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FINANCIAL LIBERALISATION AND ECONOMIC GROWTH IN SOUTH AFRICA

By

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ABSTRACT

This study examined the impact of financial liberalisation on economic growth in South Africa. The study used quarterly time series data for the period 1980 to 2010. A vector error correction model was used to determine the short run and long run effects of financial liberalisation on economic growth in South Africa. The other explanatory variables considered in this study were government expenditure, investment ratio, public expenditure on education and trade openness. Results from this study revealed that financial liberalisation, government expenditure and public expenditure on education have a positive impact on economic growth while trade openness negatively affects economic growth in South Africa. Policy recommendations were made using these results.

Keywords: Financial liberalisation, Economic growth, South Africa.

DECLARATIONS

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This treatise is dedicated to my lovely mother Darnely Mahwaya-Sibanda and my remarkable father Coghlan Sibanda.

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ACCRONYMS AND ABBREVIATIONS

JSE – Johannesburg Stock Exchange
SABE – South African Bond Exchange
OECD -Organisation for Economic Co-operation and Development
SARB – South African Reserve Bank
CPD – Corporation for Public Deposits
LAB – Land and Agricultural Bank
ABSA - Amalgamated Bank of South Africa
PIC – Public Investment Commissioners
SBDC – Small Business Development Corporation
IDC – Industrial Development Corporation
BESA – Bond Exchange of South Africa
EFT – Electronic Funds Transfer
POS – Point of Sale
ATM – Automated Teller Machine
IMF – International Monetary Fund
GDP – Gross Domestic Product
BSD – Bank Supervision Department
BCBS – Basel Committee on Banking Supervision
WTO – World Trade Organisation
SSA – sub-Saharan Africa
EU – European Union
FDI – Foreign Direct Investment
COSATU -Congress of South African Trade Union
GEAR – Growth, Equity and Redistribution
LDC - Less Developed Countries
AREAR – Annual Report on Exchange Arrangements and Exchange Restrictions
GMM - Generalised Method of Moment
VECM – Vector Error Correction Model
VAR - Vector Auto-Regression
ADF – Augmented Dickey Fuller
KPSS–Kwiatkowski, Phillips, Schmidt and Shin
OLS – Ordinary Least Squares

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

The process of financial liberalisation was made popular by McKinnon and Shaw in their 1973 publications (McKinnon (1973) and Shaw (1973)). It has since become a widespread phenomenon globally, with most African countries implementing it in the early 1990s (Calitz, 2002). Financial liberalisation refers to the opening up of a country's financial system. This process is in essence the removal of government's control over the interest rates, banks' credit policies, ownership structure and international capital mobility. According to Causevic (2003), full implementation of financial liberalisation occurs when the following measures are in place: removing government's control over credit policy of banks; removing government's control over interest rates; free entry to the banking sector; autonomy of banks; private ownership of commercial banks and other financial institutions; removing government's control over international capital flows.

The process of financial liberalisation started in the early seventies following the theoretical approach initiated by McKinnon (1973) and Shaw (1973) which favoured financial liberalisation against financial repression. Empirical literature presents two conflicting views on the financial liberalisation – growth nexus. From one point of view, financial liberalisation leads to more efficient credit allocation which increases investment and ultimately economic growth. According to Tswamuno, Pardee and Wunnava, (2007); Bekaert, Harvey and Lundblad, (2005) and King and Levine, (1993), liberalisation of the capital market encourages better corporate governance and investor protection which promotes financial development and therefore economic growth. On the other hand, some researchers find a negative relationship between openness and growth. Financial liberalisation encourages excessive risk-taking behaviour which increases macroeconomic volatility (and thus increases the chances of a financial crisis) which has a negative effect on economic growth (Rousseau and Wachtel, 2007).

According to Calitz (2002), South Africa's route to financial liberalisation started in 1980. However, South Africa formally enhanced its domestic financial liberalisation efforts after the democratic election in 1994. In South Africa, this policy was implemented to stimulate economic growth (Tswamuno et al., 2007). Policies such as financial liberalisation were expected to improve the efficiency of resource allocation which then ameliorates the rate of economic growth. The financial liberalisation efforts have taken the form of (though not limited to) the abolition of the financial rand system, enhanced market entry, development of new markets, introduction/development of new financial instruments, continuous deregulation of the Johannesburg Stock Exchange (JSE) and the South African Bond Exchange (SABE), replacement of Bank rate with a more market related repo rate (see Calitz, 2002). Economic reform in South Africa has taken a gradualist stance rather than a rapid transformation undertaken by other countries like Russia, Poland and Bolivia (Gillis et al; 1996 in Calitz; 2002).

1.2. Problem statement

There has been a significant amount of research that has been conducted on the effects of financial liberalisation on economic growth albeit with conflicting results. Some issues to explain the conflicting results have arisen through these researches, for example, the prerequisites and conditions for implementing financial liberalisation and the sequencing of economic reforms. However, although a number of empirical studies have been conducted on the financial liberalisation-growth nexus, most of these studies have concentrated on Asian and Latin American studies. Thus, there is a deficiency of empirical literature on financial liberalisation and growth in Africa and particularly in South Africa.

The financial liberalisation theory states that financial liberalisation leads to a faster and positive economic growth via an increase in interest rate which leads to an increase in savings and ultimately a rise in investment. Financial repression in the form of interest rate ceilings results in low interest rates which are transferred to low savings and consequently low investment. Notwithstanding the potential benefits that financial liberalisation brings, there are some challenges that it poses as well such as increasing financial fragility which makes the economy susceptible to financial crises (Rousseau and Wachtel, 2007). While some

countries like Pakistan have recorded success stories, others like European Union (EU) acceding countries have not experienced economic growth, others like the Latin American countries have only reaped the benefits for a short while, and some, for example Malaysia, have experienced crises and recessions following financial liberalisation.

Given that financial liberalisation theory states that competitive and efficient markets lead to a positive and greater economic growth, it is important to evaluate the effect that it has had in South Africa. Has financial liberalisation been beneficial to South Africa? Has it been a case where the benefits are reaped in the short run but followed with long run suffering? What policy lessons arise from the South African experience?

1.3. Objectives

This study seeks to empirically establish the impact of financial liberalisation policies on economic growth in South Africa. In this quest, the study will also pursue the following specific objectives:

- Critically review the financial liberalisation and the associated economic growth processes
- Empirically test for the short run and long run impact of financial liberalisation on economic growth
- Test for the causal relationship between financial liberalisation and economic growth
- Based on the empirical results determine the policy implications of the study findings.

1.4. Hypothesis

The hypotheses to be tested are that:

1. Financial liberalisation has a positive impact on growth in both the short run and long run.
2. Financial liberalisation leads to economic growth.

1.5. Justification of the study

Financial liberalisation in South Africa was implemented in order to foster economic growth. This study seeks to evaluate to what extent this goal has been achieved. When the reform process was put in to effect, there was an influx of capital (Pretorius, 2002). Ahmed, Arezki and Funke (2007) suggest that further trade and capital control liberalisation would increase

the share of foreign direct investment (FDI) in South Africa. However, COSATU has recently called for a consideration to increase capital controls. As aforementioned, literature has not managed to settle the dispute on the effects of financial liberalisation on economic growth. It is against this background coupled with COSATU's recent sentiments that this study seeks to resolve the dispute for South Africa and hence provide policy insights on the direction of future reform.

According to Fratzscher and Bussiere (2004), an important reason why there has been no robust model for the relationship between openness and growth is the presence of a time-varying relationship between openness and growth over time. This implies that there may be a trade off that occurs across time in that countries tend to gain in the short run due to an investment boom and influx of capital, but may not grow faster or even experience growth reversals in the long run. This study seeks to empirically test for such a relationship between financial liberalisation and economic growth in South Africa. South African studies have only addressed the issue of the impact of financial liberalisation on economic growth (see Tswamuno, et al 2007). A study that investigates the short run and long run effects of openness on growth will improve on previous empirical research and thus augment policy formulation.

South Africa is the economic powerhouse of Africa and is thus an engine of growth in sub-Saharan Africa. South African growth has a substantial positive impact on growth in the rest of Africa as shown by Arora and Vamvakidis (2005) hence investigating South African growth is not important only for the country but has implications for other countries as well.

1.6. Organisation of the study

This study will be structured as follows:

Chapter 1 gives an introduction to the study. This chapter also discusses the research objectives and the rationale for the research.

Chapter 2 will provide an overview of the South African economy with particular reference to the financial liberalisation process and economic growth.

Chapter 3 will review theoretical and empirical literature. This chapter will provide an evaluation of the different methods used to assess the impact of financial liberalisation and the results of various studies.

Chapter 4 will outline the methodology to be used in the study. It will discuss the formulation and specification of the model as well as the data analysis.

In chapter 5, the regression results, economic interpretation and model robustness checks will be discussed.

Chapter 6 will conclude and provide implications of the results and policy recommendations.

CHAPTER 2

AN OVERVIEW OF THE SOUTH AFRICAN FINANCIAL SYSTEM AND FINANCIAL LIBERALISATION POLICIES

2.1. Introduction

South Africa is the economic hub of southern Africa. It has abundant natural resources, well developed financial, transport, legal and communication sectors. Its stock exchange is rated among the top 20 in the world in terms of capitalisation. The economy of South Africa has implications not only for itself, but for other countries in the continent as well. The economy has undergone profound structural reform over the years, including financial liberalisation (Calitz, 2002).

Economic literature has provided ample evidence that the improvement in financial systems contributes to an increase in efficient resource allocation and hence growth (Djoumessi, 2009). In an effort to develop an efficient and competitive financial system to facilitate economic growth, many countries have undertaken the liberalisation of financial services and structural reform of the financial services sector (Bayraktar and Wang, 2005). The degree of financial liberalisation differs from country to country but has generally increased in the 1990s (particularly in Africa).

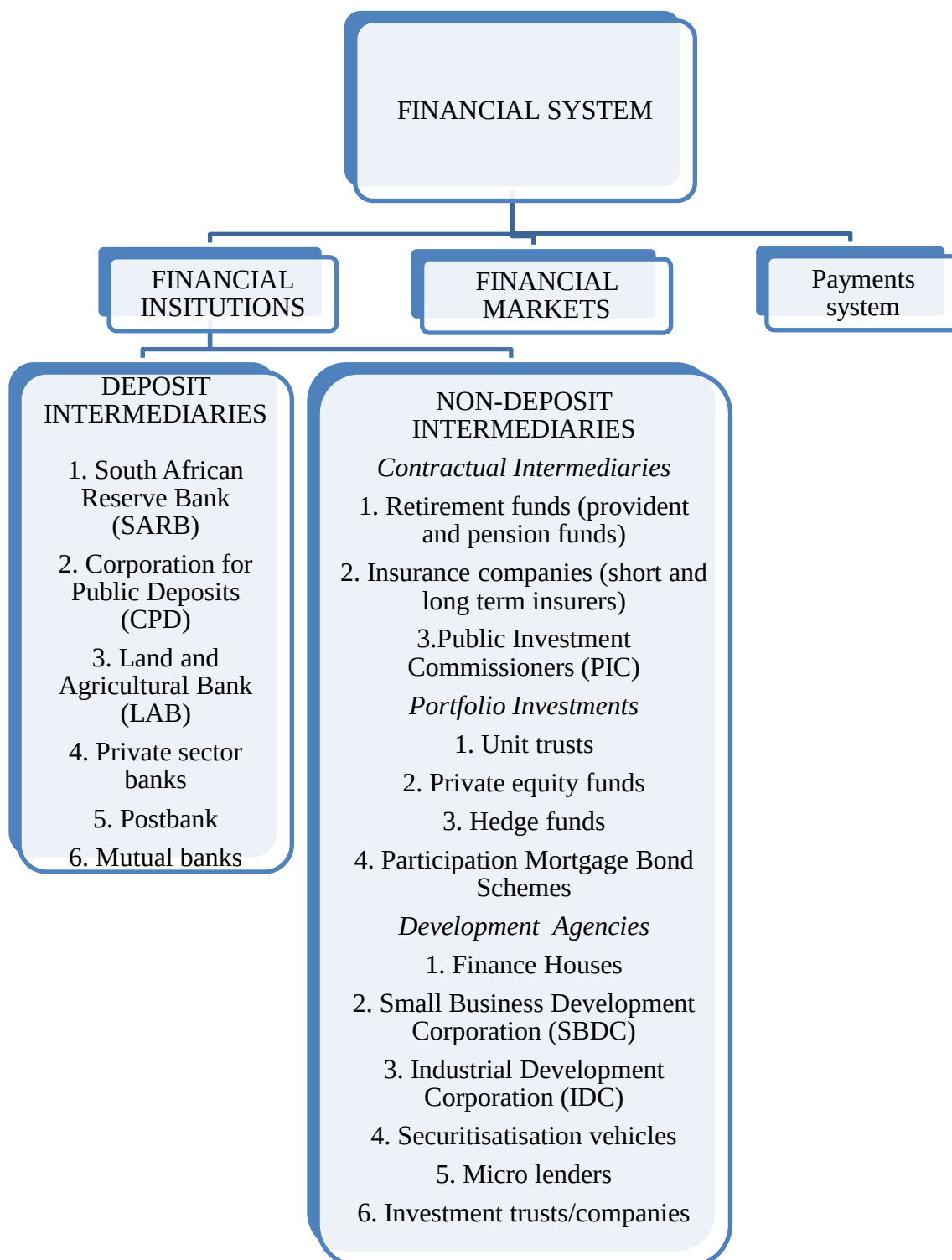
This chapter will provide an overview of the South African financial system (structure and functions) and the financial liberalisation process. According to Ergungor (2003), the structure of a financial system affects economic growth. Other authors (see for example, Rajan and Zingales, (1998); Beck et al., (2000); Levine et al., (2000); Beck et al., (2001); LaPorta et al., (2002); and Levine, (2002)) find that the overall level of development of the financial system is the major proponent of long-run economic growth. This chapter will thus review the structure, functions and developments of the financial system in South Africa. It is also important to evaluate the financial liberalisation and growth processes in South Africa. Thus, another section is dedicated to the discussion of pre-reform and the reform (financial liberalisation) process. The third section will outline the economic growth experience of South Africa. A brief discussion of monetary policy post financial liberalisation is provided followed by a conclusion of the chapter with a few comments.

2.2. The structure and functions of the South African financial system

In Fourie, Falkena and Kok (1999), a financial system is defined as a set of arrangements embracing the lending and borrowing of funds by non-financial economic units and the intermediation of this function by financial institutions to facilitate the transfer of funds, to provide additional money when required and to create markets in debt instruments so that the price and allocation of funds are determined efficiently. Essentially, a financial system increases efficiency in the allocation of funds. Without financial intermediaries, there is a problem of information asymmetry which exists when one party of the transaction may possess superior information than the other party and this leads to an inefficient allocation of funds. Thus, the financial system stimulates economic growth by influencing the allocation of financial resources and the performance of economic players.

The financial system of South Africa has undergone marked changes since the 1970s (Fourie et al; 1999). The speed of change was accelerated by the re-admission of South Africa into the global markets after 1994. These changes have been brought about by the monetary authorities and the private financial sector as a result of the liberalisation of financial markets. South Africa's financial system consists of financial institutions, financial markets and payments systems. Figure 2.1 shows the structure of the South African financial system.

Figure 2.1: Structure of the financial system in South Africa



Source: Fourie, Falkena and Kok (1999)

2.2.1. Financial institutions

Financial institutions are the key players in the financial markets as they perform the function of intermediation and thus determine the flow of funds. Financial intermediation is a productive activity in which an institutional unit incurs liabilities on its own account for the purpose of acquiring financial assets by engaging in financial transactions on the market (OECD, 2003). The role of financial intermediaries is to channel funds from lenders to borrowers by intermediating between them. These financial institutions can be classified into two broad categories: deposit and non deposit intermediaries.

a) Deposit intermediaries

The deposit intermediaries consist mainly of banks, that is, South African Reserve Bank (SARB), commercial banks, mutual banks, Postbank, Land and Agricultural Bank (LAB) and the Corporation for Public Deposits (CPD). This subdivision can thus be referred to as the banking sector and it is the domineering component in the South African financial system. This is evidenced by the banking system accounting for about 67% of the total assets of the financial system in the second quarter of 2010 and bank loans accounting for a large part of the finance sources (77 percent) in the country (Kumbirai and Webb, 2010). The roots of the banking system in South Africa are firmly entrenched in the 18th century. The first bank to be established in South Africa was the Lombard bank in Cape Town, which opened its doors to the public on 23 April 1793. It was a state bank entrusted with the issuance of government notes. The first private bank was also established in the Cape – the Cape Of Good Hope Bank which opened in 1837. The South African Reserve Bank opened its doors in 1921.

According to the SARB, there are currently 30 registered banks in South Africa. This number consists of 10 locally controlled banks, 6 foreign controlled banks (subsidiaries), 12 local branches of foreign banks and two mutual banks. In addition, 44 international banks have authorised representative offices in South Africa. Representative offices, however, may not take deposits (SARB, 2012).

The soundness of the banking sector is important in an economy as it contributes towards confidence in a particular financial system. Banks are important institutions in an economy as they are responsible for the liquidity of the economy and they also facilitate the payments system, enabling parties to engage in financial transactions. However, banks can make the system vulnerable because the maturity of assets and liabilities is not synchronised.

The South African banking system is predominated by four major commercial banks: ABSA, FirstRand, Nedbank and Standard Bank. Standard Bank is the largest bank in terms of assets, with a market share of 26 percent, followed by ABSA with 22 percent. FirstRand and Nedbank had a market share of about 19 percent and 18 percent respectively. In 1994, these groups represented 83.8 per cent of the total assets of the banking sector and in 2004 they represented 87.4 per cent of the total banking sector assets. The remaining 12.6 per cent of assets in the banking sector are currently held by the other 31 banks, excluding the two mutual banks. This means that the stability of the financial system is primarily dependent on the performance and financial strength of these banks even though South Africa is classified as a market based economy.

b) Non-deposit intermediaries

These are government or private organisations (such as a building society, insurance company, investment trust, or mutual fund or unit trust) that serve as an intermediary between savers and borrowers, but do not accept time deposits. Such institutions fund their lending activities either by selling securities (bonds, notes, stock/shares) or insurance policies to the public. Their liabilities (depending on the liquidity of the liability) may fall under one or more money supply definitions, or may be classified as near money.

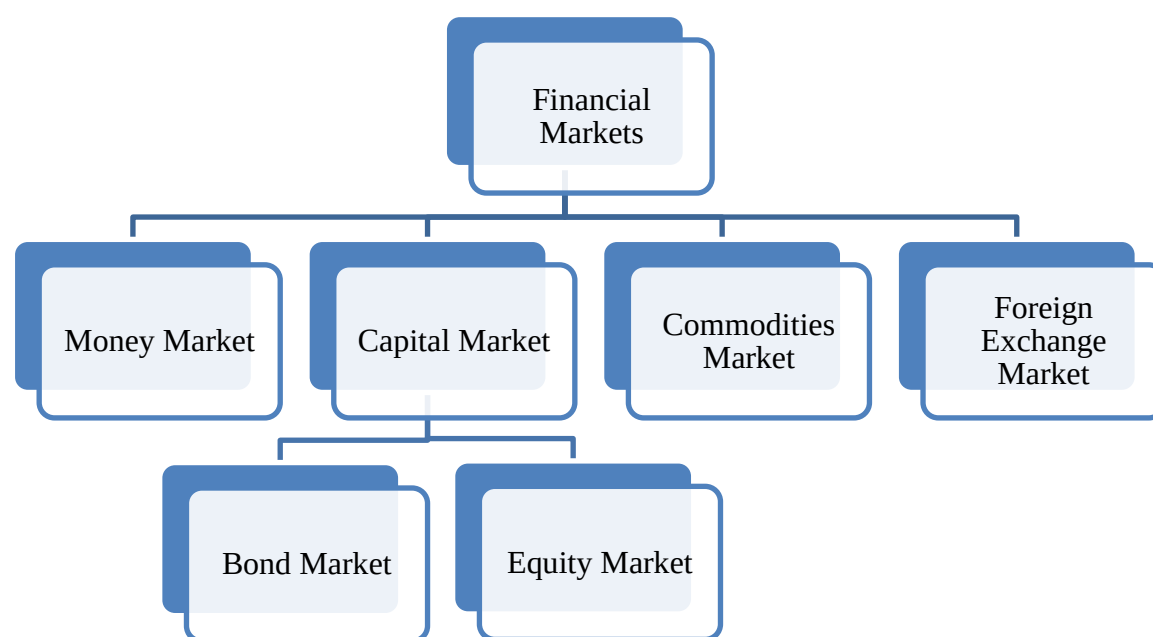
According to Fourie, et al (1999), this category of financial institutions can further be split into contractual intermediaries, portfolio institutions and (various) development agencies. Contractual intermediaries are the insurance companies, pension and provident funds and Public Investment Commissioners (PIC). The portfolio institutions are the unit trusts and participation mortgage bond schemes. The development agencies include finance houses, Small Business Development Corporation (SBDC) and Industrial Development Corporation (IDC).

2.2.2. Financial Markets

The other major component of the South African financial system is the financial market. According to the functional approach, financial markets facilitate the flow of funds from surplus units to deficit units in order to finance investments by corporations, governments and individuals. South Africa boasts of a well developed financial market. The financial market can be classified according to the financial instruments.

The financial market in South Africa comprises four major markets namely the money market, foreign exchange market, capital market and commodities market. There is also the derivatives market which is a hybrid market. The diagram below shows the financial markets of South Africa.

Figure 2.2: South African financial markets



Source: van Zyl, Botha and Skerriitt, P (2003)

a) Money market

The money market is the market for short-term interest- bearing assets with maturities of less than one year, such as treasury bills, commercial paper, and certificates of deposits. It is an environment in which entities from the household, government and business sectors (who are in need of short-term funds) meet those entities (from the same sectors) who have surplus funds, and engage in various forms of lending and borrowing (Botha, 2007). Thus, the major task of the money market is to facilitate the liquidity management in the economy. The main issuers in the money market are the government, banks and private companies, while the main investors are banks, insurance companies and pension and provident funds.

b) Capital market

The capital market is made up of the equity and bond markets. The capital market is the market for trading in assets for maturities of greater than one year, such as treasury bonds,

private debt securities (bonds and debentures) and equities (shares). The main purpose of the capital market is to facilitate the raising of long-term funds. The main issuers in the capital market are the government, banks and private companies, while the main investors are pension and provident funds and insurance companies.

b (i) Equity market

The equity market is the market for the issue and trading of equities. Such issuing and trading of equities happens in the Johannesburg Stock Exchange (JSE). The JSE is Africa's largest Stock Exchange. It is amongst the top 20 largest equities exchanges in terms of market capitalisation in the world (JSE, 2012). In terms of derivatives, the JSE is currently ranked the 20th largest exchange by the Futures Industry Association (FIA) in terms of the number of contracts traded. The product base of the JSE has also expanded to include not only shares, but also a range of equity, commodity and interest rate derivatives. Turnover on the JSE has shown strong growth over recent years, increasing from an annual turnover of R22 billion in 1992 to R1 279 billion in 2005.

b (ii) Bond market

The bond market is the mechanism/conventions that exist for the issue of, investing in and the trading of instruments that represent the long term undertakings (usually of a fixed capital nature) of the issuers (Faure, 2006). The bond market is an extension of the money market and is a market for long term debt instruments. The South African bond market is also formalised in the form of the Bond Exchange of South Africa (BESA), which was established in 1996. According to the JSE, as at December 2008, BESA had granted listing some 1,102 debt securities, issued by 100 sovereign and corporate borrowers, with a total market cap of R935 billion. Government bonds comprise around 60 per cent of the bonds listed on BESA, with the rest consisting of bonds issued by parastatals and corporates. Corporate bond issuances are currently increasing at a much faster rate than government bond issuances. The annual turnover on BESA has increased from R2.1 trillion in 1995 to a record R12.9 trillion in 2008.

c) Commodities market

The commodities market is a market where raw or primary products are exchanged. These raw commodities (big volume items like maize) are traded on regulated commodities

exchanges. The commodities are exchanged for money, thus bringing this market closer to a financial market (van Zyl, Botha and Skerritt, P (2003)

d) Foreign exchange market

The foreign exchange market plays the essential role of providing the instruments or mechanics to facilitate all payments across international borders by transferring funds between parties in different countries engaging in commercial and other financial transactions with each other (du Toit, 2005). The foreign exchange market is not really a financial market, but a conduit for foreign investors into foreign financial markets. This is because lending and borrowing domestically do not take place in this market.

e) Derivative market

Derivative markets are investment markets that are geared toward the buying and selling of derivatives. Derivatives are securities or financial instruments, which get their value, or at least part of their value, from the value of another security, which is called the underlier. According to Adelegan (2009), South Africa's derivatives market was established to further develop the financial system, enhance liquidity, manage risk and meet the challenges of globalisation. The market comprises two broad categories of derivatives, namely options and futures.

