THE IMPACT OF FINANCIAL MARKET DEVELOPMENT AND FINANCIALISATION ON ECONOMIC GROWTH IN SOUTH AFRICA

BY

DOUGLAS ZIRAMBA
STUDENT NUMBER: 201330478

THIS DISSERTATION IS SUBMITTED TO THE FACULTY OF COMMERCE, ADMINISTRATION AND LAW IN FULFILMENT OF THE REQUIREMENT OF THE MASTER OF COMMERCE (ECONOMICS) DEGREE

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Supervisor: Prof. I Kaseeram

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DECLARATION

I declare that this dissertation and the work presented in it reflect my own efforts and was written by myself as a result of my original research except for supervisory services. I also confirm that this dissertation is new and was not submitted to any university for the purpose of obtaining a degree.

Douglas Ziramba 5 December 2016

ABSTRACT

The issue of financialisation found its way through financial market developments in several economies including the South African economy, in the sense that foreign investors sought lucrative short-term investments in economies with relatively sophisticated financial markets that offered high positive interest rate differential in the debt markets and huge returns in the equity markets. The primary goal of this research study is to analyse, evaluate and identify the dynamic long run relationship between financial market development; financialisation and economic growth in South Africa over the period. Apart from determining the long run cointegrating relationship between financialisation, financial market development and economic growth the study wishes to also study the short run adjustments of the said variables due to disequilibria arising from the cointegrating relationship. To achieve these objectives various econometric approaches used include the co-integration analysis, the Vector Autoregressive (VAR) and the Vector Error Correction models (VECM), as well as the single equation methods such as the Fully Modified Ordinary Least Squares (FMOLS), the Dynamic Least Squares (DOLS) and the Canonical Cointegration Regression (CCR).

The VAR/VECM analyses concluded that there is a plausible long-term cointegrating relationship between the variables as predicted by economic theory. Additionally, although there are some valid short run adjustment relationships, however, GDP growth in the short run have adjustment relationships contrary to expectations The single equation methods confirmed the finding of the Johansen (1991) VAR/VECM approach that financialisation has negative long run impact on economic growth while financial development has a positive impact as reflected by the signs of the coefficients of the respective proxies for financialisation and financial development in all the models estimated. Two proxies were used for financialisation which included bank credit extended to households and net purchases of financial asset by foreigners, while three proxies were employed for financial development which included stock market volume trade at the Johannesburg Securities Exchange, the broad money supply (M3) and bank credit. This is a first South African study to consider such a relationship incorporating the financialisation variable and is one of the very few global papers, of this kind, involving emerging markets.

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LIST OF ACRONYMS

ANC	-	Africa National Congress
ANOVA	-	Analysis of variance
ADF	-	Augmented Dickey Fuller
ADF-GLS	-	Augmented Dickey Fuller – Generalised Least Squares
AEG	-	Augmented Engle-Granger
ARDL	-	Auto Regressive Distributed Lag
BESA	-	Bond Exchange of South Africa
CCR	-	Canonical Cointegration Regression
CRDW	-	Cointegrating Regression Durbin-Watson
DOLS	-	Dynamic Least Squares
FDI	-	Foreign direct investment
FMOLS	-	Fully Modified Ordinary Least Squares
GEAR	-	Growth, Employment and Redistribution
GDP	-	Gross Domestic Product
IPOs	-	Initial Public Offerings
IFIs	-	International financial institutions

IMF	-	International Monetary Fund
JSE	-	Johannesburg Securities Exchange
KPSS	-	Kwiatkowski, Phillips, Schmidt and Shin test
LM	-	Lagrange Multiplier
LR	-	Likelihood Ratio
OLS	-	Ordinary least squares
OTC	-	Over the Counter
PP	-	Phillips-Perron
SAFEX	-	South African Futures Exchange
SARB	-	South Africa Reserve Bank
SA	-	South Africa
U.S.	-	United States
VAR	-	Vector Autoregressive
VECM	-	Vector Error Correction models
WB	-	World Bank

CHAPTER 1
INTRODUCTION

1.0 Background

Many economies of the world, both developed and developing, have experienced transformations in their financial sector in the past decades. Since 1994, South Africa has seen its financial sector having almost doubled its rate of economic growth, Isaacs (2014). This study seeks to define, analyse and evaluate the impact of financial market growth and financialisation on economic growth in South Africa using the cointegration, Vector Autoregressive (VAR) and Vector Error Correction models (VECM), as well as single equation tests. Epstein, (2001) defined financialisation as the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of domestic and international economies. Thus, financialisation is a process whereby the financial sector rather than the real sector of the economy controls economic policy and economic outcomes. Financialisation therefore affects the economy by elevating the importance of the financial sector, especially the capital market, compared to the real sector of the economy.

