NEAR EAST UNVERSITY

INSTITUTE OF SOCIAL SCIENCES
DEPARTMENT OF BANKING AND FINANCE

THE IMPACT OF FINANCIAL DEVELOPMENT ON ECONOMIC GROWTH: EVIDENCE FROM ARGENTINA, BRAZIL AND MEXICO

IN ACCORDANCE WITH THE REGULATIONS OF THE GRADUATE SCHOOL OF SOCIAL SCIENCE

MASTER THESIS

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

This study examines long run and short run relationship between financial development and economic growth in Argentina, Brazil and Mexico, using time series analysis approach using Johansen cointegration and Granger causality. The statistical properties of the series were tested and the results show that all the variables were stationary at first difference using ADF and PP unit root test. The Johansen cointegration established a long run relationship between financial development proxies and economic growth. Furthermore, Pairwise Granger causality tests in Argentina and Brazil suggest bidirectional causality between financial development and growth rate of GDP, Mexico granger causality suggest unidirectional causality runs from financial development to growth rate of GDP, which supports the validity of supply leading hypothesis. The results clearly show that financial sector development activities in Argentina, Brazil and Mexico are catalysts for the growth of GDP. By implication financial development are significant sources of economic growth in both countries alike. Based on these findings, the study suggests that construction of the appropriate institutional structure is necessary because of the contribution of financial sector to economic growth. Conventional measures of financial depth and financial development requires policies to sustain the process through requisite policy framework.

Keywords: Financial Development, Economic Growth, Cointegration, Granger causality.

ÖZET

Bu çalışma, Johansen eşbütünleşmesi ile Granger nedensellik ilkesinde zaman serileri yöntemini kullanarak Arjantin, Brezilya ve Meksika'daki finansal gelişim ile ekonomik büyüme arasındaki uzun ve kısa vadeli ilişkiyi incelemektedir. Bu serilerin istatiki özellikleri test edilmiştir ve ADF ve PP birim kök testleri kullanılarak elde edilen sonuçlar ilk farkın sabit olduğunu göstermiştir. Johansen eşbütünleşmesi, finansal gelişim ile ekonomik büyüme arasında uzun vadeli bir bağ kurmuştur. Buna ilaveten, Arjantin ve Brezilya'da ikili gruplar halinde yapılan Granger nedensellik ilkesi testi, finansal gelişim ile Gayri Safi Yurtiçi Hasıla (GDP) oranının büyümesi arasında çift yönlü bir nedensellik ilişkisi önermektedir, Meksika'daki Granger nedensellik ilkesi ise finansal gelişimden GDP oranının büyümesine kadar süren tek yönlü bir nedensellik ilişki önermektedir ki bu da gösterilen başlıca varsayımın geçerliliğini desteklemektedir. Sonuçlar açıkça göstermektedir ki Arjantin, Brezilya ve Meksika'daki finansal sektörün gelişim faaliyetleri GDP'nin büyümesinde hızlandırıcı bir rol oynamaktadır. Dolayısıyla benzer durumdaki ülkelerin ekonomilerinin büyümesinde finansal gelişim önemli bir kaynaktır. Bu buluşlara göre, bu çalışma, ekonomik büyümenin, finansal sektöre olan katkısı nedeniyle, ilgili kurumsal yapının gerekli olduğunu önermektedir. Finansal yoğunluk ve finansal gelişim için alınan tedbirlere, zorunlu poliçe çerçevesi sürecini muhafaza etmek için bir takım poliçelere ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Finansal Gelişim, Ekonomik Büyüme, Eşbütünleşme, Granger nedensellik ilkesi.

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LIST OF ABBREVIATIONS

ADF Test	Augmented Dickey-Fuller test
DCPS	Domestic Credit to Private Sector
DCPSB	Domestic Credit to Private Sector by Banks
GDP	Gross Domestic Product
GDPGR	Gross Domestic Product Growth Rate
M2	Money and Quasi Money
OECD	Organization for Economic Cooperation and Development
PP Test	Phillips-Perron test
RGDP	Real Growth Rate of Gross Domestic Product
TRD	Trade
UNECLAC	United Nations Economic Commission for Latin America & the Caribbean
VAR	Vector Auto Regressive
WDI	World Development Indicators
FD	Financial development
FPE	Final prediction error criteria
LR	Modified likehood ratio
AIC	Akaike information criterion
HQ	Hannan-Quinn information criterion
SIC	Schwarz information criterion

CHAPTER ONE
INTRODUCTION

1.1. Background to the Study

The critical role of financial sector to affect patterns of innovation and growth goes to Schumpeter (1912). Furthermore, Gurley and Shaw (1967), Goldsmith (1969) and McKinnon (1973) and Shaw (1973) show that financial sector plays an important role in economic growth. The new growth theory suggest that intermediaries of financial sector and markets appear endogenously in response to market incompleteness and, hence, contribute to long-term growth (Bittencourt, 2012; FitzGerald, 2006). Financial systems are important elements in economic growth process due to the spread of new technological innovations and capital accumulation to undertake the supply function.

Growth rate in both developed and developing economies in the long run require countries to raise the level of physical and human resource, utilize their productive assets effectively and efficiently, and ensure access to productive assets by the population (Mhadhbi, 2014; Demetriades et al. 2011). The financial sector plays a very important role in growth process. For instance, it serves as a channel for financial intermediation though through savings mobilization from domestic households and firms, foreign savings, ensure that the funds mobilized and has been allocated to the most productive use and spread risk (Abu-Bader and Abu-Qar, 2008).

The development of the financial sector fundamentally comprise of the formation and spreading out of institutions, financial instruments and markets that aid investment and economic growth process (Jude, 2010). Over time, banks and non-bank are known for playing intermediary financial role cutting across pension funds, stock markets, allocate household savings into productive investment and also monitor investments. It is worthy to note that financial intermediation through the financial sector has externalities, which can be through information or liquidity provision processes that may be positive in nature or systemic financial crisis that are pervasive to the financial sector with negative consequences (Ekmekcioglu, 2012).

The ground breaking work of Schumpeter (1912) provided a platform for analysing the impact of financial development on economic growth. He asserts that well running banks promote technological innovation through description and funding entrepreneurs with the best chances of successfully applying innovative products and production processes. Improvement of financial intermediaries has positive impact on productivity growth, technical changes. Robinson (1952) on the other hand argued that enterprise leads financial follows. According to his demand function analysis, financial development is a result of high growth rate and high growth rate increases the demand for financial services. McKinnon and Shaw (1973) emphasized the effects of government interventions for the development of financial systems, which include maximum interest rate, high reserve requirements and restriction of direct credit program for the banks negatively affect the improvement of financial sectors that result to decrease of economic growth.

Therefore, financial development has the potential to contribute to economic growth in a number of ways. Financial development in the form of increased confidence in the financial system encourages relatively less well-off households to save more, which increases the supply of funds that could be made available to large investors and also the level of investments. In addition, financial development allows a relatively more efficient use of financial capital.

There are mixed results provided by different researches on the effect of financial development on growth rate within economy. Mirbagheri (2014), Huiran and Wang (2013), Campos et al. (2012), Kabir et al. (2011) observed that financial development is highly important for economic growth and a necessary condition to achieve high economic growth rate. In contrast, financial development, as measured by the ratio between domestic credit to private sector and GDP is negatively correlated with economic growth (Mhadhbi, 2014; De Gregorio and Guidotti 1995) for developed and developing countries. Therefore, the relationship is unclear.

Furthermore, in terms of causality between financial development and economic growth, Jenkins and Katircioglu (2010) and Kar et al. (2011) suggested that, there is no any direction of causality between financial development and economic growth. However, Hassan et al. (2011), Esso (2010) and Al-Yousif (2002) found that

financial development and economic growth are mutually causal based. Blanco (2009) and Shan et al. (2001) found a bi-directional causality between finance and economic growth.

Therefore, whereas various studies seem to support the hypothesis that financial development impact on economic growth, there seems to be no consensus on the nature and pattern of the impact as suggested by various researchers.

1.2. Statement of the Problem

The relationship between financial development and economic growth has occupied the minds of economists, financial analysts and other researchers since the work of Schumpeter (1912). Studies have shown that the channels of relationship (Mirbagheri, 2014; Mhadhbi, 2014, Huiran and Wang 2013; Campos et al. 2012; Leitao, 2010; Robinson, 1952) and the direction of causality (Jenkins and Katircioglu (2010); Kar et al. (2011; Hassan et al. (2011); Esso (2010); Blanco (2009); Shan et al. 2001) has remained unstable in both theory empirics. Moreover, a wide range of structural forms involved prevents any clear decision to any type of financial institutions may expand or may boost economic growth rate.

The investigation on a large scale experimental literature on the relationship between financial development and economic growth. The results, however, are inconclusive, with varying economic models and data used. Most studies suggest that there is a significantly positive relationship between financial development and economic growth using different measures of financial development indicators (Hassan et al. 2011; Kabir et al. 2011; Lartey, 2010; Levine et al. 2000; King and Levine, 1993; Gupta, 1986).

Robinson (1952) opined using a demand-following hypothesis that financial development is a result of high growth rate and high growth rate increases the demand for financial services on contrary to Calderon and Liu, (2003), Chang (2002) and Mazur and Alexander (2001) that established a positive association between financial development and economic growth.

Patrick (1966) developed two hypotheses that is, finance lead growth hypothesis and the demand following hypothesis, to test the possible directions of causality between financial development and economic growth. McKinnon (1973), Demetriades and Luintel (1996), Fry (1997), King and Levine (1993) supported the supply- leading hypothesis and have found a positive relationship between financial development and economic growth. However, Goldsmith (1969), Jung (1986) and Singh (1997) supported the demand-following hypothesis and have found a negative relationship between financial development and economic growth where financial development decreases the economic stability. Mhadhbi (2014) and Raynal (2007) reconfirmed the 'supply leading' hypothesis for Latin America.

The divergent views are indications that there are unsettled issues about the relationship between financial development and growth rate of economy. The quest to develop economies around the world called for investigation on the role of finance on economic growth and to determine whether the financial sector reform has yielded the desired results over the years.

1.3. Objectives of the Study

The essential objective of the study is to examine the impact of financial development on economic growth in Argentina, Brazil and Mexico.

The specific objectives are:

(i) To determine the causal relationship between financial development and economic growth.

(ii) To evaluate the trend and level of financial deepening in Argentina, Brazil and Mexico.

1.4. Research Questions

From the foregoing, the research questions that this study seeks to address can be stated as follows:

(i) What is the impact of financial development on economic growth in Argentina, Brazil and Mexico?

(ii) What is the causal relationship between financial development and economic growth?

(iii) What is the level of financial deepening in Argentina, Brazil and Mexico?

1.5. Research Hypotheses

The hypothesis that this study seek to verify are as stated below:

$H_0$1: Financial development does not impact on economic growth.

H_1: Financial development impact on economic growth.

$H_0$2: There is no causal relationship between financial development and economic growth.

H_1: There is a causal relationship between financial development and economic growth.

$H_0$3: Financial development has not deepened the financial sector.

H_1: Financial development has deepened the financial sector.

1.6. Significance of the Study

This study aims to investigate the relationship between financial development growth rate of economy in Argentina, Brazil and Mexico. According to Ekmekcioglu (2012) Latin America has significantly improved the functioning of its market economy, while further decisive steps towards macroeconomic stability and structural reforms are also enhancing the attractiveness of foreign investments. The structural reforms have integrated most Latin American economies into the globalized world. The main objectives of these developments were to enhance the efficiency of financial sector and increase the role of private sector.

Therefore, this study will be important to utilize this relationship in the case of Argentina, Brazil and Mexico. This is with the view to examine whether financial development has considerably contribute to an increase in investment and savings rate and, ultimately lead to economic growth by assessing the links between the financial progress and economic performance.

Hence, the findings of this study will provide empirical evidence on the impact of financial development on economic growth in Argentina, Brazil and Mexico for policy and research purposes.

1.7. Scope of the Study

This study focusses on the relationship between financial development and economic growth in three Latin America Economies, which are Argentina, Brazil and Mexico. The study will examine the impact of selected financial instruments on economic growth. It will employ time series data covering the period 1988-2012.

1.8. Organization of the Study

The study is structured into six chapters. Chapter one is general introduction and consists of background to the study, objectives of the study, significance of the study and structure of the study. Chapter two is literature review and theoretical framework. It reviews both empirical and theoretical literature. Chapter three is general view of the economy and financial development. Chapter four is methodology, It provides various methods and data use in the study. Chapter five provides empirical analysis and interpretation of results. Chapter six is major summary, conclusion and policy recommendations.

CHAPTER TWO
LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Empirical Review

There are many studies that have investigated the relationship between financial development and economic performance in developed and developing countries. The general consensus is that a well-developed financial system is vital for economic productivities and growth enhancing (Zhang and Wang 2012; Gurley and Shaw, 1967). A sound and functional financial system bridges information gap between surplus spenders (savers) and deficit spenders (investors), promote risks sharing and lowers the costs of transaction (Mirbagheti et al. 2014; Hassan et al. 2011; Goldsmith, 1969). However, some studies have shown that financial development also have the tendency to retard growth (Michael, 2012; King and Levine, 1993), that is the higher returns gain through improved allocation of resources by banks may be affected by decline in saving rates in case of financial sector shocks thereby affecting the level of economic activities.

Goldsmith (1969) pioneered the study on the linkage between finance and economic growth. He investigated the causal linkage between financial development and economic growth. The study covered the period 1860 to 1963, using a sample of 35 countries. The results showed that the value of financial intermediation assets to Gross Domestic Product is a positive and significant determinant of economic performance. Also, the size of the financial intermediary sector is directly correlated with the quality of financial services which the financial sector provides. This study set the pace for further studies finance-growth nexus. However, the period cover lacks the dynamics of the modern financial system in which the results may not be robust.

Chen (2006) investigated the relationship between financial development and economic growth in China. The data used for the study spanned the period 1985–1999. The results showed that China's financial development positively and significantly influence economic growth. Furthermore, he identified two channels through which the financial sector contribute to economic performance. These are mobilization of savings and credit availability. A similar study was conducted by Cheng and Degryse (2007), they examined the impact of the development of banks and non-bank financial institutions on domestic economic growth. They used data covering the period 1995–2003. Their findings showed that banking development has a positive and significant effect on economic growth. The importance of financial sector in the growth process cannot be overemphasized. Nevertheless, there are other complementing factors that need to support the process some of which are not financial.

Guariglia and Poncet (2008) investigated the relationship between finance and economic growth in China. The data used covered the period 1989 to 2003. They used state intervention and market-driven finance as indicators to measure finance. They found that state intervention indicators of financing are negatively associated with economic growth, while the market-driven financing are positively related with economic growth. Similarly, Zhang and Wang (2012) examined the relationship between financial development and economic growth in China. The study used data from 286 Chinese cities covering the period 2001– 2006. The results indicated that most of the traditional indicators of financial development are positively related with economic growth in China. While the importance of finance cannot be overemphasized, the impact in various cities cannot be symmetry.

Similarly, Loayza and Ranciere (2004) analysed the relationship between bank credit and economic growth. There findings revealed that a negative relationship exists between short-term or temporary changes in bank credit and growth in countries that have high rates of financial system instability (proxied by credit volatility and frequency of banking crises). Furthermore, the period of financial instability usually correspond with countries that are liberalizing their financial markets. They opined that the temporary effects of changes in bank credit are compatible with the positive impact that permanent increases have on economic growth over the long term. This

study has shown that financial policies are critical for the functioning of the financial system.