2.2.3. Payments systems

These are the systems (both paper backed and electronic) through which funds flow from one account and financial institution to another, for instance, when a customer of one bank writes a cheque to a customer of another bank. The South African National Payments system has undergone fundamental changes during the period under study. Payment systems in South Africa compare favourably with those in developed countries as far as customer services are concerned. It is mainly registered banking institutions that provide payment services to the public. There are various payments instruments in use in South Africa to purchase goods and services, to make financial investments and to transfer funds from one person to another. These instruments include cash, cheques, debit-, credit-and prepaid cards and electronic funds transfer (EFT) services. Over the years there has been a transition from the major use of cash for payments to cheques and lately electronic instruments (cards and EFT) have taken the lead. These payments systems are discussed below.

2.2.3.1 Cash payments

Cash payments are made using South African currency which consists of 5 banknote and 7 coin denominations. The legal tender is locally produced by subsidiaries of the Reserve Bank. The South Africa Bank Note Company prints all banknotes on behalf of the Bank, namely the R200, R100, R50, R20 and R10 notes. The South Africa Mint Company is responsible for minting all the coins on behalf of the Reserve Bank, namely, the R5, R2, R1, 50c, 20c, 10c and 5c coins. The value of notes and coins in circulation amounted to approximately R101billion at the end of 2011. This was an increase of about 88% from 2010.

2.2.3.2 Non-cash payments

i) Cheque payments

In the 1990s, cheques were the largest used instrument for making payments. This is no longer the case as cheques have been surpassed by EFT payments. The volume of cheque transactions has declined tremendously over the years. There has been a decrease in volume from 284 million to 48 million in ten years which translates to an annual decline of approximately 24% (National Treasury, 2012).

ii) Cards

The evolution of technology saw an increase in the use of debit and credit cards although 20% of the banked population still remains non-cardholders. In March 2012 Visa recorded an increase in purchases at Point of Sale (POS) with debit cards by 7% to 68%, while ATM transactions involving cash showed a slight decline (Ndhlovu, 2012). Some banks issue credit cards which are affiliated with Visa or MasterCard. An estimated 8 million credit cards and 35.2 debit cards are in circulation in South Africa. The volume of credit card transactions amounted to 140 million in 2007.

iii) Electronic instruments

An increasingly large number of people use EFT especially for payments of a regular nature. The volume of EFT transactions amounted to 616 million in 2007.

iv) Other cashless payment instruments

The Post Office provides mail orders and telegram services in respect of the transfer of money. These are especially useful for the unbanked segment of the community. Many

private sector retailers provide private-label credit cards which can only be used in-house with a certain revolving credit limit.

2.3. Evolution of financial liberalisation in South Africa

This section discusses the developments of the financial system in terms of financial regulations and financial reforms. The period from 1960 to 1980 in South Africa was characterised by repressive policies which saw the government have an active role in the economy. In the 1960s, the South African economy experienced an increase in liquidity. This increase in liquidity resulted in overspending which also led to an increase in inflation and excessive credit creation (Chauhan, 2012). The monetary authorities then decided that the usual monetary policy was not absorbing the liquidity which was creating more economic problems. More direct measures were thus implemented which included interest rate controls, cash and liquidity reserve requirements, credit allocation, credit ceilings, exchange controls. These control measures had negative consequences for the economy. It was against the backdrop of low economic growth brought about by these controls that countries embarked on a structural reform largely constituting of the dismantling of these measures (financial liberalisation). It was also expected that the removal of government controls in interest rates and barriers to entry into the financial system would lead to greater competition and, therefore, lower profit margins and interest spreads (Mlachila and Chirwa, 2002). In the 1970s and 1980s the prevailing political environment caused a gradual imposition of sanctions on South Africa and the country was effectively denied access to international financial markets. Thus, South Africa was characterised by interest and exchange rate controls, cash and liquid requirements, credit ceilings and directed credit allocation. However, South Africa embarked on a reform process, particularly after 1994, to free the finance sector.

2.4. The pre-reform period in South Africa

Gupta (2005) contends that financial repression consists of three elements. Firstly, the central bank imposes high reserve and liquidity ratios on the banking sector, forcing them to hold government bonds and money. This allows the government to finance budget deficits at a low cost. Secondly, given that the government revenue cannot be extracted easily from private securities, the development of private bond and equity markets is discouraged. Finally, the banking system is characterised by interest rate ceilings to prevent competition with public sector fund raising from the private sector and to encourage low-cost investment. Thus, the regulations generally include interest rate ceilings, compulsory credit allocation and high

reserve requirements. However, the years prior to 1980 were characterised by the removal of credit ceilings and thereafter the 1980s was characterised by interest rate deregulation in many countries. Therefore, currently the major form of financial repression is via obligatory reserve requirements.

In South Africa, the period from 1965 to 1980 was characterised by heavy reliance upon administrative controls such as ceilings on the extension of bank credit and deposit rate controls to restrain the growth in liquidity and aggregate spending (Gidlow, 1995). These direct administrative controls were introduced for a variety of reasons, but by the beginning of the 1980s had been discarded. The following discussion relates to the forms of financial repression in South Africa and the operation of these controls.

2.4.1. Regulation of cross-border capital movements (capital account controls)

The period 1961 to 1993 was characterised by intense exchange controls in South Africa which were intended to provide some protection to the domestic economy from the adverse effects of capital flights (JSE, 2005). These capital account restrictions limited cross-border flows of capital and reduced foreign competition and overseas investment opportunities (access to foreign instruments). Mkhize and Msweli-Mbanga (2006) put forward that the exchange controls however, created many distortions in the South African economy. These exchange controls had a negative impact on the interest rates, exchange rates, financial asset and property prices. These distortions led to a mal-distribution of scarce resources thus preventing the JSE from performing its function of channelling savings into investments. Exchange controls prevented the important price mechanism of the market economy from functioning properly and cost efficiency considerations were of secondary importance (JSE, 2005). However, the birth of a democratic era brought relief to the foreign exchange market. According to Prasad and Rajan (2008), liberalisation of the capital account implies removing impediments to inflows of capital, or allowing domestic investors to invest more freely in foreign assets. South Africa took a giant leap towards relaxing exchange rate control in March 1995 by abolishing the financial Rand and reverting to a unitary exchange rate system and the gradual relaxation of other exchange control measures which facilitated easier cross-border movements in capital. The dual exchange rate system that existed before 1995 hampered the development of instruments and a market for managing and hedging currency risks. The unified system allows the Rand to find its level in a relatively competitive foreign exchange market. According to Pretorius (2002), this move was followed by a marked increase in capital flows in the succeeding months. After South Africa re-entered the global

economy, there was a large build up of the official foreign reserves, increasing from about US\$12 billion in 1995 to about US\$49 billion in 2011. Independence also saw the removal of trade sanctions and this led to the opening of export markets which had been largely inwardly oriented.

2.4.2. Credit ceilings and Directions of credit allocation

The destabilising political events prior to the 1994 democratic election forced the monetary authorities to maintain a direct capital control. Direct credit controls in the form of credit ceilings were enforced through moral suasion. These credit ceilings were effected in the 1960s and 1970s. The central bank put in place quantitative credit controls, that is, a ceiling or upper limit on the amount of credit which banks could extend (Odhiambo, 2011). The government had directives on the directions of credit. Monetary policy induced allocation effects by favouring particular sectors, such as agriculture, exports and the government. In order to comply with the high liquid asset requirements, the banks extended more credit to the private sector. In November 1965, the authorities requested all the monetary banking institutions to restrict the total of their discounts and advances to the private sector excluding the Land Bank to the level of such credit as at 31 March 1965. This ceiling was reduced to 92.5% of the March 1965 level in December 1966, (Gidlow, 1995).

In June 1968 this ceiling method of control was extended to certain specified investments of the banks and in August 1970 the credit ceilings were extended also to the non-monetary banks when severe competition for deposits between the various financial institutions threatened to erupt into an interest rate war. The level of the ceilings was raised from time to time, while a number of allowances were made outside the ceilings in respect of credit extended to the agricultural sector, to smaller business undertakings and for strategic purposes. In February 1976, the authorities further tightened their credit policies by re-imposing direct quantitative restrictions on bank credit to the private sector. Certain banks were experiencing problems with their credit ceilings and so the Reserve Bank decided to raise the credit ceilings applicable to banking institutions' discounts and advances and to their investments by an additional 4% in August 1979.

These measures were aimed at controlling the growth in the monetary aggregate with a view of combating inflation. The quantitative credit controls also served to facilitate commercial bank financing of the large deficits of the public sector. However, these credit ceilings were abolished in 1980.

2.4.3. Liquid asset requirement

An additional restriction on banks was the requirement to hold liquid assets - assets which can be quickly converted to cash or used in a similar way to cash. These were administered through the Banks Act of 1965. This was a period in which there was high inflation due to overspending in the economy. Thus, the banks had plenty liquid assets. The authorities increased the minimum liquid asset ratios for commercial banks to reach the permissible maxima of 40% of short term liabilities and 30% of medium term liabilities by the end of July 1965. During the first half of 1969, the liquid asset requirements were raised to 48 % in respect of the short term liabilities of all banks, while the requirement in respect of the medium term liabilities of the non-commercial banks was raised to 30 % to place it on a par with the commercial banks. These extensive rises in minimum liquid asset requirements were used to restrain bank credit to the private sector.

The liquid asset requirement enforced banks to invest in liquid assets that the SARB could alter from time to time. These assets comprised SARB notes, coin, gold coin, cash balances with the SARB and a large number of financial assets such as Treasury Bills, government stocks, bankers' acceptances and trade bills.

2.4.4. High bank reserve requirements

Cash reserve requirements were introduced in March 1968. These were pegged at 8% of short-term liabilities, interest-free with the Reserve Bank, plus an additional 7 per cent of increase in short-term liabilities, also interest-free with the Reserve Bank. The additional requirement of 7% was however, abolished in March 1971. In 1980, the effective reserve requirement was 5.3%. The cash reserve requirements were adjusted from time to time until the basic minimum reserve balance requirement (percentage) is determined as 2.5% of total liabilities and the supplementary interest-bearing cash reserve requirement of 1% of short-term liabilities was withdrawn in March 1998.

2.4.5. Deposit Rate Control

Another direct method of monetary control exercised by the Reserve Bank was that of deposit rate control. The Bank first imposed upper limits on the rate of interest payable on bank and building society deposits from March 1965 until July 1966. In December 1969, banks and building societies were requested to maintain a maximum rate of 7% per annum on deposits. Adjustments were made from time to time to the maximum rates on the several categories of deposits and to the classes of intermediaries and liabilities subject to rate

control (Gidlow, 1995). Participation mortgages, building society shares and funds taken on loan or against debentures for the purpose of lending to the general public were included as from March 1972. Interbank deposits, including deposits between building societies and banks, were exempted from rate control in June 1974. Deposit rate controls were instated to ensure that home mortgage rates were not increased as interest rates increased and also to discourage competition between banks and building societies. These controls were subsequently dropped in March 1980.

2.4.6. Control over Lending Rates

Apart from deposit rates, controls were also exercised over the interest rates charged for various types of loans and credits, either on a statutory or informal basis. The clearing banks' prime overdraft rate had for many years prior to 1967 been set, by agreement with the Reserve Bank, at between 1.5% and 2% above Bank rate, and from 1967 to 1975 at between 2% and 2.5% above. The government subsidised certain interest rates in 1970 but interest rate controls were re-introduced in March 1972 (Gidlow, 1995).

The purpose of this form of control was to protect consumers, tradesmen and farmers from exploitation by moneylenders. Both direct deposit and lending rate controls measures kept the interest rates low to avoid large increases in politically sensitive interest rates and to minimise the cost of certain forms of socially desirable credit, such as building society mortgage loans and Land Bank cash credit advances (Chauhan, 2012).

2.5. Financial liberalisation reform in South Africa

In South Africa, various measures towards domestic financial market liberalisation were initiated in the 1980s (Calitz, 2002 and Misati and Nyamongo, 2011). It was after independence however, when the country embarked on a large-scale financial liberalisation in an effort to integrate the economy in the international arena. International economic sanctions, trade boycotts, disinvestment campaigns and pressures for the withdrawal of foreign loans from South Africa were repealed. The measures that have been undertaken in South Africa are discussed below:

2.5.1. Reduction of fiscal deficit

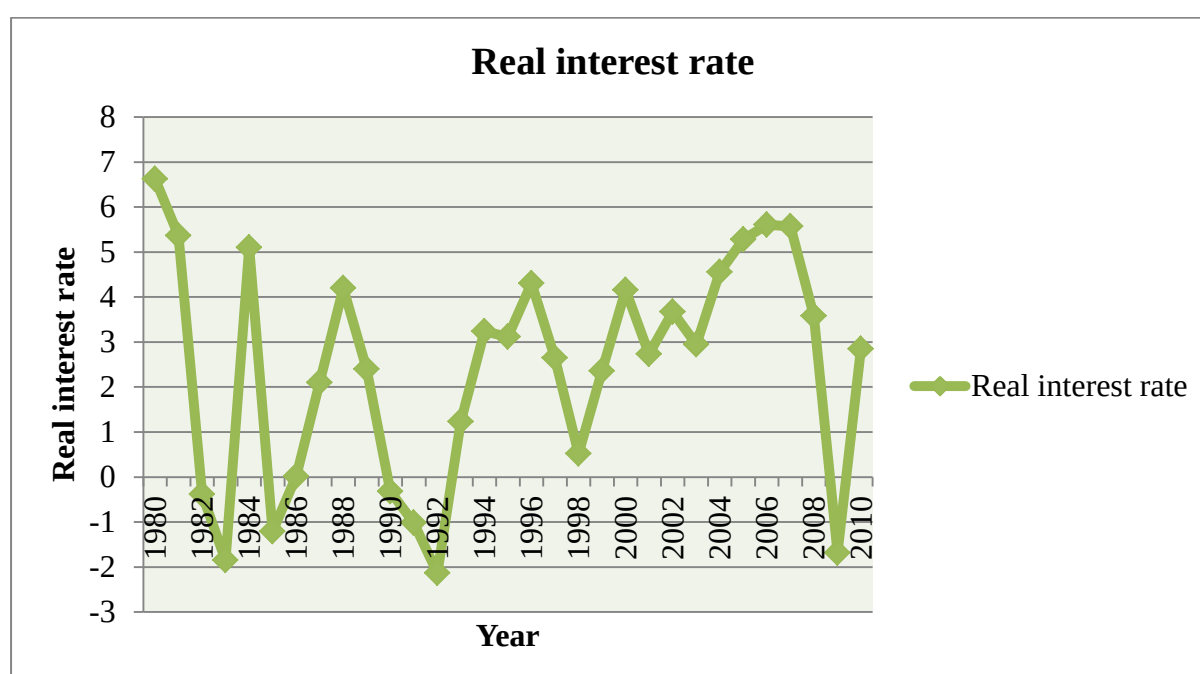
In line with the objective to stabilise the macro economy, the government announced the first in a series of budgets aimed at reducing budget deficit on 17 March 1993. Policy makers in South Africa also placed more emphasis on limiting the role of government in the economy and lowering the budget deficit as two of the policy goals of the Growth, Equity and

Redistribution (GEAR) strategy as adopted in 1996. The budget deficit fell from 8.5% of GDP in 1992/93 to 1.4% in 2002 (Calitz, 2002 and Tswamuno, Pardee and Wunnava, 2007).

2.5.2. Interest rate liberalisation

In the 1970s and 1980s, South Africa had fixed interest rates. The period of interest rate deregulation in South Africa was initiated after 1980 but gained momentum in the 1990s. Interest rates have since then been an important tool as a monetary policy tool. In South Africa interest rates were liberalised fully in 1982 whereas mortgage rates were liberalised in 1984. In the years 1982 and 1983, the real interest rate was negative (see figure 2.3).

Figure 2.3: Interest rate in South Africa (1980 – 2010)



Source: World Development Indicators

This downward trend continued until 1987. However, since 1988 interest rates have been positive, implying that no financial repression (in the form of interest ceilings) exists. Interest rates are market determined although SARB still sets the bank rate. Banks are now free to set their own deposit and lending rates and they can, in addition, decide how much credit they want to extend. In March 1998, the bank rate was replaced with a more market related repo rate.

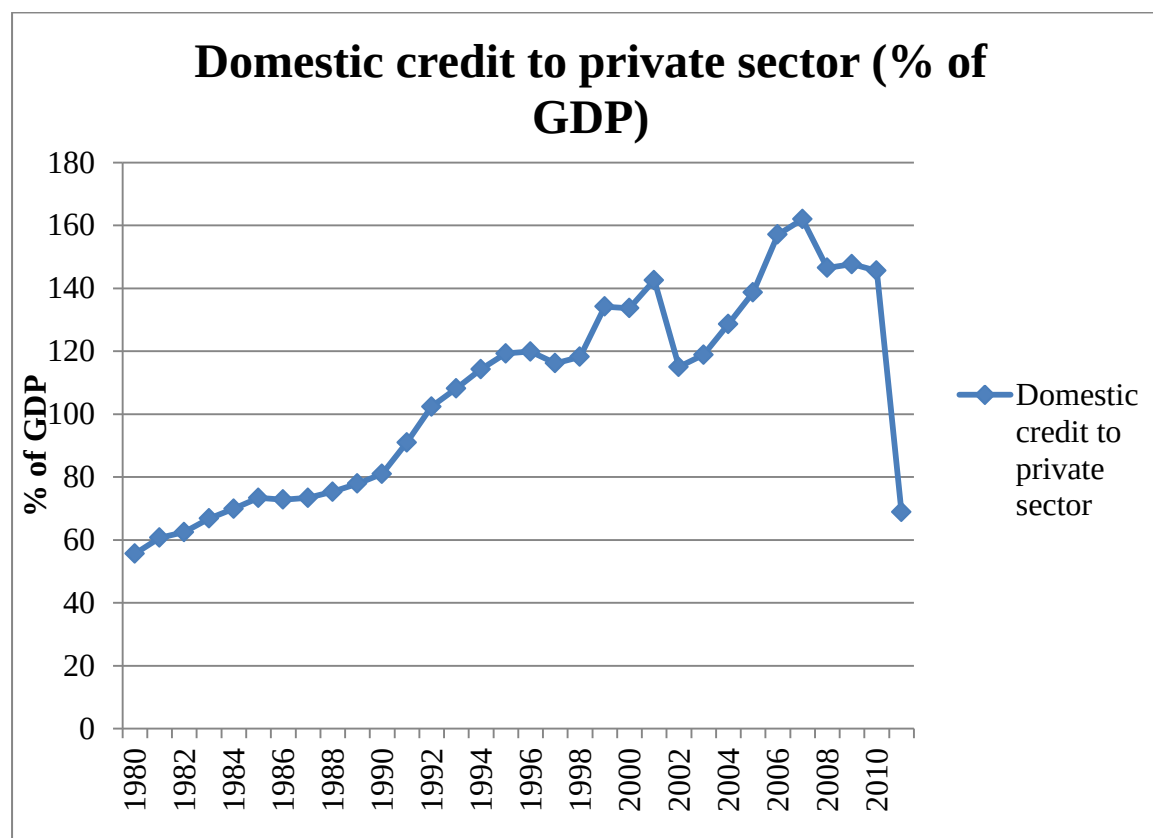
2.5.3. Reserve and liquidity requirements

The reserve and liquidity requirements were lowered in 1980 and were further lowered on more than one occasion throughout the 1980s. This created a fairer competitive environment for the financial institutions that were subject to these requirements (commercial banks) and those that were not (building societies). In the 1990s, the minimum reserve requirements to be held by banks in South Africa were changed from a fixed proportion of the value of short-term liabilities to a fixed proportion of the value of total liabilities (Nel, 2000). In March 1998, the Reserve Bank then introduced one reserve ratio of 2.5% on the total liabilities of banks, excluding issued capital and reserves. This is the current minimum reserve requirement in South Africa.

2.5.4. Abolition of Credit Ceilings and Directed Credit

Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities and trade credits and other accounts receivable, that establish a claim for repayment (IMF, 2011). For some countries these claims include credit to public enterprises.

Figure 2.4: Bank credit to the private sector in South Africa (1980-2010)



Source: World Development Indicators

Bank credit is an important source of finance to the private sector in South Africa. The credit controls that were imposed in 1965 were subsequently removed in 1980. Since then there has been a massive growth in the private credit extension as shown in Figure 2.4 below. Over the past 30 years bank lending to the private sector increased at a relatively high average annual rate of 17.9%. It has been on the steady increase from 56% of GDP in 1980 to 162% of GDP in 2007. There was however a decline from 2008 which is partly due to the global financial crisis. The credit extension has been on the decline since then as can be seen from the graph.

2.5.5. Strengthening of prudential regulation

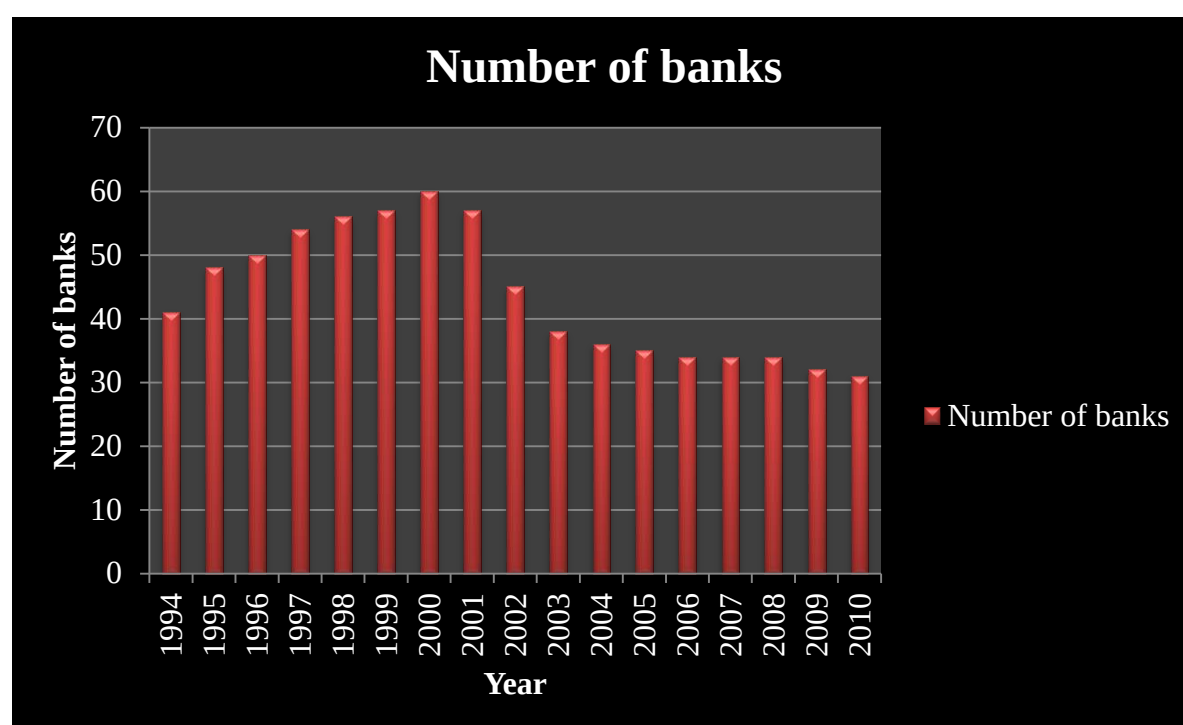
The financial regulatory system in South Africa has undergone numerous changes in order to adapt to the changes in the financial system as a whole and the banking sector in particular. The purpose of prudential supervision of banks is to ensure the safety and soundness of the South African banking system and to contribute to the stability of the financial sector (de Lange and Petros, 2010). The changes that the financial regulatory system has undergone include the transfer of responsibility for banking supervision from the National Treasury (formerly the Department of Finance) to the central bank in 1987, the establishment of the Financial Services Board in 1989 and the creation of the Policy Board for Financial Services and Regulation by Act of Parliament in 1993. The Reserve Bank Act of 1989 then gave the South African Reserve Bank more autonomy and independence. The Bank Supervision Department (BSD) of the SARB is the responsible body for carrying out prudential supervision of banks. The Banks Act of 1990 provides these powers to BSD. In December 2009, the Basel Committee on Banking Supervision (BCBS) proposed a set of bank supervision reforms (Basel III) requiring banks to hold sufficient amounts of high-quality capital and liquid assets to see them through both a solvency and a funding crisis. The proposals took into account the lessons of the 2008 crisis, particularly the rapid spread of contagion from one bank to another. The bulk of the Basel III reform package should be phased in by member countries by January 2012 and the liquidity requirements over a lengthy period ending on 1 January 2019. To facilitate implementation in South Africa, the Reserve Bank has made proposals to amend the existing regulations to the Banks Act (National Treasury, 2011).

2.5.6. Deregulated entry into the financial sector

This entails, among other things, the change in the number and range of players in the financial sector, the liberalisation of scope of activities of financial institutions to enhance

free entry into the market, the change in product offerings and the change in regulatory measures. There are other forces that have caused these changes in the financial sector, but the leading factor is the democratisation and the associated liberalisation of the South African economy since 1994. A number of foreign firms have entered the banking, insurance and broking markets since South Africa rejoined the world community in 1994. Between 1995 and 2000, there was enhanced bank market entry with foreign banks being allowed to open branches in South Africa in 1995.

