inflows, global and by group of countries, 1978-2007.
(Billions of U.S. dollars)



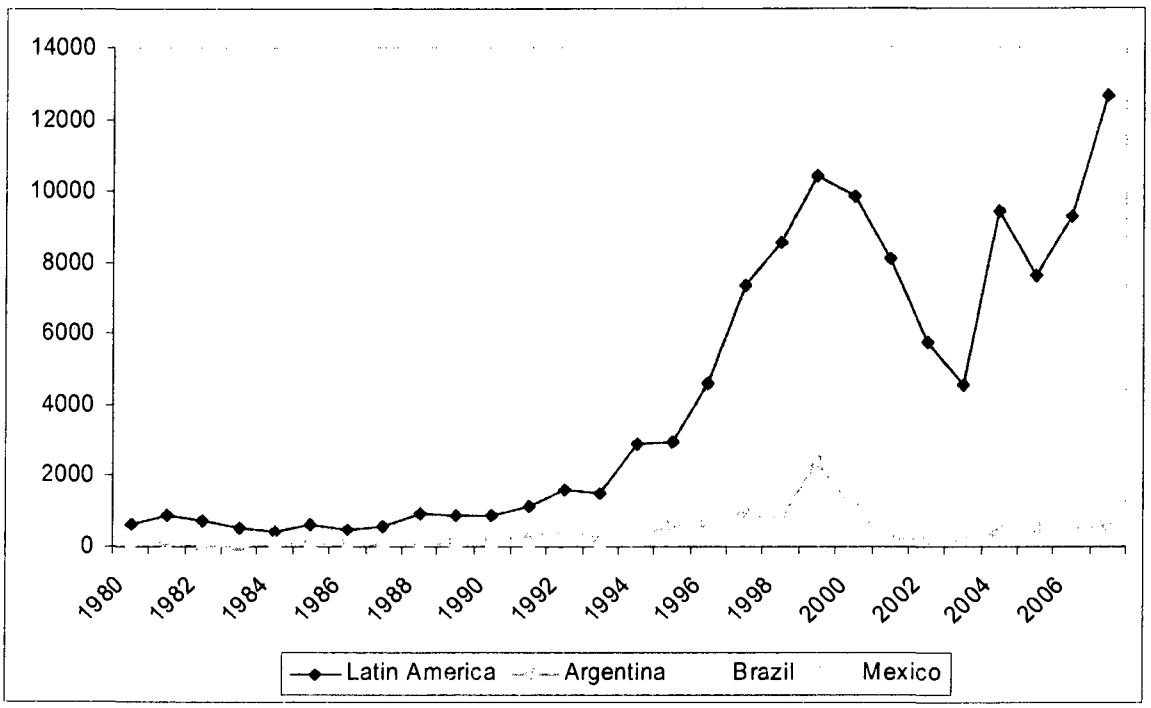
Source: UNCTAD, World Investment Report (various issues).

Figure 2.3 FDI inflows by regions, 1978-2007.
(Billions of U.S. dollars)



Source: UNCTAD, World Investment Report (various issues).

Figure 2.4 FDI inflows to selected Latin American countries, 1978-2007.
(Billions of U.S. dollars)



Source: UNCTAD, World Investment Report (various issues).

Table 2.1 Total FDI Inflows (Billions of U.S. dollars).

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total Inflows	207.28	155.75	166.72	222.50	256.85	341.04	390.46	485.82	705.54
Growth rate (%)	0.00	-24.86	7.04	33.46	15.44	32.78	14.49	24.42	45.23
Inflows to DC	35.10	39.80	53.18	76.89	103.68	115.97	147.08	190.73	190.76
Growth rate (%)	0.00	13.38	33.62	44.59	34.84	11.85	26.83	29.68	0.01
Inflows to LAC	8.94	11.62	16.16	15.14	29.00	29.51	46.27	73.51	85.47
Growth rate (%)	0.00	30.01	39.03	-6.29	91.51	1.76	56.77	58.88	16.27
% of DC	25.47	29.21	30.39	19.70	27.97	25.45	31.46	38.54	44.81

Table 2.1 (Continued)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Total Inflows	1088.51	1398.18	824.44	625.17	561.06	717.70	958.70	1411.02	1833.32
Growth rate (%)	54.28	28.45	-41.03	-24.17	-10.26	27.92	33.58	47.18	29.93
Inflows to DC	228.48	256.62	214.41	171.01	180.11	283.64	316.44	412.99	499.75
Growth rate (%)	19.78	12.31	-16.45	-20.24	5.32	57.48	11.56	30.51	21.01
Inflows to LAC	104.39	98.26	80.94	57.78	45.88	94.44	76.41	92.95	126.27
Growth rate (%)	22.13	-5.87	-17.63	-28.62	-20.59	105.85	-19.09	21.64	35.85
% of DC	45.69	38.29	37.75	33.78	25.47	33.30	24.15	22.51	25.27

Source: UNCTAD, World Investment Report (various issues).
The table provides data on FDI inflows from 1990 to 2007: for total inflows, inflows to developing countries (DC), and to Latin American countries (LAC). Also provided is the growth rate of total FDI inflows for the world, DC, and LAC, and as a percentage of total flows for DC and LAC.