Basically, both theoretical and empirical research findings seem to place an increasing reliance on the financial system to explain growth in the real sector. In 1911 Joseph Schumpeter argued that the role played by the financial intermediaries in terms of services such as mobilisation of savings, evaluating of projects, risk management, monitoring of managers as well as facilitation of transactions can stimulate economic development and technological innovation. Thus the interest of economists thereafter has been in the relationship between financial sector development and economic growth. Along the same lines Schumpeter (1911) asserts that the services provided by the financial intermediaries are important for growth and development. This has been one of the enduring debates in the field of economics, that is whether financial development causes economic growth or vice versa. Schumpeter even argued that based on the supply- leading hypothesis noting that technological innovation is the force underlying long-term economic growth and that the cause of innovation lies in the financial sector's ability to extend credit to the businesses, implying that financial development leads to economic growth. A step further was taken by Fry (1978, 1980) and Galbis (1977) to suggest that

interventions in and restrictions on the banking system impact negatively on the development in the financial sector, which ultimately reduces economic growth.

The growing dominance of capital market (through globalisation and an explosion of new financial instruments) over bank-based financial systems describes financialisation. The distinguishing feature of financialisation is evidenced by an increase in the volume of debt, especially long-term debt sourced from the capital market. It follows that financialisation raises public policy concerns at both the macroeconomic and microeconomic levels. At the macro level, it is associated with moderate and slow real economic growth associated with increased financial fragility (Palley, 2007). The scenario of financialisation in the economy should raise the fundamental question of whether the capital market evolves in response to the demand for its services (demand-following), or is the economic environment responding to the capital market (supply-leading)? In this regard, it is relevant to study causality in order to increase our understanding of the interdependence between the real sector and the financial system.

Many writers, including Mishel, Bernstein and Allegreto (2007) among others, argued that changes in macroeconomic patterns and income distribution are significantly attributed to developments of the financial sector. Such developments increase the access to finance and influence of the financial sector ahead of the non-financial sector. For the non-financial sector, which usually involves households and businesses, financialisation leads to high indebtedness and changed behaviour. This together with changes in economic policies as supported by financial and non-financial entities may cause the character and performance of the economy to change.

According to Gallagher, (2014), increased stability of the foreign exchange rate is relatively important for achieving a diversified open economy. In Brazil as well as other emerging market economies, there has been a notable rise in the number of exogenous economic and political factors, making it difficult for the economies concerned to move for development- oriented economic policies. However, in the last ten or more years, the Brazilian government has come up with a varied set of policy tools in order to address the exogenous factor to do with foreign exchange, and which have been modestly successful.

According to Rodrik, (2014), subsequent to setting the globalisation policy aims regarding the global financial sector, an increase in fixed capital formation and macroeconomic stability were expected. However, the results were the reverse in most of the global emerging and developed economies for various reasons related to fiscal, monetary and other economic policies.

Cheng and Xiong, (2014) argued that financialisation to a greater extent has changed the operation of commodities markets as investors needed to discover information, and assess and weigh the cost of risk sharing in both the commodities markets and the financial markets. This was following the huge influx of capital investment into the markets for commodity futures in the last ten years which brought about a debate regarding the impact of financialisation on commodity prices. This is in spite of what some economists, for example, Fattouh, Kilian and Mahadeva, (2012) Krugan, (2008), Irwin and Sanders, (2012b), and Stoll & Whaley, (2010) suggest. These economists argue that there is very little evidence supporting the price increases in the commodity market and that the speculators in commodity markets are not worrisome to policy makers.

While a host of studies on financialisation cross-examined the impact of global finance on the industrial economies and society at large, Zwan, (2014) in her research evaluated the in-depth analysis of more than ten years of research on financialisation. Three themes were investigated, namely: the rising of the capital accumulation regime; the rising of the shareholder value tendency; as well as financialisation in everyday life. Krippner, (2005) provided empirical evidence on the financialisation of the American economy since the time around 1970s. Whereas most of the researchers of the time put increasing importance of the financial sector on the growth of the economy, Krippner in her studies of the financialisation of the American economy, concluded that the concept of financialisation is commonly used along with other concepts and their impacts on the economy such as globalisation, neo-liberalisation, capitalisation, among many other related post industrialisation developments. For the purposes of this study financialisation will be defined as private credit to households rather than to private investors. Household debt-income ratios and corporate debt-equity ratios across industries are therefore analysed in the light of the existence of financialisation. In addition, in this study the case of

financialisation is analysed in terms of the purchase of bonds by non-residents on the Bond Exchange of South Africa and will be adopted as a proxy for financialisation denoted as the bond purchases by non-residents (RBPNR).

Demir, (2008) adopted a firm-level panel data, and analysed the effects of a rates of return gap amid the financial investments and the fixed investments in conditions of doubt regarding how the real investment performs given the emerging markets in three countries, namely Argentina, Mexico and Turkey. The researchers adopted a model called a portfolio choice model to explore the reduced rate of fixed investment in less developed economies around 1990. They propose that instead of investing in permanent long- term fixed investments, business can choose nonpermanent short-term financial investments given the rate of return and the general uncertainty in the economy. Their findings reveal that rising uncertainty and the rates of return gap significantly reduces fixed investment, whereas the reverse holds with regard to the investments in the financial sector.