Ozyildirim and Onder (2008) examined the impact of banking sector development on economic growth in Turkey. They used panel data that spanned the period 1991-2000 covering 81 provinces. They found that banking sector development in turkey had a positive effect on per capital local output and that the effect was greater for regions distant from the financial centres. It is evident that banking sector development benefit city centres more the periphery. This shows that financial sector development may be bias towards the periphery provinces.

Leitao (2010) examined the relationship between financial development and economic growth in the European Union Countries (EU-27) and BRIC (Brazil, Russia, India and China) countries. The study used a static and dynamic panel data approach and the data covers the period 1980-2006. The result of the study shows that financial development indicators contribute positively and significantly to economic growth of the study regions. This study though robust, failed to bring out country specific peculiarities.

Anwar and Sun (2011) examined the interrelationship among economic growth, the stock of foreign investment and the stock of domestic capital in Malaysia. The study used simultaneous equations approach and the data covered the period 1970–2007. The study results showed that the level of financial development has contributed to the growth of the domestic capital stock in Malaysia but its impact on economic growth is statistically insignificant. The growth of Malaysian economy can be associated with financial development especially the liberalization of the financial markets. However, used of simultaneous equations for the study may not adequately capture the dynamics of financial sector.

Michael (2012) tested the validity of Schumpeter's prediction that finance promotes growth in South Africa. The study used time series data covering the period 1965-2010. The study employed multiple approaches including Fully Modified Ordinary Least Squares (FMOLS) regression, Two-Stage Least Squares (2SLS) regression, and Error Correction Model and Pairwise Granger Causality test technique. The two

measures of financial development used were domestic credit as a share of GDP measuring the degree of financial intermediary services; and broad money supply as a share of GDP measuring the overall size of the financial intermediary sector. Control variables included in the model are inflation, size of government, openness of economy, and a dummy variable accounting for financial reforms that began in 1980s. The empirical indicated that financial development in South Africa has not promoted economic growth both in the short run and long run. The Pairwise Granger Causality test result supports the assertion that there is a unidirectional causality running from financial development to economic growth. This study seems controversial as other studies findings are on the contrary which further examination of the data and approaches employed.

Savrun (2011) investigated the long run equilibrium relationship and cointegration between real income, financial development and international trade in Turkey. International trade was proxied by exports of goods and services. The Johansen cointegration test indicated that a long run relationship exists between real income and its regressors, that is, financial development and international trade proxies. Real income in Turkey converges to its long term equilibrium level significantly at various levels by the contribution of financial sector and international trade. The Granger causality tests suggested that a change in financial sector precedes a change in real income, which supports the validity of supply leading hypothesis in Turkey. This study supports the assertion of positive relationship between financial development and economic growth.

Huiran and Wang (2013) applied a Bayesian dynamic factor model to examine the relationship between financial development and economic growth in 89 selected countries. The study covered the period 1970 to 2009. They estimated the common, country specific and idiosyncratic factors that drive the dynamics and co-movement of financial development and economic growth in three different income groups, namely industrial countries, emerging market economies and other developing countries. The results showed that the common factor played a more significant role in explaining the changes of output growth in Industrial Economies and Emerging Market Economies, but not so in Developing Countries. Furthermore, financial development variability was mainly driven by the country and idiosyncratic factors.

The level of financial development across the three selected region are different and pose a challenge on the choice of indicators and the likely impact they may have on economic performance.

Mirbagheri et al. (2014) examined the role of financial development on economic growth of selected Economic Community Organization (ECO) countries (Islamic Republic of Iran, Azerbaijan, Afghanistan, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, Turkey, Turkmenistan and Uzbekistan). The data used covered the period 1990-2012. The econometric approach employed is Pedroni Panel cointegration tests and panel data analysis. The results of the estimated model showed that market capitalization and stocks traded have positive and statistically significant effects on output levels with a coefficient of 0.0055 and 0.033, respectively. The estimated financial development indicators of domestic credit provided by banking sector and domestic credit to private sector coefficients are 0.15 and 0.08, respectively. Other variables included in the model which include capital stock per labour force; secondary enrolment (% Gross) and general government consumption expenditure have positive effect on output while output per labour force has negative effect on output. The finding of this study indicates that financial sector development play a dominant role in the growth of economies across the globe though the coefficient of this study are relatively low.

Mhadhbi (2014) examined the relationship between financial development and economic growth using 110 selected countries in developed and developing countries. The study employed dynamic panel using Generalized Method of Moments. The data covered the period 1973-2012. The result obtained shows that the variables that positively and significant influences economic growth in selected countries are those that reflects the level of availability of the banking system. In addition, the credit granted by the financial system to the private sector, though significant, has a negative influence on growth. The variable financial deepening of the economy seems to depend positively on economic growth for developing countries and negatively for developed country.

On studies that specifically relate to Argentina, Brazil and Mexico, De Gregorio and Guidotti (1995) examined the performance of financial development in Latin

America. There findings showed that the high rate of bank credit to GDP ratios during the 1970s and 1980s had a negatively affect economic growth in the region. They attributed this to unnecessary over supply of credit due to inadequate regulation and deposit insurance policies that later degenerated into banking crises. However, the influence of bank credit on growth is based on multiple channels some of which are complex and implicit in nature.

Raynal (2007) investigated the impact of financial development in economic growth in Latin America. The variables used include productivity, capital growth, income inequality and education. The data used covered the period 1971-1998 obtained from 12 selected Latin American countries. The indicators of financial development included in the study are private sector credit as ratio of GDP and bank deposits as ratio of GDP. He found two ways causality between financial development and economic growth. Furthermore, he used instrumental variables to measure financial development to address the problem of endogeneity in which the results differ significantly. He found that financial development has no significant effect on GDP per capita growth. Also, the results showed that financial development has a positive effect on income inequality and on the percentage of the population that completed secondary education. This finding indicates that financial development has impact positively on economic growth in Latin America. However, countries from the region have had their share of financial crisis and the attendant impact on growth indicating that finance-growth nexus is rather time specific.

Kabir et al. (2011) examined panel regressions with cross-sectional countries and time-series proxy measures to study linkages between financial development and economic growth in low, middle and high-income countries as classified by the World Bank. They also performed various multivariate time-series models in the frame of VAR analysis, forecast error variance decompositions, impulse response functions, and Granger causality tests to document the direction and relationship between finance and growth in these countries. They found that a low initial GDP per capita level is associated with a higher growth rate, after controlling for financial and real sector variables. A strong long-run linkage between financial development and economic growth was established. Specifically, as predicted in neo-classical models, domestic gross savings is positively related to growth. Domestic credit to the private

sector is positively related to growth in East Asia and Pacific, and Latin America and Caribbean, but is negatively related to growth in high-income countries. Using Granger causality tests they found that in the short run, there was two-way causality between finance and growth in all regions except Sub-Saharan, East Asia and Pacific. The Sub-Saharan Africa, and East Asia and Pacific have causality that runs from growth to finance and also have the lowest GDP per capita in the selected sample. However, there is a long-term association between finance and growth, as shown in the regression. This study though with a wider coverage, employed a short run analysis (VAR) which may not depict the dynamics of financial development in the long run

Similarly, Campos et al. (2012) investigated the impact of financial liberalization on economic growth in Argentina. The study used time series covering the period 1896 to 2000. The result of the study showed that the long-run effect of financial liberalization on economic growth is positive while the short-run effect is negative, though substantially smaller. This study seems to cover a wider period that may not bring out the financial sector dynamics over time.

A number of studies focused on the causal linkage between financial development and economic growth in developed and developing countries. However, findings of the studies present conflicting results. For instance, studies by Esso (2010) provided evidence to show that the causal relationship between financial development and economic growth is a function of the level of economic development and macroeconomic stability (Hassan et al., 2011).

Jenkins and Katircioglu (2010) examined the causal linkage between financial development indicators and economic growth in Cyprus. The study used bound test approach and the variables included are financial development, international trade and economic growth. The findings of their study showed that there is no causality running from either direction of financial development indicators to economic growth or vice versa. Similarly, Kar et al. (2011) investigated the causal linkage between financial development and economic growth in selected Middle East and North African (MENA) countries. The results did not show any clear direction of

causality among the six financial development indicators that were used for the study.

Al-Yousif (2002) examined the causal linkage between financial development and economic growth in 30 selected developing countries using both time series data and panel data. The results showed evidence of causal relationship between financial indicators and economic growth in the selected countries. Shan et al. (2001) examined the causal linkage between financial development and economic growth in nine selected Organization for Economic Cooperation and Development (OECD) countries and China. The result showed a bi-directional causality in five countries and uni-directional causal relationship running from economic growth to financial development in three countries. There was no causal linkage between the variables in one country. In the case of China, there was bi-directional causal relationship financial development and economic growth.

Furthermore, Blanco (2009) investigated the causal linkage between financial development and economic growth in 18 selected Latin American countries. A Vector Autoregressive Model (VAR) analysis was used. The results showed a bi-directional causal relationship exists between the variables in the middle income group and countries with strong rule of law and creditor rights. The overall results indicated that there is a uni-directional causal linkage running from economic growth to financial development.

Blackburn and Huang (1998) established a two-way causal relationship between financial development and economic growth. Similarly, Khan (2001) found a two-way causality between finance and economic growth. Luintel and Khan (1999) used a sample of 10 developing countries and found that the causality between financial development and output growth is bi-directional. Furthermore, Calderon and Liu (2000) examined the causal linkage between financial development and economic growth in a sample of 109 developing and developed countries. They found that financial development Granger causes economic growth for developed countries, but the Granger causality is two-way for developing countries.

Overall, the results of various studies using different econometric approaches provided mixed findings. This may not be unconnected with the type of data used, empirical technique of data analysis and level of country economic development. However, the overriding consensus is that financial development potentially has the capacity to impact positively on economic performance. The performance of Latin American countries since the economic reforms (in particular financial reforms) that began in 1990s attests to the fact that finance is critical for growth. This relation is reinforced by the experience of the Asian Tigers where finance played a key role in their economic transformation.

2.2. Theoretical Review

The work of Goldsmith (1969), McKinnon (1973) and Shaw (1973) laid the foundation for contemporary researches on the role of financial development on economic performance. The traditional growth theory argued that economic development requires innovations in the relevant sectors of the economy. But the works Goldsmith, McKinnon and Shaw focused on the innovations in the financial sector provide a driving force for dynamic economic growth. In other words, exogenous technological progress determines the long-run growth rate of economies.

McKinnon (1973) opined that financial markets liberalization allows for financial deepening which is a reflection of an increase use of financial intermediation by savers and borrowers. The monetisation of the economy allows for efficient flow of resources among people and institutions over time. This encourages savings and reduces constraint on capital accumulation and improves allocative efficiency of investment by transferring capital from less productive sectors to more productive sectors. The efficiency as well as the investment rate in the economy is expected to rise with the financial development that financial liberalisation tends to promote. The potential benefits of innovations in financial development include more access and low cost of capital, allocation of credit by capital markets rather than by public authorities and commercial banks, the lengthening of financial maturities, and the elimination of fragmented and inefficient markets.

Balassa (1993), and King and Levine (1993) asserts that development of the financial system in any economy facilitates portfolio diversification for savers thereby reducing risk and offers more choices to investors increasing returns. The financial system would be able to collect, process and analysed information on productivity-enhancing investment projects in a more cost effective manner which has the potential of reducing the cost of investment for individual investors. The productive capacity of the economy is determined by the quality as well as the quantity of investment and installed capacity utilisation. Also, easing credit constraint, particularly working capital is expected to improve the efficiency of resource allocation and thereby reduce the gap between actual and potential output.

It is important to note that financial systems provide financial related functions, it must be pointed out that the impact of such functions are largely country specific and cannot be generalized in terms of how well they are provided. However, three basic features of financial systems and its development pattern are perceptible on the potential impact of financial development on economic growth. These include the level of financial intermediation; the efficiency of financial intermediation and the composition of financial intermediation.

The extent to which financial system can perform their critical function of financial intermediation in the economy largely depends on the size of the financial systems innovations and participation in relation to the level of economic growth and activities. A strong and large financial system provides an opportunity to take advantage of economies of scale that has the potential to significantly reduce the cost of operations and financial intermediaries. As more individuals join in the provision of financial intermediary services, it will produce better information and positive externalities for growth. Greenwood and Jovanovic (1990) and Bencivenga and Smith (1991) emphasised the importance of wider participation of individuals in financial intermediaries in their theoretical models of finance-growth nexus. A larger financial system according to them can ease credit constraints, provides greater ability of firms to borrow, provide profitable investment opportunities.

Allen and Gale (1997) further argued that large financial system would be more effective at allocating capital and monitoring the use of funds as there are significant

economies of scale. Greater availability of financing can increase the resilience of the economy to external shocks thereby, helping to smooth consumption and investment patterns. More generally, a financial system plays an important function in transforming and reallocating risk in the economy. Besides cross-sectional risk diversification, a larger financial system may improve inter-temporal risk sharing. This can be achieved by expanding financial system activities to more individuals with a better allocation of risks, which can in turn boost investment activity in both physical and human capital, leading to higher growth rates. However, the efficiency of financial intermediation largely depends on the channels linking the size of the financial system and growth which effectively assume a high quality of financial intermediation.

Stiglitz and Weiss (1992) demonstrated that information gathering is one of the key functions of financial system which in turn determines its financial efficiency. Asymmetric information, externalities in financial markets and imperfect competition can lead to sub-optimal levels of financing and investment, an inefficient allocation of capital, or have other undesirable consequences such as fraud or illiquidity which are detrimental to economic growth. However, the market imperfections can be address by legal and institutional means (including competition policy). This will enhance the efficiency of financial markets and contribute to economic growth.

The composition of financial intermediation relates to the maturity of financing assets available and the level of the development of capital markets and institutional investors such as pension funds and insurance companies. Modigliani and Miller (1958) observed that the existence of liquid equity markets make agents to save through equities as they offer higher long-term returns. Similarly, Jacklin (1987) argued that the maturity of loans and bonds affect the extent to which certain investments may be profitably exploited. The replacement of banks with markets appears to be as a result of changes in the cost of intermediation. The potential channel for the composition of financial intermediation as it affects the efficiency with which firms allocate resources according to Shleifer and Vishny (1997) is through its impact on corporate governance.

A growing contemporary theoretical review shows that financial development through financial intermediation innovations aid the process of savings mobilization, allocates resources, diversifies risks, and contributes to economic growth (Huiran and Wang, 2013; Bittencourt, 2012; Classensetal, 2011). Furthermore, the new growth theory argued that financial intermediaries and markets appear endogenously in response to market incompleteness and hence, contribute to long-term growth. Financial institutions and markets, which arise endogenously to mitigate the effects of information and transaction cost frictions, influences decisions to invest in productivity-enhancing activities by evaluating prospective entrepreneurs and funding the most promising enterprises.

Beck and Levine (2001) identified three important financial development indicators that are essential in explaining the differences in economic performance of countries in developed and developing countries. These financial development indicators include bank credit to the private sector, stock market activities, and the ability of the country's legal system to protect creditors and investors. However, Levine (2000) argued that for financial development to influence economic performance, the impact will flow mainly through total factor productivity but not through capital accumulation or savings.

Levine (2005) provided channels through which financial sector development can determine economic growth. He identified five fundamental channels which include:

- Access to symmetry information relating to potential investment opportunities for efficient allocation of resources especially capital;
- Supervision of financial institutions and ensure that the adhere to good corporate governance principles;
- Reducing the level of risks;
- Mobilizing savings from surplus spenders; and
- Facilitating the exchange of goods and services within the economy.