Figure 2.5: Number of players within the banking sector (1994 – 2010)



Source: SARB Bank Supervision Annual Reports (various years)

The period following the liberalisation was characterised by an increase in the number of commercial banks as can be seen from Figure 2.5. There was a steady increase in the number of players in the banking industry from 41 in 1994 to a peak of 60 in 2000. These figures include finally and provisionally registered banks and mutual banks and local branches of foreign banks. There has been a general decline in the number of banks since 2000. There was a slight decline in 2001 to 57 banks and this was followed by a sharp decline of about 21% in 2002. The decline in the number of commercial banks from 2000 was a result of the acquisition of A2 banks (that is, the smaller South African banks) by larger banks as part of the consolidation in the industry (Hawkins, 2004). Other banks dissolved for reasons of poor financial management while some did not apply for renewal of their licenses as the benefits

of retaining a bank license no longer appeared to outweigh the costs (Hawkins, 2004). Thus, between 2001 and 2002, 1 bank was liquidated while 11 others were either deregistered, taken over or acquired. However, TIPS (2005) argues that foreign banks entered the South African market after the end of sanctions rather than because of any liberalisation.

This period was also characterised by the development of new markets (for example a formalised gilt market and further development of market for financial derivatives), the introduction/development of new financial instruments (for example commercial paper, equity options and futures contracts and the continuous deregulation of the Johannesburg Stock Exchange (Calitz, 2002).

2.5.7. Trade liberalisation

South Africa has been pursuing a strategy of trade liberalisation since the early 1980s although trade liberalisation gained momentum in the 1990s. South Africa announced a schedule of unilateral tariff liberalisation in 1994, expiring in 1999 and the Government began the dismantling of the system of import surcharges in June of the same year. South Africa also offered a 5-year phased-in tariff reduction with effect from January 1995 by signing the WTO agreement on trade liberalisation.

By the end of the 1990s, virtually all restrictions of trade had been eliminated, the tariff regime had been rationalised and simplified and the tariff rates drastically reduced for many sub-sectors. All other trade-related measures that contravened the WTO rules had also been abolished (Kusi, 2002).

2.5.8. Dismantling of exchange controls

Throughout 1961 to 1993, South Africa intensified its exchange controls through the Exchange Control Regulations Act to prevent deterioration of the capital account. In order to facilitate the controls, the government adopted a dual exchange rate system and introduced the financial rand for all non-resident investor transactions (Tswamuno, Pardee and Wunnava, 2007). The controls were temporarily lifted in 1983 but had to be re-instated due to the worsening political situation and the withdrawal of credit lines by foreign banks to South Africa, which caused severe depreciation of the rand. The exchange controls had a negative impact in the economy as they distorted the allocative efficiency of the market economy. There was thus a pressing need to do away with the Controls Act. The gradual phasing out of exchange controls began in 1993 (JSE, 2005) against the backdrop of positive political developments. The major step towards dismantling exchange controls however, took place on

13 March 1995, when the dual exchange rate system was finally brought to an end. Thereafter, there was a gradual relaxation of other exchange control measures which facilitated easier cross-border movements in capital. This helped minimise the problem of illiquidity in the economy and brought about increased competition, which reduced transaction costs and therefore improved economic efficiency (Gidlow, 1995). Exchange controls over residents and emigrants were however, maintained. The South African government has also taken steps to gradually reduce remaining foreign exchange controls, which apply only to South African residents. Significant relaxation over residents was effected in July 1997 (Takaendesa, 2006) and is still in progress. According to Swiss Business Hub South Africa (2012), private citizens are now allowed a one-time investment of up to 750,000 rand (R) in offshore accounts. Since 2001, South African companies may invest up to R750 million in Africa and R500 million elsewhere.. Smaller South Africa Companies can also move up to 50 Million Rand without SARB approval, allowing for swifter expansion to overseas markets. The long term objective is to lift all controls over residents so that South Africans will be allowed full access to global markets. Table 2.1 summarises the principal changes in the major dimensions of financial liberalisation.

Table 2.1: Summary of the financial liberalisation process in South Africa

Credit control	Interest rates	Entry barriers	Exchange control	Reserve requirements
Credit ceilings effected in 1965, removed in 1980.	Interest rate controls removed in 1980, replacement in March 1998 of Bank rate with a more market related repo rate	Enhanced market entry (with permission in 1995 to foreign banks to open branches in South Africa); some new banks permitted after 1983; 50 new banks since 1990, development of new markets and further development of market for financial derivatives; introduction/development of new financial instruments (e.g. commercial paper, equity options and futures contracts); continuous deregulation of the Johannesburg Stock Exchange;	Capital controls tightened in 1985, exchange controls on non-residents eliminated in 1995. Controls on residents relaxed in 1997.	Cash and liquidity requirements lowered in 1980

Source: Author's compilation

2.6. Pace of the liberalisation process

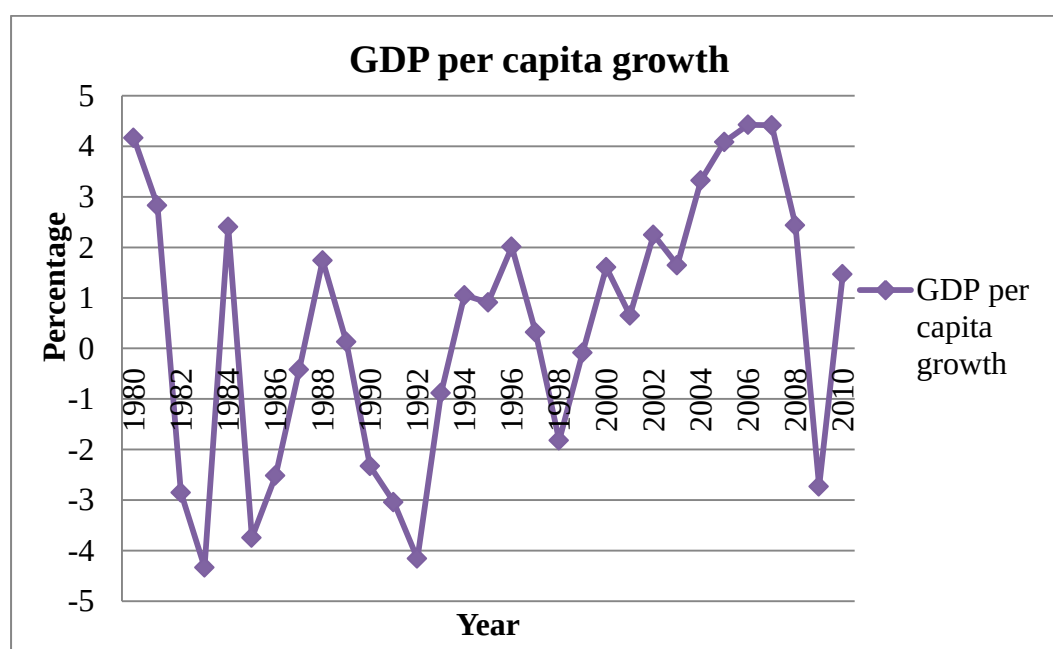
The financial liberalisation process in South Africa has taken a gradual stance rather than the “big-bang” approach. The gradual speed of adjustment has the distinct advantage that it reaps more economic advantages because it allows resource allocation to adjust to the new set of conditions. However, a gradual stance has the potential risk of fatigue setting in and the slow progress towards improved results may cause impatience and disillusionment, leading to the abandonment of the reform programme (Calitz, 2002). A rapid transformation on the other

hand has the political advantage of speed, which gives dissident pressure groups less time to mobilise opposition.

2.7. Economic growth

Strong and sustainable economic growth is important for any country in order to ensure poverty alleviation, reduce unemployment and achieve a more equitable distribution of income. The South African economic performance has shown an upward trend over the study period. An analysis of the economic performance is made using GDP per capita growth which is the growth in economic activity relative to the population.

Figure 2.6: GDP per capita growth in South Africa (1980 – 2010)



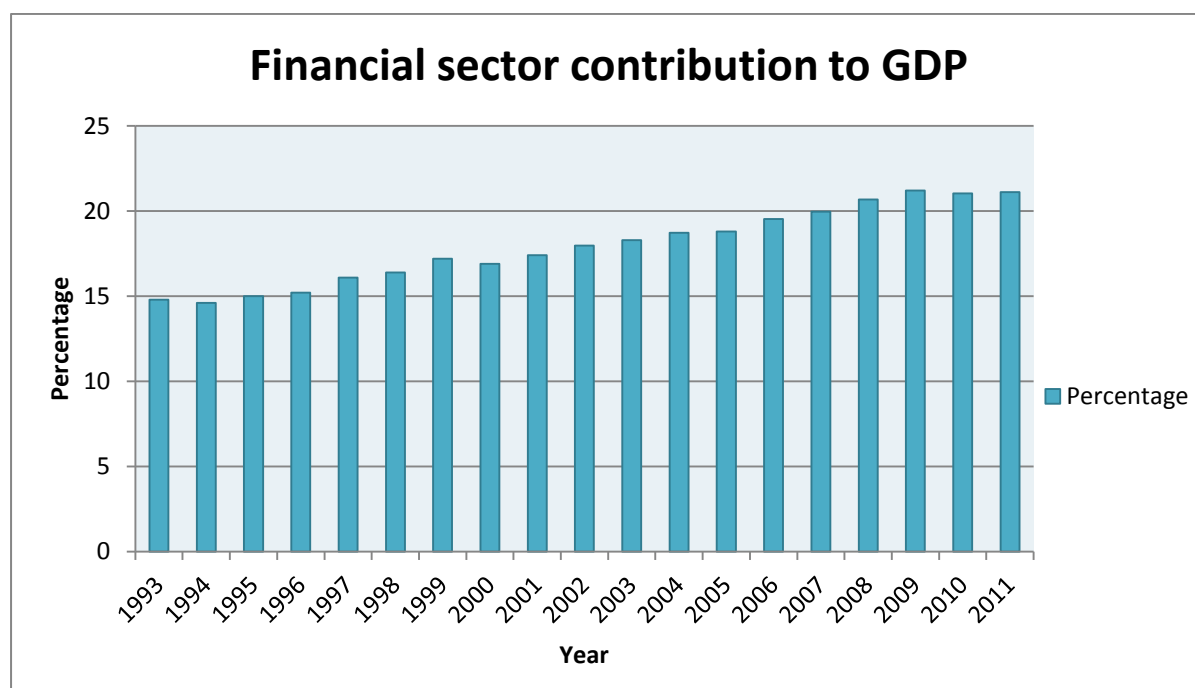
Source: World Development Indicators

The growth in GDP per capita has largely been volatile over the study period although the trend has been upward (see Figure 2.6). The period from 1980 to 1994 was the most volatile as can be seen from the graph, with an average of -0.795. This was a period of political unrest in the country which impacted negatively on the growth rate. From the graph, the GDP per capita growth rate decreased from 4.164 in 1980 to -4.33 in 1983. There was a short-lived recovery between 1984 and 1988 but the continued political and social unrest resulted in sanctions being imposed on South Africa and the withdrawal of most foreign corporations, which dramatically reduced the growth rate. After this brief recovery, the growth rate was again reduced to a low point of -4.16 in 1992. After 1992, the growth in GDP per capita

shows a significant upward trend with a downward shift being recorded after 2007. This is concurrent with the dismantling of the apartheid regime which was also accompanied by increasing gold profits and foreign investment. There was a sharp decline after 2007 when the growth rate decreased from 4.416 to -2.733 in 2009.

The main purpose of this study is to examine the impact of financial liberalisation on economic growth. Therefore, it is necessary to review the manner in which the South African economic growth has been performing in response to the liberalisation of the economy. In recent years, the South African financial sector has contributed a significant amount towards economic growth through its direct and indirect impact on investment and other factors. Figure 2.7 shows the contribution made by the South African financial sector towards economic activity. The contribution of the financial sector to South African Gross Domestic Product (GDP) has increased steadily over the years since democratisation.

Figure 2.7: Financial sector* contribution to GDP at market prices



*Financial Intermediation, Insurance, Real Estate and Business Services

Source: Statistics South Africa (2011)

As can be seen from Figure 2.7, the financial sector stands at around 20% as a proportion of GDP. The contribution of the sector seems to have stabilised within the 19-20% range over recent years. The data in Figure 2.7 are for the entire financial sector, including real estate and business services. The growth in financial sector contribution can be attributed to the

massive growth in the extension of private credit extension (SARB, 2010). Camco and Tips (2010) states that the growth emanates from South Africa's relatively well developed and increasing deregulated financial services sector with sophisticated banking, bond and insurance markets.

2.8. Monetary policy in a liberalised financial system

The implementation of financial liberalisation reform policies has implications for monetary policy framework. Between 1965 and 1980, monetary policy in South Africa was conducted by means of direct monetary instruments such as selective credit controls and credit ceilings, interest rate controls, cash reserve requirements and exchange rate control. This encouraged "grey" market borrowing and lending (Truu and Contogiannis, 1987). A more market oriented policy has been followed since 1980. The removal of the direct controls has facilitated a change in the way that the SARB implements monetary policy. The bank now has to employ indirect monetary tools such as open market operations, reserve requirements and central bank lending facilities. Open market operations are, broadly defined, the purchase or sale of financial instruments by the central bank, in either the primary market or the secondary market. Instruments commonly used for this purpose include treasury bills, central bank bills, or prime commercial paper. Reserve requirements oblige banks to hold a specified part of their portfolios in reserves at the central bank. Central bank lending facilities are typically short term; in general, they involve the rediscounting of high quality financial assets (Alexander, Balino and Enoch, 1996).

Up to the early 1980s, the monetary policy system used in South Africa was a liquid asset ratio-based system with quantitative controls on interest rates and credit (Aron and Muellbauer, 2000). This was followed by monetary targeting from 1986 which involved pre-announced, flexible monetary target ranges. Since 2000, South Africa has adopted inflation targeting as the monetary policy framework. This involves setting targets for inflation and using the interest rate to achieve the set targets. The interest rate has become more stable and predictable since this policy regime. Inflation targeting has required that authorities abandon any exchange rate intervention policies. As such, the exchange rate has become freely floating as opposed to the pegged system that was used before.

2.9. Conclusion

Financial liberalisation was implemented so that the negative effects of the financial restrictions were eliminated and the domestic financial sector operated more effectively as

part of the international sector. The success of policies such as financial liberalisation is dependent on issues such as financial system stability and the stability of the financial system is important for a country's economic growth. Financial system stability means a safe and secure financial system which is able to withstand external and internal shocks. A stable financial system creates a favourable environment for depositors and investors, encourages financial institutions and markets to function effectively and efficiently, and hence, promotes investment and economic growth.

South Africa has a healthy financial system. It has undergone intense structural reform in a bid to increase the country's economic growth. Before the liberalisation process, South Africa was a typical financially repressed country characterised by interest rate controls, direct controls, exchange controls and other forms of financial repression. A number of these controls have been lifted as the country goes further towards full financial liberalisation. The financial sector reforms have also impacted on the monetary policy framework. This is because there is an intricate relationship between financial reforms and monetary policy objectives, instruments and outcomes. Monetary policy in South Africa had transformed from direct controls to indirect monetary management due to financial liberalisation.

CHAPTER 3

LITERATURE REVIEW

3.1. Introduction

This chapter reviews the theoretical literature and empirical work related to the relationship between financial liberalisation and economic growth. It essentially consists of two parts. The first part covers the theoretical literature under the subheadings: theories of economic growth, the origin of the financial liberalisation theory and policy and the various issues concerning liberalisation theory such as the controversies over the role of financial liberalisation hypothesis, sequencing, external and internal financial liberalisation and the causal relationship between financial liberalisation and economic growth. The second part reviews empirical literature under the headings: studies on the impact of financial liberalisation on economic growth, causality, political environment, financial indices and time series versus cross section analysis. The last section provides an assessment and conclusion of the chapter.

3.2. Theoretical literature

3.2.1 Theories of economic growth

The goal of economic growth theory is to explain the determinants of growth rates within a country and the reasons for differences in growth rates and per capita incomes across countries. As noted in Dornbusch and Fisher (1994), there have been two prominent periods of intense work on growth theory. Studies on long-run economic growth were intense in the late 1950s and 1960s, which created the neoclassical growth theory. Interest in economic growth declined in the 1970s but there was resurgence in the latter part of the 1980s, resulting in the endogenous growth theory. These two main growth theories, namely, the neoclassical and endogenous growth theories are reviewed below.

i) Solow growth model

This model is also known as the neo-classical growth model and is widely used as a baseline model of long-term economic growth. The main contributions towards the neo-classical growth model came from the works of Robert Solow and Trevor Swan in 1956. This was an extension to the 1946 Harrod-Domar model, in which it was asserted that an economy's

growth rate is dependent on two factors: the level of saving and productivity of capital or the capital per output ratio (Banam, 2010). Solow extended the Harrod-Domar model by adding labour as a factor of production and making capital labour ratios flexible unlike in the Harrod-Domar model where they are fixed. These extensions allow for the distinction between capital intensity and technological progress. Thus, the Solow growth model shows how an increase in capital and labour force and advancement in technology can affect total output of goods and services of a nation (Mankiw, 2007).

In its simplest form, the neoclassical growth model, models output as dependent on two input factors, capital stock and the labour force. The production function is given by:

$$Y = f(K, L)$$

Where Y = output,

K = capital,

L = labour.

The model assumes that all savings in an economy are channelled to investment opportunities and the augmentation of physical capital stock (Kularatne, 2001). The model also has the following assumptions: the rate of depreciation of capital is assumed to be equal to zero, no technical progress and a fixed population growth rate. The only variable element left in the equation is the growth rate of capital. Capital growth is determined by saving, which in turn depends on income. Income or output in turn depends on capital. Thus, capital growth depends, via saving and income, on the capital stock (Dornbusch and Fisher, 1994). The Solow growth model shows that an increase in output is dependent on a higher rate of savings via higher stock of capital (Mankiw, 2002). Furthermore, the Solow growth model shows that an increase in the rate of labour force will lower the level of output. However, it also suggests that if there is technological progress, this can affect the level of output as it increases the efficiency of labour (Mankiw, 2002).

The neoclassical growth model explains the dynamics of the growth process but concludes that the long run equilibrium growth rate depends on two exogenous variables: the rate of population growth and the rate of technological change (Froyen, 2009). These variables are treated as exogenous and thus the theory does not isolate the fundamental sources of long-run growth. Froyen (2009) further asserts that the theory provides little reference to the role of

finance in economic growth other than making reference to savings and that, even then, any increase in the savings is assumed to have a temporary but not a long lasting effect on growth.

ii) Endogenous growth theory

The dissatisfaction from the neo-classical model gave birth to a new growth theory where the key determinants of growth are endogenous in the model. Thus, endogenous growth theory makes the rate of technological change endogenous. This means that it can be influenced by government actions, for example it can be affected by the share of the economy's resources devoted to research and development. New growth theory is an extension of the traditional theory which goes deeper into the ultimate sources of growth by making the rate of technological change or of population growth (or both) exogenous, (Froyen, 2009). The proponents of endogenous growth are driven by the view that government policy and economic behaviour must be able to affect the growth rate in the long run. New growth theory started with Romer (1986) and was followed by contributions by Lucas (1988) and Rebelo (1991).

According to Hussein and Thirlwall (2000), the AK model is the simplest endogenous model. It eliminates diminishing returns to capital which was characteristic of neo-classical theory. The AK model is shown as:

$$Y = AK$$

where Y = output,

A = a positive constant that reflects the level of the technology,

K = capital (broad sense to include human capital).

This model assumes population to be stationary, constant exogenous saving rate, a fixed level of technology and a constant marginal product of capital. The AK model argues that the growth in output depends on total factor productivity, the efficiency of financial intermediation and the rate of savings. As such, the growth rate of an economy is an increasing function of the saving rate. Hence, government policies to raise the saving rate will raise the growth rate. Endogenous growth theory implies that policies which embrace openness, competition, change and innovation will promote growth, (Fadare 2010).

Conversely, policies which are restrictive in nature have the effect of slowing economic growth.

Froyen (2009) points out that endogenous growth theory draws four important conclusions. Firstly, an increase in capital investment leads to an increase in returns and therefore, economic growth. Secondly, technological progress should not be treated as an exogenous factor but should rather be included in the model. Thirdly, the main source of technological progress is obtained from investing in research and development and finally, investment in human capital such as education and training of the workforce is the key for growth.

3.2.2. Theory of Financial Liberalisation

The importance of finance to economic growth was provided by Schumpeter in 1912 when he disputed David Ricardo's belief that banks had no role to play in the process of wealth creation, (Fowowe, 2011). Schumpeter argued that financial intermediaries promote growth by selecting entrepreneurs with most innovative and productive projects and granting them credit. Credit is granted to an entrepreneur and provides a lifeline through which he has the power to purchase and produce. Thus, the creation of credit by banks is essential for economic development as it drives the production process. Therefore, banks do have a role to play in wealth creation because they play an intermediation role between products and means of production and this is achieved by providing the entrepreneur with purchasing power. This then facilitates the process of economic development, (Fowowe, (2011).

From financial repression to financial liberalisation

In the early 1970s, less developed countries experienced decelerating economic growth and were characterised by heavily regulated financial systems. McKinnon and Shaw attributed the poor performance of investment and growth of these countries to interest rate ceilings, foreign-exchange regulations, directed credit allocation policies, high reserve requirements, quantitative restrictions in the credit allocation mechanism and heavy taxation of the financial sector. McKinnon and Shaw termed these regulations "financial repression" and advocated for financial liberalisation; which, according to Patnaik (2011), covers a whole set of measures, such as the autonomy of the Central Bank from the government; the complete freedom of finance to move into and out of the economy, the abandonment of all "priority sector" lending targets; an end to government-imposed differential interest rate schemes; a freeing of interest rates; the complete freedom of banks to pursue profits unhindered by

government directives; the removal of restrictions on the ownership of banks, which means de-nationalisation, full freedom for foreign ownership, and an end to "voting caps"; and so on.

Financial repression refers to a regime consisting of the imposition (by government) of interest rate ceilings, foreign-exchange regulations, directed credit allocation policies, high reserve requirements and heavy taxation of the financial sector. The less developed countries had shallow financial markets which were argued to have contributed to retarding economic growth. Shallow finance had distorted both interest rates and foreign exchange rates among other financial prices and consequently, the real rate of economic growth had been greatly weighed down. Low interest rates, McKinnon (1973) and Shaw (1973) reasoned, had the effect of reducing savings and consequently stifling investment.

The negative effects of financial repression

Financial repression in the form of interest rate ceiling suggests that the interest rate is kept at a level that is below the free market level. If credit is not offered on the basis of price, then the government can influence who has access to that credit, at a low interest rate. Such regulations distort the financial system of a country. The amount of saving and therefore capital formation will be negatively affected, while inefficient and relatively unproductive investment will be encouraged. Nyawata and Bird (2004) state that direct controls to suppress interest rates may also undermine the effectiveness of monetary policy, encourage capital flight and may, in general, stimulate unproductive rent-seeking behaviour. Such arguments against financial repression resulted in the birth of financial liberalisation.

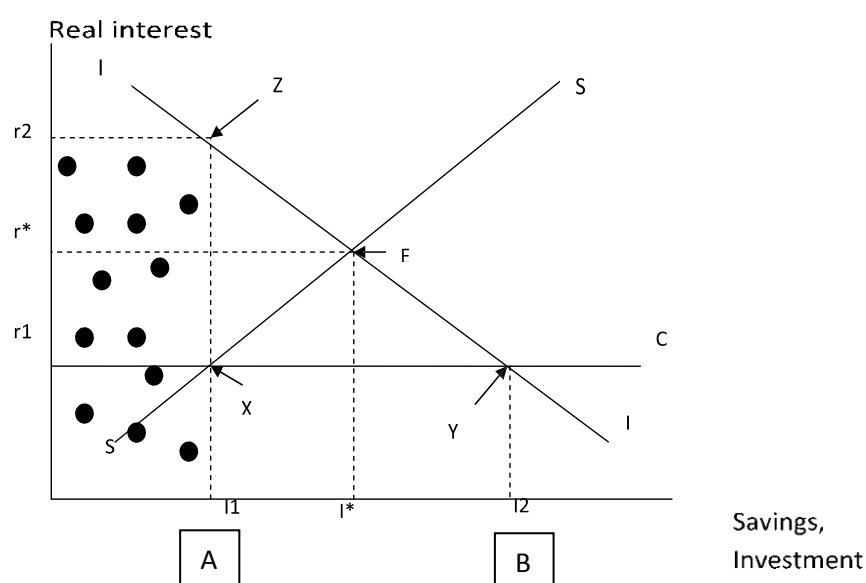
Gupta (2005) contends that financial repression consists of three elements. Firstly, the central bank imposes high reserve and liquidity ratios on the banking sector, forcing them to hold government bonds and money. This allows the government to finance budget deficits at a low cost. Secondly, given that the government revenue cannot be extracted easily from private securities, the development of private bond and equity markets is discouraged. Finally, the banking system is characterised by interest rate ceilings to prevent competition with public sector fund raising from the private sector and to encourage low-cost investment. Thus, the regulations generally include interest rate ceilings, compulsory credit allocation and high reserve requirements. However, the years prior to 1980 were characterised by the removal of credit ceilings and thereafter the 1980s was characterised by interest rate deregulation in

many countries. Therefore, currently the major form of financial repression is via obligatory reserve requirements.