Hardie, (2012), questions why some emerging economy governments can afford new funds and refinance their current debt via the private markets with no problem. Hardie, (2012) relaxed the confusing variations regarding the public sector borrowing capacity. His findings are that the huge disparity in governmental borrowing capacity amongst the emerging economies is accounted for by the extent of financialisation, and the degree of internationalisation, as well as liberalisation.

Nevertheless, regarding the importance of finance in promoting economic growth, economists do not all seem to come to consensus. Robinson, (1952), argued from the demand-following hypothesis that economic growth creates a demand for various types of financial services to which the financial system responds. He even questioned the significance of finance in the growth process and believes that financial development rather occurs as a result of economic development. Furthermore, there are serious doubts about the sustainability of the financialisation process, with the last two decades having witnessed rapidly rising household debt-income ratios and corporate debt-equity ratios across industries (Palley, 2007). These developments explain both the patterns of business growth and increasing fragility, a clear indication of long-run unsustainability. The risk from extreme financialisation of an economy will therefore be vulnerability to debt-deflation and

protracted economic downturn. Empirical investigations of the link between stock markets and economic growth in the developing economies are still very few in number. Tharavanji, (2007) observed that countries with advanced capital markets face less severe business cycle crisis and hence lower chances of economic downturn. In terms of causality, Gursoy and Muslumov, (1998), Luintel and Khan (1999) and Hondroyiannis et al., (2005) found a two way causal relationship between stock market development and economic growth.

Many studies have adopted the growth regression framework to investigate the finance-growth relationship, namely, Ologunla, (2008) King and Levine, (1993), Atje and Jovanovic, (1993), Levine and Zervos, (1996), Harris, (1997), Levine and Zervos, (1998), and Levine, Loayza and Beck, (2000). In 2008, Ologunla further stated that many techniques were utilised in an attempt to deal with these issues, including: (a) using only initial values of financial variables, (b) using instrumental variables, and (c) examining cross-industry variations in growth. He further argued while citing Carroll and Weil, (1994); Hess and Porter, (1993); Aigbokan, (1995); Odusola and Akinlo, (1995); Jin and Yu, (1995); and Darrat and Lopez, (1989) that Granger causality tests have been widely used in studies of financial markets as well as in several studies of the determinants of economic growth. However, very few if any have used the VAR or VECM methodology to analyse and evaluate the relationship between the financial market growth, financialisation, and growth. Luintel and Khan, (1999) studied 10 developing economies and found two- way causality regarding financial development and economic growth in all the sampled countries.

In South Africa, studies have shown that the Johannesburg Securities Exchange (JSE) has grown at almost double the rate of economic growth, (Isaacs 2014). So far, limited empirical literature exists in the South African context regarding financial market growth, financialisation and economic growth.

There exists extensive theoretical work on the relationship between financial development and economic growth. Levine and Zervos, (1996), following on from Schumpeter (1911), summarise the basic theoretical framework of the finance-growth nexus as follows: financial markets purely exist due to market friction to facilitate effective resource allocation and risk management; thereby affecting growth through its two main channels, namely capital accumulation and technological innovation. Earlier on, in the same vein, McKinnon, (1973) and Shaw, (1973)

developed growth models where economic development was said to have been accelerated by financial liberalisation and development. McKinnon, (1973) also suggested that access to a larger pool of savings mobilised by the financial intermediaries facilitates large projects that would have been impossible to finance without financial liberalisation. The above debate makes it clear that the issue cannot be settled satisfactorily without further empirical work. The obvious methodologies that are likely to give new insight would be those based on causality analysis.

1.1 Problem Statement

It is theoretically accepted that developed and well-regulated financial markets provide an attractive investment destination both locally and internationally hence spur economic growth in which they exist. However, in South Africa the economic growth rate has been slowing down in recent years whereas the financial market has been growing fast during the same period under study. This may suggest that development of the financial market as one aspect financialisation process transforms the operation of the economic system, and may involve undesirable seeds that are negatively impacting the South African economy at both large and small- scale levels. The main undesirable effects of financialisation evident in the South African Economy include: serious indebtedness of some members of society; the elevated significance of the financial sector compared to the real sector; shift of income from the real sector to the financial sector as the financial sector makes more profit than the real sector; and reduced economic equity in terms of income inequality and contribution to wage stagnation as the economy guards against ruinous wage inflation. In addition, if the situation remains unattended, the South African economy is likely experience prolonged stagnation or recession or debt-deflation risk.

However, very little empirical evidence involving rigorous statistical modeling exists at the global level and none at the local level. This study will be the first South African study to investigate the tripartite relationship between financial market development, financialisation and economic growth.