Table 2.2 Top 13 recipients of FDI in Latin America

	1990-2007 averages	
Country	Total FDI flows	Share of GDP
Brazil	15,801,198,776	2.29
Mexico	13,644,353,592	2.44
Argentina	7,155,416,230	2.43
Chile	4,380,660,984	5.35
Venezuela	2,759,307,856	2.69
Colombia	2,368,121,693	2.35
Peru	1,837,658,146	2.87
Ecuador	831,163,725	3.42
Dominican Rep.	622,671,184	3.32
Panama	615,140,794	5.03
Bolivia	504,402,775	5.47
Costa Rica	492,888,261	3.15
El Salvador	229,961,533	1.57
Top 13 total	51,242,945,549	

Source: UNCTAD, World Investment Report (various issues).
The table provides data on FDI inflows to lists the top 13 countries in Latin America from 1990 to 2007.

Table 2.3 Effect of selected variables on FDI

Determinants of FDI	Positive	Negative	Insignificant
Market Size	Schneider & Frey (1985) Nigh (1985) Billington (1999) Chakrabarti (2001) Mossa & Cardak (2006)	Edwards (1990)	Loree & Guiinger (1995) Wei (2000)
Growth Rate	Schneider and Frey (1985) Culem (1988) Billington (1999) Chakrabarti (2001)		Nigh (1985) Tasi (1994)
Inflation		Schneider & Frey (1985) Trevino, Daniels, Arbelaez, & Upadhyaya (2002) Bouoiyour (2003)	Asieedu (2002)
Openness	Kravis & Lipsey (1982) Edwards (1990) Akhter (1993) Asieedu (2002) Janicki & Wunnava (2004)		Chakrabarti (2001)
Human Capital	Bouoiyour (2003) Deichmann, Karidis, & Sayek (2003) Elmawazini, Saadi, &		
Infrastructure	Wheeler & Mody (1992) Kumar (1994) Loree & Guiinger (1995)		
Labor Cost	Wheeler & Mody (1992)	Schneider and Frey (1985)	Loree & Guisinger (1995) Lipesy (1999)
Political Instability		Schneider and Frey (1985) Edwards (1990) Akhter (1993) Suleyman (2004)	Ferris, Thompson, & Valsan (1994) Loree & Guisinger (1995) Asieedu (2002) Hausmann & Arias (2000)

Note: This table presents the observed effect of seven potential determinants of FDI that have been widely used in the literature.

Table 2.4 Definition of Variables

Definition of Variables

Variable	Definition	Source
Foreign Direct Investment (FDI)	Net inflows of investment / GDP	UNCTAD
Market Size (GDP)	GDP per capita	WDI
Inflation (IR)	Percentage change of the Consumer Price Index (CPI)	WDI
Government Consumption (GOV)	Government final consumption expenditure / GDP	WDI
Openness (OP)	Total amount of exports and imports / GDP	WDI
Current Account Balance (CA)	Current account deficits /GDP	WDI
School Enrollment (SCH)	Secondary school enrollment rate	WDI
Public Infrastructure (TELE)	Telephone mainlines per 1,000 people	WDI
Bank Assets (BA)	Deposit Money Bank Assets / GDP	FSEDD
Liquid Liabilities (LIQ)	Liquid Liabilities / GDP	FSEDD
Private Credit (PC)	Private Credit by Deposit Money Banks and Other Fin.Inst / GDP	FSEDD
Stock Market Capitalization (SMC)	Total market value of all listed shares / GDP	FSEDD
Stock Market Value Traded (VT)	Value of trades of domestic stocks / GDP	FSEDD
Stock Market Turnover Ratio (TR)	Value of trades of shares over market capitalization	FSEDD
International Variables		
	U.S. GDP growth rate (U.S. GDPG)	IFS
	U.S. industrial production index (IPI)	IFS
	U.S. T-Bill	IFS
	Yield on 10 years U.S. Government Bonds (U.S. Bonds)	IFS

Table 2.5 Descriptive Statistics

	FDI	GDP	GOV	OP	CA	IR	TELE	SCH	T-BILL	U.S.GDPG	IPI	U.S. Bonds
Mean	2.00	3.43	1.05	1.64	-2.12	1.31	9.03	1.78	6.01	3.05	76.10	7.60
Maximum	12.20	3.97	1.45	2.12	17.60	4.07	32.20	2.04	14.08	7.20	107.45	13.91
Minimum	-3.05	2.92	0.47	1.06	-15.59	0.06	1.11	1.26	1.01	-1.97	52.17	4.02
Std. Dev.	2.09	0.27	0.14	0.20	4.60	0.60	7.03	0.16	3.03	1.77	18.53	2.73

Note: FDI is the net inflows of foreign direct investment as a percentage of GDP, GDP is a proxy of market size, GOV the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is curre account deficits as a percentage of GDP, Inflation rate (IR) equals the percentage change in the consumer price inde SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people, T-Bill is the U.S. T-Bill, U.S. GDP is the U.S. GDP growth rate, IPI is the U.S. industrial production index, and U.S. Bonds is the yield on 10 years U.S Government Bonds.

Table 2.6 Descriptive Statistics (Financial Development Indicators: 1978-2007).

	BA	LIQ	PC	SMC	VT	TR
Mean	0.280	0.291	0.255	0.146	0.026	0.175
Maximum	0.779	0.691	0.802	1.464	0.445	2.165
Minimum	0.028	0.045	0.030	0.002	0.000	0.088
Std. Dev.	0.147	0.119	0.147	0.209	0.047	0.218

Note: Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP. Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP. Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares.