The policy prescription provided by McKinnon and Shaw was the liberalisation of the financial sector of these developing countries in order to promote economic growth. By allowing the interest rates to adjust freely according to market mechanisms, entrepreneurs have more incentive to invest in high-yield projects. As such, higher economic growth is expected. Thus, the seminal works of McKinnon and Shaw propounded the thesis that became known as financial liberalisation which can be concisely summarised as amounting to ‘freeing’ financial markets from any intervention and letting the market determine the allocation of credit.

The effects of financial repression (and liberalisation) are shown in Figure 3.1.

Figure 3.1



Source: Fowowe (2011)

In the diagram above, the vertical axis measures the real rate of interest whereas the horizontal axis measures both savings and investment. The SS curve is the savings function which is a positive function of real interest rates. II represents the investment function. If the market was allowed to operate freely, equilibrium in the market for loanable funds will be attained at point E, where amount saved is equal to amount invested (I^*) and the market-determined rate of interest will be r^* . The line C represents an interest rate ceiling (as a result of financial repression) which is an administratively fixed nominal interest rate that holds the

real rate below its equilibrium level. If the interest rate ceiling is imposed on deposit rates, actual savings will be limited to I_1 . Since the ceiling is applied only to deposit but not loan rates, the investor/borrower faces a lending rate r_2 which would be the market clearing rate at constrained investment of I_1 . However, interest rate ceilings usually apply to both deposit and lending interest rates. In this case, both savings and investment will be restricted to I_1 , AB amount of investment opportunities is not met and the investment undertaken will be inefficient (dotted area).

With financial liberalisation, interest rates will rise, increasing savings and also investment. This process will continue until the real interest rate is at R^* , where savings is enough to satisfy investment. McKinnon and Shaw therefore advocated the liberalisation of such repressed financial systems so as to increase savings and investment, and consequently, promote economic growth.

External versus internal financial liberalisation

Financial liberalisation can be classified as internal or external. Internal financial liberalisation refers to the freeing of the domestic financial system and external liberalisation generally refers to capital accounts liberalisation. As indicated in Ghosh (2005), internal financial liberalisation typically includes some or all of the following measures, to varying degrees:

- The reduction or removal of controls on the interest rates charged by financial agents. The central bank will continue to influence or administer the rate structure through adjustments of its discount rate and through its own open market operations. Deregulation typically removes interest rate ceilings and encourages competition between similarly placed financial firms whose aim is to attract depositors on one hand and enticing potential borrowers to take on debt on the other.
- The withdrawal of the state from the activity of financial intermediation with the conversion of the “development banks” into regular banks and the privatisation of the publicly owned banking system. This is because development banks and publicly owned banks are not conducive to the dominance of market signals in the allocation of capital. This is usually accompanied by the decline of directed credit and the removal of requirements for special credit allocations to priority sectors, whether they

are government, small-scale producers, agriculture or other sectors seen as priorities for strategic or developmental reasons.

- The easing of conditions for the participation of both firms and investors in the stock market (market entry) by diluting or doing away with listing conditions, by providing freedom in pricing of new issues, by permitting greater freedoms to intermediaries, such as brokers and by relaxing conditions with regard to borrowing against shares and investing borrowed funds in the market.
- The reduction in controls over the investments that can be undertaken by financial agents, that is, breaking down the wall between banking and non-banking activities. Most regulated financial systems sought to keep separate the different segments of the financial sector such as banking, merchant banking, the mutual fund business and insurance. Agents in one segment were not permitted to invest in another for fear of conflicts of interest that could affect business practices adversely. The removal of the regulatory walls separating these sectors leads to the emergence of “universal banks” or financial supermarkets. This increases the inter-linkages between and pyramiding of financial structures;
- The expansion of the sources from and instruments through which firms or financial agents can access funds. This leads to an increase in instruments such as commercial paper and certificates of deposit issued in the domestic market and allows for offshore secondary market products;
- The liberalisation of the rules governing the kinds of financial instruments that can be issued and acquired in the system. This transforms the traditional role of the banking system’s being the principal intermediary bearing risks in the system. Conventionally, banks accepted relatively small individual liabilities of short maturities that were highly liquid and involved lower income and capital risk and made large, relatively illiquid and risky investments of longer maturities. The protection afforded to the banking system and the strong regulatory constraints thereon were meant to protect its viability given the role it played. With liberalisation, the focus shifts to that of generating financial assets that transfer risks to the portfolio of institutions willing to hold them;

- The shift to a regime of voluntary adherence to statutory guidelines with regard to capital adequacy, accounting norms and related practices, with the central bank's role being limited to supervision and monitoring.

External financial liberalisation typically involves changes in the exchange control regime. Ghosh (2005) further shows capital-account liberalisation measures as:

- Measures that allow foreign residents to hold domestic financial assets, either in the form of debt or equity. This can be associated with greater freedom for domestic firms to undertake external commercial borrowing, often without government guarantee or even supervision. It can also involve the dilution or removal of controls on the entry of new financial firms, subject to their meeting pre-specified norms with regard to capital investments.
- Measures which allow domestic residents to hold foreign financial assets. This is typically seen as a more drastic degree of liberalisation, since it eases the possibility of capital flight by domestic residents in periods of crisis. However, a number of countries that receive “excessive” capital inflows that do not add to domestic investment in the net and are reflected in unnecessary accumulation of foreign-exchange reserves, have turned to such measures as a means of reducing pressure on the exchange rate;
- Measures that allow foreign currency assets to be freely held and traded within the domestic economy (the “dollarisation” of accounts). This is the most extreme form of external financial liberalisation, which has been implemented only in very few countries.

Source: Ghosh (2005)

According to financial liberalisation theory, deregulating the domestic financial market and allowing the market to define the interest rate and controlling the capital (credit), helps in the macroeconomic stability and economic growth of countries (Banam, 2010). McKinnon and Shaw argue that financial liberalisation can promote economic growth by increasing investment and productivity. Financial liberalisation is expected to lead to higher real interest rates and to stimulate savings. In return, a higher level of savings would be expected to finance a higher level of investments, therefore, leading to higher economic growth. Savings and investment are the transmission mechanisms through which financial liberalisation

affects economic growth. However, McKinnon and Shaw propose different ways by which these transmission mechanisms work.

McKinnon (1973) developed a complementary hypothesis which asserts that money and investment are complementary. This means that investment needs a prior accumulation of money. This hypothesis predicts that a real return on money (deposit rate) induces the accumulation of a real money balance and this in turn finances capital formation for financially constrained developing economies. A positive relationship between money balances and the deposit interest rate therefore means that higher deposit interest rates from liberalisation attract money balances and this is channelled into investment, thus stimulating growth. The investment ratio to GDP will rise with the real deposit rate of interest.

Shaw (1973) on the other hand, developed a debt intermediation view which emphasises the role of financial intermediaries. In Shaw's view, financial intermediaries promote investment and raise output growth through borrowing and lending. Deposit accumulation acts as a source of funds for expanding the lending potential of financial intermediaries. An increase in the deposit rate of interest stimulates an inflow of deposits to banks. The increased deposits lead to an increase in lending and subsequently, investment is enhanced, thereby enhancing growth.

These two arguments emphasise the importance of high interest rate, which can be the result of financial liberalisation, in enhancing investment projects which will lead to increased output growth.

Merits and demerits of financial liberalisation

In their recommendations for financial liberalisation, McKinnon and Shaw focused on the interest rate-growth nexus. An increase in interest rates will lead to increased savings, investment and ultimately economic growth. Financial sector liberalisation also lends its importance by enabling market forces to play a role in capital formulation, economic development and mobilising resources mobilisation, allocating credit, setting financial asset prices and improving financial intermediation, Gibson and Tsakalatos (1994) and Ahmed,(2006). Mishkin (2004) also asserts that financial liberalisation is generally a good thing because it promotes competition and can make a financial system more efficient.

However, financial liberalisation is not without its drawbacks. It can lead to an increase in moral hazard, with more risk taking on the part of banks if there is lax regulation and supervision. The subsequent result can then be banking crises. Empirical literature has investigated the role of financial liberalisation on banking and financial crises (see for example Misati and Nyamongo, (2011)). Inadequate supervision of the banking system can lead to lending booms that arise in the aftermath of financial liberalisation which also leads to significant loan losses. The other argument put forward against financial liberalisation is that it is biased towards deflationary macroeconomic policies and forces the state to adopt a deflationary stance to appease financial interests (Patnaik, (2003) and Ghosh, (2005)).

3.2. Empirical literature

The theory of financial liberalisation was propounded on the basis that investment and growth in developing countries has been suppressed by financial repression. From an empirical point of view, there is a large body of literature which examines the relationship between financial liberalisation and economic growth. The results of the empirical literature offer diverse conclusions with some suggesting a positive relationship, others a negative relationship and yet others who find that financial intermediation is not important for economic growth.

There are several ways of classifying empirical literature on financial liberalisation and economic growth. These include grouping by the type of econometric procedure employed, for example time series analysis, single period cross-section analysis and panel data analysis, and categorisation by countries studied, such as studies of developed countries or developing countries and also classification according to dependent variables used, for example ratio of liquid liabilities to GDP and real rate of interest. This study will group empirical literature according to the main contributions made by the individual studies and the objectives sought by this study. This section is thus divided into empirical evidence on the impact of financial liberalisation on economic growth, causality, political environment, financial indices and time series versus cross section analysis.

3.2.1. Studies on the impact of financial liberalisation on economic growth

Oshikoya (1992) used time series econometrics to see how interest rate liberalisation has affected economic growth in Kenya. The author used data from 1970 to 1989 and the results showed a negative and statistically insignificant coefficient for the real deposit rate. The sample was then split into two sub-periods: 1970–1979 and 1980–1989. The coefficient on

real deposit remained negative and insignificant for the 1970s but turned positive albeit insignificant during the 1980s. Oshikoya concluded that the experience of Kenya with interest rate deregulation provides only mild support to the financial liberalisation theory. Other studies like Seck and El Nil (1993) and Charlier and Oguie (2002) find a significantly positive relationship between economic growth and the real interest rate.

In their study on the effects of financial development on economic growth, Arestis and Demetriades (1997) advocated for the use of time series analysis rather than the cross sectional analysis that “was popularised by Barro (1991).” They presented evidence from both time series and cross sectional approaches and argued that the time series approach is more fruitful in analysing financial development and real output. Arestis and Demetriades found that financial repression had a positive effect on financial development and that the real rate of interest had a negative effect on output. This finding contradicts the liberalisation thesis which predicts a positive association between output growth and real interest rates. In conclusion, they stated that the effects of financial liberalisation depend on the institutional context and existence or lack thereof good governance in the country in question. In the event that there is market failure, there is a scope for government intervention to amend the situation. Thus, in a situation of market failure, financial liberalisation may prove detrimental.

Khan and Hassan (1998) undertook to provide empirical evidence concerning McKinnon’s hypothesis for Pakistan. Using annual time-series data for the period 1959–60 to 1994–95, they found strong support for McKinnon’s hypothesis. The coefficients of the saving ratio in the money demand function and of real money balances in the savings function were both found to be positive and statistically significant. These results held true when money demand and savings functions were estimated in static long-run formulations as well as in the dynamic formulation. The authors indicated that the financial liberalisation policies pursued in Pakistan at that time were likely to result in financial deepening. In their conclusions, the authors noted that an increase in the real interest rate (either by increasing the nominal interest rate or by reducing the inflation rate) would lead to the accumulation of money balances (financial assets), which would improve the availability of loanable funds for investment.

Some studies like Rodrik (1998) and Kraay (1998) have undertaken to examine the effect of capital account openness rather than financial liberalisation per se. Using data from 100 developed and developing countries, Rodrik regressed growth in per capita GDP on capital

account openness and found no association between the liberalisation of the capital account and economic growth. Capital account openness for each country was measured as the number of years during the sample period when the country's capital account was free from any restrictions. Kraay also found a weak link between capital account liberalisation and growth. For a sample of 117 countries over the period 1985 – 1997, Kraay uses four different measures of financial sector strength: M2/GDP, domestic credit to the private sector as a share of GDP, number of banking crises per year and an index of the restrictiveness of bank regulations. Both Kraay and Rodrik also found no evidence for the hypothesis that capital account liberalisation is more beneficial in countries with strong financial institutions or sectors.

Ingham and Ebrahim (1999) state that recent empirical literature shows a positive relationship between the development of the financial sector and economic performance in Less Developed Countries (LDCs). They indicate that initial studies to test the M-S hypothesis (conducted before the publishing of the World Development Report 1989) did not reach a consistent result whereas the recent studies (studies after 1989) reached the same conclusion that financial liberalisation stimulates economic growth in their study of the Egyptian case, they found that the Egyptian experience in the 1990s was consistent with M-S prediction. However, Fratzscher and Bussiere (2004), note that the results of the liberalisation-growth nexus are mixed and that there is remarkably little consensus that has been reached about the underlying forces that make financial liberalisation raise economic growth.

Using various indicators of financial development, Allen and Ndikumana (2000) investigated the role of financial intermediation in stimulating economic growth in Southern Africa. Indicators used were the ratio of liquid liabilities, ratio of banks' private sector credit, ratio of banks' total credit and an index to include all these three measures as proxies for financial intermediation. They produced regression results for both annual data and pooled cross-sections. The authors find that only the ratio of liquid liabilities is positive and significant, and even this variable is insignificant in the fixed effects estimation and when annual data are used. The other financial intermediation variables take on different signs but are all insignificant. The results lend some support to the hypothesis that financial development is positively correlated with the growth rate of real per capita GDP. This relationship is more evident in regressions that use pooled data (5 year cross sectional) than those using annual data. This finding suggests that the finance-growth nexus is a long run phenomenon.

The results from Edwards (2001) and Klien and Olivei (2008) indicate that financial liberalisation is good for growth. Countries that had relatively open capital markets experienced a boost in economic growth. However, the higher rates of economic growth are experienced by the relatively developed countries in the sample. Edwards used the Quinn (1997) measure of openness whereas Klien and Olivei constructed an index of capital mobility. The index is defined as the number of years in the sample period. Contrary to Rodrik (1998) and Kraay (1998), Klien and Olivei also suggest that the benefits of capital account liberalisation are only fully realised if the policy change occurs in the presence of adequate institutions and sound macroeconomic policies. Edwards lends credence to the view that there is an optimal sequencing of capital account liberalisation.

Aziakpono (2004) looked into the relevance of domestic financial institutions in promoting economic growth. Using two indicators of financial intermediation (ratio of private credit to nominal GDP and the ratio of liquid liabilities to GDP), a panel data econometric technique was adopted for the analysis and the results were mixed. The study found that growth was negatively related to financial intermediation in Botswana, Lesotho and Swaziland whereas the relationship was positive in South Africa.

Fratzscher and Bussiere (2004) state that no empirical evidence has yet emerged for the existence of a robust positive relationship between financial openness and economic growth. They argue that the key reason for this is that there exists an inter-temporal trade-off relationship between openness and growth. This means that countries tend to gain from financial liberalisation in the short term following the opening of the financial system but then the rate of growth reduces or is not existent in the medium to long term. For measuring capital account openness, Fratzscher and Bussiere emphasised *de jure* openness which is mostly proxied by the removal of restrictions to capital account transactions as published in the International Monetary Fund (IMF)'s Annual Report on Exchange Arrangements and Exchange Restrictions (AREAR). In their study, they employed a panel data approach and found significant empirical evidence for the existence of such an inter-temporal trade-off for forty five industrialised and emerging market economies. The acceleration of growth immediately after liberalisation was found to be often driven by an investment boom and a surge in portfolio and debt inflows.

Bekaert, Harvey and Lundblad, (2005) shows that equity market liberalisations (allowing foreign investors to transact in local securities and vice versa), on average, lead to a 1%

increase in annual real economic growth over a five year period. This study was of 95 countries from 1980 to 1997. The authors also find that capital account liberalisation has a less robust effect on economic growth than equity market liberalisation. In addition, countries with better legal systems, high quality institutions, favourable conditions for foreign investment and investor protection, generate larger growth effects from liberalisation.

Chaudhry (2006) examined the impact of financial sector liberalisation on macroeconomic performance in Pakistan by using a time series analysis over the time period 1972-2006. The study undertook bi-variate and multi-variate models for empirical analysis. The study found a significant positive impact of financial liberalisation variables on economic growth and investment. The findings of this study also reveal the short run and long run relationship between the indicators of financial liberalisation and economic growth and investment in Pakistan.

Tswamuno, Pardee and Wunnava (2007) analysed the effect of financial liberalisation of the Johannesburg Stock Exchange (JSE) and the Bond Exchange and the subsequent boost in foreign investor participation on economic growth. The study employed a time series analysis using data from 1975Q3 to 2005Q1. They found that post-liberalisation foreign portfolio investments had no positive effect on economic growth. In addition, increased post-liberalisation stock market turnover had a negative effect on economic growth.

Following liberalisation and integration, Turkey experienced macroeconomic instability and financial crises. By the end of 2006, Turkey had the highest current account deficit and the highest private sector borrowings in its history. It was against this background that Odezmir and Erbil (2008) sought to examine the effect of financial liberalisation on long-run income per capita and economic growth. They use both de-facto and de-jure measures of financial openness. The results indicate clear a positive between the long-run growth and a number of indicators of financial liberalisation.

Bilel and Mouldi (2011) analyse the impact of financial liberalisation and FDI on economic growth on six MENA countries over the period 1986-2010 using panel data analysis. All these countries have liberalised their financial systems but in different periods. The results indicate a negative relationship between financial liberalisation and economic growth. The authors attribute this negative relationship to the level or the degree, sequencing and pace of liberalisation policies.

The study by Meltem (2011) investigates the effect of financial growth on economic growth for Turkey. The study uses observation from 1980 to 2010. The results of the study show that there is a strong relationship between finance and growth in the short-run but this relationship fails in the long run. The study also examines the causality of the finance-growth nexus and finds that contrary to conventional findings, there is a one way link from financial development to economic growth for Turkey.

3.3.2. Studies on causality

One of the most debated issues in development research is the relationship between finance and economic growth, although the results surrounding this issue are mixed. The question concerns the causal relationship between finance and economic growth, that is, whether economic growth is finance-led or growth driven. One school of economic thought contends that financial development causes economic growth (economic growth is finance-led) whereas the other school propounds that increased economic performance causes growth of the financial sector (economic activity is growth led) the question of causality is important for policy making because the determination of the nature and direction of the relationship between finance and growth influences the growth and development policies to be adopted. If financial development is found to have a positive causal effect on economic growth, this means that the financial sector is important in the economic growth and development of that country. Therefore, then countries will have a lot to gain by adopting policies directed at expanding and improving the efficiency of the financial system.

Akinboade (1998) examined causality between financial development and economic growth in Botswana. Using two indicators of financial development (the ratio of bank claims on the private sector to nominal non-mineral GDP and the ratio of bank deposit liabilities to nominal non-mineral GDP) against real per capita income over the 1972-1995 period, the Granger causality test is used. The study suggests a bidirectional relationship, that is per capita income and financial development indicators cause one another. Increasing per capita income can encourage the development of the financial services in the country which can also augment further economic development through the provision of more services, Akinboade (1998).

For a sample of six Asian countries, Luintel and Khan (1999) examined the long-run causality between financial development and economic growth employing a multivariate VAR framework. They found bi-directional causality between financial development and

economic growth in all six countries, namely: India, Korea, Malaysia, the Philippines, Sri-Lanka and Thailand.

Ghirmay (2004) also undertook to empirically explore the causal link between the level of financial development and economic growth in thirteen sub-Saharan African countries. The causality tests were based on the time series data of the individual countries rather than a cross-sectional sample to avoid the misleading results caused by averages. Credit to the private sector was used as a measure of financial development which according to Ghirmay is a more accurate proxy of the functioning of financial development since it is a measure of the quantity and quality of investment. Evidence was found of financial development causing economic growth in eight countries, economic growth causing financial development in nine countries and bidirectional causal relationships in six countries. This result suggests that in sub-Saharan African countries, financial development does cause economic growth and therefore, there is a need to expand and improve the efficiency of the financial system through appropriate regulatory and policy reforms in order to promote faster economic growth.

Conflicting results were found by Odhiambo (2007) on the investigation of direction of causality between financial development and economic growth in three sub-Saharan African countries – Kenya, South Africa and Tanzania. Using three proxies of financial development against real GDP per capita (a proxy for economic growth), the study finds that the direction of causality between financial development and economic growth is sensitive to the choice of measurement for financial development. In addition, the strength and clarity of the causality evidence varies from country to country and over time. On balance, a demand-following response is found to be stronger in Kenya and South Africa, whilst in Tanzania a supply-leading response is found to be dominant. A supply-leading response means that the effect runs from financial development to economic growth whereas the postulation of the demand-following hypothesis is that causality runs from economic growth to financial development.

Odhiambo (2008) then examined the dynamic causal relationship between financial depth and economic growth in Kenya by including savings as an intermitting variable. Using the co-integration and error-correction techniques, the empirical results of this study reveal that there is a distinct unidirectional causal flow from economic growth to financial development. The results also reveal that economic growth causes savings, while savings drive the development of the financial sector in Kenya.

Acaravci et al (2009) investigate the causality between financial development and economic growth in sub-Saharan Africa for the period 1975- 2005. Using panel co-integration and panel GMM estimation for causality, the empirical findings in the paper show a bi-directional causal relationship between the growth of real GDP per capita and the domestic credit provided by the banking sector for the panels of twenty four sub-Saharan African countries. These findings imply that African countries can accelerate their economic growth by improving their financial systems and vice versa.

Kilimani (2009) also tests for this relationship for Uganda using the Granger causality test. This study employed a number of explanatory variables namely total credit, real interest rate, inflation rate, M2/GDP, fiscal deficits, exports, exchange rates and population. The study also includes two dummy variables to account for the policy change and political instability. The results led to the conclusion that it is financial development which Granger causes real GDP in Uganda. These results are in line with a number of previous studies in Africa. Agbetsiafe (2004) also found unidirectional causality running from financial development to economic growth in seven African countries. Eita and Jordaan (2007) also found that financial development causes economic growth in Botswana. The finance-led growth hypothesis was also supported by Abu-Bader and Abu-Qarn (2008) whose results equally support a unidirectional causality from financial development to economic growth in Egypt, Morocco and Tunisia. Therefore, financial intermediation and institutional financial reforms should be enhanced in order to promote economic growth in African countries.

Akinlo and Egbetunde (2010) examined the long run and causal relationship between financial development and economic growth for ten countries in sub-Saharan Africa (SSA). Using the vector error correction model (VECM), the study finds that financial development is co-integrated with economic growth in the selected ten countries in sub-Saharan Africa, that is, there is a long run relationship between financial development and economic. The results show that financial development Granger causes economic growth in Central African Republic, Congo Republic, Gabon, and Nigeria while economic growth Granger causes financial development in Zambia. However, bidirectional relationship between financial development and economic growth was found in Kenya, Chad, South Africa, Sierra Leone and Swaziland. The results show the need to develop the financial sector through appropriate regulatory and macroeconomic policies. However, in Zambia emphasis needs to be placed on economic growth to propel financial development.

Al-Naif (2012) also found the existence of a long-run equilibrium between financial development and economic growth in Jordan. There is a one-directional causality relationship from financial development to economic growth in both the long- and short-run. This result suggests that financial development in Jordan is expected to play an important role in the future in determining the economic growth.

3.3.3. Studies on the measures of financial liberalisation

The measurement of financial liberalisation has proven to be a controversial issue in literature. Most studies on the effect of financial liberalisation use a 0/1 dummy to capture periods of non-liberalisation and liberalisation, respectively.¹ The disadvantages of using the dichotomous variable are that it does not reflect the extent of liberalisation, nor the type of restrictions that exist or have been abolished. Other studies have not adequately measured the gradual institutional changes that financial liberalisation entails. Goldsmith (1969), McKinnon (1973), Gelb (1989), World Bank (1989), King and Levine (1993), Allen and Ndikumana (2000) and Aziakpono (2004) employed the ratio of liquid liabilities of the financial system to GDP as a measure of financial intermediation. Nevertheless, this variable does not indicate the specific financial liberalisation policies embarked upon by various countries. Another weakness of using these ratios as proxies of financial development is that they are likely to measure the extent to which transactions are monetised rather than the functions of the financial system such as savings mobilisation and efficient allocation of investments as presented in the theoretical models.

Some studies such as Seck and El Nil (1993), Oshikoya (1992) and Matsheka (1998) used the real rate of interest as a measure of financial liberalisation. The major disadvantage of this variable is that it captures only one policy of financial liberalisation – deregulation of interest rates. Financial liberalisation does not consist solely of interest rate deregulation but involves other policies. As such, use of the real interest rate results the problem of omitted variable bias.

Ghirmay (2004) used credit to private sector. He argues that credit to the private sector represents an accurate indicator (proxy) of the functioning of financial development because it is a measure of the quantity and quality of investment. A major weakness of such a measure is that it is a narrow measure of financial development because it does not include financial developments that occur outside the banking system.

¹(for example Demirgüç- Kunt and Detragiache, (2001); Eichengreen and Arteta, (2002); Noy, (2004).