1.2 Objectives

The main aim of the research study is to identify, analyse and evaluate the relationship between financial market development, financialisation, and economic

growth in South Africa, while paying attention to the inherent seeds that might lead to undesirable impacts in the economy owing to the interaction of the financial and real sectors of the economy. In a nutshell, the objectives of this study are:

- To model the interrelationships among financial market growth, financialisation and economic growth using South Africa as a case study
- To provide results whereby financial market growth explain economic growth in South Africa.
- To measure the effect of financialisation as implied by financial market growth over time on economic growth.
- To determine the long- run relationship between financialisation, financial market development and economic growth involving the long- run adjustments arising from disequilibria.
- To assess the short- run adjustment of the various variables to a possible long-run cointegrating relationship.

1.3 Intended Contribution to the Body of Knowledge

While many researchers have looked at the relationship between financial sector developments and economic growth in terms of direction of causality in general, none of the literature has considered the impact of financialisation on financial markets and economic growth. Nobel Laureate Stiglitz and other leading academics like Epstein (2005) have criticised financialisation for wreaking havoc on emerging market and developed economies, using conceptual arguments while selectively pointing to broad trends in financial and economic variables without subjecting them to rigorous statistical scrutiny. In the international literature in general there is a scarcity of empirical literature that confirms the negative impact of financialisation on economic growth, and destabilisation of financial systems. This study will attempt to model the interrelationships between financial market growth, financialisation and economic growth using South African data. However, the study will have relevance to all emerging markets in terms of designing effective policies if indeed financialisation is destabilising to both the economy and financial markets. Hence this research study will be contributing to this knowledge gap.

1.4 Dissertation outline

This research study is made up of six chapters. The first chapter provides an overview of the whole dissertation. Chapter two looks at the theoretical background surrounding the relationship between financial market development, financialisation and economic growth. Chapter three further looks at the empirical literature aspects of the reviewed theories from chapter two together with different methods that have been used to undertake some of the empirical work. Chapter four focuses on providing an outline of the methodologies, model specification, and research strategies as well as empirical techniques that will be adopted in the following chapter 5. The methodology and model specification outline in chapter four will be limited and dovetailed to match the research objectives of the dissertation. In chapter five, the thrust is to conduct an empirical analysis of the effect of financial market development and financialisation on economic growth in South Africa, with a view to unearthing the likely effects on the economy. In chapter five also, there is presentation of research findings subsequent to the estimation of the models, as well as data analysis. Chapter six gives a synoptic presentation of the research findings coupled with policy recommendations as well as challenges and suggestions for future researches.

CHAPTER 2
THEORETICAL LITERATURE REVIEW

2.0 Introduction

This chapter looks at the theoretical background surrounding the relationship between financial market development, financialisation and economic growth. Section 2.1 provides the traditional perspectives surrounding the relationship between the financial sector development, financialisation and economic growth. Sections 2.2, 2.3, 2.4, and 2.5 outline the Solow Growth Model, key assumptions of the Solow model, Schumpeter's Supply- leading hypothesis, and Demand-following hypothesis by Robinson, (1952) respectively. Subsequent to this, the definitions and explanations of financialisation and financial markets together with the main instruments traded in financial markets are provided. The main institutions active in the financial markets are also highlighted alongside with the roles of financial markets. The roles of financial markets include: facilitating risk amelioration; acquisition of information about investments and allocation of resources; monitoring managers and exerting corporate control; mobilising savings; and facilitating exchange of goods and services. The theoretical background of global financial crises will be explained in terms of the Marxist political economy's fundamental approach; the post-Keynesian analysis of financialisation; as well as other unorthodox and sociological views of financialisation. The South African experiences in the financial sector are also discussed starting from the neoliberal central bank; financialisation; the transformation of the South African Reserve Bank (SARB) as well as its promotion of financial interests to the growth of the financial sector; and the speculative investment behaviour of various economic participants.

2.1 Traditional perspectives

This study will adopt the traditional model as a basis into which the determinants of economic growth will be expanded to include variables of financial market growth and financialisation. One of such traditional endogenous models of production in the economy is the Cobb-Douglas production function. This model incorporates labour, capital, and physical output as variables in the model to examine the relationship of output and the inputs (labour and capital) used. This however is a very simplified representation of the economy since other factors or inputs can be considered to be

impacting on the economic performance and the model still remains remarkably stable. Generally the form of a Cobb-Douglas production function is given as:

$$Y = AL^{\alpha}K^{\delta} \quad 2.1$$

where the letter Y stands for total production, L stands for labour input, K stands for capital and A stands for the level of technology. To estimate such a model using the ordinary least squares (OLS) one has to take the natural logarithms of both sides of equation 2.1 above. So the equation will look as follows:

$$lnY = \ln(AL^{\alpha}K^{\delta})$$

$$lnY = \ln(A)+\ln(L^{\alpha})+\ln(K^{\delta})$$

$$lnY = \ln(A) + \alpha\ln(\mathrm{L}) + \delta\ln(\mathrm{K})$$

It follows that the regression model to be tested using the OLS will be stated as follows.