From the foregoing, one can deduce that the core theoretical argument on the role of finance on economic development is centred on two key issues. First, greater financial depth (that is, higher ratios of total financial assets to national income or

output) is associated with higher levels of productivity and income per capita. Secondly, the financial depth is associated with a more advanced financial structure. By implication, there is usually a more away from banks towards non-bank financial intermediaries, and then both banks and non-banks toward stock markets.

The dismantling of the traditional development finance theory (bank-based systems, directed credit, public development banks, closed capital accounts, capped interest rates, and active monetary intervention) established in developing countries in the post-War decades later became a core element of economic reforms in recent times. The new standard model of financial structure reflects the imperatives of 'financial development' based both on financial market liberalisation towards open capital markets. These reforms were expected to raise savings and investment levels, increase the growth rate and reduce macroeconomic instability.

Therefore, financial development structures are different across regions and countries. It is difficult to lay any claim that a unique relationship exists between financial development and economic growth in different countries. What is clear however is that banks remain central to the financial intermediation process.

CHAPTER THREE
ECONOMIC AND FINANCIAL OUTLOOK OF ARGENTINA, BRAZIL, AND MEXICO

3.1. Financial and Economic Outlook of Latin America

The three selected countries that this study focuses on are within Latin American region. The three countries seem to share experiences, the pattern and level of financial development and economic growth. Garcia et al. (2002) analysed the level of financial development in Latin America in comparism with other regions of Asia and Eastern Europe. They observed that Latin American countries lag behind Asia and Eastern Europe in terms of financial depth. The available evidence of financial development in Latin America shows that financial system are bank based and the stock market is not well developed as it is in Eastern Europe. They provided statistics to show that in the 1990s the average level of credit to the private sector in Latin America was 28% of GDP. This is low when compared to 72% in Asia and 43% in the Middle East and North Africa.

The economies of Latin America had underdeveloped financial market in 1970s and 1980s as observed by Marichal (1997). The underdevelopment of the financial sector had been attributed to the strong government intervention in that sector in the period. Latin American governments use the banking sector to finance their budget deficits through borrowing and implicit taxation. The government also used the banking sector to subsidize sectoral development projects. This created a bias to refinance non-performing loans, and benefited bad banks and bad borrowers.

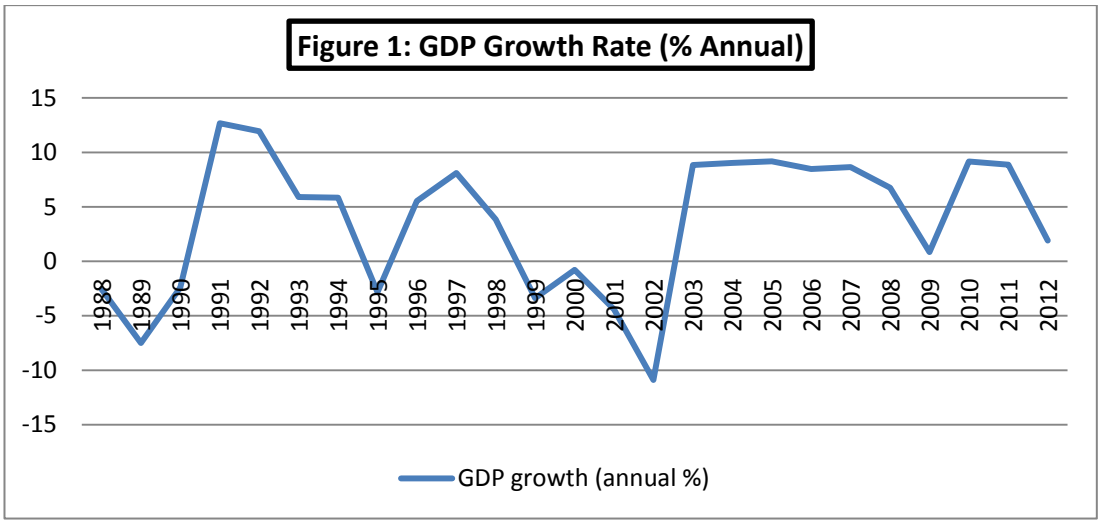
Furthermore, Mas (1995) showed that the activities of government in the banking sector in four Latin American countries (Argentina, Brazil, Nicaragua, and Venezuela) created the wrong incentives. The bank regulations allowed unprofitable banks to continue raising deposits even at the state of insolvency. The policy changes in the banking sector in 1990s according to De la Torre et al. (2006) focussed on bank privatization. The incentives generated were geared toward a market-based financial system.

The Latin American countries economic performance for over two decades has been attributed to some factors including political and economic. The economic policies pursued by the region have long-term development prospects that mitigate short-term risks and shocks. There are fundamental differences in economic condition of countries within Latin America (with evidence showing that South America performs better than Central America, Mexico and the Caribbean). There seems to be a strong external demand especially from emerging economies like China, in combination with vital internal demand have resulted in an average annual GDP growth rate of almost 5.0% between 2003 and 2008. Other factors that contributed to remarkable economic performance include stable macroeconomic management that created the fiscal space to manage the effects of the global financial crisis without jeopardising fiscal sustainability. The public debt in the region shrank between 2000 and 2007 averaging about 15% points of GDP. The fiscal balance recovered from an overall deficit of 2.4% to a surplus of 0.4% of GDP. The Latin America's grow in 2011 was 4.4% and decline to 4.1% in 2012 (UNECLAC, 2012).

The macroeconomic policies coupled with higher primary export prices enjoyed by the economies of the region strengthened macroeconomic stability and provided resources for implementing economic policies, provision of basic public services and anti-poverty programmes.

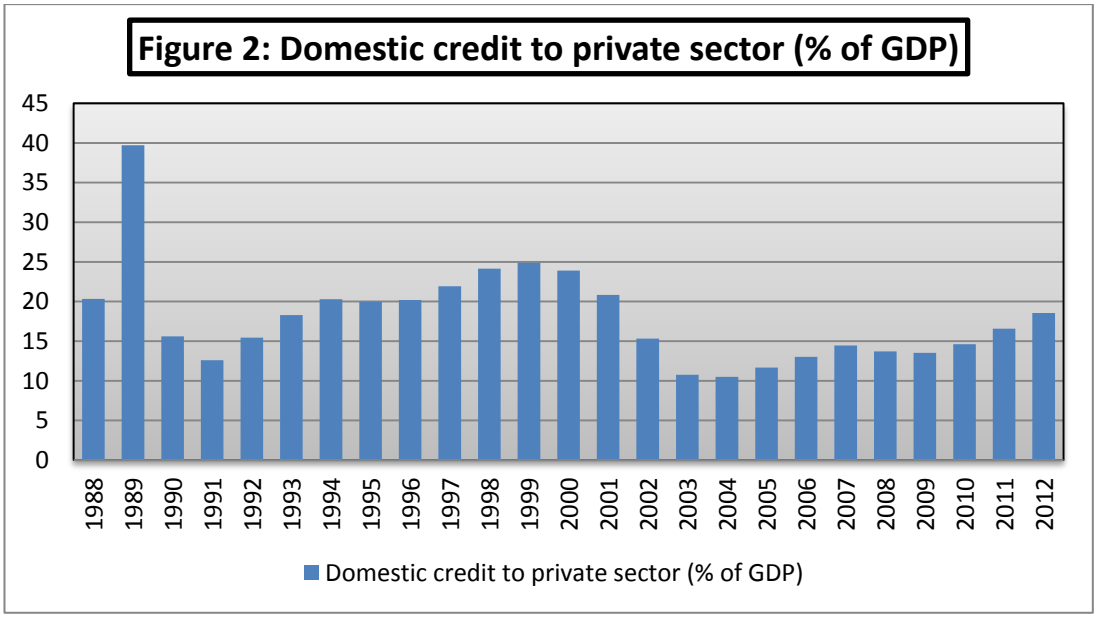
3.2. Financial and Economic Outlook of Argentina

The economy of Argentina's experienced high inflation, an overvalued currency and an unfriendly policy regime in before the reforms in 1990s. The greatest risks to the business environment were from capital controls, trade restrictions, and currency devaluation. According to figure 1 below, the economic growth rate in Argentina was negative in 1988, 1989 and 1990 with the rates at -2.6%, -7.49% and -2.5% respectively. It peaked in 1991 (12.7%). Between 2005 and 2012 the rate average 5.4%.



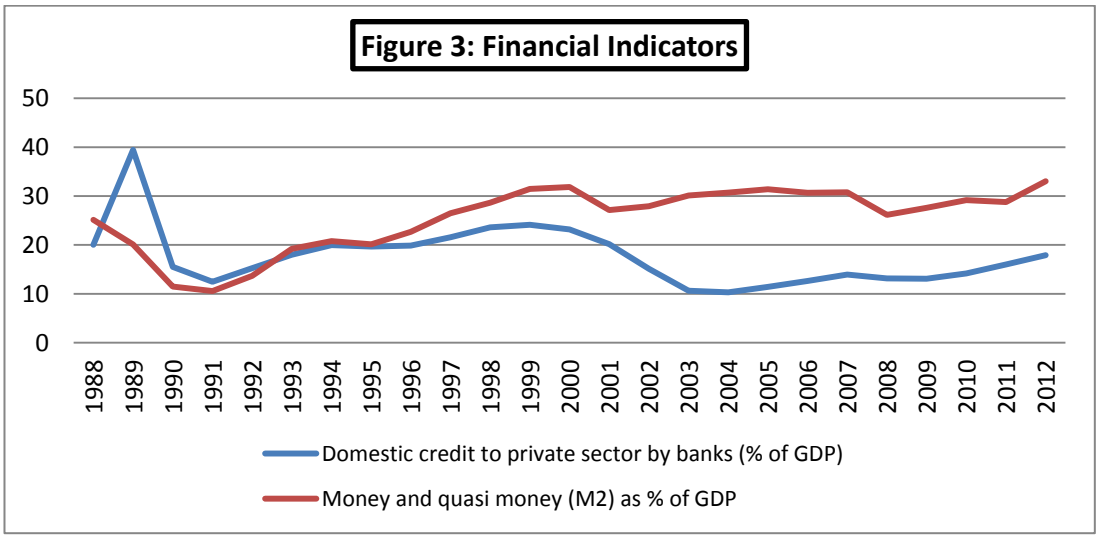
Source: WDI, 2013

On monetary indicators, monetary base expansion, at a cumulative annual 34% to October and 38.2% year-on-year between October 2011 and October 2012, outstripped nominal GDP growth. The factors driving monetary base expansion were currency purchases and public sector funding. Monetary aggregates M2 and M3 rose at an average yearly rate of 31% and 30%, in 2011 and 2012 respectively, during the same period and grew by 34.3% and 33.5%, respectively, between October 2011 and October 2012 (WDI, 2013).



Source: WDI, 2013

The domestic credit to the private sector (as % of GDP) remained above 10.0% in the period under review. Between 1993 and 2001 the rate was considerably high (Figure 2). Similarly, the domestic credit to private sector by banks (as % of GDP) remained above 10.0% and average 14.2% over the period (Figure 3). The broad money supply (money and quasi money as ratio of GDP) averaged 14.6% between 1988 and 1992. However, the value increased to above 25% between 2000 and 2012 (Figure 3).

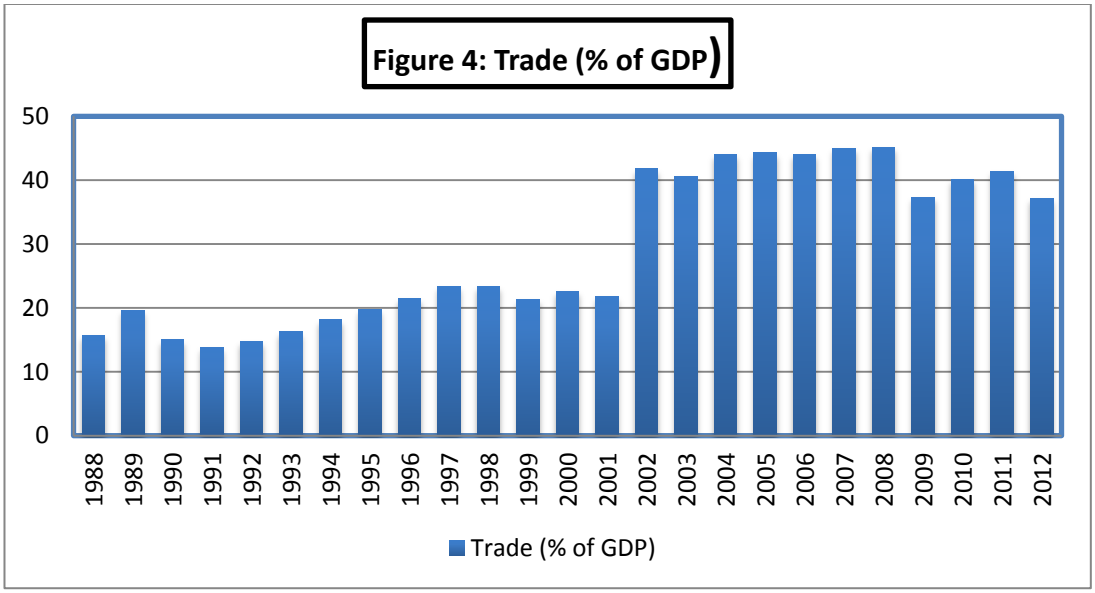


Source: WDI, 2013

The inflation in Argentina by 2011 was above the regional average. Average wages climbed by nearly 25%, reinforcing the uptrend in real wages. Private sector wages was also above average 2011 and 2012. The public sector wages grew at a rate below the average. The Argentina's budget forecasts of 4.4% economic growth was projected for 2013 and was also achieved. The average exchange rate of 5.10 pesos to the U.S. dollar, a trade surplus of $13.35 billion, and 12-month inflation of 10.8% was the indicators for 2013 (WDI, 2013).

The Argentina economy has experienced higher balance-of-payments current account balance and substantially lower capital outflows over the years. The international reserves as at 2011 stood at US$45.238 billion. The total external debt (public and private) was equivalent to 31% of GDP by 2012, which is a 0.9% less during the same period the previous year and the lowest in 19 years (WDI, 2013). The trade (% of GDP) increased continuously in the period under consideration. For

instance rate averaged 16% between 1988 and 2001 and averaged 40.0% between 2002 and 2012 (Figure 4).