Table 2.7 Panel Unit Root Tests

	Levels	First differences
FDI	-1.09	-10.86***
GDP	-2.55***	-6.23***
IR	-1.73	-8.62***
GOV	1.10	-4.24***
OP	-0.71	-9.01***
CA	-3.90***	-13.02***
SCH	0.23	-9.79***
TELE	2.34	-2.19**
BA	0.741	-6.26***
LIQ	-0.83	-4.10***
PC	-1.20	-3.64***
SMC	-1.36	-5.87***
VT	-1.90	-8.42***
TR	-2.31	-9.57***
T-BILL	-7.04***	-9.21***
U.S.GDPG	-6.89***	-12.96***
IPI	-3.34***	-3.52***
U.S. Bonds	-9.10***	-11.161***

Note: Panel unit root tests are estimated based on Im, Peseran and Shin (2003) test. ***signifies rejection of the unit root hypothesis at the 1% level, ** signifies rejection of the unit root hypothesis at the 5% level, *signifies rejection of the unit root hypothesis at the 10% level. FDI is the net inflows of foreign direct investment as a percentage of GDP, GDP is a proxy of market size, GOV is the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is current account deficits as a percentage of GDP, Inflation rate (IR) equals the percentage change in the consumer price index, SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people. Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, T-Bill is the U.S. T-Bill, U.S. GDPG is the U.S. GDP growth rate, IPI is the U.S. industrial production index, and U.S. Bonds is the yield on 10 years U.S. Government Bonds.

Table 2.8 Determinants of FDI Inflows in Latin America, 1978–2007.

Independent Variables	Domestic	1	2	3	4
GDP	-0.76	-0.79	-0.49	-0.62	-0.49
	(-6.69)***	(-6.98)***	(-4.61)***	(-5.23)***	(-3.68)***
IR	-0.63	-0.63	-0.35	-0.33	-0.36
	(-9.26)***	(-8.87)***	(-5.17)***	(-4.73)***	(-4.46)***
GOV	-0.40	-0.40	(-0.32	-0.42	-0.24
	(-1.47)	(-1.45)	(-1.19)	(-1.55)	(-0.85)
OP	1.37	1.39	0.54	0.51	0.64
	(7.70)***	(7.65)***	(3.09)***	(2.97)***	(3.24)***
CA	-0.05	-0.05	-0.07	-0.07	-0.06
	(-5.18)***	(-5.156)***	(-7.52)***	(-7.01)***	(-5.93)***
SCH	1.37	1.35	-0.24	-0.22	0.02
	(5.05)***	(4.86)***	(-0.79)	(-0.72)	(0.06)
TELE	0.10	0.11	0.06	0.06	0.06
	(20.36)***	(19.63)***	(7.77)**	(8.27)***	(6.70)***
U.S.GDP		0.03	0.02	0.03	0.03
		(1.19)	(1.27)	(1.60)	(1.49)
IPI			0.04	0.05	0.04
			(10.99)***	(11.23)***	(6.91)***
T-BILL				0.04	0.14
				(2.69)***	(4.59)***
U.S.Bonds					-0.16
					(-3.59)***
Adjusted R-squared	0.73	0.71	0.84	0.84	0.77
Durbin-Watson	1.40	1.40	1.50	1.52	1.52

Notes: All models are estimated using OLS model. The dependent variable is the net inflows of foreign direct investment as a percentage of GDP. GDP is a proxy of market size, GOV is the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is current account deficits as a percentage of GDP, Inflation rate (IR) equals the percentage change in the consumer price index, SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people, T-Bill is the U.S. T-Bill, U.S. GDPG is the U.S. GDP growth rate, IPI is the U.S. industrial production index, and U.S. Bonds is the yield on 10 years U.S. Government Bonds. Durbin-Waston is the test statistics for serial correlation under the null hypothesis of no serial correlation. Values in parentheses are t-statistics. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 2.9 Determinants of FDI Inflows in Latin America, 1978–2007.

		Banking Sector Indicators		
Independent Variables	1	2	3	4
GDP	-0.49	-0.71	-0.75	-0.53
	(-3.68)***	(-5.44)***	(-5.92)***	(-4.02)***
IR	-0.36	-0.21	-0.26	-0.17
	(-4.46)***	(-2.52)**	(-3.16)***	(-1.97)**
GOV	-0.24	-0.66	-0.58	-0.20
	(-0.85)	(-2.44)**	(-2.11)**	(-0.65)
OP	0.64	1.24	1.56	1.31
	(3.24)***	(4.98)***	(5.60)***	(4.94)***
CA	-0.06	-0.06	-0.05	-0.05
	(-5.93)***	(-5.94)***	(-5.48)***	(-4.97)***
SCH	0.02	-0.13	0.07	-0.69
	(0.06)	(-0.41)	(0.22)	(-1.82)*
TELE	0.06	0.05	0.06	0.06
	(6.70)***	(5.58)***	(6.43)***	(5.71)***
U.S.GDP	0.03	0.04	0.04	0.03
	(1.49)	(1.76)*	(1.82)**	(1.47)
IPI	0.04	0.03	0.02	0.03
	(6.91)***	(5.58)***	(3.70)***	(5.18)***
T-BILL	0.14	0.14	0.15	0.13
	(4.59)***	(3.85)***	(4.13)***	(4.12)***
U.S.Bonds	-0.16	-0.17	-0.18	-0.16
	(-3.59)***	(-3.26)***	(-3.58)***	(-3.63)***
BA		3.15	4.24	1.83
		(8.73)***	(8.60)***	(3.24)***
LIQ			-2.00	-3.06
			(-3.45)***	(-4.48)***
PC				3.53
				(5.90)***
Adjusted R-squared	0.77	0.73	0.75	0.77
Durbin-Watson	1.52	1.48	1.47	1.48

Notes: All models are estimated using OLS model. The dependent variable is the net inflows of foreign direct investment as a percentage of GDP. GDP is a proxy of market size, GOV is the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is current account deficits as a percentage of GDP, Inflation rate (IR) equals the percentage change in the consumer price index, SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people, T-Bill is the U.S. T-Bill, U.S. GDPG is the U.S. GDP growth rate, IPI is the U.S. industrial production index, and U.S. Bonds is the yield on 10 years U.S. Government Bonds. Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. Durbin-Waston is the test statistics for serial correlation under the null hypothesis of no serial correlation. Values in parentheses are t-statistics. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 2.10 Determinants of FDI Inflows in Latin America, 1978–2007.