$$lnY_t = \ln A + \alpha \ln L_t + \delta\ln K_t + \varepsilon_t$$

2.2 The Solow Growth Model

Like the majority of economic growth analyses, this study also makes use of the Solow Growth Model (SGM) as a starting base and point of reference. Apparently, although some of the models differ in terms of the main principles from the Solow growth model, such models are best comprehended when they are compared to the Solow economic growth model. It follows that understanding of the Solow economic growth model is vital for one to comprehend the theories of economic growth. Principally, the Solow economic growth model concludes that the amassing of physical capital does not provide an explanation for the immense economic growth as time passes in terms of output per head and the enormous geographic variances in respect of output per head. To be more specific, if accumulation of capital impacts on the real output via the traditional channel which postulates that capital makes a direct input to the production process, as it is paid by the marginal product, it follows that the economic growth model by Solow implies the differences in real incomes are far too huge to be explained by capital contribution alone. Thus according to the Solow model the differences in real output can be explained by exogenous factors. If the assumption of a constant saving rate by the Solow model is relaxed, three advantages can be cited. To start with the ostensibly important in studying economic growth, it reveals that the Solow economic growth model conclusions regarding the inner queries of the economic growth hypothesis do not rely on the model's

assumptions of a constant rate of saving. The second aspect of Solow economic growth model is that it gives the provision for considering the welfare issues through the building of the endless horizon as well as the overlapping-generations models based on the behaviour of individuals hence one can analyse the welfare issues in terms of being better or worse off. The third advantage is that the infinite-horizon as well as the overlapping-generations models can be used as important instruments in the analysis rather than economic growth alone. Thus, the major concluding remark of the analysis is that endogenous technological progress is central to economic growth across the globe in spite of the differences in real income.

2.3 Key assumptions of the Solow model

The Solow economic growth model is centered on four variables which are output (*Y*), capital (*K*), labour (*L*), and "knowledge" or the "effectiveness of labour" (*A*). So it follows that at any given moment, every economy has some quantities of the four variables such as capital, labour, and knowledge, which tend to be combined to give the real output. The production function known as the Cobb-Douglas production function is represented in the form $Y_{(t)} = F\ (K_{(t)},A_{(t)}\ L_{(t)})$, in which the italicised *t* stands for time. A point to note is that the time aspect only enters the production function through K, A and L, thus it does not enter into production directly. This implies that the output variable only changes with the passage of time as the inputs into the production process change over time. Particularly, the total production got from a certain measure of capital and labour increases with time; it implies there is technological advancement as the variable A increases representing a rise in the knowledge level. It is also important to note that the amount of A and L impact on production through multiplication of AL, which is also known as effective labour or labour-augmenting or Harrod Neutral. Together with the other assumptions of the model specifying how *A* enters the production function in this manner will imply that the ratio of capital to output, *K*/*Y*, eventually settles down. Thus, practically, the capital-output ratios do not show any clear upward or downward trend over prolonged period of time. Furthermore, constructing the model such that the ratio is eventually constant makes the analysis much easier, and also where *A* multiplies, *L* becomes very expedient.

Assumptions pertaining to the Solow growth model encompass the features of the Cobb-Douglas production function as well as the conclusion emanating from the inputs such as capital, labour, and knowledge into production over time. The Solow growth model has an important assumption regarding the production function which states that there are constant returns to scale in terms of capital as well as effective labour. Put differently, if capital and effective labour quantities are doubled while A is held constant it will lead to a double output. If both factors in the production function are multiplied by a non-negative constant such as letter ¢ it results in the output changing in the same factor ¢, as illustrated by the following equation: $F(¢K, ¢AL) = ¢F(K,AL)$ for all $¢ \geq 0$.

This implies that two separate assumptions can be thought of as having been combined in one assumption of the so- called constant returns to scale. While the first assumption entails that the economy in question is large enough such that the gains from specialisation are believed to have been exhausted, however in a small economy there is a possibility that more specialisation can result in a situation where doubling labour and capital results in more than double the level of output. The Solow model assumes, however, that the economy is sufficiently large that, if capital and labour double, the new inputs are used in essentially the same way as the existing inputs, and so output doubles.

Economists agree that there is a causal relationship between economic growth and finance, however the direction of causality has not been agreed on and has remained a controversial issue. The debate has been basically centred on whether it is financial development that leads to economic growth or it is the other way round. This among other factors has led to the development of three main theories to explain the causal relationship between finance and growth. These are: the 'supply-led growth' which is the finance-led growth; the 'growth-led finance', also-called the demand-following hypothesis; and the 'feedback hypothesis'. In this regard, many studies have been conducted with a view to having a better understanding of the causal relationship between finance and economic growth in enhancing the economy of the country. This study will focus on defining, analysing and evaluating the impact of financial market growth and financialisation on economic growth.