Some studies have attempted to improve measures of financial liberalisation by constructing indices that capture the specific policies undertaken and the “intensity of liberalisation.” Kaminsky and Schumukler (2003), Abiad and Mody (2005), Angkinand et al (2010) and Fowowe (2008) constructed indices that capture both the intensity and changes in policy with respect to financial liberalisation. Kaminsky and Schumukler constructed a financial liberalisation index based on the liberalisation of the capital account, the domestic financial sector and the stock market. The index has three levels: full liberalisation, partial liberalisation and no liberalisation. Their sample covers 28 countries during the period of 1973-1999.

Abiad and Mody (2005) constructed an index that is closer in scope to the one by Kaminsky and Schmukler. They identified six policy dimensions namely: directed credit/reserve requirements, interest rate controls, entry barriers and/or lack of pro-competition policies, restrictive operational regulations, the degree of privatisation in the financial sector and controls on international financial transactions. On each dimension, a country is classified as being fully repressed, partially repressed, largely liberalised or fully liberalised. These dimensions were then aggregated using the sum of individual components. The major difference between the Kaminsky and Schmukler and the Abiad and Mody indices is that the former puts more weight on liberalisation of international capital flows whereas the latter emphasises reforms in the domestic financial sector.

Angkinand et al (2010) used an updated dataset of financial reforms for 42 countries between 1973 and 2002. Of the seven dimensions in the database, Angkinand et al used six of these: eliminations of credit allocation controls, interest rate controls, capital account controls, equity market controls, entry barriers and privatisation. The intensity of each reform category is captured on a four-point scale: fully repressed, partially repressed, largely liberalised, and fully liberalised for the six dimensions of liberalisation. A simple aggregate index for the six categories was constructed to capture the degree of total financial liberalisation by summing up scores for all six dimensions of liberalisation.

Fowowe (2008) conducted an empirical investigation into the effects of financial liberalisation policies on the growth of nineteen countries in sub-Saharan Africa. Fowowe constructed two indices which measure the gradual progression and institutional changes involved in financial liberalisation. Five major indicators of moves towards liberalisation were identified: bank denationalisation and restructuring, interest rate liberalisation,

prudential regulation, directed credit abolition and free entry into banking. These variables have a value of 0 prior to liberalisation. After liberalisation, the indicators take on values from 1 and this increases depending on the progress made for each specific liberalisation policy. For the first index, use of principal components analysis is made and the first principal component for each country as is used as the index of liberalisation. The second liberalisation index uses the same five major indicators of liberalisation used for the first index. In this case each of these measures was assigned a value of zero prior to liberalisation and it becomes one after liberalisation. The index is the sum of the variables for each year. Fowowe also used a dummy variable which takes a value of 0 prior to liberalisation and 1 after liberalisation.

3.4. Assessment of literature and conclusion

The theory of financial liberalisation as postulated by McKinnon and Shaw, holds that liberalisation of the financial system will accelerate the growth of the real economy. Proponents of this theory argue that financial openness enhances investment and economic growth. Theory suggests different channels through which financial integration can positively affect investment and growth. The critics however, argue that international financial integration leads to financial fragility and hence financial and currency crises as has happened in countries like Kenya, Democratic Republic of Congo and Burkina Faso which experienced banking sector crisis following financial liberalisation.

The empirical results on the link between financial openness and growth are mixed. The differences can be attributed to study time differences, countries, sequencing of reform programmes, quality of domestic institutions and the size of foreign direct investment inflows. Most of these studies however conclude that there is a strong positive relationship between economic growth and financial liberalisation, although via different mechanisms. However, there is no consensus on the real direction of causality between the two variables. In some countries, finance seems to lead growth, while there is reverse causality, bidirectional causality or no clear causal link elsewhere.

The support for a time series rather than a cross-sectional analysis made by Arestis and Demetriades (1997) is valid. This is because a cross-sectional analysis involves averaging out variables over long time periods and using them to explain each country's variation in growth

rate. The average for all countries in the cross-country regression might not address country-specific effects due to different levels of economic and financial development.

Most studies use the real rate of interest and the ratio of liquid liabilities to GDP as a measure of financial liberalisation. However, these variables either do not capture the specific policies implemented by different countries or measure one specific policy and omit other policies. They also do not capture the gradualist approach that some countries like South Africa adopt. To address this pitfall, use is made of the indices constructed by Abiad and Mody (2005).

CHAPTER 4

RESEARCH METHODOLOGY

4.1. Introduction

The objective of this study is to assess the impact of financial liberalisation on economic growth in South Africa. The preceding review of the literature on financial liberalisation has shed some light on the linkage between financial liberalisation and economic growth and also on the variables that might impact on the effect between these two. This chapter builds upon that background to describe the analytical framework that will be used in this study. The chapter is divided into the following sub-sections: section 4.2 specifies the model and defines the variables and section 4.3 discusses the data sources. A presentation of the methods of data analysis and estimation techniques follows in section 4.4 while section 4.5 concludes the chapter.

4.2. Model Specification

Based on theoretical and empirical considerations as well as the availability of data, the methodological approach is adopted on the works of Barro (1996), Abiad and Mody (2005) and Angkinand (2008). This study estimates the following relationship, where the notation **ln** denotes a log form which is virtually a percentage change:

$$Y_t = \alpha + \beta \ln FL + \lambda_1 INV + \lambda_2 GOVT + \lambda_3 EDUC + \lambda_4 TOPEN + \varepsilon_t \dots \dots \dots (4.1)$$

Where: Y_t = GDP per capita growth rate (%)

FL = financial liberalisation index

INV = Investment ratio

GOVT = National government expenditure less expenditure on education (% of GDP)

EDUC = Public spending on education (% of GDP)

TOPEN= trade (% of GDP)

4.3. Definition of Variables

The variables specified in the model above are defined below and the *a priori* relationships highlighted.

4.3.1. Growth rate

Consistent with literature, an increase in real per capita GDP will serve as the indicator for economic growth. Specifically, Y refers to GDP per capita growth rate.

4.3.2. Financial liberalisation index

The financial liberalisation index is based upon the works of Abiad and Mody (2005) and Angkinand et al (2010). Six dimensions of liberalisation are identified as: the elimination of credit controls including reserve requirements, interest rate liberalisation, the elimination of entry barriers and of restrictions on the scope of banks' activities, securities market policy, the elimination of capital account restrictions and the reduction of state ownership in the banking sector. These dimensions are measured on a scale from 0 to 3 where 0, 1, 2 and 3 represent fully repressed, partially repressed, largely liberalised and fully liberalised, respectively. The financial liberalisation index is constructed by summing scores for all six dimensions of liberalisation. Therefore, this aggregate index has a scale from 0 to 18.

4.3.3. Investment ratio

The investment ratio is obtained from gross fixed capital formation divided by nominal GDP. Endogenous economic theory posits that investment provides a positive link to economic growth. The effect of the investment ratio on economic growth is expected to be positive.

4.3.4. Government expenditure

Government expenditure in this study excludes expenditure on education (which is assessed on its own). The influence of government expenditure on economic growth is unclear. According to some scholars, an increase in government expenditure on socio-economic and physical infrastructure encourages economic growth. For example, government expenditure on health and education raises the productivity of labour and increase the growth of national output. Similarly, expenditure on infrastructure such as roads, communications, power, etc, reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth. Studies such as Cooray (2009), Ranjan and Sharma (2008), Al-Yousif (2000), Abdullah (2000) have found a positive relationship between government expenditure and economic growth. On the other hand, empirical evidence shows a negative relationship between government expenditure and economic growth; see for example,

Nurudeen and Usman (2010), Folster and Henrekson, (2001).The argument put forward is that higher government expenditure may slowdown overall performance of the economy. For instance, in an attempt to finance rising expenditure, government may increase taxes and/or borrowing. Higher income tax discourages individuals from working for long hours or even searching for jobs. This in turn reduces income and aggregate demand. Furthermore, higher profit tax tends to increase production costs and reduce investment expenditure as well as profitability of firms. If government increases borrowing (especially from the banks) in order to finance its expenditure, it will compete (crowds-out) away the private sector, thus reducing private investment. Thus, government activity sometimes produces misallocation of resources and impedes the growth of national output. The effect of government expenditure on economic growth is therefore ambiguous.

4.3.5. Public expenditure on education

Expenditure on education has been analysed separately from total government expenditure because of its relative importance in South Africa to address low economic growth and high levels of poverty. This variable is used to measure human capital formulation. It is measured as a percentage of GDP. Education has high economic value because investment in education leads to the formation of human capital, comparable to physical capital and social capital, and that makes a significant contribution to economic growth (Dickens et al., (2006) and Loening, (2004)).

The provision of education is a key element of a policy to promote broad-based economic growth. Education plays a significant role in the economy of a nation, thus educational expenditures are found to constitute a form of investment. The skilled manpower that is a product of education accelerates economic development and improves the quality of society. It increases their chances of employment in the labour market and allows them to reap financial and non-financial returns and gives them opportunities for job mobility.

Human capital theory accentuates how education increases the productivity and efficiency of workers thereby increases their chances of employment in the labour market, and allows them to reap financial and non-financial returns and gives them opportunities for job mobility. The provision of formal education is seen as a productive investment in human capital. Thus, public expenditure on education is expected to have a positive effect on economic growth.

4.3.6. Trade liberalisation

The measure chosen as an indicator of the degree of openness of an economy is trade as a percentage of GDP. Trade liberalisation is proxied by the ratio of exports and imports to GDP. This variable is added because of the important role that international trade has on the South Africa as an outward-oriented economy. The degree of liberalisation (TOPEN) is expected to have a positive relationship with economic growth.

4.4. Data sources

This study will employ quarterly data from the first quarter of 1980 to the fourth quarter of 2010. The period of study is motivated by the need to include both the pre- and post-liberalisation periods to analyse the impact of financial liberalisation on economic growth. Financial liberalisation policies were started in 1980 but were thwarted by political instability at that time. Efforts to liberalise (financially) South Africa gained momentum in 1994 with political freedom and the subsequent readmission into the world economy.

The data will be obtained from the South African Reserve Bank online statistical query, IMF's International Financial Statistics online database and World Bank Development Indicators, among other sources.

4.5. Estimation Techniques

In order to test the relationship between financial liberalisation and economic growth, the model specified above will be subjected to a number of econometric tests. Since use is made of time series data, stationarity tests have to be performed in order to avoid spurious regression. The stationarity test is followed by the co-integration procedure to examine whether any long run relationship exists between financial liberalisation. If a relationship is detected, the next step is to estimate the long run relationship. Finally, there is a need to ascertain causality between financial liberalisation and economic growth. Thus, a causality test between the variables will be conducted.

4.5.1. Testing for stationarity/Unit root

Stationarity is a key concept underlying time series processes. It is important to test time series data for stationarity prior to identifying any possible long run relationships. Most economic variables are non-stationary in nature and yet the stationarity properties can influence the behaviour and properties of a series (Brooks, 2002). Employing regression techniques on non-stationary series may lead to spurious (meaningless) results. A regression of two non-stationary series may show "good" results when assessed by using usual test

statistics (such as t-ratios, F-statistics and R^2 values) when in fact the results should indicate a lack of relationship. Thus, it is necessary to establish the order of integration of individual series.

Unit root tests can be used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. A non-stationary time series might need to be differenced more than once before it becomes stationary. A stationary series is said to be integrated of order (d) if it achieves stationarity after being differenced (d) times. This is denoted as $I(d)$, where d is the order of integration. If a time-series, for example Z , becomes stationary after being differenced d times, Z is said to be integrated of order d , denoted by $Z \sim I(d)$. The order of integration refers to the number of unit roots in the series or the number of differencing operations it takes to make a variable stationary. An $I(0)$ series is a stationary one whilst an $I(1)$ series contains one unit root. According to Asteriou and Hall, (2007) a time series is covariance stationary when it has the following three characteristics:

- i. Exhibits mean reversion in that it fluctuates around a constant long-run mean;
- ii. Has a finite variance that is time-invariant; and
- iii. Has a theoretical correlogram that diminishes as the lag length increases.

The stationarity of a series can be assessed by employing stationarity tests and/or unit root tests. These tests comprise of informal and formal tests. The informal tests are carried out by means of visual plots of data in the form of graphs and correlogram (autocorrelation function). The informal tests check for stationarity by plotting the time series and looking for evidence of trend in mean, variance, autocorrelation and seasonality. Use is made of a subjective visual inspection of plots. However, the plots do give an initial clue about the likely nature of the time series. The formal unit root tests include the Augmented Dickey-Fuller (ADF) and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests. Formal tests help with determining stationarity and are based for the most part on formal statistical tests. The difference between the different types of formal tests lies in the stringency of the assumptions they use as well as in the form of the null and alternative hypotheses they adopt. Most economists are inclined towards formal tests because of their statistical nature. This study will employ both informal and formal tests to establish stationarity/unit roots in the variables. A comparison will also be made, of results obtained from the different tests. The

essence of conducting two distinct formal stationarity tests is to ensure that series enter the model to be estimated in a non-explosive form and mainly to address the issue of tests with low power.

4.5.1.1. The Augmented Dickey Fuller (ADF) test

The augmented Dickey-Fuller (ADF) test is an extension on their earlier version (the Dickey-Fuller test) which includes extra lagged terms of the dependent variable in order to eliminate autocorrelation. The ADF test is a stricter version of the Dickey Fuller (DF) test. Brooks (2004) asserts that the ADF test is more preferred to the DF test. The weakness of the DF test is that it does not take account of possible autocorrelation in the error process or term and has critical values that are greater in absolute terms and may sometimes lead to a rejection of a correct null hypothesis. To cater for this shortfall, the ADF can be used. The ADF test corrects for high-order serial correlation by adding a lagged differenced term on the right-hand side in the DF equation. The process involves estimating the following equation:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \varepsilon_t \dots\dots\dots (4.2)$$

The null hypothesis is that there exists a unit root in the time series (non-stationary time series), against the alternative hypothesis that the time series is stationary (no unit root. If the calculated statistic is less (in absolute terms) than the MacKinnon (1991, 1996) values, which are used by the E-views software, the null hypothesis is accepted and will therefore mean that there is a unit root in the series. In other words, it means the time series is not stationary. The opposite is true when the calculated statistic is greater than the MacKinnon critical value.

The lags of ΔY_t soak up any dynamic structure that may be present in the dependent variable to ensure that ε_t is not auto correlated. Like the DF test, the ADF test estimates three models for each variable, that is;

- i) with no constant and no trend
- ii) with constant and no trend
- iii) with constant and trend

Gujarati (2003) points out that the main idea behind introducing lags is to include enough terms so that the error term is serially uncorrelated. On the most favourable number of lags for the ADF, including too few will not eliminate all of the autocorrelation while using too

many will increase the coefficient standard errors. The latter arises since an increase in the number of parameters to estimate uses up the degrees of freedom. Consequently, the power of the test will be reduced. Gujarati (2003) and Brooks (2004) show that unit root tests have low power if the process is stationary but with a root close to the non-stationary boundary. This lack of power means that the ADF test fails to detect stationarity when the series follows a stationary process (Claessens and Thomas, 1997); meaning that for a stationary process the null hypothesis of a unit root will less likely be rejected than would have been the case otherwise (Gujarati, 2003). The reasons for this could be because the null hypothesis was correct or because there is insufficient information in the sample to enable rejection. There are several ways of solving this problem, including increasing the sample size and using a stationarity test among others. The former solution could be limited by data unavailability, while the latter could be a good alternative without changing the sample size. Brooks (2004) recommends using a unit root test together with a stationarity test.

4.5.1.2. The Kwiatkowski, Phillips, Schmidt and Shin (KPSS) test

To mitigate the low power of the ADF test, it is supplemented by a stationarity test, namely the KPSS test. Liang and Teng (2006) have shown that the KPSS test generally has greater power than other unit root tests. The null hypothesis is that the series is stationary, versus non-stationarity. Thus, under stationarity tests, the data will appear stationary by default if there is little information in the sample.

The test is based on the residuals from the OLS regression of the dependent variable on the explanatory variables. The KPSS (1992) test is similar to ADF (1979) test but the KPSS test includes an automatic correction for auto correlated residuals (Brooks, 2002) and does not suffer from small sample problems as ADF does.

The KPSS test is conducted using the t-statistic following the same method as the ADF approach. The calculated t-statistic is compared with the KPSS (1992) critical values in order to make a conclusion about the stationarity of a series. The null hypothesis (of stationarity) is rejected when the calculated t-value is greater than the critical t-value using the 5% level of significance.

4.5.2. Co-integration and Vector Error Correction Modelling

After establishing that variables are stationary, it is necessary to determine whether or not there is any long-term relationship between them. Thus, the next procedure would be to test

for the possibility of co-integration among the variables used. King and Watson (1997) and Koustas and Serletis (1999) argue that co-integration techniques should only be applied if the underlying variables are integrated of the same order. Therefore if both series are found to be of the same order, they can be tested to verify whether a stable long-run relationship exists between them. The process of converting non-stationary data into stationary data usually leads to loss of the long run relationship between the variables and testing if the variables are co-integrated is germane in this research.

The concept of co-integration was first introduced by Granger (1981) and there are currently several ways of testing for its presence. Two time-series are said to be co-integrated if a linear combination of the two variables is stationary. To proceed to a co-integration test, all the series of interest should be integrated of the same order, at least $I(1)$, from the unit root tests. If the series display level stationarity, that is, are $I(0)$, standard regression and statistical inference could be carried out, as there would be no problem of spurious regressions. Harris (1995) however, shows that it is not necessary for all the variables in the model to have the same order of integration, especially if theory *a priori* suggests that such variables should be included. Thus, a combination of $I(0)$, $I(1)$ and $I(2)$ can be tested for co-integration. According to Brooks (2002), in most cases, if two variables that are $I(1)$ are linearly combined, their combination would also be $I(1)$. More generally, if variables with differing orders of integration are combined, the combination would have an order of integration equal to the largest. The exception to this rule is when the series are co integrated.

Gujarati (2003) points out that the co-integration of two or more series suggests that there is a long run or equilibrium relationship between them. This means that even though the series themselves may be non-stationary, they will move closely together over time and their difference will be stationary. The long run relationship between the series is the equilibrium to which the system joins over time and the disturbance term can be interpreted as the disequilibrium error or the distance that the system is away from equilibrium at time t .

Brooks (2002) further shows that a co-integrating relationship may also be seen as a long term or equilibrium phenomenon, since it is possible that co-integrating variables may wander from the relationship in the short run, but their relationship would return in the long-run. This concept is particularly important in this study where we seek to identify and distinguish those variables that have a long term relationship with real exchange rate.

Tests for co-integration include the Engle-Granger approach and the Johansen technique. The former is residual based and seeks to determine whether the residuals have an equilibrium relationship or are stationary. The latter is based on maximum likelihood estimation on a VAR system and seeks to determine the rank of the matrix.

4.5.2.1. The Engle-Granger approach

This test is conducted between two non-stationary time series to determine if they are co-integrated of the order (1, 1). The test requires running an Ordinary Least Squares (OLS) regression, saving the residuals and then running the ADF or PP tests on the residual in order to determine whether or not it is stationary. The initial step includes pre-testing the variables for their order of integration. Co-integration of the variables necessitates that the two variables be integrated of the same order. The second step involves estimating the long run equilibrium relationship. The third step involves estimating the error correction model. If the variables are co-integrated, the residuals from the equilibrium regression can be used to estimate the error-correction model. Finally, the model is assessed for adequacy.

This test is essentially used in the case of two variables:

$$\check{Z}_t = \omega \check{Z}_{t-1} + n_t$$

If $|\omega| = 1$, then the series has a unit root and x_t and y_t are not co-integrated

If $|\omega| < 1$, then Z_t is stationary and the variables are co-integrated.

The Engle-Granger approach suffers from numerous problems when applied to multivariate models. The Engle-Granger technique assumes that there is only one co-integrating relationship. In this case, the OLS estimation will be applicable only if there is only one co-integrating vector. However since this is unlikely to be the case, the Engle-Granger model will not be valid and will not be able to identify all co-integrating relationships. According to Seddighi et al. (2000) in the presence of more than one co-integrating relationships, the Engle-Granger approach would produce inconsistent estimates. According to Harris (1995) and Brooks (2002) the Engle Granger method suffers from the following problems;

1. The usual infinite sample problem of lack of power in unit root and co-integration tests,

2. There could be a simultaneous equation bias if the causality between y and x runs in both directions. This single equation approach requires the researcher to normalise on one variable,
3. It is not possible to perform any hypothesis tests about the actual co-integration relationship estimated.
4. The inability to detect more than one co-integrating relationships that may exist in a model.

Since the model used in this study is multivariate, there is a likelihood of having more than one co-integrating vector. The Engle-Granger approach would therefore produce inconsistent estimates. Thus, in light of these problems, the Johansen technique is more preferred to the Engle-Granger method since it captures the underlying properties of time series data and is a systems equation test that provides estimates of all co-integrating relationships that may exist within a vector of non-stationary variables or a mixture of stationary and non stationary variables. These include: unit root tests and the co-integration tests.

The purpose of the VAR co-integration tests is to determine whether the variables in the model are co-integrated or not. The presence of co-integration relation(s) forms the basis of the vector error correction model (VECM) specification. The Johansen methodology is described below.

4.5.2.2. The Johansen technique

The Johansen technique has become an essential tool in the estimation of models that involve time series data. This technique is preferred in this study as it allows the estimation of a dynamic error correction specification, which provides estimates of both the short and the long run dynamics in the model. The Johansen test allows for testing restricted forms of the co-integrated vector(s). It centres on an examination of the Π matrix. Π is interpreted as a long run coefficient matrix. Johansen and Juselius (1990) proposed two tests for determining the number of co-integrating vectors. These are the likelihood ratio test (which is based on the maximum eigenvalue) and the trace test. According to their analysis the power of the trace test is lower than the power of the maximal eigenvalue test (Johansen and Juselius: 1990). Generally the Johansen and Juselius testing and estimating procedure follows four steps which are as follows:

a. Setting the appropriate lag length of the model

The choice of lag length is an empirical question. This is so in order to avoid spurious rejection or acceptance of estimated results. Brooks (2002) argues that the Johansen test can be affected by the lag length employed in the VECM. It is therefore important to attempt to select the lag length optimally, that is, the chosen lag length should produce the number and form of co-integration relations that conform to all the *a priori* knowledge associated with economic theory. According to Brooks (2002) one way of deciding this question is to use information criterion such as the Akaike Information Criteria (AIC), Schwarz Information Criteria (SIC), Hannan-Quinn criterion (HIQ), Final prediction error (FPE) as well as Likelihood Ratio test (LR) criteria and choose the model that gives the lowest values of these criteria.

However, these information criteria usually produce conflicting VAR order selections. The decision about the lag structure of a VAR model could be based on the fact that a given criteria produces a white noise residual and conserves degrees of freedom. Including too many lagged terms will waste degrees of freedom and may introduce the possibility of multicollinearity. On the other hand including too few lags will lead to specification errors and omission of important lag dependences. Also if serial correlation is present the estimated coefficients will be inconsistent. The lag length also influences the power of rejecting hypothesis. In light of these problems, we will use both the information criteria approach and the *a priori* knowledge from economic theory to select the appropriate order of the VAR.

b. Choosing the right model regarding the deterministic components in the multivariate system

The choice of deterministic components requires that all variables be pre-tested to assess the order of integration. It is easier to detect the possible trends when a series is plotted. The order of integration is important, because variables with different orders of integration pose problems in setting the co-integration relationship. Order of integration is detected by the unit root tests discussed above. The graphical analysis of the raw data and unit root tests, together with *a priori* knowledge from economic theory, should assist in selecting the deterministic trend assumption to be used in the Johansen test for co-integration (rank of Π).

Co-integration tests are very sensitive to the assumptions made about the deterministic components (i.e. the intercept and the trend) of the model. There are basically five alternative models in theory regarding deterministic trend assumptions:

1. no deterministic trend in the data and no intercepts or trend in the VAR and in the co-integrating equation (CE),
2. no deterministic trend in the data but an intercept in the CE and no intercept in VAR
3. a linear deterministic trend in the data and an intercept in CE and test VAR
4. a linear deterministic trend in data, intercept and trend in CE and no trend in VAR
5. a quadratic deterministic trend in data, intercept and trend in CE and linear trend in VAR

According to Kar and Mandal (2011), these five models are nested so that model (i) is contained in model (ii) which is contained in model (iii) and so on. The specification of the deterministic components is based on the Pantula principle which simultaneously chooses the correct rank order and deterministic components of the system. Using the trace test, the null hypothesis of zero co-integrating vectors is tested for model (i) (the most restricted model). If that hypothesis is rejected, the same hypothesis is considered for model (ii), (iii), and so on. The test procedure then is to move through from the most restrictive model to less and at each stage compare the trace test statistic to its critical value. The selection process only stops at the first time where the null hypothesis is not rejected.