		Stock Market Indicators		
Independent Variables	1	2	3	4
GDP	-0.49	-0.49	-0.50	-0.54
	(-3.68)***	(-1.64)	(-1.63)	(-1.71)*
IR	-0.36	-0.26	-0.27	-0.29
	(-4.46)***	(-1.49)	(-1.50)	(-1.58)
GOV	-0.24	-0.20	-0.22	-0.19
	(-0.85)	(-0.31)	(-0.34)	(-0.29)
OP	0.64	0.88	0.90	0.95
	(3.24)***	(2.14)**	(2.10)**	(2.17)**
CA	-0.06	-0.09	-0.09	-0.09
	(-5.93)***	(-4.59)***	(-4.55)***	(-4.54)***
SCH	0.02	0.19	0.22	0.24
	0.06	(0.31)	(0.34)	(0.37)
TELE	0.06	0.04	0.04	0.04
	(6.70)***	(2.21)**	(2.21)**	(2.29)**
U.S.GDP	0.03	0.07	0.07	0.07
	1.49	(1.51)	(1.50)	(1.47)
IPI	0.04	0.03	0.03	0.03
	(6.91)***	(2.70)***	(2.65)***	(2.60)***
T-BILL	0.14	0.19	0.19	0.19
	(4.59)***	(2.65)***	(2.63)***	(2.66)***
U.S.Bonds	-0.16	-0.25	-0.25	-0.25
	(-3.59)***	(-2.46)**	(-2.43)**	(-2.47)**
SMC		1.77	2.09	2.15
		(4.25)***	(3.81)***	(3.86)***
VT			0.41	0.43
			(0.86)	(0.16)
TR				0.42
				(1.75)*
Adjusted R-squared	0.77	0.37	0.38	0.45
Durbin-Watson	1.52	1.86	1.86	1.91

Notes: All models are estimated using OLS model. The dependent variable is the net inflows of foreign direct investment as a percentage of GDP. GDP is a proxy of market size, GOV is the ratio of government expenditure to GDP, OP is the ratio of total trade (imports plus exports) to GDP, CA is current account deficits as a percentage of GDP, Inflation rate (IR) equals the percentage change in the consumer price index, SCH is secondary school enrollment, TELE is telephone mainlines per 1,000 people, T-Bill is the U.S. T-Bill, U.S. GDPG is the U.S. GDP growth rate, IPI is the U.S. industrial production index, and U.S. Bonds is the yield on 10 years U.S. Government Bonds. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares, Durbin-Waston is the test statistics for serial correlation under the null hypothesis of no serial correlation. Values in parentheses are t-statistics. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 2.11 Panel Granger Causality Tests of FDI and Banking Development Indicators.

	Number of lags F-statistics (p-value)	
Null Hypothesis	(1)	(2)
BA does not Granger cause FDI	15.17***	5.38***
	(0.00)	(0.00)
FDI does not Granger cause BA	0.40	1.46
	(0.52)	(0.23)
LIQ does not Granger cause FDI	6.54**	2.52*
	(0.01)	(0.08)
FDI does not Granger cause LIQ	0.30	0.02
	(0.57)	(0.97)
PC does not Granger cause FDI	14.38***	5.61***
	(0.00)	(0.00)
FDI does not Granger cause PC	0.76	1.14
	(0.38)	(0.31)

Note: This table shows the results of Granger causality tests for all Latin American countries. Parenthesized values are the probability of rejection the null hypothesis of Granger non-causality. For each equation the null hypothesis is, therefore, that financial development does not Granger-cause FDI in the first regression and that FDI does not Granger-cause financial development in the second regression. FDI is the net inflows of foreign direct investment as a percentage of GDP. Bank Assets (BA) equals the ratio of total assets of deposit money banks as a percentage of GDP. Liquid liabilities (LIQ) equal the sum of currency, demand and interest-bearing liabilities of bank and non-bank financial intermediaries as a percentage of GDP. Private Credit (PC) equals the value of loans made by banking institution to the private sector as a percentage of GDP. ***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

Table 2.12 Panel Granger Causality Tests of FDI and Stock Market Development Indicators.

	Number of lags F-statistics (p-value)	
Null Hypothesis	(1)	(2)
SMC does not Granger cause FDI	10.87***	5.65***
	(0.00)	(0.00)
FDI does not Granger cause SMC	1.84	3.10**
	(0.17)	(0.04)
VT does not Granger cause FDI	4.73***	3.97***
	(0.00)	(0.00)
FDI does not Granger cause VT	2.23*	4.65***
	(0.08)	(0.00)
TR does not Granger cause FDI	12.38***	7.11***
	(0.00)	(0.00)
FDI does not Granger cause TR	1.38	5.23***
	(0.24)	(0.00)

Note: This table shows the results of Granger causality tests for all Latin American countries. Parenthesized values are the probability of rejection the null hypothesis of Granger non-causality. For each equation the null hypothesis is, therefore, that financial development does not Granger-cause FDI in the first regression and that FDI does not Granger-cause financial development in the second regression. FDI is the net inflows of foreign direct investment as a percentage of GDP. Stock market capitalization (SMC) equals the average value of listed domestic shares on domestic exchanges in a year as a share of the size of the economy as a percentage of GDP, Value Traded (VT) equals the value of the trades of domestic shares on domestic exchanges as a percentage of GDP, Turnover ratio (TR) equals the value of the trades of domestic shares on domestic exchanges divided by the value of listed domestic shares.***Significant at the 1% level, **Significant at the 5% level, *Significant at the 10% level.