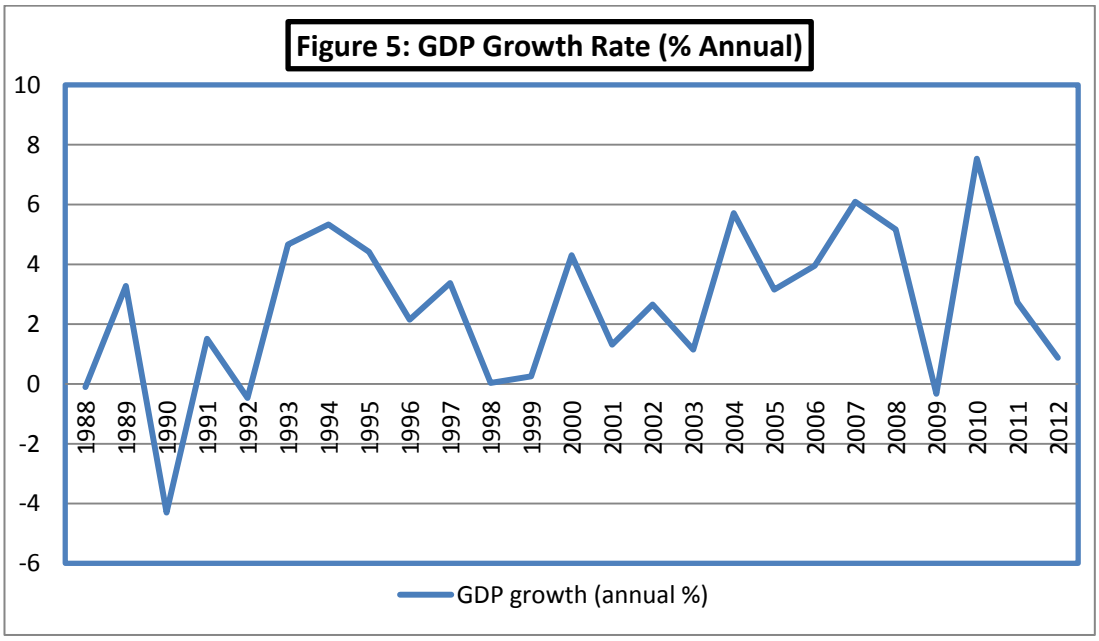
Source: WDI, 2013

3.3. Financial and Economic Outlook of Brazil

The Brazilian economy before the economic reforms of 1990s shows features of large and well-developed agricultural, mining, manufacturing and service sector. The economy is larger than those of other South American countries and has been able to expand its presence in global markets. Beginning with economic reforms of 1990s and in particular the year 2003, the Brazilian economy has progressively improved its macroeconomic stability, foreign reserves, declining debt profile, manageable inflation rates and commitment to fiscal responsibilities. The Brazil economy recovered from economic crisis of 1998 that caused instability in the global market and also faced similarly market pressures in 2002.

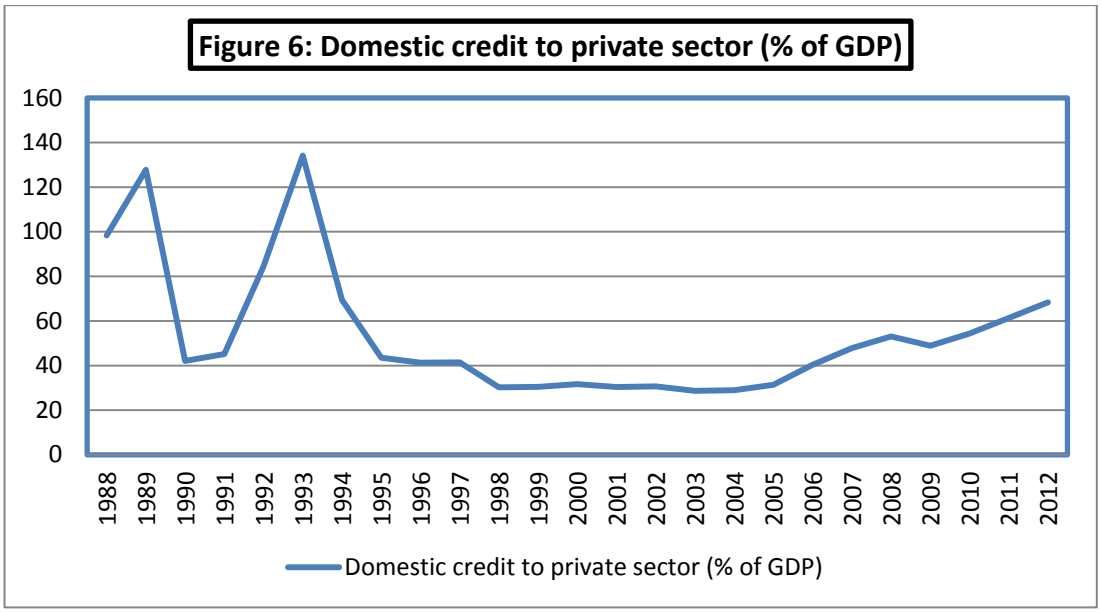
The Brazil economy gross domestic product was US$2.024 trillion in 2009. The gross domestic product per capita on PPP basis in Brazil stood at US$10,200 in 2009 (CIA 2009). This amount makes Brazil economy the 10th largest economy of the world when we compare the level of gross domestic product volume among

countries of the world. The gross domestic product can be described as the market value of all the goods and services produced within a country in a given fiscal year. From Figure 5, we can deduce that economic growth rate in Brazil was negative in 1988, 1990 and 2009 with the rates at -4.3%, -0.47% and -0.33% respectively. It reached its maximum in 2010 with about 7.5%. It is evident that the economic growth rate in Brazil has been lower than that of Argentina averaging 3.2%.



Source: WDI, 2013

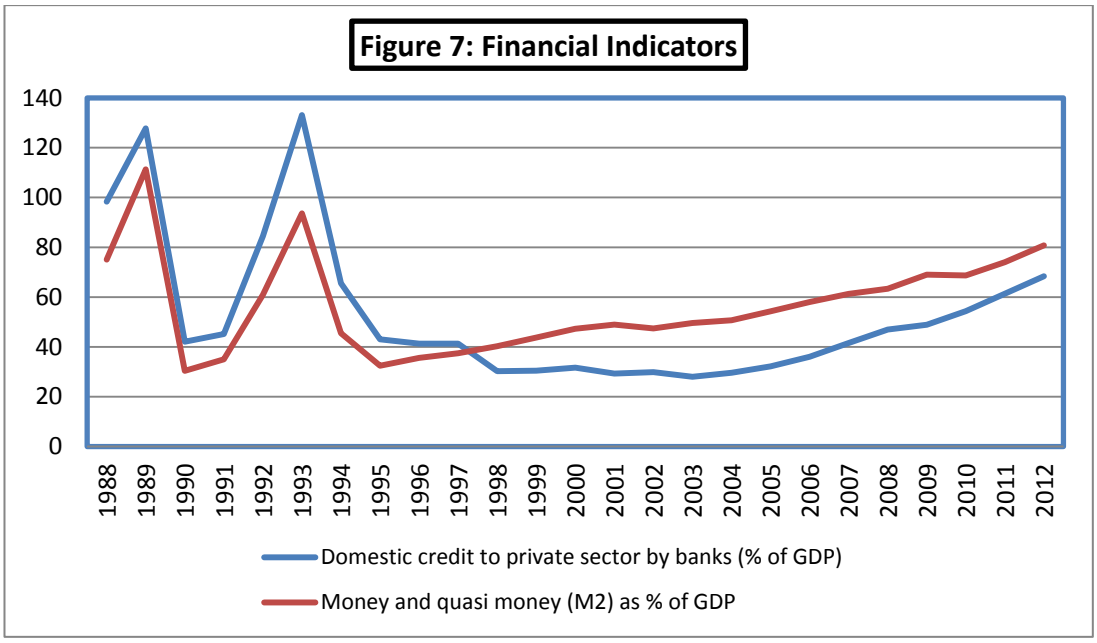
Inflation in Brazil over time especially from 1964 to 1994 was relatively high. The primary cause of the high levels of inflation was the weak and unstable macroeconomic fundamentals in Brazil. The government activities of printing money and easily spend same in executing government budget fuel inflation Brazil. The results of such actions made it difficult to understand and address inflation in Brazil. The headline inflation in Brazil exceeded the upper limit set by the Brazilian central bank as the variability interval. The core inflation rose slightly and lapsed below the Brazilian central bank's target of 3%, in which the medium to long-term inflation expectations are targeted (ECLAC, 2012).



Source: WDI, 2013

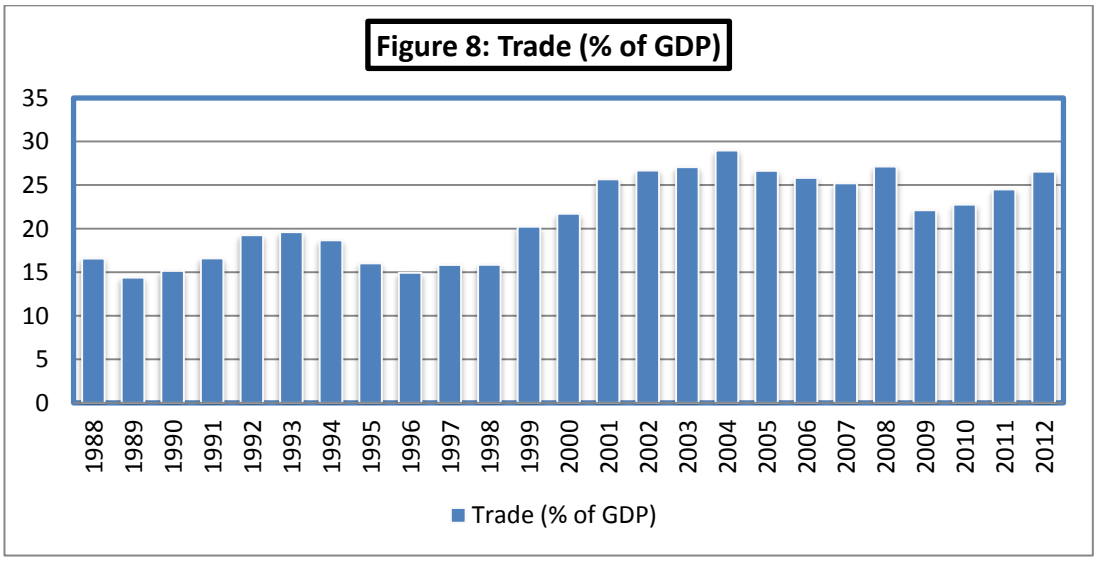
The domestic credit to private sector (% of GDP) was high between 1988 and 1993. It decline considerable between 1995 and 2006. It however, recorded marginal increase between 2008 and 2012 (Figure 6).

In terms of the economic index of freedom, a total of 179 countries were listed on the economic index of freedom and Brazil takes the 113th place. The economic freedom score for Brazil was 55.6 (out of 100) in 2012. The indication is that Brazil is relatively not a free country in relation to freedom of economic activities and investment. The Brazilian overall score on economic index of freedom was below the regional and world averages. The Brazilian government still carry out many and large projects across the Brazilian economy. The level of efficiency and overall quality of government service provision remained poor. This is despite large amount of government expenditure taking as percentage of GDP (WDI, 2012).



Source: WDI, 2013

The domestic credit to private sector by banks (% of GDP) and money and quasi money (M2) (% of GDP) was high between 1988 and 1994. It was averagely lower between 1995 to 2012 (Fig. 7). The trade (% of GDP) as shown in Fig. 8 enjoyed boom between 2001n and 2008 (Fig. 8).

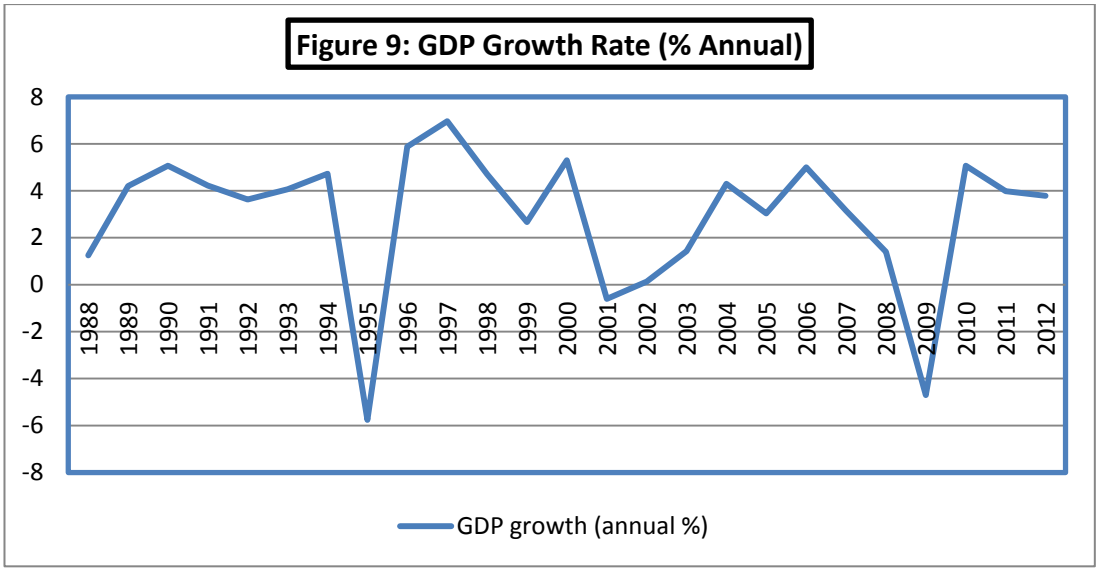


Source: WDI, 2013

3.4. Financial and Economic Outlook of Mexico

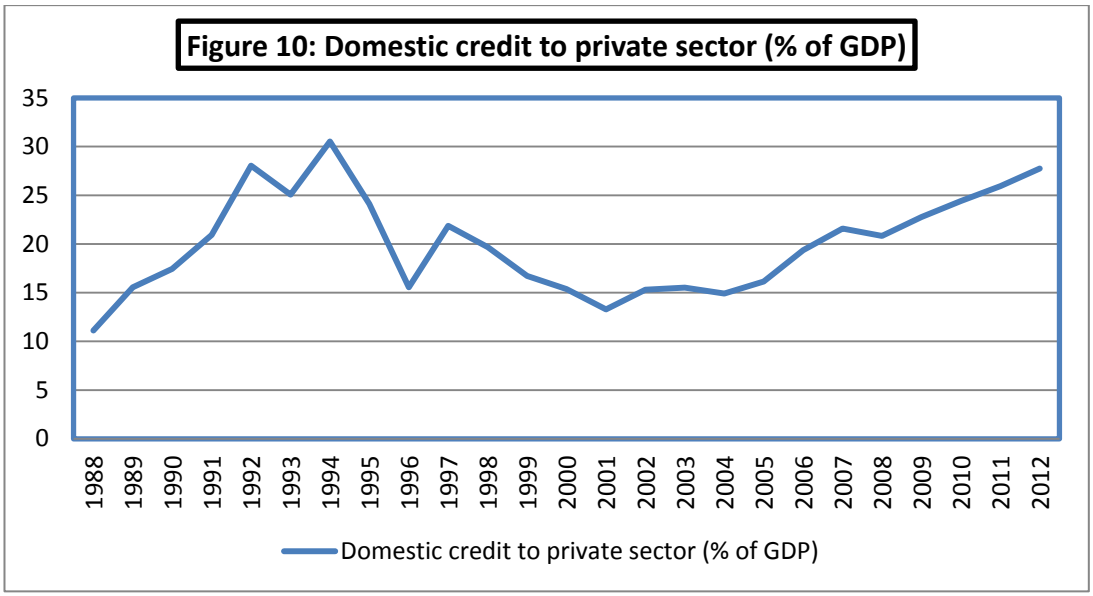
The government policies over time in Mexico enhanced its macroeconomic and financial performance. Marichal (1997) observed that Mexico sources of credit were limited, high concentration of the financial market, and modern financial markets did not start developing until the 1900s. Only 27% of the population had access to financial services, which was lower than what obtains in other Latin America countries like Chile (42%) and Brazil (56%).

Mexico's macroeconomic policies are averagely adjudged to credible where the markets have helped the country to avert lingering consequences from the global financial crisis and shocks. The economy has been growing at above its potential rate since 2010 (OECD, 2013). Growth has been supported by expanding domestic demand and greater export market penetration on top of substantial improvements in relative unit labour costs, driven by moderate wage increases.