This dissertation also makes use of the traditional Cobb-Douglas endogenous growth model to study the long run relationship between economic growth and financial development and financialisation:

$$GDP_t = AL^{\beta_1}K^{\beta_2}FIN^{\beta_3}u^{e_t}$$

The above equation, suggests that real output is a function of labour (L), capital (K) and a proxy for financial development (FIN). Financial development will be represented by market capitalisation, real stock market growth, and growth in M3 where A in the model above is the value of the constant representing the level of technology in the economy.

In addition, in order to determine whether financialisation has an impact on economic growth, the model above is expanded and will appear as follows:

$$GDP_t = AL^{\beta_1}K^{\beta_2}FIN^{\beta_3}FZ^{\beta_4}u^{e_t}$$

Thus, the new model which is an extension of the first model, includes the additional variable (FZ) to represent financialisation and to be proxied by variables such us household credit growth, household debt, and net foreign purchases of stocks and bonds. Capital and labour will serve as control variables in this study. This makes the current research work different from the traditional endogenous models and other models.

Kumar, (2014:35) also adopted an endogenous model in which: GDP = f(FD,RR). Where GDP is the Gross Domestic Product at factor cost, FD is the level of Financial Development, and RR is the Real Interest Rate.

2.4 Schumpeter's Supply-leading hypothesis

The chief proponents for the 'finance-led growth hypothesis' are Schumpeter, (1911) and Levine, (1997). The 'finance-led growth' hypothesis states that 'supply-leading' is the relationship between financial development and economic growth. According to this theory, the existence of a well-functioning financial sector including financial markets and financial intermediaries in channelling the limited resources from economic units with surplus resources to economic units with deficit, would enhance the efficient allocation of resources, thereby leading to a better performance in other sectors of the economy in their growth process. Thus a number of arguments have been put forward in support of the view that developments in the financial sector contributes to economic growth.

Patrick, (1966) supported the same line of thought, suggesting that a well-established and functioning financial sector encourages technological advancement and innovation through recognising and financially supporting those programmes and projects that have potential for success and provide the maximum benefits to the public. Accordingly, development in the financial sector is believed to be exogenous and the causality runs from financial development to economic growth. Shaw, (1973), McKinnon, (1973), and Fry, (1995) support the same hypothesis.

2.5 Demand-following hypothesis, Robinson (1952)

On the other hand, the growth-led finance hypothesis postulates the opposite of the supply-leading hypothesis. It states that high economic growth may create increased demand for certain financial instruments and arrangements and hence the financial markets are in effect a response to the increased demand in financial instruments. Put differently, the demand-following hypothesis suggests a 'demand-following' kind of relationship between finance and economic growth. Thus this hypothesis suggests that performance the real sector of the economy influences the financial sector development. The main proponents of the demand-following hypothesis are Robinson, (1952) and Romer, (1990).

Lastly, the third theory which is linked to both the demand-following hypothesis and supply-leading hypothesis is called the 'feedback' hypothesis which is supported by the works of Luintel and Khan, (1999). This hypothesis suggests a two-way causal relationship in terms of the performance in economic growth and financial sector development. According to this hypothesis a well-developed financial system promotes economic growth through technological advancement as well as product and services innovations, (Schumpeter, 1912). In turn, this will create high demand for financial instruments, financial arrangements and services (Levine, 1997). Whereas the financial sector, that is, the financial markets and the banking institutions, respond to these demands, it follows that these responses and arrangements tend to stimulate expansion in national output.

2.6 Definitions and explanation of Financialisation and Financial markets

According to Orlik, (2014:109), the economic literature of the past two decades invented the concept financialisation after the failure of the Bretton Woods financial

system. Many different definitions have been used to explain the concept of financialisation. It has been described as a pattern of accumulation in which profit-making occurs increasingly through the financial channels instead of through trade and real production, (Krippner, 2005). According to Epstein (2005:4), financialisation can be defined as the expansion of the financial motives, financial markets, financial players and institutions, in the functioning of local and international economies. This definition encompasses different views of many writers according to Krippner, (2004:14) where some writers use the term 'financialisation' to mean the ascendancy of 'shareholder value' as a mode of corporate governance, some use it to refer to the growing dominance of capital market financial systems over bank-based financial systems, and others use it to refer to the increasing political and economic power of a particular class grouping: the rentier class. For some, financialisation represents the explosion of financial trading with a myriad of new financial instruments, but for Krippner herself, the term refers to a 'pattern of accumulation in which profit-making occurs increasingly through financial channels rather than through trade and commodity production. Thus Levy-Orlik, (2014:109) notes that different authors, including Arrighi, (1987), Orghanzi, (2008), Boyer, (1990), Krippner, (2005), Magdoff and Sweezy, (1987) and Stockhammer, (2012) have different notions of the same concept of financialisation, reflecting a lack of cohesion.