REFERENCES

Abramovitz, M. 1986. Catching up, forging ahead, and falling behind. *Journal of Economic History*, 46, 385-406.

Agarwal, J. 1980. Determinants of foreign direct investment: A survey. *Archiv*, 116, 739-73.

Agarwal, S., & Mohtadi, H. 2004. Financial markets and the financing choice of firms: Evidence from developing countries. *Global Finance Journal*, 15, 57-70.

Aitken, B., Hanson, G., & Harrison, A. 1997. Spillovers, foreign investment, and export behavior. *Journal of International Economics*, 43, 103–132.

Akhter, H. 1993. Foreign direct investment in the developing countries. *International Trade Journal*, 7, 655-673.

Albuquerque, R., Norman L., & Luis S. 2002. World market integration through the lens of foreign direct investors. Prepared for the conference entitled "The FDI race: Who gets the Prize? Is it worth the Effort?

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. 2004. FDI and economic growth: The role of local financial markets. *Journal of International Economics,* 64, 89-112.

Amya, C., & Rowland, P. 2004. Determinants of investment flows into emerging markets. Borrodores de Economia, no. 313, Banco de la Republica de Columbia.

Al-Yousif, K. 2002. Financial development and economic growth. Another look at the evidence from developing countries. *Review of Financial Economics*, 11, 131-150.

Andres, J., Hernando, I., & Lopez-Salido, J. 1999. The role of the financial system in the growth–inflation link: The OECD experience. Banco de Espana, Working Paper.

Ang, J. B., & McKibbin, W. J. 2007. Financial Liberalization, Financial Sector Development and Growth: Evidence from Malaysia. *Journal of Development Economics*, 84, 215-233.

Apergis, N., Filippidi, I., & Economidou, C. 2007. Financial deepening and economic growth linkages: A panel data analysis. *Review of World Economics*, 143, 179-198.

Arestis, P., Demetriades, O., & Luintel, K. 2001. Financial development and economic growth: The role of stockmMarkets. *Journal of Money, Credit and Banking*, 33, 16-41.

Asiedu, E. 2002. On the determinants of foreign direct investment to developing countries: Is Africa different? *World Development*, 30, 107-119.

Aslan, A. 2008. Financial development and economic growth: A panel cointegration analysis of Middle East countries. *The Empirical Economics Letters*, 7, 681-691.

Baltagi, B. 2005. Econometric analysis of panel data. 3rd Edition. New York: John Wiley & Sons.

Barro, J. 1991. Economic growth in a cross section of countries. *Quarterly Journal of Economics*, 106, 407-443.

Barro, J., & Sala-i-Martin, X. 1995. Economic growth. Boston, Mass.: Mc-Graw Hill.

Barro, J. 1996. Inflation and growth. *Federal Reserve Bank of St. Louis Review*, May/June, 153-169.

Beck, T., & Levine, R. 2004. Stock markets, banks, and growth: Panel evidence. *Journal of Banking and Finance*, 28, 423–442.

Bengoa, M., & Sanchez-Robles, B. 2003. Foreign direct investment, economic freedom and growth: New evidence from Latin America. *European Journal of Political Economy*, 19, 529-545.

Billington, N. 1999. The location of foreign direct investment: An empirical analysis. *Applied Economics*, 31 65-72.

Blomström, M., & Kokko, A. 1998. Multinational corporations and spillovers. *Journal of Economic Surveys*, 12, 247-277.

Borensztein, E., De Gregorio, J., & Lee, J. 1998. How does foreign direct investment affect economic growth? *Journal of International Economics*, 45, 115–135.

Bornschier, V. 1980. Multinational corporations and economic growth: A cross-national test of the decapitalization thesis. *Journal of Development Economics*, 7, 191–210.

Boyd, J., Levine, R., & Smith, B. 2001. The impact of inflation on financial sector performance. *Journal of Monetary Economics*, 47, 221–248.

Bordo, D., & Wheelock, C. 2006. When do stock market booms occur? The Macroeconomic and Policy Environments of 20th Century Booms" Federal Reserve Bank of St. Louis, Working Paper No. 2006-051A.

Boyd, J., Levine, R., & Smith, B. 2001. The impact of inflation on financial sector performance. *Journal of Monetary Economics*, 47, 221-248.

Bouoiyour, J. 2003. The determining factors of foreign direct investment in Morocco. Background Paper for the ERF 10th Annual Conference, Marrakesh, Morocco.

Braun, M., & Hausmann, R. 2002. Financial development and credit crunches: Latin America and the world" *Latin American Competitiveness Report,* edited by J. Vial and P. K. Cornelius. New York: Oxford University Press.

Brouthers, L., Werner, S., & Wilkinson, T. 1996. The aggregate impact of firms' FDI strategies on the trade balance of host countries. *Journal of International Business Studies*, 27, 359-373.

Bruno, M., & Easterly, W. 1998. Inflation crises and long-run growth. *Journal of Monetary Economics*, 41, 3-26.

Calvo, G. 2005. Crises in emerging market economies: A global perspective" NBER Working Paper 11305, Cambridge, Mass.

Calvo, G., & Carlos, V. 1999. Inflation stabilization and BOP crises in developing countries. *NBER working paper* 6925.