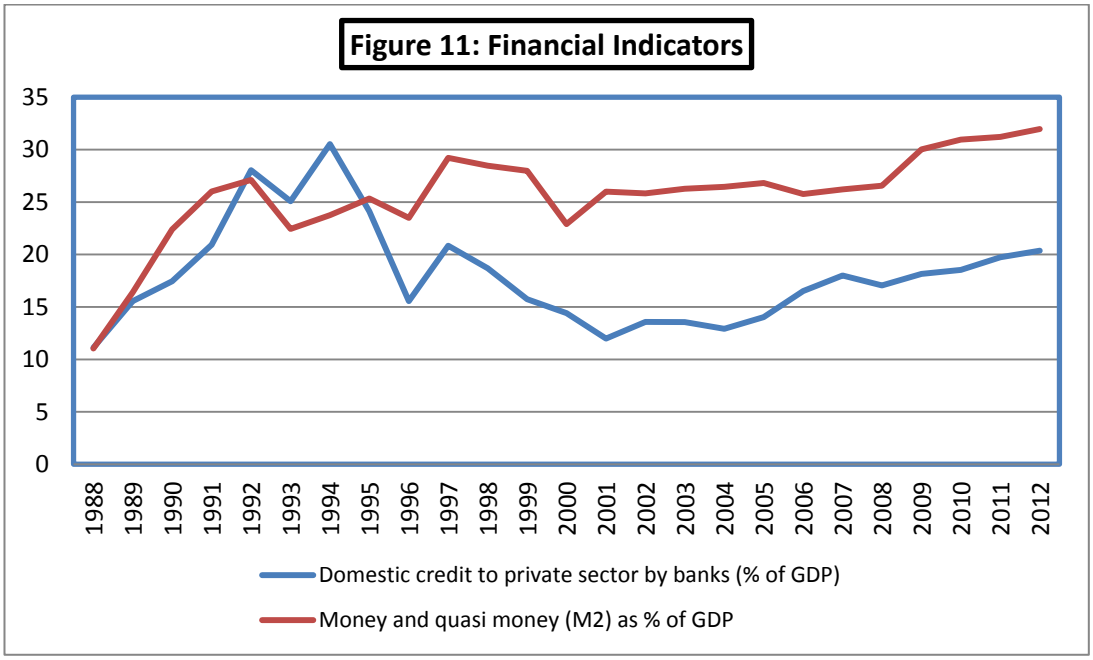
Source: WDI, 2013

The GDP at current prices (MXN) billion stood at 11,930.2, with growth rate of 5.3%, 3.9% and 3.8% in 2010, 2011 and 2012 respectively (Fig. 9).



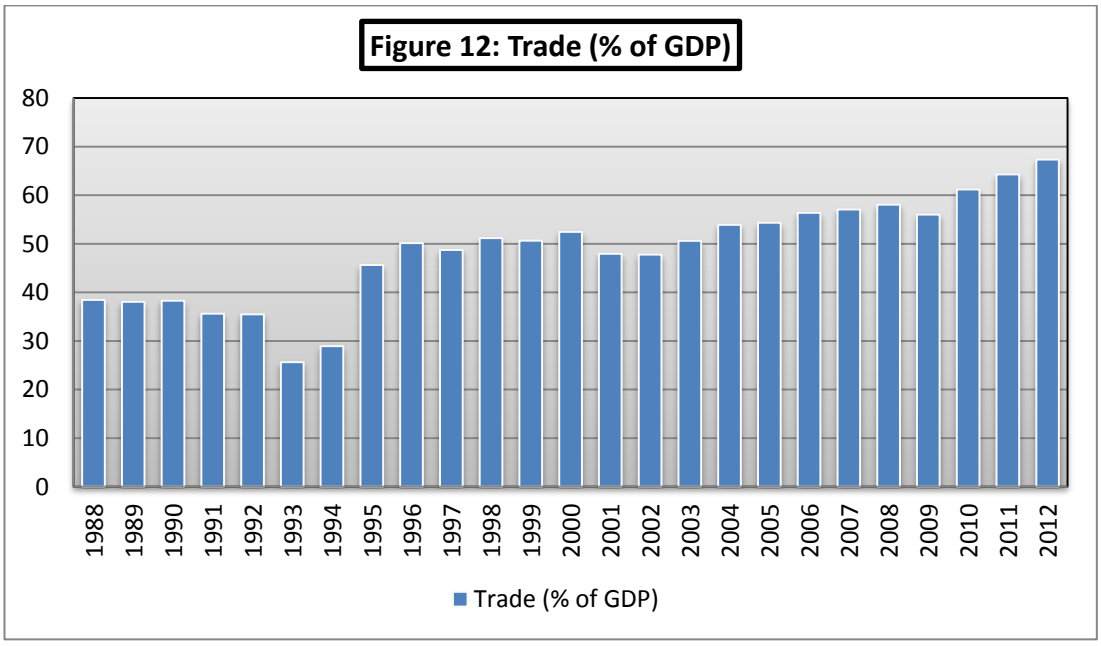
Source: WDI, 2013

The domestic credit to private sector (% of GDP) was high between 1988 and 1995 and though it decline between 1999 and 2004, it remains relatively high between 2007 and 2012 (Fig. 10). The domestic credit to private sector by banks (% of GDP) was highest in 1994 (32.0%). The money and quasi money (M2) (% of GDP) has considerable remained high (Fig. 11).



Source: WDI, 2013

The banking sector in Brazil has remained relatively less concentrated. About 7 of the 43 banks in Brazil hold about 80% of the banks total assets. There seems to be some form of risk hindering competition. This to a large extent explains the relatively low credit penetration and consumer credit. Also, the weaknesses exhibited by the poor legal framework make contract enforcement difficult, thereby limiting the capacity of small and medium scale enterprises to utilise available collateral. Available data on financial indicators show that the return on asset was 1.3% and 1.5% in in 2008 and 2012 respectively. The return on equity was 13.0% and 14.0% in 2008 and 2012 respectively. The capital adequacy that is explain by regulatory capital/risk and weighted assets was 15.3% and 15.9% in 2008 and 2012 respectively. The liquidity explained by deposits-loans ratio was 127.1% and 117.0% in 2008 and 2012. The non-performing Loans as explain by non-performing loans to total loans ratio was 3.2% and 2.5% in 2008 and 2012 respectively (OECD, 2013).



Source: WDI, 2013

The trade (% of GDP) in Mexico has enjoyed considerable and continuous increase over the years (Fig. 12). Mexico seems to enjoy high rate of trade (% of GDP) compared to Argentina and Brazil. The exports and imports of goods and services in 2009 was 3,295 and 3,469.5 current prices (MXN) billion respectively. The growth in exports declined from 21.7% in 2010 to 4.7 in 2013. Similarly, growth in imports

declined from 19.7% in 2010 to 4.8 in 2013. The net exports stood at -174.0 current prices (MXN) billion in 2009, with -0.1% growth rate in 2013 (OECD, 2013).

3.5 Theoretical Framework

The proponents of financial development through liberalization of the financial markets have lay emphasis on two main channels through which financial development can increase private investment. The first is through increase in the mobilization, availability and flow of credit by banks to investors and can be achieved through removal of interest rate ceiling and increase private savings. The second is greater control over investment projects as a result of higher cost of capital that often increase the marginal productivity of investment (McKinnon, 1973). Addressing financial repression improves bank efficiency, safeguarding positive real interest rates, eliminating excess reserves requirements and the elimination of mandatory credits allocation (McKinnon, 1989). The companies as a matter of fact will not be under any form of restriction in their investment decision based on their savings capacity in the form of reinvested earnings (de Melo and Tybout, 1986).

Other theoretical views have expanded the main propositions of McKinnon and Shaw ideas on financial development. For instance, the works of Kapur (1976) and Mathieson (1980) focused on investment levels, Galbis (1977) and Fry (1988) focused on investment quality. However, Wijnbergen (1983) and Taylor (1983) are sceptical on whether indeed liberalization of the financial markets will increase the level of financial intermediation. Their argument is centred on the effect of changes in market regulations that are not subject to reserve requirements that apply to banks. Furthermore, changes in the time deposit and secondary market will reduce the total amount of funds available for the private sector. As a result of the likely limited access of the private sector to bank credit, a fundamental change in the secondary market of the banking system will greatly reduce the availability of credit to except the liberalization of the banking sector addresses the issues that may be bias against small credit borrowers in the economy.

The specific experiences of the liberalization of the financial markets across countries of the world provide evidence to show that liberalization process including

the effect. In many of the developing countries and emerging countries where both market and non-market imperfections exist within a broad macroeconomic framework and liberalized financial market, there are other factors aside the quantity and cost of credit that determine investment decisions of private firms according to Mosley (1999).

However, there seems to be a general consensus on the fact that liberalization of financial markets has the capacity to promote greater efficiency in the allocation of financial resources especially viewing it from the perspective of commercial banks profitability. The work of Williamson and Mahar (1998) showed that the impetus upon which the work of McKinnon and Shaw was predicated upon as a drive for savings seems difficult for banks to achieve.

In general, economic theory postulates three awards at the imact of financial activity on whole economic performance. First, the payment methods are the least expensive services offered by the financial system (Kindleberger, 1993). Second, a level of effect, where economic activity rises and thus saving resources can be a source of investment financing. Schematically, we have:

Financial development → Capital accumulation→ Economic growth

Thirdly, an allocation effect, that financial development ameliorate the allocation of resources for investment. Schematically, we:

Capital accumulation → Economic growth
↑
Financial development

Theoretical findings on the relation between financial development and growth have shown that financial intermediation is likely to have positive effects on growth. The major summary of the theoretical literature can be categorized into three key issues:

- Effect of liberalization versus financial repression on economic growth (Ang and McKibbin, 2007; McKinnon 1973; Shaw, 1973)
- Impact of financial structure on economic performance (Levine, 2002; Mayer, 1987; Gerschenkron, 1962)
- Effect of capital account liberalization on economic growth (Kose et al., 2006; Edison et al. 2002; Edwards, 2001).

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1. Analytical Framework of the Model

Growth models have provided strong relationship among capital, labour and technological development (Katircioglu, 2010; Blanco, 2009; Ang and McKibbin, 2007). The Schumpeterian growth model on finance-growth nexus provided a robust foundation for analysis. Carlin and Soskice (2006) presented an overview of Schumpeter's theory on the relationship between financial sector development (through technological progress) and economic growth in a model. For instance, given the model:

$$Y = X(\lambda, \varphi) \quad 4.1$$

In equation 4.1, Y represents financial development (technological progress as a function of X [which represents research and development (R&D)]. The parameter 'λ' represents financial innovation that is made possible through expenditure on R&D, while 'φ' represents increase productivity as a result of financial innovation in the economy. The critical components of the R&D are given as exogenous by the investor and include capital per unit efficiency, real interest rate, discounted value of expected returns, and financial institutions characteristics in the economy. The research and development parameter (X) was further expanded to include:

$$X = f(\lambda, \varphi, ir, mc, ce, pr, \xi) \quad 4.2$$

In equation 4.2, R&D expenditure (X) is expected to be positively related to discounted value of expected return (as measured by λ and φ), and capital per efficiency unit (ce), but it is expected to be negatively related to real interest rate (ir). Property right (pr) and product market competition (mc) are institutional features within the economy that are expected to positively relate to R&D expenditure. The parameter ξ represents other institutional features of the economy that is not captured in the model. Given equation 4.1 and 4.2, Schumpeter finance-growth relationship can be derived as:

$$Y = f(K) \quad 4.3$$

By inference, since the level of technology (financial innovation) (Y) depends on X, which in turn, depends on K, Y can be said to be a function of K (referred to as capital efficiency per unit). The implication is that any increase in the rate of savings in the economy will invariably increase the capital efficiency per unit, which will in turn stimulates more R&D activities through financial innovation thereby spur economic growth. Their basic conclusion was that given a stable economy, financial innovation or technological advancement in the financial sector is similar to economic growth.

4.2. Empirical Model Specification

The relationship between financial development and economic growth has three major views concerning the importance of finance in economic growth. The first view which includes the works by Schumpeter (1912), Goldsmith (1969), McKinnon (1973), and Shaw (1973) considers finance as a critical element of growth, while the second which includes Lucas (1988), Robinson (1952), and Stern (1989) regards finance as relatively unimportant factor in growth. The third which includes Buffe (1984) and Van Wijnbergen (1983), however, focused on the potential negative impact of finance on growth. Xu, (2000) on the other hand expressed rather parallel opinion to the previous three by stressing that there is neither positive nor negative (neutral) role between financial development and growth.

In specifying our model therefore, we adopt the model of Leitao (2010) whose study covers the BRIC nations (Brazil, China, India, Russia). In specifying our model, Real Gross Domestic Product growth rate (% annual) is the dependent variable; while the explanatory variables are Domestic Credit to Private Sector (% of GDP), Domestic Credit to Private Sector by Banks (% of GDP), Money and Quasi Money (M_2) (% of GDP) (which are proxies for financial sector development), and Trade (% of GDP).

Essentially our model for estimation can be stated in the following functional relationship form:

$$RGDP_t = f(DCPS/GDP, DCPSB/GDP, M2/GD, TRD/GDP) \quad 4.4$$

Where RGDP is the Real Gross Domestic Product growth rate; DCPS is Domestic Credit to Private Sector as ratio of GDP); DCPSB is Domestic Credit to Private Sector by Banks as ratio of GDP); M2 is Money and Quasi Money as ratio of GDP; TRD is Trade as ratio of GDP. Specifically, DCPSB/GDP and DCPS/GDP are use as proxy for financial intermediary and M2/GDP variables use as proxy for financial Deeping, moreover TRD/GDP are use as proxy for openness economy and also trade is measuring international flow of resources (Katircioglu, 2010; Beck, 2002) as they are critical indicators for financial development. The variable of. Equation 4.4 shows that real growth domestic product growth rate is a function of financial development proxies and trade proxy.

Equation 4.4 can further be expanded in a logarithmic form to include the coefficient as follows:

$$lnRGDP_t = \beta_0 + \beta_1 lnDCPS/GDP + \beta_2 lnDCPSB/GDP + \beta_3 lnM2/GDP + \beta_4 lnTRD/GDP + \varepsilon_t \quad 4.5$$

The a priori expectation is such that all the variables are expected to be positive, which is, β_1, β_2, β_3, and $\beta_4 > 0$.

4.3. Methodology

First, unit root test of stationarity by applying Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) test approach. Second, Johansen Co integration test (Trace Statistics and Max-Eigen Statistics) to examine the long run relationship between economic growth, and financial development and trade indicators. Third, Granger causality test use to define the direction of causality (transmission mechanism) between variables.

4.3.1. Unit Root Test

Unit root test was implemented by Fuller (1976) and Dickey and Fuller (1979, 1981) to test the null hypothesis of different stationaries. To make the result more accurate with the null hypothesis of non-stationary, this study will employ Augmented Dickey Fuller (ADF) and Philips Perron (PP) test. The data will be identified whether it is consistent with an I(1) process with a stochastic trend, or it is consistent with an I(0)

process; whether it is stationary or non- stationary with a deterministic trend. In unit root test, the stationary model required differencing to get stationarity and the processes are also known as integration of order 1, I(1) (Walters and Hassler, 2006).