Regarding financial markets, Cecchetti, (2011) gives an extensive analysis, defining them as resembling typical microeconomic markets where there is the facilitating of selling and buying of financial instruments or securities such as stocks and bonds. The four financial markets identified are the bond market, the money marke, the stock market, and the derivatives market.

In the bond market, a bond refers to a long-term financial instrument that promises that the issuer will pay the holder interest and will repay the capital over a certain period of time. On any bond contract there are three important things that feature. These are: the principal (also called the face value or par value or nominal value of the bond); the coupon rate, which is the interest rate that the borrower promises to pay to the bond holder at the expiry date of the bond; and the maturity date, that is the date at which the bond will expire.

The money market can be broadly defined as the market for the issue and trading of short-term retail and wholesale securities. Thus a money market is a situation where individuals from the household, government and business community are in need of short-term funds from other individuals with surplus funds. As money became a commodity, the money market became a component of the financial markets for assets involved in short-term borrowing, lending, buying and selling with original maturities of one year or less. Trading in the money markets is done over the counter and is wholesale. Various instruments like treasury bills, commercial paper, bankers' acceptances, deposits, certificates of deposit, bills of exchange, repurchase agreements, federal funds, and short-lived mortgage- and asset-backed securities exist. The money provides liquidity funding for the global financial system.

Furthermore, the stock market, or common stock, or equities market refers to trade of financial instruments whose time to maturity is more than a year, which is described as long-term. The stock market is one of the most important sources for companies to raise money. This allows businesses to be publicly traded, or raise additional financial capital for expansion by selling shares of ownership of the company in a public market. The liquidity that an exchange affords the investors gives them the ability to quickly and easily sell securities. This is an attractive feature of investing in stocks, compared to other less liquid investments such as real estate. Some companies actively increase liquidity by trading in their own shares. According to Cecchetti (2011) history has shown that the price of shares and other assets is an important part of the dynamics of economic activity, and can influence or be an indicator of social mood. An economy where the stock market is on the rise is considered to be an up-and-coming economy. In fact, the stock market is often considered the primary indicator of a country's economic strength and development. Rising share prices, for instance, tend to be associated with increased business investment and vice versa. Share prices also affect the wealth of households and their consumption. Therefore, central banks tend to keep an eye on the control and behaviour of the stock market and, in general, on the smooth operation of financial system functions. This shows that growth in the financial sector leads to economic growth, so this is in line with the Schumpeterian hypothesis.

Exchanges also act as the clearinghouse for each transaction, meaning that they collect and deliver the shares, and guarantee payment to the seller of a security. This eliminates the risk to an individual buyer or seller that the counterparty could default on the transaction.

The last function of financial markets can be described within the context of derivatives; these are financial instruments whose value depend on or are derived from the value of another financial instrument called an underlying asset. Derivatives can be used for speculative purposes or to gamble on future price changes. This is because derivatives are important in that they allow investors to manage and reduce risk in the modern financial markets. Derivatives provide insurance in the financial markets. By shifting the risk to those who are willing and able to bear it, the derivatives increase the risk- carrying capacity of the economy as a whole, (Cecchetti 2011:248)

Derivatives can be grouped into three broad categories as follows: forwards and futures, options and swaps. A forward contract is an agreement between a buyer and a seller to exchange a commodity or financial instrument for a specified amount of cash on a prearranged future date. A futures contract refers to a forward contract that has been standardised and sold through an organised exchange. A futures contract specifies that the seller (with a short position) will deliver the financial instrument to the buyer (with a long position) on a specific date called the settlement date, for a predetermined price.

Options are similar to futures in that they are agreements between two parties. The seller is called the option writer while the buyer is called the option holder. Option writers incur obligations while option holders obtain rights. There are two basic options, which are calls and puts. A call option is the right to buy a given quantity of an underlying asset at a predetermined price (strike price) on or before a specific date. When the price of the underlying asset, which can be a stock, is higher than the strike price of the call option, exercising the option is profitable and is said to be in the money. If the stock price is exactly equal to the strike price then the option is said to be at the money. Where the strike price happens to be above the price of the underlying asset it is said to be out of the money. A put option gives the right but not the obligation to the holder to sell the underlying asset at a predetermined price on or

before a fixed date. The holder can put the asset in the hands of the option writer. Since the buyer of a put obtains the right to sell a stock the put is in the money when the price of the option is above the price of the underlying asset and out of the money when the reverse is true, (Cecchetti 2011:256).

Swaps are contracts that allow traders to transfer risks like other derivatives. Two types of swaps can be provided as follows: the interest-rate swaps, which allow one swap party to alter the stream of payments it makes or receives; and the credit-default swap which is a form of insurance that allows a buyer to own a bond or mortgage without bearing its default risk, (Cecchetti, 2011:263).