Calvo, A., Leonardo, L., & Carmen, M. 1994. Inflows of capitals to developing countries in the 1990s: Causes and effects. *IADB working papers No.* 302. Inter-American Development Bank.

Chakrabarti, A. 2001. The determinants of foreign direct investment: sensitivity analyses of cross-country regressions. *Kyklos*, 54, 89-113.

Christopoulos, D., & Tsionas, E. 2004. Financial development and economic growth: evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73, 55-74.

Chuhan, P., Stijn, C., & Nlandu, M. 1993. Equity and bond flows to Asia and Latin America. Policy *Research Working Paper* 1160. The World Bank.

Claessens, S., Daniela, K., & Sergio L. 2001. FDI and stock market development: complements or substitutes? *World Bank* , New York.

Claessens, S. & Laeven, L. 2003. Financial development, property rights and growth. *Journal of* Finance, 58, 2401-36.

Culem, C. 1988. The locational determinants of direct investments among industrialized countries European. *Economic Review*, 32, 885-904.

Daniels, J., & Quigley, Jr. 1980. Pull factors for direct investment: a cross regional comparison. *Foreign Trade Review*, 15, 263-288.

Darrat, A. 1999. Are financial deepening and economic growth causally related? Another look at the evidence. *International Economic Journal*, 13, 19-35.

Deichmann, J., Karidis, S., & Sayek, S. 2003. Foreign direct investment in Turkey: Regional determinants. *Applied Economics*, 35, 1767-1778.

De Gregorio, J. 1992. Economic growth in Latin America. *Journal of Development Economics,* 39, 58-84.

De la Torre, A., Juan Carlos, G., & Sergio, S. 2007. Capital market development: whither Latin America? Unpublished manuscript, the World Bank.

DeMello, L.R., Jr. 1997. Foreign direct investment in developing countries: A selective survey. *Journal of Development Studies*, 34, 1–34.

Demetriades, P., & Hussein, K. 1996. Does financial development cause economic growth? Time series evidence from 16 countries. *Journal of Development Economics*, 51, 387–411.

Dunning, J. 1993. Multinational enterprises and the global economy. New York: Addison-Wesley Publishing Company.

Easterly, W., & Rebelo, S. 1993. Fiscal policy and growth: An empirical investigation. *Journal of Monetary Economics*, 32, 417-458.

Easterly, W., & Sewadeh, M. 2002. Global development network growth database. *World Bank*, New York.

Edwards, S. 1990. Capital flows, foreign direct investment, and debt-equity swaps in developing countries. *National Bureau of Economic Research*, Working Paper No 3497.

Elmawazini, K., Saadi, S., & Ngouhouo, I. 2005. Does FDI imply productivity growth for the host economy? *Journal of American Academy of Business*, 6, 85-91.

Engle, R., & Granger, C. 1987. Cointegration and error correction: representation, estimation and testing. *Econometrica*, 55, 251-276.

Fernández-Arias, E., & Ricardo, H. 2000. Foreign direct investment: Good cholesterol? *IADB Working papers*, No. 417. Inter-American Development Bank.

Ferris, P., Thompson, G., & Valsan, C. 1994 Foreign direct investment in an emerging market economy. *Eastern European Economics*, 32, 81-96.

Fischer, S. 1993. The role of macroeconomic factors in growth. *Journal of Monetary Economics*, 32, 485–512.

Fohlin, C. 1998. Banking systems and economic growth: lessons from Britain and Germany in the pre-World War I era" Federal Reserve Bank of St. Louis, issue May, 37-48.

Galindo, A., Schiantarelli, F., & Weiss, A. 2007. Does financial liberalization improve the allocation of investment? Micro-evidence from developing countries. *Journal of Development Economics*, 83, 562-587.

Garcia, H., Alicia, S., Javier, G., Sonsoles, C., & Egea, C. 2002. Latin American financial Development Perspective" Working Paper No. 0216, Bank of Spain.

Garcia, V., and Liu, L. (1999) "Macroeconomic Determinants of Stock Market development. *Journal of Applied Economics*, 1, 29-59.

Gastanaga, V., Nugent, J., & Pashamiova, B. 1998. Host country reforms and FDI inflows: How much difference do they take? *World Development*, 26, 1299-1314.

Globerman, S., & Shapiro, D. 2002. Global foreign direct investment flows: the role of governance infrastructure. *World Development*, 30, 1899-1920.

Granger, C. 1980. Long memory relationships and the aggregation of dynamic models. *Journal of Econometrics*, 14, 227-38.

Granger, C. 1981. Some properties of time series data and their use in econometric model specification. *Journal of Econometrics*, 16, 121-30.

Granger, C. W. J. (1988) "Some Recent Developments in a Concept of Causality" *Journal of Econometrics*, 39, 199-211.

Granger, C., & Newbold, P. 1974. Spurious regressions in econometrics. *Journal of Econometrics*, 2, 111-120.

Gujarati, D. 1995. Basic econometrics, Third Edition, McGraw-Hill Inc, New York.

Gujarati, D. 2003. Basic Econometrics. Fourth Edition McGraw-Hill. New York.

Hausmann, R., & Fernández-Arias, E. 2000. "Foreign direct investment: Good cholesterol? Paper presented at the Seminar "The New Wave of Capital Inflows: Sea Change or Just another Tide? IDB Annual Meetings, New Orleans, United States.

Hernández, H., & Heinz. R. 1995 Sustainability of capital flows to developing countries. Is a generalized reversal likely? *Policy Research Working Paper* 1518, The World Bank.