Assume *X* can be any variable and the augmented Dickey-Fuller (ADF) model can be defined as follows:

$$\Delta X_t = \beta_1 + \beta_2 t + \delta X_{t-1} + \sum_{i-1}^{m} \alpha_i \Delta X_{t-i} + \varepsilon_t \qquad 4.6$$

Where X is the series and t= trend factor (time); *B1* is constant; m is the lag order; ε_t is a pure white noise error term and $\Delta X_{t-1} = (X_{t-1} - X_{t-2})$, $\Delta X_{t-2} = (X_{t-2} - X_{t-3})$, $\Delta X_{t-i} = (X_{t-i} - X_{t-j})$, and *i* represents the number of recent time and *j* as the number of previous times or years. The hypothesis of Augmented Dickey Fuller ADF is:

$H_0 : \delta = 0, X_t$ is non- stationary, (there is unit root)

$H_0 : \delta \neq 0, X_t$ is stationary, (there is no unit root)

The null hypothesis (H0) states that the series is non-stationary (there is unit root) whereas the alternative propose that the series is stationary (has no unit root). If the coefficient is greater than critical values, then we rejects H0 and considered variable is stationary, if not it is not stationary.

The first differencing in unit root test is to be tested if non stationary time series *Y* need to "differenced" at the times to make it stationary. Then the result that is stationary and accurate can proceed to test for the cointegration.

Another alternative test statistic is Philips and Perron (PP). This test can be observed as Dickey Fuller statistics that gave made strong result to serial correlation, by using Newey–West (1987) heteroskedasticity, and autocorrelation-consistent covariance matrix estimator. The advantage for using PP tests over the ADF tests is that the PP tests are robust to general forms of heteroskedasticity in the error term ε_t.

Another advantage is that the user does not have to specify a lag length for the test regression. The Phillips-Perron (PP) test offers an alternative method for correcting

for serial correlation in unit root testing. Basically, they use the standard DF or ADF test, but modify the t-ratio so that the serial correlation does not affect the asymptotic distribution of the test statistic (Philips and Perron, 1988).

4.3.2. Johansen Juselius Cointegration test

Cointegration is the test for investigating long run equilibrium relationships between series of variables (Gujarati, 2003). The Johansen (1988) and Johansen and Juselius (1990) approach allows the estimating of all possible cointegration vectors between set of variables (Katircioglu et, 2007). Therefore it is based on a Vector Autoregressive Model. A conintegration test can be done for bivariate models by using Engle and Granger (1987) procedure, but this procedure cannot be used in multivariate models hence VAR model is used in the cointegration test. Moreover the Johansen and Juselius (1990) test avoids bias which can be resulted from applying Engle and Granger separately on the selected variables. The procedure can be shown as in the following Vector Auto Regressive (VAR) model:

$$x_t = C + \Pi_k x_{t-1} + \cdots \Pi x_{t-k} + \varepsilon_t \quad (4.7)$$

Where *Xt, Xt-1, ⋯, Xt-K* are vectors of lagged and current values of *n* variables respectively which are *I(1)* in the model*;* $\Pi 1, \cdots, \Pi K$ are known as matrices of coefficients with *(n X n)* dimensions; C is an intercept vector and ε_t is a vector of random errors (Katircioglu et., 2007). The number of lag selection is found in such a way that residual are not auto correlated. The rank of Π shows the number of cointegrating relationship(s) (i.e. *r)* which is determined by testing whether its Eigen values *(*λi*)* are different from zero. Johansen test uses both the trace test and the maximum eigenvalue test for cointegration. According to Cheung and Lai (1993), trace test is more robust than maximum Eigenvalue and also gives better result for cointegration. Johansen (1988) and Johansen and Juselius (1990) suggest that using the Eigen values of Π ordered from the largest to the smallest is for computation of

trace statistics (Katircioglu et., 2007). The trace statistic *(λ trace)* is computed by the following formula[1]:

$$\lambda_{trace} = -T \sum Ln(1 - \lambda_i), i = r + 1 \ldots n - 1 \quad (4.8)$$

and the hypotheses are:

H0: r = 0 H1: r ≥ 1

H0: r ≤ 1 H1: r ≥ 2

H0: r ≤ 2 H1: r ≥ 3

4.3.3. Granger Causality Test

If the variables are found to be co integrated, the Granger causality can be applied. In order to explain Granger Causality Test, assume Y_t and X_t are the series to predict the causal relationship between the variables. For example, X_t causes Y_t if the previous value of X_t can predict the current value of Y_t, and considering other related and relevant information in the past. Specifically, the pair of causality variables can be explained by the following regression:

$$\Delta X_t = \sum_{i=1}^{n} \alpha_i \Delta Y_{t-i} + \sum_{j=1}^{n} \beta_j \Delta X_{t-j} + u_{1t} \quad (4.9)$$

$$\Delta Y_t = \sum_{i=1}^{n} \lambda_i \Delta Y_{t-i} + \sum_{j=1}^{n} \delta_j \Delta X_{t-j} + u_{2t} \quad (4.10)$$

Where u_{1t} and u_{2t} are not correlated. This study will investigate the bilateral causality for two variables. A unidirectional causality from Y to X is represented as the estimated coefficients on the lagged Y in equation I and are statistically different from zero $(\sum \alpha_i \neq 0)$ and the set of estimated coefficients on the lagged X in equation II is not statistically different from zero $(\sum \delta_i = 0)$.

[1] Before we start the procedure, we test for the null hypothesis of there is no co-integration relationships among the variables. If the alternative hypothesis is rejected (ie r ≤1, ..., r ≤ n) are tested sequentially. If r = 0 cannot be rejected at first, and it means that there is no long run association between the variables.

Conversely, a unidirectional causality from X to Y exists if the set of lagged Y coefficients in equation I is not statistically different from zero $(\sum \alpha_i = 0)$ and the set of lagged X coefficients in equation II is statistically different from zero $(\sum \delta_j \neq 0)$ Bilateral causality exists when both regressions of the set Y and X coefficients are statistically significantly different from zero, $(\sum \alpha_i \neq 0)$ and $(\sum \delta_j \neq 0)$.

4.4. Data Source and Description

This study covers three Latin American countries which include Argentina, Brazil and Mexico for the period 1988-2012 yearly. The data are annual or time series data source from World Bank Development Indicators (WDI) of the World Bank 2013. The variables measured in terms of real growth domestic product growth rate use as proxy for economic growth. There are various measures for financial development as suggested by various studies (Leitao, 2010; Beck, 2002).

Based on Leitao (2010) and Beck (2002), the following explanatory variables as proxies for financial development and trade in the study were selected; First, domestic credit to the private sector as a share of GDP (DCPS / GDP). This includes the financial resources provided to the private sector such as loans, purchases of non-equity securities and commercial credit that establish refund request.

Second credit provided by domestic private sector banks as a share of GDP (DCPSB/ GDP). (This means the domestic credit provided by the banking sector to the whole (public and private) sector.

Third, the money and quasi money as percent of GDP (M2/ GDP), which measures the financial Deeping in the economy. It include (supply of currency, savings deposits, traveller's checks of nonbank issuers, other deposits, other deposits and deposits in a given country's economy moment).

Fourthly the variable measuring trade and openness of the economy (meaning the sum of imports and exports of goods and services as a percentage of GDP (TRD/ GDP)).

Moreover, the expected sign of financial development variables with economic growth based on the previous studies and countries financial structures and macroeconomic conditions for Latina America countries has been normalized in the table below:

Table 4.1: variable description and the Expected prior

Variables/ countries	Argentina	Brazil	Mexico
DCPS	Positive(+) Negative(-)	Positive(+) Negative(-)	Positive(+) Negative(-)
DCPSB	Positive(+) Negative(-)	Positive(+) Negative(-)	Positive(+) Negative(-)
M2	Negative(-)	Negative(-)	Negative(-)
TRD	Positive(+)	Positive(+)	Positive(+)

CHAPTER FIVE
EMPIRICAL ANALYSIS AND DISCUSSION OF RESULTS

5.1. Unit root Tests

The unit root test was used to tests for stationarity of the time series data used in the study. The test was carried out in log levels of the variables and the result presented in Table 5.1. In regression analysis, Ordinary Least Squares estimation might produce results that are spurious especially where the time series are non-stationary. Thus the data must be stationary for results to be relied upon either for policy purposes or forecasting. The common test for stationarity is the unit root test. The presence of unit root indicates that the data series is non-stationary. Two unit root test were carried out in the study and include Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests to check for stationarity of time series. The unit root test shows that the series are integrated of the same order, that is, I (1).

The results of the unit root test for stationarity using Augmented Dickey Fuller (ADF) and Phillip Perron (PP) is presented in Table 5.1. The result of the test shows that that all the variables at level were not stationary. The implication is that we cannot reject the null hypothesis of a unit root and nonstationary of data at levels. However, the result indicates that all the variables are stationary after first difference that is, integrated of order one [I(1)] in a linear deterministic trend. This implies that all the variables first-difference stationary using both ADF and PP test. The result of the test therefore suggests that the variables are integrated of order one [I(1)] in the levels but integrated of order zero [I(0)] in first difference in all the countries (Argentina, Brazil and Mexico).

Table 5.1: Unit Root Test for Stationarity

Variables	ADF Test	PP Test	Order of Integration
	H_0: Variable is non-stationary	H_0: Variable is non-stationary	
ARGENTINA			
Δ*logGDPGR*	-4.342***	-3.290*	I(1)
Δ*logDCPS*	-3.671**	-5.673***	I(1)
Δ*logDCPSB*	-6.963***	-3.851**	I(1)
Δ*logM2*	-3.336*	-5.964***	I(1)
Δ*logTRD*	-7.381***	-6.037***	I(1)
BRAZIL			
Δ*loGDPGR*	-5.622***	-3.582**	I(1)
Δ*logDCPS*	-3.363*	3.945**	I(1)
Δ*logDCPSB*	-4.245***	-10.734***	I(1)
Δ*logM2*	-4.557***	3.863**	I(1)
Δ*logTRD*	-3.633**	-13.014***	I(1)
MEXICO			
Δ*logGDPGR*	-3.668**	-3.981**	I(1)
Δ*logDCPS*	-8.341***	-11.827***	I(1)
Δ*logDCPSB*	-3.604**	9.723***	I(1)
Δ*logM2*	-7.477***	-7.896***	I(1)
Δ*logTRD*	-4.132**	-4.563***	I(1)
Asymptotic Critical Values			

1%	-4.243	-4.243	-
5%	-3.544	-3.543	-
10%	-3.205	-3.205	-
**** implies significance at1%; ** implies significance at 5%; * implies significance at 10% level; Δ denote first difference*			

Source: Computed by Author from E-Views 7.0 Test of Stationary

5.2. Optimal lag length selection

Before applying the cointegration and Granger causality tests we shall be determining the optimal Lag length selection for the countries using lag length in the VAR model and it determine the optimal lag length for the variables that does not have serial autocorrelation which is "white noise" residuals. There is five criteria are widely used such as the final prediction error criteria (FPE), modified likehood ratio (LR) test statistic, the Akaike information criterion (AIC), the Hannan-Quinn information criterion (HQ) and the Schwarz information criterion (SIC) have been used to determine the optimal lag length into the VAR system. And the result of Argentina shows the selection of 2 lag length which is suggested by AIC and LR, However Brazils result shows 2 lag length which has been suggested by (LR, FPI, SC and HQ). Moreover the result of lag length selection for Mexico also shows 2 lag selection which suggested by (LR, SC and HQ)

5.3. The Johansen's Cointegration Test for Cointegrating Vectors

The establishment of stationarity of the series allows for the conduct of Johansen cointegration test which primarily involves testing of a long-run equilibrium relationships among the series. The results obtained from the Johansen and Juselius (1990) method is presented in the table below for Argentina, Brazil and Mexico.

5.4. Argentina Cointegration Test

The result of Trace Tests and Maximum Eigenvalue Tests is presented in Table 5.2a and 5.2b, which has been suggested by selection criteria to determine the number of cointegrating vectors (r) for this specification.

Table 5.2a: Johansen Co-integration (Trace Test)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.908582	133.7954	88.80380	0.0000
At most 1 *	0.765203	78.77209	63.87610	0.0017
At most 2 *	0.610239	45.44427	42.91525	0.0273
At most 3	0.528881	23.77319	25.87211	0.0892
At most 4	0.244950	6.462353	12.51798	0.4039

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5.2b: Johansen Cointegration (Maximum Eigenvalue Test)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.908582	55.02326	38.33101	0.0003
At most 1 *	0.765203	33.32782	32.11832	0.0354
At most 2	0.610239	21.67107	25.82321	0.1610
At most 3	0.528881	17.31084	19.38704	0.0976
At most 4	0.244950	6.462353	12.51798	0.4039

The Trace Tests result in Table 5.2a indicates 3 cointegrating equations at 5% level of significance ($\alpha = 0.05$) while Maximum Eigenvalue Test presented in Table 5.2b indicates 2 cointegrating equations. In both cases we reject the null hypothesis of no cointegration at 5%. From the test we can conclude that there are only 3 and 2 cointegrating relationship among the *GDPGR, DCPS, DCPSB, M2, and TRD* using Trace Tests and Maximum Eigenvalue Test respectively.

Model Estimation

The results show that a long-run equilibrium relationship exists between growth rate of economy and financial development indicators. The estimated co-integrating coefficients for the first normalized eigenvector are presented below. The variables

are converted into natural log transformation and hence these values represent long term elasticity measures. Therefore, the co-integration relationship can be express as follows:

$$GDPGR = -7.16DCPS + 7.90DCPSB - 0.69M2 + 0.70TRD$$

The coefficients for domestic credit to private sector as ratio of GDP (DCPS) and money and quasi money as ratio of GDP (M2) are negative while domestic credit to private sector by banks as ratio of GDP (DCPSB) and trade as ratio of GDP (TRD) are positive.

Subject to the cointegration result a negative long-run relationship exists between domestic credit to private sector (DCPS), money and quasi money (M2) and growth rate of GDP respectively. Moreover a positive long run relationship exists between domestic credit provided by banking sector (DCPSB), trade (TRD) and growth rate of GDP respectively.

5.5. Argentina Pairwise Granger Causality Tests

Cointegration test investigate whether they have the stable long-term relations, but it does not indicate the direction of causality among the variables. If the variables are co-integrated each other, there need to be at least one direction of causality among the variables (Enders, 1995). In this study, Granger Causality Tests were applied and the result is presented in Table 4.3. The test results suggest a bi-directional causality is obtained between the following variables respectively GDPGR and DCPS, GDPGR and DCPSB, DCPS and DCPSB, DCPS and M2, DCPSB and M2. On the other hand a unidirectional causality runs from TRD to DCPSB which means that a change in TRD stimulates a change in DCPSB. The causality shows that there is a feedback relationship (impact) between these variables. The result consist with the finding of katircioglu (2007) Shan (2001) and Luintel and khan (1999) examining the casual relation between financial development and economic growth.