Kar and Mandal (2011) cite the work of Hjelm and Johansson (2005) which shows that the Pantula principle suffers from a major drawback of being heavily biased towards choosing model (iii) when the correct data generating process is given by model (iv). These researchers came up with a modified version, called the Modified Pantula principle, which improves the probability of choosing the correct model significantly. According to their modified principle, firstly models that are not compatible with economic theory or the data set are to be excluded (in this case model (i) is excluded). The Pantula principle is applied as before, only that model (i) is excluded, and if this chooses model (ii), (iv) or (v), then accept the result. If the Pantula principle chooses model (iii), test for the presence of a linear trend in the co-integrating space. If the null of no trend is rejected, choose case (iv), otherwise choose case (iii).

c. Determination of the rank of Π matrix

Once the appropriate lag length and the deterministic trend assumption have been identified, the rank of the Π matrix can then be tested. This step involves determining the number of co-integrating vectors. There are two test statistics for co-integration under the Johansen approach which are formulated as:

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^g \ln(1 - \hat{\lambda}_i) \dots \dots \dots (4.5)$$

and

$$\lambda_{\text{max}}(r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \dots \dots \dots (4.6)$$

where r in equation (4.5) and (4.6) is the number of co-integrating vectors under the null hypothesis and $\hat{\lambda}_i$ is the estimated value for the i^{th} ordered eigenvalue from the Π matrix. Therefore, the larger $\hat{\lambda}_i$ is, the larger will be the test statistic. λ_{trace} is a joint test where the null hypothesis is that the number of co-integrating vectors is less than or equal to r against the alternative that there are more than r . λ_{max} conducts separate tests on each eigenvalue. The null hypothesis is that the number of co-integrating vectors is r against the alternative of $r+1$ (Brooks, 2002).

Johansen and Juselius (1990) provide critical values for the two statistics. However, to determine the rank of the Π matrix, the above trace and maximum eigenvalue test statistics are compared to the (nonstandard) critical values from Osterwald-Lenun (1992), which, differ slightly from those originally reported by Johansen and Juselius (1990). Osterwald-Lenun (1992) provides a more complete set of critical values for the Johansen test. If the test statistic is greater than the critical value from Johansen's tables, reject the null hypothesis that there are r co-integrating vectors in favour of the alternative that there are $r + 1$ (for λ_{trace}) or more than r (for λ_{max}).

However, the trace and maximum eigenvalue statistics may yield conflicting results. To deal with this problem, Johansen and Juselius (1990) recommend the examination of the estimated co-integrating vector and basing one's choice on the interpretability of the co-integrating relations. On the other hand, Luintel and Khan (1999) and Cheung and Lai (1993) suggested that the trace test shows more robustness to both skewness and excess kurtosis in the residuals

than the maximal eigen-value statistic in testing for co-integration. Hence, this study is guided by the trace statistic.

d. Estimating the VECM

The final step involves estimating the VECM if co-integration is found. The VECM can be estimated by specifying the number of co-integrating vectors, trend assumption used in the previous step and normalising the model on the true co-integrating relation(s). Hence, a VECM is merely a restricted VAR designed for use with non-stationary series that have been found to be co integrated. The specified co integrating relation in the VECM restricts the long run behaviour of the endogenous variables to converge to their co-integrating relationships, while allowing for short run adjustment dynamics. Once estimation is complete, the residuals from the VECM must be checked for normality, heteroskedacity and autocorrelation (Brooks, 2009).

4.5.3. Granger causality

Once the variables are found to be co-integrated, this implies that a long run equilibrium relationship exists between economic growth and financial liberalisation. Therefore, it is imperative to test the existence and direction of causality between these variables. Granger causality test is essentially a test to determine whether changes in one variable are a cause of changes in another. The theory of Granger causality states that a variable x Granger-causes y if y can be better predicted using the histories of both x and y than it can using the history of y alone. Testing causality, in the Granger sense, involves using F-tests to test whether lagged information on a variable y provides any statistically significant information about a variable x in the presence of lagged x . If not, then y does not Granger-cause x . To test for causality between economic growth and financial liberalisation, three alternative Granger-causality models can be specified: VAR in levels, VAR in first differences and the ECM. The appropriate Granger-causality alternative models that best fit the model developed will be used based upon the results of unit roots and co-integration tests.

According to Granger (1969), causality can be sub-divided into long-run and short-run causality using error correction models or VECMs, depending on the approach for determining causality. Long-run causality is determined by the error correction term where significance is indicative of evidence of long run causality from the explanatory variable to the dependent variable. Short-run causality is determined with a test on the joint significance

of the lagged explanatory variables, using an F-test or Wald test. It is possible to have evidence of long-run causality, but not short-run causality and vice versa.

In order to test causality, Granger (1969) suggests a procedure, in which we examine how much of the current value of Y can be explained by past values of Y and then looking at whether adding lagged values of X can improve the explanation. X is said to Granger cause Y if X aides in the prediction of Y, or equally if the coefficients on the lagged Xs are statistically significant. This study determines whether financial liberalisation Granger-causes economic growth by formulating and testing a simple regression where the change in economic growth is regressed on lags of economic growth and the change in financial liberalisation.

4.5.4. Diagnostic checks

This is a crucial stage in the impact of financial liberalisation on economic growth because it validates the parameter estimation outcomes achieved by the estimated model. Johansen suggests using residuals from the unrestricted model to decide whether the model is acceptable or not. The assumption is that the error terms are independent. Diagnostic checks test the stochastic properties of the model. The tests employed in this study include the autocorrelation of the residuals, heteroskedasticity and normality. On diagnostic tests, the null hypothesis is that they are well specified, thus p values below 0.05 indicate that there is a problem.

4.5.4.1. Autocorrelation LM test

Gujarati (2003) defines autocorrelation as the relationship between members of a series of observations ordered in time. It arises in cases where the data have a time dimension and where two or more consecutive error terms are related. In this case, the error term is subject to autocorrelation or serial correlation.

The Lagrange Multiplier (LM) test to be used in this study is a multivariate test statistic for residual serial correlation up to the specified lag order. Harris (1995) argues that the lag order for this test should be the same as that of the corresponding VAR. Much emphasis is on the value of the R^2 for the regression. If one or more coefficients in an equation are statistically significant, then the value of R^2 for that equation will be low and relatively significant, while if none of the variables is significant, R^2 will be relatively low. This test uses R^2 from the auxiliary regression and multiplies it by the number of observations. It can be indicated as follows:

$$TR^2 \approx X^2(m)$$

where m is the number of regressors in the auxiliary regression which is equal to the number of restrictions placed in under the F-tests. The null hypothesis of the test is that there is no serial correlation in the residuals up to the specified lag order against an alternative hypothesis of autocorrelated residuals. There is serial correlation (i.e. autocorrelation) when the residuals show correlation with its values in pasts periods. An (effectively) zero probability value would strongly indicate the presence of serial correlation in the residuals, and if the probability of the LM statistic is high, one fails to reject the null that there is no serial correlation.

4.5.4.2. Heteroskedasticity test

The most popular test for heteroskedasticity is White's (1980) general test to systems of equations. This test is useful because it takes into account several assumptions. It assumes that the estimated regression model is a standard linear. The null hypothesis for the White test is that the errors are both homoskedastic (no heteroskedacity problem) and independent of the regressors and that there is no problem of misspecification. The test regression is run by regressing each cross product of the residuals on the cross products of the regressors and testing the joint significance of the regression. The absence of any one or more of the above mentioned conditions could result in a significant test statistic. Subsequently, if we reject the null hypothesis, then we have heteroskedasticity.

4.5.4.3. Residual normality test

The Bera-Jarque (BJ) normality test statistic is used for testing whether the series is normally distributed. It uses the property of a normally distributed random variable that the entire distribution is characterised by the first two moments - the mean and the variance. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The Bera-Jarque test statistic is formulated under the null hypothesis that the distribution of the series is symmetric. The reported probability is the probability that a BJ statistic exceeds (in absolute value) the observed value under the null hypothesis - a small probability value leads to the rejection of the null hypothesis of a normal distribution. A significant BJ statistic thus points to non-normality in the residuals. Nevertheless, the lack of normality in the residuals may not result in co-integration tests being invalid. The null hypothesis of normality would be rejected if the residuals are either significantly skewed or leptokurtic or both.

4.5.5. Impulse response and variance decomposition

If the estimated models pass the residual diagnostic tests, impulse response and variance decomposition analyses will also be employed. This shows how economic growth reacts to shocks in itself and any of the variables in the equation, which shock is relatively the most important and the average period it takes for economic growth to restore its equilibrium following such a shock. The usual block F-tests and an examination of causality in a VAR show which of the variables in the model have statistically significant influences on the future values of each of the variables in the system. However, these tests will not reveal whether changes in a value of a given variable have a negative or positive influence on the other variables in the system, or how long it would take for the effect to work through the system (Brooks, 2002). To provide such information, Lütkepohl and Reimers (1992) and Mellander *et al* (1992) developed impulse response and forecast error variance decomposition analyses for a VAR process with co-integrated variables as discussed below:

4.5.5.1. Impulse response analysis

Impulse response analysis traces out the responsiveness of the dependent variable in the VAR to shocks to each of the other variables. It shows the sign, magnitude and persistence of real and nominal shocks to the dependent variable. A unit shock is given to each of the system equations, and the responses of all the variables for the future time periods are traced. A shock to a variable in a VAR not only directly affects that variable, but is also transmitted to all other endogenous variables in the system through the dynamic structure of the VAR. For each variable from the equations separately, a unit or one-time shock is applied to the forecast error and the effects upon the VAR system over time are observed.

In the context of this study, the impulse response function answers questions with regard to response of economic growth to a one standard error unit shock in any of the other variables being studied. The analysis is also used to determine the signs of the effects between the variables. The impulse response analysis is applied on the VECM and, provided that the system is stable, the shock should gradually die away (Brooks, 2002). There are several ways of performing impulse response analysis, but the Cholesky orthogonalisation approach to impulse response analysis, which is a multivariate model extension of the Cholesky factorisation technique, is preferred in this study. This approach is preferred because, unlike other approaches, it incorporates a small sample degrees of freedom adjustment when estimating the residual covariance matrix used to derive the Cholesky factor (Lütkepohl, 1991).

4.5.5.2. Variance decomposition

The next step is to perform variance decomposition analysis, which is a confirmation of the impulse response functions for examining the effects of shocks to the dependent variables. It provides information on the linkage of each of the variables to the objective being tested. This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations (impulses) in itself and each explanatory variable, over a series of time horizons. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR (Brooks, 2002). It is also important to consider the ordering of the variables when conducting the tests, because the error terms of the equations in the VAR will be correlated, so the result will be dependent on the order in which the equations are estimated in the model. Brooks (2002) also observed that own series shocks explain most of the forecast error variance of the series in a VAR. The same factorisation technique and information used in estimating impulse responses is applied in the variance decompositions.

4.5.6. Econometric tools

The study will utilise Eviews 7 Econometric Package. The software includes a wide range of single and multiple equation estimation techniques for time series data. The software allows a simple estimation of Co-integration and Vector Error Correction models as well as the Two-Stage least squares. The software allows the examination for the impulse response functions and variance decompositions for the VECM as well. In addition, the software allows the presentation of a variety of graphical and tabular formats, as well as run a number of diagnostic tests.

4.6. Conclusion

This chapter details the analytical framework which will be applied in this study in order to analyse the impact of financial liberalisation on economic growth in South Africa. The empirical model relating economic growth to various explanatory variables was specified based on theoretical and empirical foundations. The explanatory variables are investment ratio, government expenditure (less expenditure on education), trade liberalisation, public expenditure on education and a financial liberalisation index.

Section 4.3 provided a description of the variables used, reviewed the *a priori* expectations and also described the sources of the data to be used in the study.

Section 4.4 then explained the various estimation techniques that will be used in the study. The Augmented Dickey Fuller (ADF) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests will be used to test for a unit root and stationarity. The Johansen (1991, 1995) co-integration technique has been chosen as the preferred parameter estimation technique for the real exchange rate model, because of its several advantages over alternative techniques. If the estimated model passes several residual diagnostic checks, orthogonalised impulse response and variance decomposition analyses will be employed to investigate the impact and magnitude of shocks to each of the determinants on the real exchange rate and the proportion of the variance in the real exchange rate that is accounted for by each determinant over time.

In the next chapter, the analytical framework presented in this chapter will be applied to South African data in order to achieve the objectives of this study as set out in Chapter 1.

CHAPTER 5

PRESENTATION AND ANALYSIS OF EMPIRICAL FINDINGS

5.1. Introduction

The previous chapter set the analytical framework and the model estimation technique to be used in this study in order to analyse the impact of financial liberalisation on economic growth. This chapter applies the model developed in the previous chapter and the other techniques that were discussed. The dataset used is quarterly South African data covering the period 1980 to 2010. The results from this chapter are used to address the objectives set out in Chapter 1, that is, to evaluate the short run and long run impact of financial liberalisation policies on economic growth and to determine the direction of causality which prevails between financial liberalisation and economic growth. The results presented include those of unit root, co-integration and granger causality tests. Also, the error correction model will be estimated. This chapter proceeds in three broad sections: the next section presents the empirical findings and the last section concludes this chapter.

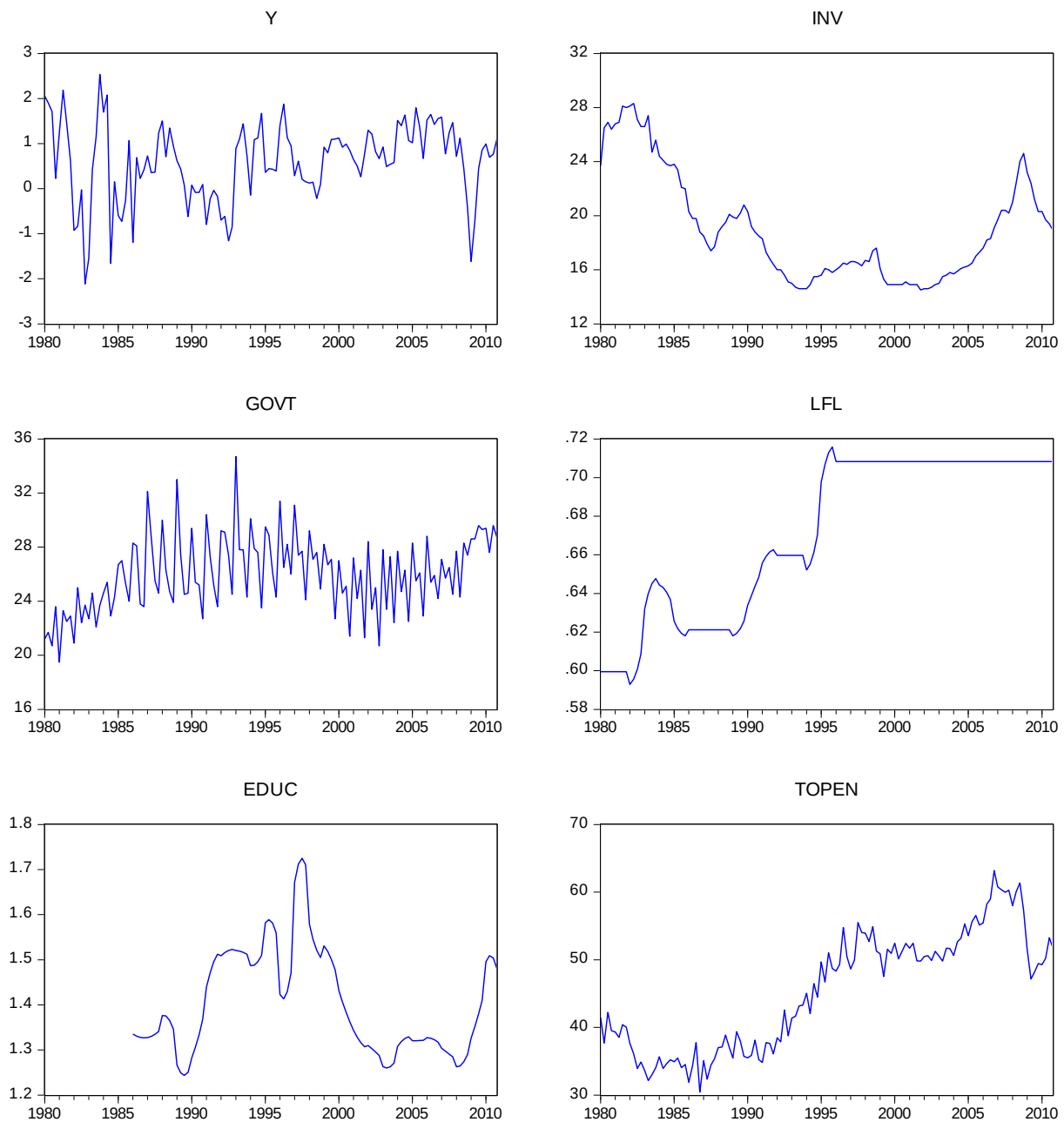
5.2. Empirical Findings

This section is divided into eight sub-sections. The first section presents the results of stationarity/unit root tests to evaluate the stationarity of the variables considered in the model. The second section presents and discusses the co-integration test results to assess the long run and short dynamics of the selected model. Diagnostic checks results are provided in the third sub-section, while impulse response analysis and variance decomposition results are presented in the fourth sub-section. Granger causality tests are presented in section 5.

5.2.1. Stationarity/Unit root test results

In this study, one informal test for stationarity and two formal tests are employed. As indicated in chapter 4, the study first makes use of a graphical analysis of the series. This is a visual plot of the series which is an important step in the analysis of time series before pursuing any formal tests. This preliminary examination of the data (eye balling) is important as it allows the detection of any data capturing errors and structural breaks and gives an idea of the trends and stationarity of the data set. Figure 5.1 below displays plots of all variables considered for the model.

Figure 5.1: Unit root test - Graphical analysis at levels

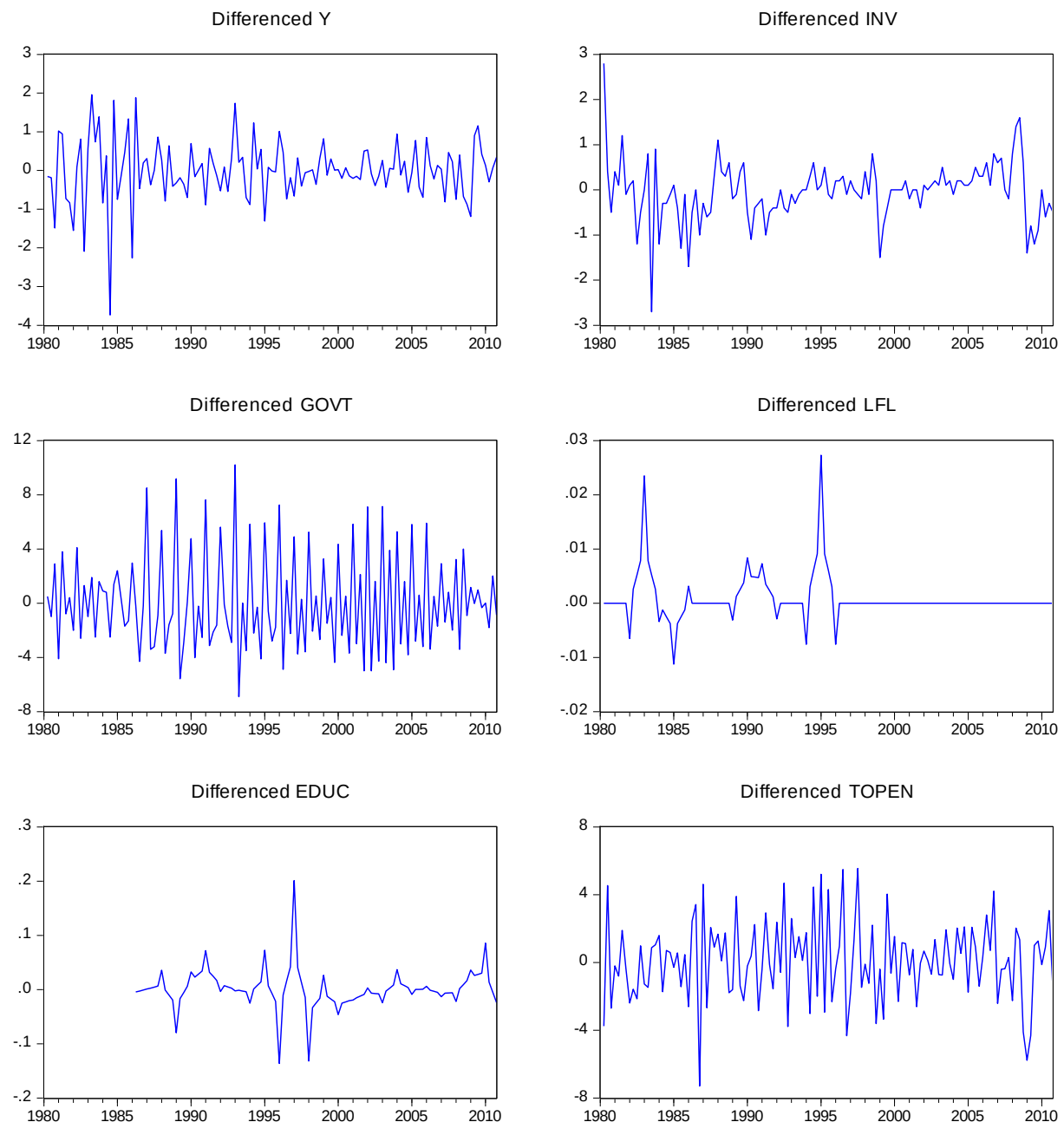


Source: Author's computation using Eviews 7 Econometric Package

From the plots in Figure 5.1, the variables, LFL and TOPEN seem to be trending upward and INV trends downwards, albeit with fluctuations. The remaining three variables (Y, GOVT and EDUC) do not show any trend, but also show huge fluctuations over time. All the other variables in Figure 5.1 with the exception of Y and GOVT, have a time variant mean and variance suggesting that they are not stationary in their levels. Y and GOVT could be stationary or closer to the stationary boundary, as they seem to be hovering around their means, but their variances are clearly not constant over time.

This analysis is inconclusive regarding the presence of unit root in the series. The series were differenced once and graphical analysis repeated. After differencing once (Figure 5.2), all variables become stationary. A conclusion can be reached out that all variables are stationary at first difference. That is, they are integrated of order one based on graphical analysis.

Figure 5.2: Unit root test - Graphical analysis at first difference



Source: *Author's computation using EViews package*

However, a formal test is still required to be sure about the stationarity status of the variables, especially those that do not follow a clear trend.

Formal unit root tests

The Augmented Dickey-Fuller (ADF) test and the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test are applied to examine the stationary properties of the series. The null hypothesis of ADF test is that the series has a unit root, whereas the KPSS test assumes stationarity as the null hypothesis. Thus, the KPSS test is performed as a confirmatory test of the results of ADF.

These tests were applied to the data under different deterministic trend assumptions. The results of the tests are shown in Table 5.1. The results confirmed that differencing once was all that was required to bring these variables to stationarity.

Table 5.1: Unit root/Stationarity test results

Test	Augmented Dickey-Fuller (ADF)			Kwiatkowski-Phillips-Schmidt-Shin (KPSS)	
	None	Trend and intercept	Intercept	Trend and intercept	Intercept
Y	-4.709251***	-6.036256***	-5.831966***	0.077725***	0.285457***
Δ Y	-14.09900***	-14.00277***	-14.04207***	0.123555***	0.213176***
LFL	1.277934	-1.383523	-1.693420	0.212663***	1.224409
ΔLFL	-2.696720***	-2.919005**	-2.900965	0.058570***	0.128606***
INV	-1.369620	-0.855460	-2.295165	0.287884	0.582633***
ΔINV	-6.055278***	-9.834544***	-6.111569***	0.074285***	0.169462***
EDUC	-0.486154	-2.266149	-1.881899	0.175255***	0.262670***
ΔEDUC	-3.287525***	-3.326146**	-3.254183*	0.048359***	0.129816***
GOVT	-4.709251***	-1.885495	-1.905305	0.149721***	0.215311**
ΔGOV	-6.411955***	-6.522989***	-6.549109***	0.074831***	0.080051***
TOPEN	0.530967	-2.270539	-1.040253	0.119069***	1.132347
ΔTOPEN	-16.10923***	-16.02348***	-16.09551***	0.110918***	0.114367***
Critical value 1%	-2.56	-3.43	-3.96	0.216	0.739
Critical value 5%	-1.94	-2.86	-3.41	0.146	0.463
Critical value 10%	-1.62	-2.57	-3.13	0.119	0.347

Notes:

*** (1% level of significance), ** (5% level of significance) and * (10% level of significance).

The ADF test is based on the null hypothesis of unit roots.

The KPSS test is based on the null hypothesis of trend stationarity.

The lag order for the series was determined by the Schwarz information criterion and the spectral estimation method is Bartlett Kernel for ADF and KPSS, respectively.

Since the test do not have conventional 't' distribution, special critical values originally calculated by Dickey and Fuller are used. For the KPSS, the KPSS (1992) critical values are used

Source: Author's Computation using EViews 7 Econometric Package

It is worth noting again that the ADF test tests the null hypothesis of a unit root, while the KPSS has as its null hypothesis that the series is stationary. Therefore, a rejection of the null hypothesis under the ADF means the series does not have a unit root, while the rejection of the null hypothesis under the KPSS is interpreted as evidence of non-stationarity or presence of a unit root in the series. The ADF results for none and trend and intercept deterministic assumptions are similar, only Y is stationary at levels. All the other variables become stationary after first differencing, suggesting that they are I(1).