Hondroyiannis, G., Lolos, S., & Papapetrou, E. 2004. Financial markets and economic growth in Greece, 1986-1999. Working Paper, No. 17.

Hosono, A., & Nishijima, S. 2001. Prospects for closer economic relations between Latin America and Asia. REIB Discussion Paper No. 121.

Hsiao, C. 1986. *Analysis of panel data*, Cambridge: Cambridge University Press.

Im, K., Pesaran, M., & Shin, Y. 2003. Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115, 53-74.

Janicki, P., & Wunnava, V. 2004. Determinants of foreign direct investment: empirical evidence from EU accession candidates. *Applied Economics*, 36, 505-510.

Jeffus, W. 2004. FDI and stock market development in selected Latin American countries. *International Finance Review*, 5, 35-44.

Johansen, S. 1988. Statistical analysis of cointegration vectors. *Journal of Dynamics and Control*, 12, 231-254.

Kao, C. 1999. Spurious regression and residual-based tests for cointegration in panel data. *Journal of* Econometrics, 90, 1–44.

Kennedy, P. 2003. A guide to econometrics. MIT Press, Cambridge, MA.

King, R., & Levine, R. 1993. Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717-38.

Kinoshita, Y. 1998. Micro-determinants of Japanese foreign direct investment in Asia. Eastern Economic Association and Japan Economic Seminar at Columbia University.

Kravis, I., & Lipsey, R. 1982. The location of overseas production and production for export by U.S. multinational firms. *Journal of International Economics*, 12, 201-223.

Kumar, N. 2001. Infrastructure availability, foreign direct investment inflows and their export-orientation: A cross-country exploration. *Research and Information System for Developing Countries*, New Delhi.

Leybourne, S., & Newbold, P. 2003. Spurious rejections by cointegration tests induced by structural breaks. *Applied Economics*, 35, 1117-21.

Levin, A., and Lin, C. 1992. Unit root tests in panel data: Asymptotic and finite sample properties. UC San Diego, Working Paper 92-23.

Levine, R. 1997. Financial development and economic growth: Views and agenda. *Journal of* Economic *Literature*, 35, 688-726.

Levine, R. 2002. Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation*, 11, 398–428.

Levine, R. 2005. Finance and growth: Theory and evidence. In P. Aghion and S. Durlauf (eds.), *Handbook of Economic Growth*. The Netherlands: Elsevier Science.

Levine, R., Loayza, N., & Thorsten, B. 2000. Financial intermediation and growth: causality and causes. *Journal of Monetary Economics*, 46, 31-77.

Levine, R., & Zervos, S. 1998. Stock markets, banks, and economic growth. *American Economic Review*, 3, 537-558.

Levy-Yeyati, E., Ugo, P., & Eduardo, S. 2002. The cyclical nature of North-South FDI flows. *IADB working paper*. Inter-American Development Bank.

Li, X. & Liu, X. 2005. Foreign direct investment and economic growth: An increasingly endogenous relationship. *World Development*, 33, 393-407.

Loree, D., & Guisinger, S. 1955. Policy and non-policy determinants of US equity foreign direct investment. *Journal of Business Studies*, 26, 281-299.

Lucas Jr. 1988. On the mechanics of economic development. *Journal of Monetary Economics*, 22, 3–42.

Lucas Jr. 1990. Why doesn't capital flow from rich to poor countries. *American Economic Review*, 80, 92-96.

Luintel, K., & Khan, M. 1999. A quantitative reassessment of the finance-growth nexus: Evidence from a multivariate VAR. *Journal of Development Economics*, 60, 381-405.

Maniam, B. 2007. An empirical investigation of US. FDI in Latin America, *Journal of International Business Research,* 6, 1-15.

Mas, I. 1995. Policy-induced disincentives to financial sector development: Selected examples from Latin America in the 1980s. Journal of Latin American Studies, 27, 683-706.

Masih, A., & Masih R. 1996. Energy consumption, real income, and temporal causality: Results from a multi-country study based on cointegration and error-correction modeling techniques. *Energy Economics*, 18, 165-183.

McCoskey, S., & Kao, C. 1998. A residual based test of the null of no cointegration in panel data. *Econometric Reviews*, 17, 57–84.

McKinnon, R. 1973. Money and capital in economic development. Brookings Institutions, Washington DC.

Montiel, M., & Reinhart, P. 1999. Do capital controls and macroeconomic policies influence the volume and composition of capital flows? Evidence from 1990s. *Journal of International Money and Finance*, 18, 619-635.

Morisset, P. 2000. Foreign direct investment to Africa: Policies also matter. *Transnational Corporation*, 9, 107–25.

Moosa, I. 2002. Foreign direct investment: theory, evidence and practice. (1st Edition), New York: Palgrave.

Moosa, I., & Cardak, B. 2006. The determinants of foreign direct investment: An extreme bounds analysis. *Journal of Multinational Financial Management*, 16, 199-211.

Moschos, D. 1989. Export expansion, growth and the level of economic development. *Journal of Development Economies*, 30, 93-102.

Nelson, R., & Plosser, I. 1982 Trends and random walks in macroeconomic time series: Some evidence and implications. *Journal of Monetary Economics*, 10, 139-162.

Nigh, D. 1985. The effect of political events on United States direct foreign investment: A pooled time-series cross-sectional analysis. *Journal of International Business Studies*, 16, 1-17.

Omran, M., & Bolbol, A. 2003. Foreign direct investment, financial development, and economic growth: Evidence from the Arab countries. *Review of Middle East Economics and Finance*, 1, 231–249.

Pack, H., & Saggi, H. 1997. Inflows of foreign technology and indigenous technological development. *Review of Development Economics*, 1, 81-98.