Table 5.3: Argentina Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(LOGDCPSB) did not cause D(LOGDCPS)	23	5.90769	0.0107

D(LOGDCPS) did not cause D(LOGDCPSB)		5.61912	0.0127
D(LOGGDPGR) did not cause D(LOGDCPS)	23	6.53278	0.0074
D(LOGDCPS) did not cause D(LOGGDPGR)		4.22788	0.0312
D(LOGM2) did not cause D(LOGDCPS)	23	9.50921	0.0015
D(LOGDCPS) did not cause D(LOGM2)		3.69783	0.0451
D(LOGTRD) did not cause D(LOGDCPS)	23	2.54890	0.1060
D(LOGDCPS) did not cause D(LOGTRD)		0.38966	0.6829
D(LOGGDPGR) did not cause D(LOGDCPSB)	23	6.21118	0.0089
D(LOGDCPSB) did not cause D(LOGGDPGR)		3.82166	0.0414
D(LOGM2) did not cause D(LOGDCPSB)	23	9.76892	0.0013
D(LOGDCPSB) did not cause D(LOGM2)		3.78477	0.0425
D(LOGTRD) did not cause D(LOGDCPSB)	23	2.92408	0.0495
D(LOGDCPSB) did not cause D(LOGTRD)		0.42756	0.6586
D(LOGM2) did not cause D(LOGGDPGR)	23	0.52351	0.6012
D(LOGGDPGR) did not cause D(LOGM2)		0.51949	0.6035
D(LOGTRD) did not cause D(LOGGDPGR)	23	0.65864	0.5296
D(LOGGDPGR) did not cause D(LOGTRD)		0.35967	0.7028
D(LOGTRD) did not cause D(LOGM2)	23	0.78640	0.4705
D(LOGM2) did not cause D(LOGTRD)		0.82534	0.4540

5.6. Brazil Co-integration Test

The Trace Tests result in Table 5.4a indicates 2 co integrating equations at 5% level of significance ($\alpha = 0.05$) while Maximum Eigenvalue Test result is presented in Table 5.4b indicates 2 co integrating equations. In both cases we reject the null hypothesis of no co integration at 5% ($\alpha = 0.05$). From the test we can conclude that there are only 2 co integrating relationship among *GDPGR, DCPS, DCPSB, M2, and TRD* using Trace Tests and Maximum Eigenvalue Test in the case of Brazil.

Table 5.4.a: Johansen Co-integration(Trace Test)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**

None *	0.951265	131.3181	88.80380	0.0000
At most 1*	0.717542	71.82693	63.87610	0.0035
At most 2	0.612339	32.74976	42.91525	0.3491
At most 3	0.339035	10.95439	25.87211	0.8778
At most 4	0.060327	1.431137	12.51798	0.9928

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5.4.b: Johansen Co-integration (Maximum Eigenvalue Test)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.951265	69.49114	38.33101	0.0000
At most 1*	0.717542	42.07718	32.11832	0.0025
At most 2	0.612339	21.79537	25.82321	0.1559
At most 3	0.339035	9.523253	19.38704	0.6697
At most 4	0.060327	1.431137	12.51798	0.9928

Model Estimation

The results show that a long-run equilibrium relationship exists between growth rate of GDP and financial development indicators. The estimated co-integrating coefficients for the first normalized eigenvector are presented below. The variables are converted into natural log transformation and hence these values represent long term elasticity measures. Therefore, the co-integration relationship can be express as follows:

GDPGR = 0.36DCPS - 0.03DCPSB - 0.70M2 + 0.30TRD

The coefficients for domestic credit to private sector by banks as ratio of GDP (DCPSB), and money and quasi money as ratio of GDP (M2) are negative while domestic credit to private sector as ratio of GDP (DCPS) and trade as ratio of GDP (TRD) are positive.

Subject to the findings of the cointegration model a negative long-run relationship exists between domestic credit to private sector by banks (DCPSB), money and quasi

money (M2) and growth rate of GDP respectively. Moreover a positive long run relationship exists between domestic credit to private sector by banks (DCPS), trade (TRD) and growth rate of GDP respectively.

5.7. Brazil Pairwise Granger Causality Tests

The Granger Causality Tests result for Brazil is presented in Table 5.5 The test result suggests a bi-directional causality between M2 and DCPS, and M2 and DCPSB, which indicate each variable stimulates the other. Also, a unidirectional causality runs from GDPGR to DCPS, GDPGR to DCPSB, TRD to GDPGR, DCPSB to TRD, and TRD to M2. This means that a change in the variable that caused the other stimulates a change in the other. For example a change in GDPGR spurs a change in DCPS. The causality shows that there is a feedback relationship (impact) between these variables. The result consist with the finding of katircioglu (2007) Shan (2001) and Luintel and khan (1999) examining the casual relation between financial development and economic growth.

Table 5.5: Brazil Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(LOGDCPS) did not cause D(LOGGDPGR)	23	0.29522	0.7479
D(LOGGDPGR) did not cause D(LOGDCPS)		3.82249	0.0412
D(LOGDCPSB) did not cause D(LOGGDPGR)	23	0.34158	0.7152
D(LOGGDPGR) did not cause D(LOGDCPSB)		5.91212	0.0025
D(LOGM2) did not cause D(LOGGDPGR)	23	0.08496	0.9189
D(LOGGDPGR) did not cause D(LOGM2)		0.34905	0.7100
D(LOGTRD) did not cause D(LOGGDPGR)	23	6.47084	0.0002
D(LOGGDPGR) did not cause D(LOGTRD)		1.83478	0.1883
D(LOGDCPSB) did not cause D(LOGDCPS)	23	0.24763	0.7833
D(LOGDCPS) did not cause D(LOGDCPSB)		0.12144	0.8864
D(LOGM2) did not cause D(LOGDCPS)	23	3.62532	0.0475
D(LOGDCPS) did not cause D(LOGM2)		5.73625	0.0118
D(LOGTRD) did not cause D(LOGDCPS)	23	0.48813	0.6217
D(LOGDCPS) did not cause D(LOGTRD)		2.41267	0.1179

D(LOGM2) did not cause D(LOGDCPSB)	23	4.20971	0.0316
D(LOGDCPSB) did not cause D(LOGM2)		7.28942	0.0048
D(LOGTRD) did not cause D(LOGDCPSB)	23	0.50585	0.6113
D(LOGDCPSB) did not cause D(LOGTRD)		3.14265	0.0443
D(LOGTRD did not cause D(LOGM2	23	2.97402	0.0491
D(LOGM2) did not cause D(LOGTRD)		0.49210	0.6193

5.8. Mexico Co-integration Test

The Trace Tests result in Table 5.6a indicates 1 co integrating equations at 5% level of significance ($\alpha = 0.05$) while Maximum Eigenvalue Test result is presented in Table 5.6b indicates 1 cointegrating equations. In both cases we reject the null hypothesis of no co integration at 5% ($\alpha = 0.05$). From the test we can conclude that there are only 1 co integrating relationship among *GDPGR, DCPS, DCPSB, M2, and TRD* using Trace Tests and Maximum Eigenvalue Test in the case of Mexico.

Table 5.6a: Johansen Co integration (Trace Test)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.852260	95.53161	88.80380	0.0150
At most 1	0.600874	71.54866	63.87610	0.0276
At most 2	0.459274	30.42366	42.91525	0.4773
At most 3	0.433837	16.28231	25.87211	0.4701
At most 4	0.129818	3.198216	12.51798	0.8522

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5.6b: Johansen Co-integration (Maximum Eigenvalue Test)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.852260	43.98294	38.33101	0.0101
At most 1	0.600874	35.12500	32.11832	0.0324
At most 2	0.459274	14.14136	25.82321	0.7104

At most 3	0.433837	13.08409	19.38704	0.3213
At most 4	0.129818	3.198216	12.51798	0.8522

Model Estimation

The results show that a long-run equilibrium relationship exists between growth rate of GDP and financial development indicators in the case of Mexico. The estimated co-integrating coefficients for the first normalized eigenvector are presented below.

$$GDPGR = -0.19DCPS + 0.37DCPSB - 0.23M2 + 0.46TRD$$

The coefficients for domestic credit to private sector as ratio of GDP (DCPS), and money and quasi money as ratio of GDP (M2) are negative, while domestic credit to private sector by banks as ratio of GDP (DCPSB) and trade as ratio of GDP (TRD) are positive. From the above cointegration model a negative long-run relationship exists between domestic credit to private sector (DCPS), money and quasi money (M2) and growth rate of GDP respectively. Moreover a positive long run relationship exists between domestic credit to private sector by banks (DCPSB), trade (TRD) and growth rate of GDP respectively and all the previous findings are consistent with the economic theory.

5.9. Mexico Pairwise Granger Causality Tests

The Granger Causality Tests result for Mexico is presented in Table 5.8. The test result suggests a unidirectional causality between TRD and GDPGR, which indicate that trade stimulate economic growth. Also, a unidirectional causality runs from M2 to DCPS, TRD to DCPS, M2 to DCPSB, and TRD to DCPSB. For instance, a change in M2 spurs a change in DCPS. We can conclude that there is a unidirectional causality runs from financial development to economic growth and the findings reveal consistent with Savrun (2011) and Michael (2012) they found a unidirectional causality between financial development and economic growth.

Table 5.7: Mexico Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
D(LOGDCPS) did not cause D(LOGGDPGR)	23	0.41344	0.6675

D(LOGGDPGR) did not cause D(LOGDCPS)		0.74467	0.4890
D(LOGDCPSB) did not cause D(LOGGDPGR)	23	0.66316	0.5274
D(LOGGDPGR) did not cause D(LOGDCPSB)		0.18549	0.8323
D(LOGM2) did not cause D(LOGGDPGR)	23	0.54961	0.5866
D(LOGGDPGR) did not cause D(LOGM2)		0.80535	0.4624
D(LOGTRD) did not cause D(LOGGDPGR)	23	8.26065	0.0028
D(LOGGDPGR) did not cause D(LOGTRD)		2.96564	0.0770
D(LOGDCPSB) did not cause D(LOGDCPS)	23	0.19893	0.8214
D(LOGDCPS) did not cause D(LOGDCPSB)		0.83682	0.4493
D(LOGM2) did not cause D(LOGDCPS)	23	2.77597	0.0477
D(LOGDCPS) did not cause D(LOGM2)		0.25120	0.7806
D(LOGTRD) did not cause D(LOGDCPS)	23	5.98951	0.0101
D(LOGDCPS) did not cause D(LOGTRD)		0.47840	0.6274
D(LOGM2) did not cause D(LOGDCPSB)	23	3.86427	0.0037
D(LOGDCPSB) did not cause D(LOGM2)		0.37199	0.6945
D(LOGTRD) did not cause D(LOGDCPSB)	23	2.85700	0.0433
D(LOGDCPSB) did not cause D(LOGTRD)		0.37398	0.6932
D(LOGTRD) did not cause D(LOGM2)	23	0.01187	0.9882
D(LOGM2) did not cause D(LOGTRD)		0.29854	0.7455

5.10. Interpretation of the results

The long run relationship between financial development and economic growth in three Latina Americas countries based on our empirical findings are explained as follow. Regards Argentina and Mexico, the positive relation between economic growth and bank credit (DCPSB) and negative relation with domestic credit to private sector (DCPS) is because their domestic capital markets were predominately bank-based and securities markets were less important and illiquid. Since the 1990s, the banking system has been through a financial liberalization process that involved its deregulation, regional openness to foreign bank entry and the decline of government intervention due to privatization. Moreover they imposed tight capital controls on their security market; credit provided by financial corporations other than

banks, less international capital and FDI entered the economy due to the high risks and tight regulations by their governments. This result is consistent with (Agnoli et al, 2008).

In contrast, the financial intermediation activity (DCPSB) of Brazil's banks has remained unchanged over the last 10 years, while in Argentine and Mexico, domestic credit provided by banks have improved, highlighting a deeper banking sector in these regions. This negativity effect of bank credit in Brazil might be explained due to the financial crisis, economic and political turmoil which occurred and raised the risks (costs) of lending. Also the interventions by the government represented by the increase in the discount rate will reduce the level of market liquidity and then slow down the economic activity. Moreover the development of alternative sources of financing, such as stocks and bonds and other external financing sources, gave a bigger effect to the domestic credit to private sector which provided by the financial corporations (DCPS) on economic growth reflecting its positive effect on these economies. In other words domestic capital markets, FDI and financing from abroad might be crowding out the banking system. This is consistent with results by (Choong et al, 2005)

According to the monetarist theory dominated by the works of Friedman (1953; 1960) the pioneer and Saini (1982), the immediate cost of inflation is an abnormal rapid increase of the quantity of money with respect to the volume of production. In other words an increase in money supply more than the real increases in production. Thus, inflation is stimulated by an expansionary monetary policy. Moreover inflation may affect saving and investment decisions, reducing the proportion of GDP devoted to investment and so causing the economy to accumulate less human or physical capital. For example, when inflation is high, it often is more variable, thus harder to forecast. This may make it more difficult to deduce the real returns on investments from available market information and may cause savers and investors to be less willing to make long-term nominal contracts or to invest in long-term projects. The resulting reduced stocks of productive capital may, in turn, imply lower levels of future GDP (Motley, 1994). Barro (1991), Cozier and Selody (1992), and Fischer (1993) also conclude that countries with higher rates of inflation tend to have lower rates of real growth in the long run.

Our results show a positive relation between trade and economic growth accompanying with trade-led growth theory. This is justified that trade openness affects economic growth by adopting advance technology which enhances the total factor productivity. Moreover trade liberalization encourages specialization in industries which have economies of scale that leads to improve the efficiency and productivity in long run. This is consistent with the results of Krueger, (1978) and Bhagwati,(1978), Robinson (1984) and Rajan and Zingales, (2003).

Table 5.8: Sign of variables with Economic Growth

Countries/ variables	DCPS	DCPSB	M2	TRD
Argentina	Negative	Positive	Negative	Positive
Brazil	Positive	Negative	Negative	Positive
Mexico	Negative	Positive	Negative	Positive

The results of the granger causality test which shows the direction of the causality between financial development and economic growth can be explained by the following related theories in the literature. The financial sector intermediation role is grounded on finance-led growth hypothesis that assumes the supply-leading relationship between financial development and economic growth. The hypothesis maintained that the existence of the financial sector provides for smooth functioning of financial intermediaries in channeling the limited resources from surplus to deficit units and provide resources for efficient allocation thereby leading other economic sectors in the growth process. The work of Schumpeter (1912) and Levine (1997) provided evidence to show that the development of financial sector has significantly boosted economic growth.

Furthermore, the growth-led finance hypothesis highlight the fact that high economic growth has the potential of creating high demand for certain financial instruments in which financial markets must adjust to effectively respond to such demands and economic changes. Specifically, the growth-led finance hypothesis suggests a form of demand-following relationship between financial development and economic growth. The works of Robinson (1952) and Romer (1990) centered on growth-led

hypothesis and provided evidence that economic growth impact significantly on financial development.

The feedback hypothesis between financial development and economic growth based on the two earlier hypotheses of finance-led growth and growth-led finance hypothesis indicates the likelihood of a two-way causal linkage between financial development and economic growth. The hypotheses are central to the performance of a country with well-developed financial system that has the capacity to stimulate high rate of economic growth and expansion through technological, product and services innovation (Schumpeter, 1912) on one hand, and creating high demand on financial products and services (Levine, 1997). The ability of the banking institutions to effectively respond to evolving demands will engender high economic performance. The work of Luintel and Khan (1999) supported this assertion by arguing that both financial development and economic growth are positively interdependent and their relationship could lead to feedback causality.

CHAPTER SIX
CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1. Conclusion

The main objective of this study is to examine the impact of financial development on economic growth in Argentina, Brazil and Mexico. The study investigates long run equilibrium relationship (co-integration) and short run of the relationship between growth rate of GDP and four regressors as indicators of financial development (DCPS, DCPSB, M2 and TRD). The data use for the study is time series.