Results based on the KPSS deviate partly from those of the ADF. The KPSS test applied in the level variables fails to reject the null hypothesis of stationarity in all variables except INV (trend and intercept assumption). All the variables become stationary at first difference. These results are similar to the deterministic trend assumption of a constant only. Only LFL and TOPEN are not stationary at levels. However, after first differencing all variables become stationary.

A conclusion is reached that five of the series are first difference stationary I(1) while Y is level stationary I(0), thus the variables are not integrated of the same order. As mentioned in Chapter 4, I(0) and I(1) variables could be co-integrated, so we carry all the variables forward to co-integration tests.

5.2.2. Co-integration test results

After establishing the stationarity of the variables, it is necessary to determine whether or not there is any long-term relationship between the variables. This means testing the co-integration. Since the model to be used in this study is multivariate, there is likelihood of having more than one co-integrating vector. The Vector Autoregressive (VAR) based on co-

integration tests developed by Johansen (1991) is therefore preferred as it captures the underlying time series properties of the data (see Hwang, 2012). Before running the Johansen test, the selection of lag length and the identification of deterministic components should be done first.

5.2.2.1 Order of integration

The unit root test conducted show that all the variables become stationary after first differencing. A conclusion is reached that all the variables are first-difference stationary, that is, are integrated of order one. Having established the order of integration, the next step is to conduct co-integration tests. For this purpose the Johansen technique is used to test the existence of co-integration and the number of co-integrating vectors (Johansen, 1991). If the variables are also co-integrated, they can be represented by a VAR in differences with an ‘error correction’ component, that is., by a Vector Error Correction Model (VECM). In order to construct the VECM, we need to determine the order of the VAR, which is the optimum number of lags.

5.2.2.2 Optimal Lag Length Selection Criteria

The choice of lag length mainly depends on the information criteria. For the optimal lag length, the information criteria approach, augmented by theoretical priors, is used as a guide in selecting the lag order. The information criteria used is Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn criterion, (HIQ), Final predication error (FPE) as well as Likelihood Ratio test (LR). All these criteria can produce conflicting lag length choices. However, decision about the lag structure of a VAR model could be based on the fact that a given criteria produces a white noise residual and conserves degrees of freedom. Table 5.2 presents the selection of an optimal lag length. Since the series are quarterly, the selection is drawn from a maximum of 8 lags in order to allow for adjustment in the model and the attainment of well behaved residuals.

Table 5.2: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-475.7686	NA	0.001424	10.47323	10.63769	10.53961
1	78.68541	1024.535	1.82e-08	-0.797509	0.353742*	-0.332854
2	130.9808	89.81161	1.29e-08	-1.151756	0.986282	-0.288826
3	162.0793	49.35208	1.47e-08	-1.045203	2.079622	0.216003
4	229.6868	98.47173	7.75e-09	-1.732322	2.379290	-0.072840
5	295.0875	86.72694	4.43e-09	-2.371466	2.726932	-0.313709
6	355.5690	72.31489	2.95e-09	-2.903674	3.181512	-0.447641
7	399.6562	46.96246	2.97e-09	-3.079483	3.992490	-0.225175
8	465.0418	61.12129*	2.04e-09*	-3.718299*	4.340460	-0.465716*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: Hannan-Quinn Information Criterion

Source: Author's Computation using Eviews 7 Econometric Packages

Table 5.2 indicates that four criteria (LR, FPE, AIC and HQ) choose an optimal lag length of 8. The Schwarz Information Criterion (SIC) chooses a lag of 1. Gujarati (2003), advocates for the use of the SIC as it imposes a harsher penalty for including an increasingly large number of regressors. Thus, the information criteria approach produces conflicting results and no conclusion can be reached on this approach alone. Brooks (2002) attributes this problem to a small sample bias. To reach a conclusion, the performance of the model under the two suggested lag orders was considered. Lag length 8 did not produce good diagnostic check results, while 1 lag resulted in well-behaved residuals. The Johansen co-integration test is therefore conducted under the assumption of no trend but a constant in the series and 1 lag for the VAR.

5.2.2.3 Deterministic trend assumption (Pantula Principle Test)

The Pantula Principle is a method which can help to identify the right model. The method suggests to carry out the co-integration test for each of the models and compare the trace statistic from the most restrictive option (intercept in the co-integration equation, but no intercept in the VAR) to the least restrictive (intercept in the co-integration equation, and intercept in the VAR). The method selects the model at which the null hypothesis of no co-integration is not rejected for the first time. If the null of no co-integration is rejected for all options, an assumption can be made that there is no long term relationship between the variables. If there is a co-integration relationship for one or more linear combinations, we assume a long-term connection and estimate the ECM to examine the short-term dynamics of those relationships.

The Pantula Principle test was applied to the series and using the Trace statistic, conclusions were drawn on the deterministic trend suitable for this analysis and data. The results are presented in Table 5.3 below.

Table 5.3: Pantula principle test results

r	n-r	Model 2		Model 3		Model 4	
		Test statistic	Critical value	Test statistic	Critical value	Test statistic	Critical value
0	3	151.4425	103.8473	148.9281	95.75366	164.5306	117.7082
1	2	81.01543	76.9727	78.50288	69.81889	90.88208	88.80380
2	1	50.17804*	54.07904	47.87460	47.85613	55.62633	63.87610

Note: * indicates the first time that the null cannot be rejected

Source: Author's computation based of Eviews 7 econometric package

Based on the results presented, in Table 5.4 the Johansen co-integration test is therefore conducted under the assumption of unrestricted intercept and no trend in CE and no intercept in VAR (model 2) as chosen by the Pantula principle test. Since the Pantula test chose model 4, there is no need to proceed with the modified Pantula tests based on the recommendation of Hjelm and Johansson (2005). The results of Table 5.4 above allows the acceptance of two

co-integrating vectors and that there are restricted deterministic trends in the levels of the data.

5.2.2.4 Determination of the rank of Π

Table 5.4 shows the co-integration test results for the specified model, based on trace and maximum eigenvalue statistics. The Johansen technique was chosen as it performs better than single-equation and alternative multivariate methods (Ibrahim, 2000).

Table 5.4(a): Co-integration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512587	151.4425	103.8473	0.0000
At most 1 *	0.269968	81.01543	76.97277	0.0238
At most 2	0.251129	50.17804	54.07904	0.1066
At most 3	0.112338	21.83752	35.19275	0.6064
At most 4	0.051867	10.15944	20.26184	0.6242
At most 5	0.049158	4.939883	9.164546	0.2901

Trace test indicates 2 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): Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512587	70.42708	40.95680	0.0000
At most 1*	0.269968	34.80587	30.83739	0.1381
At most 2	0.251129	28.34052	28.58808	0.0537
At most 3	0.112338	11.67808	22.29962	0.6861
At most 4	0.051867	5.219557	15.89210	0.8686
At most 5	0.049158	4.939883	9.164546	0.2901

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

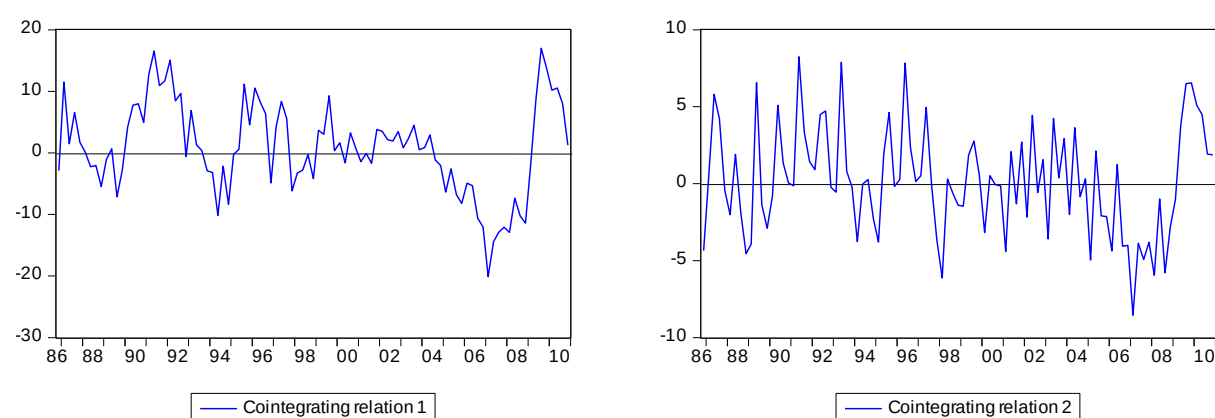
Source: Author's Computation using Eviews 7 Econometric Package

Table 5.4(a) presents the Johansen co-integration test based on the trace test, while the bottom part presents the results of this test based on the maximum eigenvalue test. The trace test shows the null hypothesis that the number of co-integrating equations is greater than the number of variables involved, (Hendrel et al., 2000). The null hypothesis fails to be rejected if the trace test statistic is smaller than critical values of the trace tests. The null hypothesis of no co-integrating vectors is rejected, since the test statistic of about 200.9916 is greater than the 5 per cent critical value of approximately 117.7082. In the same way, the null hypothesis that there are at most 1 co-integrating vectors is rejected, but the null hypothesis that there are at most 2 co-integrating vectors cannot be rejected, since the test statistic of approximately 61.88168 is now less than the 5 per cent critical value of about 63.87610. The trace test, therefore, indicates 2 co-integrating relationships (vectors) at the 5 per cent level of significance.

Table 5.4(b) presents the results of the Johansen co-integration test based on the maximum eigenvalue. The maximum eigenvalue tests the null hypothesis of r co-integrating equations against the alternative of $r+1$. The null hypothesis fails to be rejected when the test statistic is smaller than the maximum eigenvalue test's critical values, (Hendry et al 2000). The maximum eigenvalue test gives similar results and rejects the null hypothesis of no and at most 1 co-integrating vector, since the test statistics of about 70.42708 and 34.80587 are greater than the 5 percent critical values of approximately 40.95680 and 30.83739, respectively.

The results presented above can be confirmed by plotting graphs of co-integration vectors as shown in Figure 5.3 below. The vectors in the co-integrating equation appear to be relatively stationary.

Figure 5. 3: Co-integration graphs



Results in Table 5.5 show that there are two co-integrating vectors. Figure 5.3 confirms results in Table 5.5 of two co-integrating vectors in our VAR model. Since a long run relationship has been established between the variables, the short run and long run dynamics of the model can be established within the error correction model. Thus a Vector Error Correction Model (VECM) can be specified from the results of the analysis.

5.3. Vector Error Correction Modelling

The discovery of a co-integration equation in the previous section implies that a VECM can be used. This allows us to distinguish between the long and short run impacts of variables so as to establish the extent of influence that financial liberalisation has on economic growth. The outcomes from the co-integration test (number of co-integrating relationships, the number of lags and the deterministic trend assumption), are used to specify the VECM. The

VECM models allows the long run behaviour of the endogenous variables to converge to their co-integrating (that is, long run equilibrium) relationships while allowing a wide range of short run dynamics. The VECM results are presented in Tables 5.5 and 5.6. In order to avoid any bias of the regression results by measurement errors, the co-integrating regression was considered without imposition of symmetry and proportionality restrictions (except for those automatically imposed by E-views).

Table 5.5: VECM results

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1	CointEq2
Y(-1)	1.000000	0.000000
INV(-1)	0.000000	1.000000
GOVT(-1)	0.276666 (0.08152) [3.39376]	-2.910707 (0.25701) [-11.3254]
LFL(-1)	38.34316 (8.78855) [4.36286]	-44.32990 (27.7068) [-1.59996]
EDUC(-1)	1.136536 (1.03025) [-1.10317]	25.60829 (3.24796) [7.88443]
TOPEN(-1)	-0.201143 (0.03951) [-5.09095]	0.114256 (0.12456) [0.91728]

C	-22.59983	44.99309
	(4.76028)	(15.0073)
	[-4.74758]	[2.99808]

Source: Author's Computation using Eviews 7 Econometric Package

The main concern is to determine which variables have the greatest impact on economic growth and hence our discussion is mostly concerned with the influence of those other variables on economic growth rather than how all the variables influence each other. We proceed to estimate a VECM normalised on economic growth where we have economic growth in the VEC as a function of the remaining variables.

The coefficients in the co-integrating equation give the estimated long-run relationship among the variables. The empirical findings, as reported by the positive coefficient of the variable LFL, indicate that financial liberalisation has a positive long run effect on economic growth. GOVT and EDUC also have a positive long run impact on economic growth whilst TOPEN has a negative long run implication on economic growth.

The impact of increases in national government expenditure (as a percentage of GDP) on economic growth is theoretically ambiguous, thus can either be positive or negative. More often than not, increases in government spending bolsters economic growth. From the results, increases in government expenditure increases economic growth. A percentage increase in national expenditure leads to a 0.28 percent increase in economic growth. An increase in government expenditure on socio-economic and physical infrastructure encourages economic growth.

From the empirical results, there is evidence of a positive and statistically significant effect of financial liberalisation on economic growth. The coefficient of LFL which is significant at the 5 percent significance level implies that financial liberalisation has improved economic growth by about 38 percent. This is consistent with theory and *a priori* expectation.

Public expenditure on education is expected to have a positive effect. The results show that government expenditure on education is highly significant in explaining economic growth in South Africa and the positive impact is consistent with theory and empirical findings such as Loening, (2004) and Dickens et al, (2006). Investment in education leads to the formation of human capital and that makes a significant contribution to economic growth. Education as an

investment secures returns in the form of skilled manpower that is geared to accelerating economic development. In other words, a well educated workforce is more productive. With reference to the significant coefficient in the results, a one percentage increase in public spending on education increases GDP by about 1.14 percent.

TOPEN, a measure of the degree of trade liberalisation is negatively related to economic growth. The negative coefficient of this variable suggests that an increase in openness leads to a decrease in economic growth by 0.2 percent. This could be due to an increased flow of imports relative to exports. This is particularly the case in the early stages of trade liberalisation.

5.3.2.2 Short run relationships

Short run analysis is intended to capture the short run dynamics of the model. Comparing the coefficients of the error correction terms (CointEq1), of Table 5.6) below, for the first vector shows that Y has a negative sign. The other variables either have a wrong sign or are not significant, suggesting that the equation constitutes the true co-integrating relationship in the first co-integrating vector.

Table 5.6 Vector Error Correction Model

Error Correction:	D(Y)	D(INV)	D(GOVT)	D(LFL)	D(EDUC)	D(TOPEN)
CointEq1	-0.248695	-0.089549	0.598401	-0.000278	-0.002405	1.988411
	(0.10577)	(0.09597)	(0.45514)	(0.00067)	(0.00711)	(0.40577)
	[-2.35137]	[0.93306]	[1.31476]	[-0.41249]	[-0.33823]	[4.90029]
 CointEq2	 -0.049339	 0.006739	 0.689469	 -0.000136	 -0.003597	 0.128018
	(0.02160)	(0.01960)	(0.09293)	(0.00014)	(0.00145)	(0.08285)
	[-2.28471]	[0.34392]	[7.41916]	[-0.98666]	[-2.47779]	[1.54516]

Source: Author's Computation using Eviews 7 Econometric Package

In Table 5.6 the speed of adjustment is indicated by the coefficients of the error correction terms (highlighted). The coefficient on that term in the VECM shows how deviations from the long-run relationship affect the changes in the variable in the next period. Y, LFL, INV and EDUC have coefficients that are negative and lie between 0 and -1, indicating that these

variables converge to their long-run equilibrium. However, GOVT and TOPEN have coefficients that do not meet the above requirement, indicating that any disequilibrium in these variables continues to grow. Furthermore, it should be noted that a positive coefficient in an error correction model could also signify incomplete specifications.

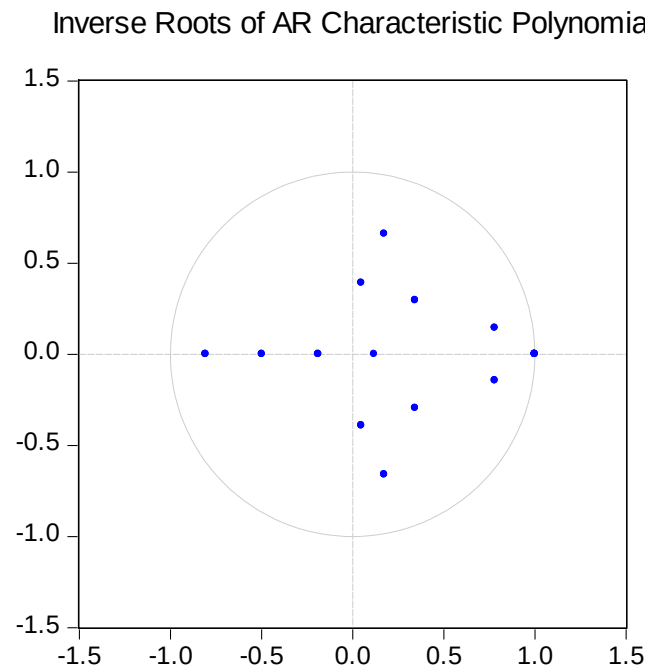
The adjustment coefficients imply the short-run dynamics. They show the speed of adjustments of the variables in response to a standard deviation from long-run equilibrium. GOVT changes, for instance, by 0.248695 units in response to the one unit deviation from long-run equilibrium. In order for the system to return to the long-run equilibrium, the movements of at least some of the variables must respond to the magnitude of the disequilibrium. If all adjustment coefficients were equal to zero, there would be no long-run relation and no error correction. Therefore, at least one of them should be statistically different from zero (Enders, 1995).

Since most of the short run effects from the VECM were insignificant, more information on the short run dynamics can be obtained from impulse response and variance decomposition analyses. However, before considering impulse response and variance decomposition analyses, there is need to confirm that the results from the VECMs we have just reported are deriving from efficient models with well-behaved residuals. Thus, the next step is to perform diagnostic tests on the residuals from the alternative model specifications.

5.4. Diagnostic checks

Diagnostic checks are important to the model because they validate the parameter evaluation of the outcomes achieved by the model. The VAR model was subjected to rigorous diagnostic tests. Diagnostic checks are crucial in this analysis, because if there is problem in the residuals from the estimation of a model, it is an indication that the model is not efficient, such that parameter estimates from such a model may be biased. The VAR was tested for AR Roots test and serial correlation and the results are indicated in figure 5.4. The fitness of the model was also tested in the following ways: Firstly, serial correlation was tested using the Lagrange Multiplier (LM) test, followed by the White test for heteroskedasticity and finally the Jarque-Bera for normality test.

Figure 5.4: AR Roots Graph



Source: Author's own computation using Eviews 7 Econometric Package

The AR Roots Graph reports the inverse roots of the characteristic AR polynomial. The estimated VAR is stable (stationary) if all roots have modulus less than one and lie inside the unit circle. If the VAR is not stable, certain results such as impulse response standard errors are not valid. Figure 5.4 shows that all roots lie inside the unit circle which is an indication that the VAR model is stable.

5.4.1. Autocorrelation LM test

The Lagrange Multiplier (LM) test was carried out to check for autocorrelation based on residual auto co-variances. The null hypothesis of the test is that there is no serial correlation in the residuals up to the specified lag order. The problem of serial correlation arises when a variable has relationships with itself in a manner that the value of such a variable in past periods had an effect on its future values. A zero probability value would indicate the presence of serial correlation and if the probability of the LM statistic is high, we fail to reject the null that there is no serial correlation.

Table 5.7 Autocorrelation LM test

Lags	LM-Stat	Prob
1	37.62943	0.3945
2	36.58814	0.4414
3	55.94771	0.0181
4	163.7377	0.0000
5	54.81382	0.0231
6	23.56198	0.9450
7	45.22021	0.1395
8	155.4925	0.0000
9	57.49363	0.0129
10	23.28603	0.9497
11	33.74003	0.5765
12	90.23616	0.0000

Probs from chi-square with 36 df.

Source: *Author's own computation using Eviews 7 Econometric Package*

Results from the table above shows that the test for serial correlation produced an LM statistic of 37.62943 with a probability of 0.3945. The LM results suggest that we cannot reject the null hypothesis of no serial correlation and conclude that there is no serial correlation among the variables.

5.4.2. Heteroskedasticity test

The presence of heteroskedasticity means the model has some misspecifications hence conclusive results cannot be derived from such a model. Table 5.9 presents the result of the White Heteroskedasticity (no cross terms) test.

Table 5.8: Heteroskedasticity test**Joint test**

Chi-sq	df	Prob
299.8145	294	0.4421

Source: Author's own computation using Eviews 7 Econometric Package

The test for heteroskedasticity using White test with no cross terms produced a Chi-sq of 299.8145 at a probability of 0.4421. The null hypothesis of homoskedastic residuals or no misspecification will thus not be rejected. Therefore, the model does not suffer from any misspecifications and can be relied on.

5.4.3. Normality test

The null hypothesis for the Jarque-Bera test states that there is a normal distribution.

Table 5.9: Residual normality test

Null Hypothesis: residuals are multivariate normal

	Chi-sq	P value
Skewness	1.278949	0.2581
Kurtosis	0.148927	0.6996
Jarque-Bera		0.4897

Source: Author's own computation using Eviews 7 Econometric Package

The null hypothesis is rejected if the probability is less than 5%. From the results presented in table 5.10, we fail to reject the hypothesis of normal distribution as the JB test has a p value of 0.4897 which is a clear indication of normality at 1 percent. The probabilities of the Kurtosis (p-value 0.6996) and Skewness (p-value 0.2581) are both insignificant thus we fail to reject the null hypothesis which is a clear indication of normality.

The diagnostic test results reveal that the model is relatively well specified. The diagnostic checks have all revealed the suitability of the model. There is no serial correlation and no misspecification while the errors are normally distributed. Therefore, impulse response and variance decomposition analyses can be applied to the model.

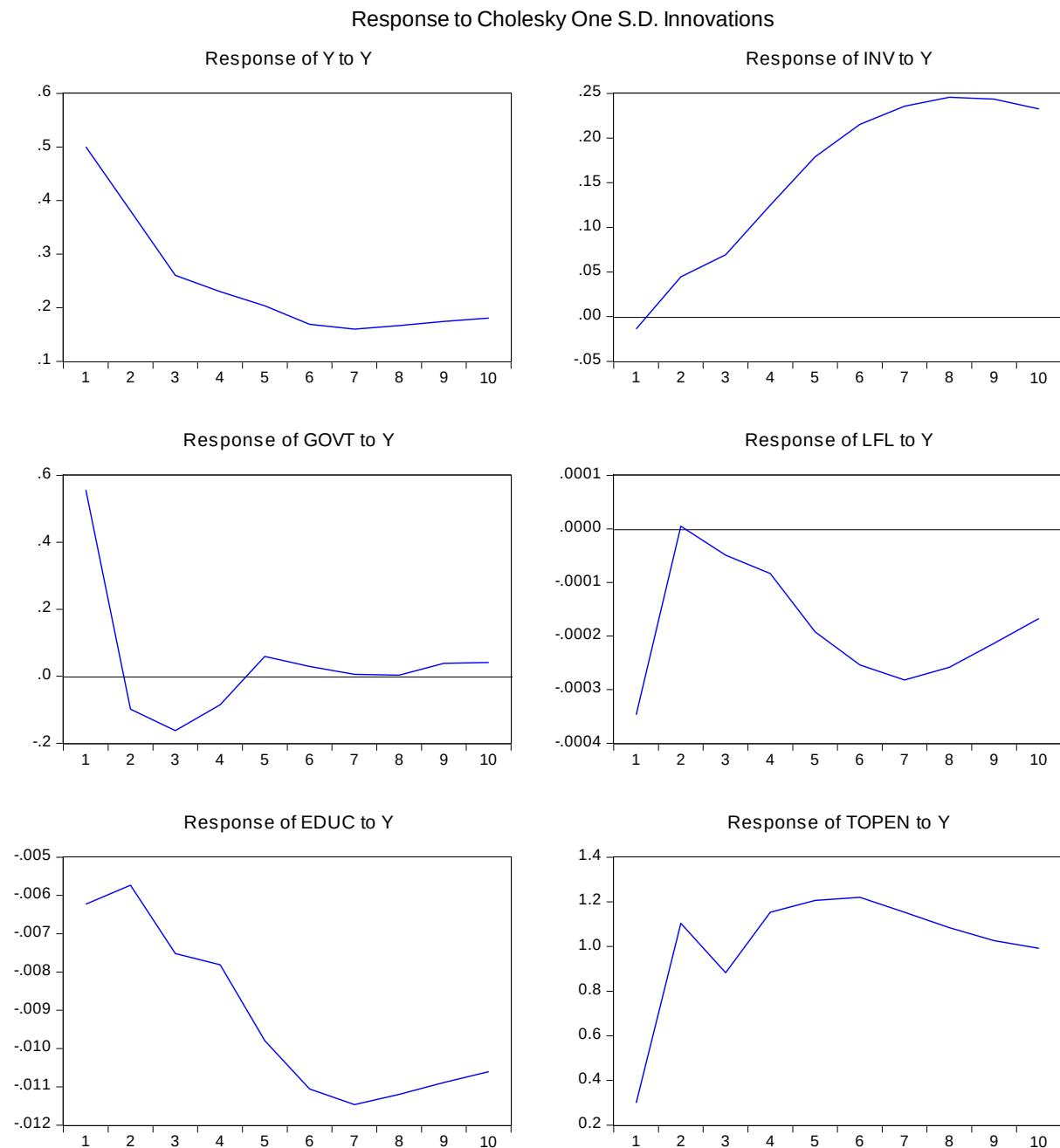
5.5. Impulse response and variance decomposition

Impulse response analysis, together with variance decomposition, reveals a wealth of information on dynamic effects that is missing in both static studies and those dynamic studies that do not employ these techniques.