Pagano, M. 1993. Financial markets and growth: an overview. *European Economic Review*, 37, 613-22.

Pedroni, P. 1999. Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61, 653–678.

Plender, J. 1986/7. London's big bang in international context. *Journal of International Affairs*, 2, 39-48.

Porzecanski R. & Gallagher K. 2007. Economic reform and foreign direct investment in Latin America: A critical assessment. Progress in Development Studies, 7, 217-33.

Ram, R. 1999. Financial development and economic growth: additional evidence" *Journal of Development Studies*, 35, 164-74.

Rioja, F., & Valev, N. 2004. Finance and the sources of growth at various stages of economic development. *Economic* Inquiry, 42, 127–140.

Robinson, J. 1952. The rate of interest and other essays. London, Macmillan.

Root, F., & Ahmed, A. 1979. Empirical determinants of manufacturing direct foreign investment in developing countries. *Economic Development and Cultural Change*, 27, 751-767.

Rousseau, P., & Wachtel, P. 2000. Equity markets and growth: Cross country evidence on timing and outcomes, 1980–95. *Journal of Banking and Finance*, 24, 1933–57.

Rousseau, P., & Wachtel, P. 2002. Inflation thresholds and the finance-growth nexus. *Journal of International Money and Finance,* 21, 777–93.

Saggi, K. 2000. "Trade, foreign direct investment and international technology transfer: a survey. World Bank, Washington DC.

Schneider, F., & Frey, B. 1985. Economic and political determinants of foreign direct investment. *World Development*, 13, 161-175.

Schumpeter, J. 1911. The theory of economic development. Cambridge, MA. Harvard University Press.

Shan, J. Z., Sun, F., & Morris, A. 2001. Financial development and economic growth" *Review of International Economics*, 9, 443–54.

Shatz, J., & Venables, A. 2000. The geographical of international investment. *World Bank Research*, Working Paper No 2338.

Shaw, E. 1973. Financial deepening in economic development, Oxford University Press, London.

Suleyman, T. 2004. What drives foreign direct investment into emerging markets? *Emerging Markets Finance and Trade*, 40, 101-114.

Tang, D. 2006. The effect of financial development on economic growth: evidence from the APEC countries, 1981-2000. *Applied Economics*, 38, 1889–1904.

Tang, D. 2006. The effect of financial development on economic growth: evidence from the APEC countries, 1981-2000. *Applied Economics*, 38, 1889–1904.

Taylor, C. 2000 .The impact of host country government policy on US multinational investment decisions. *World Economy*, 23, 635-648.

Tasi, P. 1994. Determinants of foreign direct investment and its impact on economic growth. *Journal of Economic Development*, 19, 137-163.

Thangavelu, S., & Ang, J. 2004. Financial development and economic growth in Australia: an empirical analysis. *Empirical Economics* 29, 247–260.

Trevino, L., Daniels, J., Arbelaez , H., & Upadhyaya, K. 2002. Market reform and foreign direct investment in Latin America: evidence from an error correction model. *International Trade Journal*, 16, 367- 392.

Tuman, J., & Emmert, C. 2004. The political economy of U.S. foreign direct investment in Latin America: A reappraisal. *Research Review*, 39, 9-28.

Tyler, W. 1981. Growth and export expansion in Developing countries. *Journal of Development Economics*, 9, 121-130.

United Nations Conference on Trade and Development (UNCTAD), Various issues, World Investment Report (United Nations).

Wei, S. 2000. How taxing is corruption on international investors? *Review of Economics and Statistics*, 8, 1-11.

Wheeler, D., & Mody, A. 1992. International investment location decisions: The case of U.S. firms. *Journal of International Economics*, 33, 57-76.

World Bank. 1997. Private capital flows to developing countries: The road to financial integration. Oxford University Press, New York, New York.

World Bank. 2005. Global development finance report. The World Bank, Washington, DC.

World Bank 2009. *World development indicators* 2008. Washington, D.C.: World Bank. CD-ROM.

Xu, B. 2000. Multinational enterprises, technology diffusion, and host country productivity growth. *Journal of Development Economics*, 62, 477-493.

Zhang, K. 2001. Does foreign direct investment promote economic growth? Evidence from East Asia and Latin America. *Contemporary Economic Policy*, 19, 175–185.

BIOGRAPHICAL SKETCH

Mr. Omar M. Al Nasser is currently working as a Visiting Assistant Professor of Finance at the University of Houston-Victoria. He was born and brought up in the Hashemite Kingdom of Jordan where he completed his undergraduate degree in Accounting/Finance at Yarmouk University. Upon completing a Master in Business Administration (M.B.A) at the University of Houston-Victoria, Mr. Al Nasser enrolled in the University of Texas-Pan American for his Ph.D. in Finance. He is scheduled to graduate in August 2009 with a Ph.D. in Finance from the University of Texas-Pan American.

Mr. Al Nasser research interests focus primarily on International Finance, Financial Economics, Financial Markets and Institutions and International Trade. Mr. Al-Nasser possesses two publications in the *International Research Journal of Finance and Economics* and *Global Economic Review*, and an article forthcoming in the *International Research Journal of Finance and Economics*. Furthermore, he has one of his papers under first review at the *Journal of Economics and Finance*. Mr. Al Nasser also has several other articles in the process of revision. He has presented four papers at several conferences (Financial Management Association, Academy of Economics and Finance, Southwestern Finance Association, etc.).

He can be contacted at 14000 University Blvd. Sugar Land, TX 77479, via E-mail at alnassero@uhv.edu or by phone at (713) 550-0866.