The statistical properties of the series were tested to determine their stationarity. The unit root tests have revealed that all the variables were stationary at first difference using both ADF and PP unit root test. All the variables were included in further analyses due to the fact that Johansen methodology requires the variables to be integrated of the same order (Jenkins and Katircioglu, 2009). Johansen cointegration tests confirm long run equilibrium relationship between growth rate of GDP and its regressors that is, financial development indicators.

Finally, Pairwise Granger causality tests in Argentina and Brazil, suggest bidirectional (feedback relationship) causality between financial development (FD) and economic growth. Mexico results suggest unidirectional causality that runs from

financial development to growth rate of GDP, which supports the validity of supply leading hypothesis.

The results clearly show that financial sector development and trade activities in Argentina, Brazil and Mexico are catalysts for the growth of GDP. By implication financial development and trade are significant sources of economic growth in both countries alike.

6.2. Recommendations and Policy Implications

This study has examined the importance of financial sector development and economic growth for three American countries America (Argentina, Brazil and Mexico), based on the studies findings it is recommended to enhance the role of the stock market (and the security markets) as a mechanism for mobilization and allocation funds between financial and economic agents. Our findings suggest that the evolution of the financial sector tends to be more likely to encourage and promote economic growth, when the monetary authorities adopt liberalized investment and opening policies, improve the size and the rules of the stock market and macroeconomic stability. It also recommends improving the overall climate by implementing macroeconomic stabilization policies, creating a better business environment and improving economic fundamentals. In addition, new laws and regulations to protect the rights of investors.

Latin American banks have to comply with the rules of Basel II and the governments of the region should develop comprehensive financial development programs in order to strengthen the banking system and capital markets in the long term.

Central Bank is important for the countries concerned to control inflationary pressures resulting from the expansion in the volume of money in circulation. Both should be encouraged domestic and foreign investors to place their investments, in particular the real sector.

Financial liberalization leads to more efficient and liquid financial intermediation, and must be supported with the necessary policy framework.

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APPENDICES

Appendix I: Argentina cointegration Estimates Result

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
0.249958	1.790481	-1.975371	0.174397	-0.176356	0.085478
0.571954	-0.477120	0.854825	0.259922	-0.005423	-0.119111
-0.000833	4.770961	-4.983034	0.244198	-0.094291	-0.214081
0.039889	15.38835	-15.27487	-0.382582	0.436237	-0.524570
-0.057497	-2.000973	1.888857	0.206505	0.053770	-0.173139

Unrestricted Adjustment Coefficients (alpha):

D(LOGGDPGR)	-3.028602	-1.526756	-1.421830	-0.141473	0.872860
D(LOGDCPS)	2.071038	-0.480484	-1.143426	-0.014674	-0.079958
D(LOGDCPSB)	2.094023	-0.513571	-1.074143	-0.012083	-0.089544
D(LOGM2)	0.773270	-0.667313	-0.825043	-0.564968	-0.889923
D(LOGTRD)	1.189762	-1.300948	2.434249	-2.007741	0.037792

1 Cointegrating Equation(s): Log likelihood -174.6059

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)

1.000000	7.163121	-7.902805	0.697704	-0.705542	0.341969
	(5.43353)	(5.46267)	(0.16721)	(0.15796)	(0.24843)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-0.757024
	(0.20181)
D(LOGDCPS)	0.517673
	(0.10646)
D(LOGDCPSB)	0.523418
	(0.10286)
D(LOGM2)	0.193285
	(0.14780)
D(LOGTRD)	0.297391
	(0.27730)

2 Cointegrating Equation(s): Log likelihood -157.9420

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.514339	0.479819	-0.082087	-0.150859
		(0.10644)	(0.09393)	(0.06885)	(0.09707)
0.000000	1.000000	-1.175067	0.030417	-0.087037	0.068801
		(0.02421)	(0.02137)	(0.01566)	(0.02208)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.630257	-4.694208
	(0.44409)	(1.31833)
D(LOGDCPS)	0.242859	3.937403
	(0.25505)	(0.75714)
D(LOGDCPSB)	0.229679	3.994342
	(0.24404)	(0.72447)
D(LOGM2)	-0.188387	1.702914
	(0.35409)	(1.05115)
D(LOGTRD)	-0.446691	2.750954
	(0.66204)	(1.96534)

3 Cointegrating Equation(s): Log likelihood -147.1064

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	0.397771	-0.346758	0.296557
			(0.07528)	(0.06119)	(0.11504)
0.000000	1.000000	0.000000	0.217867	0.517634	-0.953373
			(0.15339)	(0.12468)	(0.23441)
0.000000	0.000000	1.000000	0.159523	0.514585	-0.869886
			(0.13941)	(0.11332)	(0.21305)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.629073	-11.47770	11.76253
	(0.38470)	(3.15441)	(3.34538)
D(LOGDCPS)	0.243811	-1.517837	1.195931
	(0.18225)	(1.49436)	(1.58483)
D(LOGDCPSB)	0.230574	-1.130353	0.777008
	(0.17738)	(1.45444)	(1.54249)

D(LOGM2)	-0.187700	-2.233333	2.013285	
	(0.32986)	(2.70472)	(2.86847)	
D(LOGTRD)	-0.448719	14.36466	-15.59225	
	(0.54223)	(4.44611)	(4.71529)	

4 Cointegrating Equation(s): Log likelihood -138.4510

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	0.000000	-0.242429	0.552900
				(0.11602)	(0.20232)
0.000000	1.000000	0.000000	0.000000	0.574777	-0.812968
				(0.09469)	(0.16513)
0.000000	0.000000	1.000000	0.000000	0.556425	-0.767081
				(0.09183)	(0.16013)
0.000000	0.000000	0.000000	1.000000	-0.262283	-0.644450
				(0.16701)	(0.29124)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.634716	-13.65474	13.92351	-1.218098
	(0.38485)	(9.97845)	(9.97443)	(0.33924)
D(LOGDCPS)	0.243226	-1.743644	1.420073	-0.037314
	(0.18260)	(4.73459)	(4.73268)	(0.16096)
D(LOGDCPSB)	0.230092	-1.316284	0.961567	-0.025979
	(0.17773)	(4.60821)	(4.60635)	(0.15667)
D(LOGM2)	-0.210235	-10.92727	10.64310	-0.023920
	(0.31850)	(8.25828)	(8.25495)	(0.28076)
D(LOGTRD)	-0.528805	-16.53117	15.07572	1.231910
	(0.44346)	(11.4981)	(11.4934)	(0.39090)

Appendix II: Brazil cointegration Estimates Result

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
-0.189482	0.068625	-0.007573	-0.133704	0.058326	0.195912
0.227711	-0.353771	0.265547	0.092422	-0.343513	-0.026671
0.827848	-0.053206	0.023148	0.029206	-0.077686	-0.131402
-0.004737	-0.269276	0.293044	-0.051059	0.279004	-0.122394
0.089824	0.020913	-0.104890	0.104903	0.061515	-0.137021

Unrestricted Adjustment Coefficients (alpha):

D(LOGGDPGR)	0.804106	-0.651155	-1.704354	0.576384	-0.164412
D(LOGDCPS)	17.71862	5.465892	-3.684075	2.840384	3.016432
D(LOGDCPSB)	17.80861	3.782690	-4.251293	1.578854	3.311605
D(LOGM2)	16.25624	2.899376	-1.549546	0.972618	1.910115
D(LOGTRD)	0.137079	1.023465	-1.101253	-0.347573	-0.066780

1 Cointegrating Equation(s): Log likelihood -296.7756

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	-0.362171	0.039966	0.705630	-0.307821	-1.033933
	(0.15795)	(0.16743)	(0.05757)	(0.12720)	(0.10773)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-0.152364
	(0.12349)
D(LOGDCPS)	-3.357357
	(0.75571)
D(LOGDCPSB)	-3.374408
	(0.75622)
D(LOGM2)	-3.080261
	(0.45546)
D(LOGTRD)	-0.025974
	(0.09321)

2 Cointegrating Equation(s): Log likelihood -282.2370

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	-0.302376	0.796750	0.057179	-1.312625
		(0.06379)	(0.08502)	(0.18753)	(0.15317)
0.000000	1.000000	-0.945250	0.251594	1.007810	-0.769503
		(0.09092)	(0.12117)	(0.26727)	(0.21830)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-0.300638	0.285541
	(0.18694)	(0.22741)
D(LOGDCPS)	-2.112715	-0.717735
	(1.10997)	(1.35026)
D(LOGDCPSB)	-2.513049	-0.116092
	(1.14860)	(1.39725)
D(LOGM2)	-2.420042	0.089867
	(0.67892)	(0.82589)
D(LOGTRD)	0.207080	-0.352665
	(0.12446)	(0.15140)

3 Cointegrating Equation(s): Log likelihood -271.3394

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	-0.039202	-0.039559	-0.073850
			(0.01942)	(0.10214)	(0.06961)
0.000000	1.000000	0.000000	-2.361651	0.705402	3.102992
			(0.09677)	(0.50884)	(0.34677)
0.000000	0.000000	1.000000	-2.764608	-0.319924	4.096795
			(0.12634)	(0.66434)	(0.45274)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.711584	0.376224	-0.218454
	(0.40929)	(0.16957)	(0.12413)
D(LOGDCPS)	-5.162570	-0.521718	1.231994
	(3.19342)	(1.32302)	(0.96851)

D(LOGDCPSB)	-6.032474	0.110104	0.771213	
	(3.27856)	(1.35830)	(0.99433)	
D(LOGM2)	-3.702831	0.172313	0.610948	
	(1.98609)	(0.82283)	(0.60235)	
D(LOGTRD)	-0.704591	-0.294071	0.245248	
	(0.27903)	(0.11560)	(0.08462)	

4 Cointegrating Equation(s): Log likelihood -266.5777

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	0.000000	0.139768	-0.229333
				(0.10937)	(0.07463)
0.000000	1.000000	0.000000	0.000000	11.50862	-6.263779
				(2.86719)	(1.95649)
0.000000	0.000000	1.000000	0.000000	12.32660	-6.868180
				(3.25037)	(2.21797)
0.000000	0.000000	0.000000	1.000000	4.574436	-3.966196
				(1.25820)	(0.85856)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.714315	0.221017	-0.049549	-0.246900
	(0.38919)	(0.20051)	(0.17538)	(0.07651)
D(LOGDCPS)	-5.176025	-1.286567	2.064351	-2.116508
	(3.13184)	(1.61351)	(1.41125)	(0.61569)
D(LOGDCPSB)	-6.039953	-0.315044	1.233886	-2.236258
	(3.26019)	(1.67963)	(1.46909)	(0.64092)
D(LOGM2)	-3.707439	-0.089590	0.895967	-2.000476
	(1.97458)	(1.01729)	(0.88978)	(0.38818)
D(LOGTRD)	-0.702944	-0.200478	0.143394	0.061846
	(0.26837)	(0.13826)	(0.12093)	(0.05276)

Appendix III: Mexico cointegration Estimates Result

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
0.655787	0.126315	-0.246812	0.156092	-0.303091	0.373231
-0.116099	0.288011	-0.485990	0.591659	-0.039188	-0.340591
-0.207953	-0.783979	0.858766	-0.024152	0.063384	0.256496
-0.325389	0.198529	-0.215723	0.097810	-0.158320	0.110565
-0.134426	0.365092	-0.375955	0.065802	0.136068	-0.209002

Unrestricted Adjustment Coefficients (alpha):

D(LOGGDPGR)	-1.822074	0.702658	1.012812	1.078615	0.505079
D(LOGDCPS)	0.072701	-0.334408	0.833010	-0.200131	0.520722
D(LOGDCPSB)	0.123315	0.131138	-0.407217	0.167882	0.668059
D(LOGM2)	-0.451886	-1.140274	-0.707339	0.012955	0.013565
D(LOGTRD)	1.694331	-0.342460	0.140384	1.978097	-0.695712

1 Cointegrating Equation(s): Log likelihood -237.6161

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.192615	-0.376359	0.238022	-0.462179	0.569135
	(0.16043)	(0.17240)	(0.09903)	(0.05739)	(0.09646)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.194893
	(0.47168)
D(LOGDCPS)	0.047676
	(0.32289)
D(LOGDCPSB)	0.080869
	(0.32357)
D(LOGM2)	-0.296341
	(0.29739)
D(LOGTRD)	1.111121
	(0.60201)

2 Cointegrating Equation(s): Log likelihood -227.0536

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	-0.047641	-0.146306	-0.404558	0.739497
		(0.08249)	(0.11154)	(0.07003)	(0.08068)
0.000000	1.000000	-1.706605	1.995316	-0.299145	-0.884466
		(0.28010)	(0.37874)	(0.23781)	(0.27396)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.276471	-0.027781
	(0.46451)	(0.21935)
D(LOGDCPS)	0.086501	-0.087130
	(0.32315)	(0.15260)
D(LOGDCPSB)	0.065643	0.053346
	(0.32787)	(0.15483)
D(LOGM2)	-0.163956	-0.385491
	(0.23489)	(0.11092)
D(LOGTRD)	1.150880	0.115387
	(0.60870)	(0.28744)

3 Cointegrating Equation(s): Log likelihood -219.9829

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	-0.293365	-0.379693	0.767076
			(0.10206)	(0.06027)	(0.09235)
0.000000	1.000000	0.000000	-3.272645	0.591587	0.103473
			(0.64818)	(0.38277)	(0.58649)
0.000000	0.000000	1.000000	-3.086808	0.521932	0.578892
			(0.52360)	(0.30920)	(0.47377)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.487088	-0.821805	0.977993
	(0.45343)	(0.54898)	(0.66104)

D(LOGDCPS)	-0.086726	-0.740193	0.859936	
	(0.30577)	(0.37020)	(0.44578)	
D(LOGDCPSB)	0.150325	0.372596	-0.443872	
	(0.33606)	(0.40687)	(0.48993)	
D(LOGM2)	-0.016863	0.169048	0.058254	
	(0.21291)	(0.25777)	(0.31039)	
D(LOGTRD)	1.121687	0.005329	-0.131192	
	(0.63722)	(0.77149)	(0.92897)	

4 Cointegrating Equation(s): Log likelihood -213.4408

Normalized cointegrating coefficients (standard error in parentheses)

LOGGDPGR	LOGDCPS	LOGDCPSB	LOGM2	LOGTRD	@TREND(2)
1.000000	0.000000	0.000000	0.000000	5.703289	-9.087577
				(1.71120)	(2.47917)
0.000000	1.000000	0.000000	0.000000	68.45057	-109.8306
				(19.2500)	(27.8893)
0.000000	0.000000	1.000000	0.000000	64.52755	-103.1125
				(18.1356)	(26.2748)
0.000000	0.000000	0.000000	1.000000	20.73521	-33.59180
				(5.88078)	(8.52004)

Adjustment coefficients (standard error in parentheses)

D(LOGGDPGR)	-1.838057	-0.607669	0.745311	0.212360
	(0.45522)	(0.51310)	(0.61484)	(0.36670)
D(LOGDCPS)	-0.021606	-0.779925	0.903109	-0.226202
	(0.33519)	(0.37781)	(0.45271)	(0.27001)
D(LOGDCPSB)	0.095698	0.405925	-0.480088	0.123093
	(0.36940)	(0.41637)	(0.49893)	(0.29757)
D(LOGM2)	-0.021079	0.171619	0.055460	-0.726838
	(0.23491)	(0.26478)	(0.31727)	(0.18923)
D(LOGTRD)	0.478036	0.398038	-0.557912	0.251938
	(0.59112)	(0.66628)	(0.79839)	(0.47618)