5.5.1. Impulse response analysis

The impulse response function traces the temporal and directional response of an endogenous variable to a change in one of the structural innovations. Impulse response functions give an indication of the lag structure in the economy. These impulse response functions show the dynamic response of economic growth to a one-period standard deviation shock to the innovations of the system and also indicate the directions and persistence of the response to each of the shocks over a 10 quarter period. Since this study focuses on the impact of financial liberalisation on economic growth, only the responses of economic growth to the other variables and to itself are reported in Figure 5.5.

Fig 5.5 Impulse response of Economic growth



Source: Author's Computation using Eviews 7 Econometric Package

The variables have varied impact on real economic growth. A one-period standard deviation shock to INV and TOPEN has a lasting positive impact on economic growth. An unexpected shock to EDUC yields a response which is not different from zero over the entire period. Looking at the relationship between LFL and economic growth, it seems that any shocks in LFL will invoke a sharp increase in the first 2 quarters. After the second quarter, the effect becomes negative and increases slightly later.

5.5.2. Variance decomposition of Economic growth

Variance decomposition analysis provides for a means of determining the relative importance of shocks in explaining variations in the variable of interest. In other words, it indicates the proportion of the movements in a sequence due to its ‘own’ shocks versus shocks to the other variables. It shows the fraction of the forecast error variance for each variable that is attributable to its innovations and to innovations in the other variables in the system. In the context of this study, it therefore provides a way of determining the relative importance of shocks to each of the variables in explaining variations in economic growth. The results of the variance decomposition analysis are presented in Table 5.10.

Table 5.10: Variance decomposition of Economic growth

Period	S.E.	Y	INV	GOVT	LFL	EDUC	TOPEN
1	0.500184	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.641315	96.13757	1.236401	0.010629	1.684113	0.880166	0.051122
3	0.733695	86.06225	10.64821	0.248560	1.984732	1.001709	0.054542
4	0.814021	77.91349	17.75679	0.836873	2.213291	1.016362	0.263194
5	0.868760	73.89966	21.54247	0.766658	2.398187	0.899436	0.493598
6	0.907875	71.13876	23.10544	0.707501	2.882907	0.824100	1.341286
7	0.939447	69.34414	23.59488	0.669766	3.391975	0.770035	2.229205
8	0.970662	67.90952	23.29240	0.780495	4.136693	0.723748	3.157147
9	1.000880	66.90278	22.85967	0.783315	5.027714	0.680916	3.745614
10	1.033350	65.82569	22.30577	0.759804	6.177039	0.641308	4.290386

Source: Author’s Computation using Eviews 7 Econometric Package

The interest of this study lies in the movements of economic growth following shocks to itself or other variables. Therefore, focus is turned on the variance decomposition in economic growth and analyse the relative importance of each of the variables in influencing its movements. The study allows the variance decompositions for 10 years in order to

ascertain the effects when the variables are allowed to affect unemployment for a relatively longer time.

In the first year, all of the variance in economic growth is explained by its own innovations (shocks), as suggested in Brooks (2002). For the 5th quarter ahead forecast error variance, reported in column 2 of Table 5.10 under S.E., economic growth itself explains about 74 per cent of its variation, while the other variables explain only the remaining 26 per cent. Of this 26 per cent, LFL explains about 2.4 per cent, INV about 22 per cent, GOVT about 0.8, EDUC about 0.9 and TOPEN about 0.5 per cent.

However, after a period of 10 quarters, economic growth explains about 66 per cent of its own variation, while fiscal policy variables explain the remaining 34 per cent. The influence of INV does not change at 22 per cent, while LFL increases to about 6.2 per cent. The influence of TOPEN increases significantly to 4.3 per cent, whereas EDUC and GOVT decreases to about 0.64 percent and 0.76 percent respectively. These results are similar to those from impulse response analysis.

5.6. Granger causality tests

The interest of this section is to examine the causal relationship between economic growth and financial liberalisation in South Africa. Of significant interest is to test for bi-directional causality, if it exists, between economic growth and financial liberalisation. An error correction procedure was employed to model short-run changes in the relationship between these variables.

The VECM allows causality to emerge even if the coefficients' lagged differences of the explanatory variable are not jointly significant (Miller and Russek, 1990). It must be pointed out that the standard Granger-causality test omits the additional channel of influence. VAR model is estimated to infer the number of lag terms required (with the help of simulated results using VAR) to obtain the best fitting model and appropriate lag lengths were then used in causality tests yielding the F-statistics and respective p-values. For any F-statistic, the null hypothesis is rejected when the p-value is significant (less than 0.05 or 5% level of significance or those stated otherwise). A rejection of the null hypothesis would imply that the first series Granger-causes the second series and vice versa. The estimated Granger causality results are reported in Table 5.11.

Table 5.11: VECM Granger Causality Results

Dependent variable: D(Y)

Excluded	Chi-sq	df	Prob.
D(INV)	8.701272	2	0.0129***
D(GOVT)	2.582699	2	0.2749
D(LFL)	1.093012	2	0.5790
D(EDUC)	0.637792	2	0.7270
D(TOPEN)	5.081358	2	0.0788
All	24.43884	10	0.0065

*** denotes rejection at 5% level

Dependent variable: D(LFL)

Excluded	Chi-sq	df	Prob.
D(Y)	2.820645	2	0.2441
D(INV)	1.429315	2	0.4894
D(GOVT)	0.894347	2	0.6394
D(EDUC)	0.086954	2	0.9575
D(TOPEN)	0.456378	2	0.7960
All	5.564690	10	0.8504

Source: Author's Computation using Eviews 7 Econometric Package

Evidence from Table 5.11 using the p-values, shows that LFL (p-value 0.5790) does not Granger-cause economic growth in the South African economy. Inversely, economic growth (p-value 0.2441) does not Granger-cause financial liberalisation. This implies that economic growth is not induced by financial liberalisation in as much as financial liberalisation is not induced by economic growth. The p-value values are both insignificant which is indicative of evidence of absence of long run causality from the explanatory variables to the dependent variables. The findings in this section imply that both economic growth and financial liberalisation are not vital in explaining the behaviour of each of the variables. Thus financial liberalisation is not a function of economic growth and economic growth equally is not a

function of financial liberalisation. The results therefore conclude that there is no causality linkage economic growth and financial liberalisation as hypothesised in chapter one.

5.7. Summary and conclusion

This chapter analysed the impact of financial liberalisation on economic growth. It was divided into six sections. The first section analysed the time series properties of the data by employing both informal and formal tests for stationarity. The Augmented Dickey-Fuller and KPSS tests were used as the formal test for stationarity. The variables were found not to be integrated of the same order, as five were first difference stationary while one was level stationary.

Co-integration tests were presented in the second section. Johansen co-integration tests provided evidence that there is co-integration between the variables in the model. This finding, therefore, indicates that economic growth is subject to permanent changes as a result of changes in the other variables. The lag order information criteria approach was applied as a direction in choosing the lag order. The information criteria approach used provided mixed results – choosing 1 and 8 lags. To reach a conclusion about the lags, the performance of the model under the two suggested lag orders was considered. Lag length 8 did not produce good diagnostic check results, while 1 lag resulted in well-behaved residuals. Therefore, a conclusion to adopt 1 lag for VAR was made. The trace and maximum eigenvalue co-integration tests were used to test for co-integration. Both tests reflected that at least two co-integrating equation existed at 5% significance level. Evidence of co-integration allowed the estimation of VECMs in the third section, which simultaneously provided the parameter estimates for both the long and short run relationships.

The subsequent sections of the chapter respectively presented diagnostic checks, impulsive response and variance decomposition. Diagnostic checks revealed the suitability of the model. There is no serial correlation and no misspecification while the errors are normally distributed. Both the impulse response and variance decomposition produced results that are compatible with economic theory. Therefore, the results from this research can be relied on. Compelling conclusions on the impact of financial liberalisation on economic growth can be deduced and applicable policies can be safely formulated.

Lastly, Granger causality test were conducted and the results show that shows that financial liberalisation does not Granger-cause economic growth in the South African economy.

Inversely, economic growth does not Granger-cause financial liberalisation. This implies that economic growth is not induced by financial liberalisation in as much as financial liberalisation is not induced by economic growth.

CHAPTER 6

SUMMARY, CONCLUSIONS, POLICY IMPLICATIONS AND RECOMMENDATIONS

This chapter presents summaries of findings, conclusions as well as some policy implications and recommendations for South Africa based on the findings and outcome of the study. The main objective of the study has been to empirically examine the impact of financial liberalisation on economic growth in South Africa.

6.1. Summary of the study and conclusion

The study investigated the impact of financial liberalisation on economic growth in South Africa using quarterly data of the period 1980 to 2010. Chapter two of this study gave an overview of the financial sector, financial liberalisation policies and economic growth in South Africa. This chapter revealed that South Africa has a healthy financial system. It has undergone intense structural reform in a bid to increase the country's economic growth. Before the liberalisation process, South Africa was a typical financially repressed country characterised by interest rate controls, direct controls, exchange controls and other forms of financial repression. A number of these controls have been lifted as the country goes further towards full financial liberalisation. The financial sector reforms have also impacted on the monetary policy framework. This is because there is an intricate relationship between financial reforms and monetary policy objectives, instruments and outcomes. Monetary policy in South Africa had transformed from direct controls to indirect monetary management due to financial liberalisation.

Based on an extensive review of the theoretical and empirical literature on financial liberalisation and economic growth and on data availability, an empirical model was specified. The variables included in this model are government expenditure, investment ratio, public expenditure on education and trade liberalisation.

In order to determine both the long and short run impacts, the Johansen co-integration and error correction methodology was preferred to the other techniques, because of its several advantages over those alternative techniques. In the application of this methodology, the initial step was the analysis of time series properties of the data employing both informal and formal tests for stationarity. For the formal test, the ADF and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) tests were used. The variables were found not to be integrated of the same order, as five were first difference stationary while the other was level stationary. Johansen co-integration tests on alternative model specifications provided evidence that there is co-integration between the variables in the model. This finding, therefore, indicates that

economic growth is subject to permanent changes as a result of changes in the other variables. Evidence of co-integration allowed the estimation of VECMs, which simultaneously provided the parameter estimates for both the long and short run relationships. All the variables in the model have a long run relationship with economic growth.

The results of the estimation show that financial liberalisation has a significant positive effect on economic growth. The results support the view that liberalising the financial sector to eliminate financial repression promotes economic growth. An increase in government expenditure and public expenditure on education increase economic growth while trade openness decreases economic growth (contrary to economic theory). Diagnostic checks performed proved that the model is quite suitable in capturing the influence of the explanatory variables on economic growth in South Africa. There is no serial correlation and no misspecification while the errors are normally distributed. Both the impulse response and variance decomposition produced results that are compatible with economic theory. Therefore, the results from this research can be relied on. Compelling conclusions on the impact of financial liberalisation on economic growth can be deduced and applicable policies can be safely formulated.

Granger causality test were conducted and the results show that shows that financial liberalisation does not Granger-cause economic growth in the South African economy. Inversely, economic growth does not Granger-cause financial liberalisation. This implies that economic growth is not induced by financial liberalisation in as much as financial liberalisation is not induced by economic growth.

6.2. Policy implications and recommendations

A number of policy implications and recommendations are borne out of this study. The presence of long run co-integration between economic growth and the explanatory variables implies the effectiveness of targeting one of the variables in influencing the long run behaviour of the other variables. Therefore, on the basis of the long-run linkages, this study recommends that policies aimed at promoting economic and financial system development (outlined below) should be adopted.

Managed financial liberalisation policies

Liberalisation of the financial sector is a necessary, but not sufficient requirement for economic development. South Africa should adopt a careful and properly timed approach (managed financial openness policy) for lifting of controls in the financial sector rather than full-blast openness that ignores country characteristics and the possibilities of experiencing the growth retarding effects of such openness. In addition, liberalisation should be cautiously coordinated with reforms that are aimed at strengthening and stabilising the local real macro-economy in order to ensure its effectiveness.

Economic stability

The study concludes that financial liberalisation has a growth-stimulating effect in South Africa. It recommends that economic stability should either be maintained or pursued before implementing any form of financial liberalisation measures and that the regulatory and supervisory framework for the financial sector should be strengthened.

Increase investment in human capital

Public expenditure in education, a proxy for human capital, was found to have a positive effect on economic growth. This means that a well educated and skilled population will improve the economy of South Africa. This study recommends therefore, that the government embarks on measures to increase literacy levels such as provision of free primary education and increasing funding of the education sector to enhance growth. Also, the government should monitor the management of these resources to ensure that they are properly used and managed for the development of education services. Education is the key to reduce poverty and accelerate long-term economic growth; therefore, the bulk of government expenditure should be allocated to education to make sure that South Africans' skills remain relevant to the economic progress.

Improve the productivity and efficiency of government expenditure

The study found a positive relationship between government expenditure and economic growth. This shows that government expenditure is indeed a policy tool, in the hands of political authority, which can be used to impact economic growth. Government expenditure can impede growth by crowding out domestic investment by increasing interest rates and raising investment taxes. It is recommended that the government increases its expenditure to affect economic growth whilst appropriate policies should be put in place to the development of the private sector in order to take over the bulk of the investments activities and to

influence economic growth in the long run. Consequently, more effective and well directed economic policy will improve the impact which government expenditure has on the economic climate of South Africa and thus, positively enhance economic growth.

6.3. Limitations of the study and areas of further research

The major problem encountered in this study concerns the unavailability of data on the actual variables suggested by the theoretical models. This means that some of the variables either had to be excluded in the empirical model, albeit with the risk of an omitted variables bias, or proxies had to be found for those variables. The risk involved in finding proxies is that they may not correctly represent the impact of the actual variables, resulting in inconsistent results. Striking this balance poses a serious challenge to empirical studies on the effect of financial liberalisation on economic growth. However, this problem seems not to have significantly affected the findings presented in this study, since they corroborate both the theoretical and empirical knowledge on the impact of financial liberalisation on economic growth.

The study is limited to the South African economy only and the consequence is that the results obtained may not be directly applicable to other economies. Nonetheless, the study remains significant as the conclusions drawn from it may prove to be useful in the South African context. Applications to other economies must be done with caution, given different economic structures and different stages of development.

The study also unearthed areas of further research. The effect of financial liberalisation on economic growth is a complex process which needs to be traced through disaggregated aspects of financial liberalisation policies. Future studies could therefore, look at this effect from disaggregated aspects, that is analyse the individual effects of interest rate deregulation, capital account liberalisation, equity market liberalisation and other aspects. Research into the effect of political environment in South Africa may improve the analysis of financial liberalisation and economic growth in South Africa. Further research can include a variable to capture the economic implications of political development (or stability) in South Africa.

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APPENDIX1

Data used in the regressions

YEAR	Y	LFL	INV	EDUC	GOVT	TOPEN
1980/01	2.054446457	0.59947	23.7		21.2	41.4597
1980/02	1.901052783	0.59947	26.5		21.7	37.6981
1980/03	1.71201201	0.59947	26.9		20.7	42.2282
1980/04	0.224769222	0.59947	26.4		23.6	39.5219
1981/01	1.242018037	0.59947	26.8		19.5	39.3222
1981/02	2.183856548	0.59947	26.9		23.3	38.5181
1981/03	1.455402947	0.59947	28.1		22.5	40.4132
1981/04	0.623883738	0.59947	28		22.9	40.0422
1982/01	-0.92637612	0.59295	28.1		20.9	37.6537
1982/02	-0.83441726	0.59556	28.3		25	36.0737
1982/03	-0.02557312	0.60078	27.1		22.4	33.9249
1982/04	-2.11403582	0.60861	26.6		23.7	34.8987
1983/01	-1.54348046	0.6321	26.6		22.7	33.6216
1983/02	0.415250394	0.63993	27.4		24.6	32.1538
1983/03	1.152777069	0.64515	24.7		22.1	33.0155
1983/04	2.536372366	0.64776	25.6		23.7	34.0598
1984/01	1.696768415	0.64436	24.4		24.6	35.6497
1984/02	2.077489555	0.64311	24.1		25.4	33.9231
1984/03	-1.65746731	0.64061	23.8		22.9	34.6287
1984/04	0.154609289	0.63686	23.7		24.3	35.2133
1985/01	-0.59577411	0.6256	23.8		26.7	34.9207
1985/02	-0.72714037	0.62185	23.4		27	35.48
1985/03	-0.26398123	0.61935	22.1		25.3	34.0452
1985/04	1.069339605	0.6181	22		24	34.5024
1986/01	-1.1913903	0.62123	20.3	1.33508	28.3	31.8926
1986/02	0.69040549	0.62123	19.8	1.33048	28.1	34.3282
1986/03	0.225036763	0.62123	19.8	1.3277	23.8	37.7441
1986/04	0.419881978	0.62123	18.8	1.32674	23.6	30.446
1987/01	0.727281526	0.62123	18.5	1.32758	32.1	35.0545
1987/02	0.356607665	0.62123	17.9	1.33024	28.7	32.3718
1987/03	0.364922707	0.62123	17.4	1.33471	25.5	34.43
1987/04	1.227633281	0.62123	17.7	1.34099	24.6	35.3372
1988/01	1.50294454	0.62123	18.8	1.3764	30	37.0045
1988/02	0.710055179	0.62123	19.2	1.37538	26.3	37.1007
1988/03	1.344919032	0.62123	19.5	1.36525	24.7	38.847
1988/04	0.93898266	0.62123	20.1	1.346	23.9	37.0556
1989/01	0.619315662	0.6181	19.9	1.26617	33	35.4551

1989/02	0.433855963	0.61935	19.8	1.24928	27.4	39.3526
1989/03	0.080343565	0.62185	20.2	1.24386	24.5	37.9693
1989/04	-0.61883282	0.6256	20.8	1.24992	24.6	35.7133
1990/01	0.080054485	0.63397	20.3	1.28253	29.4	35.497
1990/02	-0.08252408	0.63888	19.2	1.30551	25.4	35.8757
1990/03	-0.08404122	0.64369	18.8	1.33392	25.2	38.1061
1990/04	0.092813142	0.64842	18.5	1.36778	22.7	35.2616
1991/01	-0.7954245	0.65571	18.3	1.43943	30.4	34.8319
1991/02	-0.2256438	0.65919	17.3	1.47123	27.3	37.7494
1991/03	-0.03879018	0.6615	16.8	1.49555	25.2	37.6287
1991/04	-0.17206096	0.66266	16.4	1.51237	23.6	36.0715
1992/01	-0.70075131	0.65976	16	1.5088	29.2	38.4452
1992/02	-0.61337423	0.65976	16	1.51579	29.1	37.8664
1992/03	-1.15773618	0.65976	15.6	1.52046	27.4	42.5478
1992/04	-0.84971389	0.65976	15.1	1.52279	24.5	38.7628
1993/01	0.885901325	0.65976	15	1.5204	34.7	41.3572
1993/02	1.096862157	0.65976	14.7	1.51902	27.8	41.6518
1993/03	1.439514025	0.65976	14.6	1.51627	27.8	43.1737
1993/04	0.740853496	0.65976	14.6	1.51214	24.3	43.2961
1994/01	-0.14249074	0.65218	14.6	1.48681	30.1	45.0438
1994/02	1.084857956	0.65521	14.9	1.48787	27.9	42.0265
1994/03	1.124753679	0.66128	15.5	1.49548	27.6	46.4706
1994/04	1.669115006	0.67038	15.5	1.50966	23.5	44.4694
1995/01	0.361221075	0.69769	15.6	1.58224	29.5	49.6693
1995/02	0.444024944	0.70679	16.1	1.5888	28.9	46.7328
1995/03	0.431641261	0.71285	16	1.58119	26.1	51.031
1995/04	0.394653246	0.71589	15.8	1.5594	24.3	48.7139
1996/01	1.40323584	0.7083	16	1.42321	31.4	48.3217
1996/02	1.87304425	0.7083	16.2	1.41316	26.5	49.293
1996/03	1.134757999	0.7083	16.5	1.42902	28.2	54.7726
1996/04	0.948471858	0.7083	16.4	1.4708	26	50.4451
1997/01	0.287283701	0.7083	16.6	1.67171	31.1	48.6275
1997/02	0.611664833	0.7083	16.6	1.71202	27.4	49.9676
1997/03	0.208896325	0.7083	16.5	1.72496	27.7	55.5072
1997/04	0.150989595	0.7083	16.3	1.71053	24.1	54.0317
1998/01	0.126384235	0.7083	16.7	1.57895	29.2	53.9291
1998/02	0.141421448	0.7083	16.6	1.54567	27.1	52.6871
1998/03	-0.21916505	0.7083	17.4	1.52093	27.6	54.8892
1998/04	0.09663055	0.7083	17.6	1.50472	24.9	51.2745
1999/01	0.919589658	0.7083	16.1	1.53088	28.2	50.8803
1999/02	0.795848349	0.7083	15.3	1.5182	26.7	47.5288
1999/03	1.092115496	0.7083	14.9	1.50052	27.1	51.5645

1999/04	1.099654732	0.7083	14.9	1.47784	22.7	50.9282
2000/01	1.124836247	0.7083	14.9	1.43168	27	52.459
2000/02	0.920100689	0.7083	14.9	1.40639	24.6	50.1485
2000/03	0.990384908	0.7083	14.9	1.38349	25.1	51.3149
2000/04	0.850764937	0.7083	15.1	1.36299	21.4	52.4268
2001/01	0.649407616	0.7083	14.9	1.34339	27.2	51.6964
2001/02	0.499910709	0.7083	14.9	1.32827	24.2	52.4624
2001/03	0.265581919	0.7083	14.9	1.31612	26.3	49.8444
2001/04	0.76889645	0.7083	14.5	1.30697	21.3	49.7972
2002/01	1.297595165	0.7083	14.6	1.30985	28.4	50.4722
2002/02	1.210954371	0.7083	14.6	1.30305	23.4	50.5973
2002/03	0.820282777	0.7083	14.7	1.29561	25	49.9044
2002/04	0.668047432	0.7083	14.9	1.28753	20.7	51.2495
2003/01	0.925368348	0.7083	15	1.26303	27.8	50.5342
2003/02	0.488345655	0.7083	15.5	1.26001	23.4	49.7903
2003/03	0.542678582	0.7083	15.6	1.26266	27.3	51.7191
2003/04	0.576860312	0.7083	15.8	1.27099	22.4	51.6474
2004/01	1.513859675	0.7083	15.7	1.3079	27.7	50.639
2004/02	1.397436766	0.7083	15.9	1.31844	24.7	52.6623
2004/03	1.635113387	0.7083	16.1	1.3255	26.3	53.1994
2004/04	1.067866691	0.7083	16.2	1.32909	22.5	55.298
2005/01	1.016625898	0.7083	16.3	1.32018	28.3	53.546
2005/02	1.794582033	0.7083	16.5	1.32042	25.5	55.6217
2005/03	1.363623291	0.7083	17	1.32079	26.1	56.541
2005/04	0.669612879	0.7083	17.3	1.32129	22.9	55.1272
2006/01	1.520094751	0.7083	17.6	1.32715	28.8	55.4542
2006/02	1.645216398	0.7083	18.2	1.32581	25.4	58.2564
2006/03	1.42514816	0.7083	18.3	1.3225	25.9	58.9688
2006/04	1.555868603	0.7083	19.1	1.31722	24.2	63.1729
2007/01	1.588012448	0.7083	19.7	1.30386	27.1	60.7569
2007/02	0.772748577	0.7083	20.4	1.29709	25.7	60.3526
2007/03	1.238014434	0.7083	20.4	1.29079	26.5	59.9759
2007/04	1.465425976	0.7083	20.2	1.28497	24.5	60.2652
2008/01	0.715518497	0.7083	21	1.26278	27.7	58.0053
2008/02	1.117812957	0.7083	22.4	1.26466	24.3	60.0291
2008/03	0.447222467	0.7083	24	1.27376	28.3	61.363
2008/04	-0.42709995	0.7083	24.6	1.29007	27.4	57.2528
2009/01	-1.61521995	0.7083	23.2	1.32601	28.6	51.4796
2009/02	-0.71163771	0.7083	22.4	1.3518	28.6	47.1618
2009/03	0.444110801	0.7083	21.2	1.37983	29.6	48.1617
2009/04	0.858783708	0.7083	20.3	1.41013	29.3	49.4209
2010/01	0.98961246	0.7083	20.3	1.49554	29.4	49.2894
2010/02	0.696817505	0.7083	19.7	1.50919	27.6	50.1983
2010/03	0.763605811	0.7083	19.4	1.50395	29.6	53.2601
2010/04	1.105887433	0.7083	18.9	1.47981	28.7	51.6219