2.7 The main instruments traded in financial markets

A synopsis of commonly used money market instruments can be listed as follows:

- Certificate of deposit, which is a time deposit, commonly offered to consumers by banks, thrift institutions, and credit unions.
- Repurchase agreements, which are in the form of short-term loans, normally for less than two weeks and frequently for one day, arranged by selling securities to an investor with an agreement to repurchase them at a fixed price on a fixed date.
- Commercial papers another form of money market instrument which is unsecured promissory notes with a fixed maturity of one to 270 days and usually sold at a discount from face value.
- Eurodollar deposit consists of deposits made in the U.S. dollars at a bank or bank branch located outside the United States.
- Federal agency short-term securities also in the U.S. refer to short-term securities issued by government- sponsored enterprises such as the Farm Credit System, the Federal Home Loan Banks and the Federal National Mortgage Association.
- Federal funds in the U.S. are the interest-bearing deposits held by banks and other depository institutions at the Federal Reserve; these are immediately available funds that institutions borrow or lend, usually on an overnight basis. They are lent for the federal funds rate.
- Municipal notes, which, in the U.S. refer to short-term notes issued by municipalities in anticipation of tax receipts or other revenues.

- Treasury bills, which take the form of short-term debt obligations of a national government, are issued to mature in three to twelve months.
- Money funds, which are composed of pooled short maturity, high quality investments which buy money market securities on behalf of retail or institutional investors.
- Foreign Exchange Swaps refer to exchanging a set of currencies on spot date and the reversal of the exchange of currencies at a predetermined time in the future.
- Short-lived mortgage and asset-backed securities.

In the South African context, the financial instruments trading in the above discussed markets can be classified into different categories according to the nature of the instruments and the market. The financial markets together with the respective main instruments are split into the following categories: the equity market which is a market where the shares of companies and related instruments such as equity derivatives are traded publicly. The Johannesburg Securities Exchange (JSE) is a formalised exchange in SA where shares that are listed on this exchange are traded. A company must apply to list, and is subject to certain listing qualifying criteria which must be met prior to its listing.

In the money market, there are short-term loans and investments in short-term debt instruments. These instruments do not trade through an exchange, but rather over-the-counter (OTC). The bond market involves the long-term loans. The Bond Exchange of SA (BESA) is the exchange through which the instruments (called bonds) trade. Lastly, in the derivative market, a derivative instrument traded on a derivatives market derives its value from an underlying instrument. This market gives the investor the opportunity to hedge against the risk of dramatic price fluctuations. Numerous instruments known as derivatives trade in this market on an OTC basis, except for futures and options which trade on the South African Futures Exchange (SAFEX). In addition, there is also the foreign exchange market where foreign currencies can be bought and sold through this market; in South Africa it is regulated by the SA Reserve Bank which acts in a supervisory capacity. No formalised exchange exists and currencies are traded on an OTC basis directly between authorised dealers.

2.8 The main institutions active in the financial markets

Generally the financial institutions can be classified into the four following categories: brokers; dealers; investment bankers; financial intermediaries. To start with, a broker is a commissioned agent of a buyer (or seller) who facilitates trade by locating a seller (or buyer) to complete the desired transaction. A broker does not take a position in the assets he or she trades, that is, the broker does not maintain inventories in these assets. The profits of brokers depend on the commissions they charge to the users of their services, (either buyers, sellers, or both). Examples of brokers include real estate brokers and stock brokers. Secondly, like brokers, dealers facilitate trade by matching buyers with sellers of assets; they do not engage in asset transformation. Unlike brokers, dealers do take positions i.e. they maintain inventories in the assets they trade which permits the dealer to sell out of inventory rather than always having to locate sellers to match every offer to buy. Also, unlike brokers, dealers do not receive sales commissions. Instead, dealers make profits by buying assets at relatively low prices and reselling them at relatively high prices (buy low - sell high). The price at which a dealer offers to sell an asset (the asked price) minus the price at which a dealer offers to buy an asset (the bid price) is called the bid-ask spread and represents the dealer's profit margin on the asset exchange. Real-world examples of dealers include car dealers, dealers in government bonds, and stock dealers. A third participant in the financial market are investment banks. An investment bank helps in the initial sale of newly issued securities, for example, Initial Public Offerings (IPOs) by engaging in a number of different activities, which include: advising corporations on whether they should issue bonds or stock, and, for bond issues, on the particular types of payment schedules these securities should offer; underwriting, thus guaranteeing corporations a price on the securities they offer, either individually or by having several different investment banks form a syndicate to underwrite the issue jointly; and assisting in the sale of these securities to the public. Some of the well-known investment banking firms include Morgan Stanley, Merrill Lynch, Salomon Brothers, First Boston Corporation, and Goldman Sachs.

2.9 Financial markets and their role

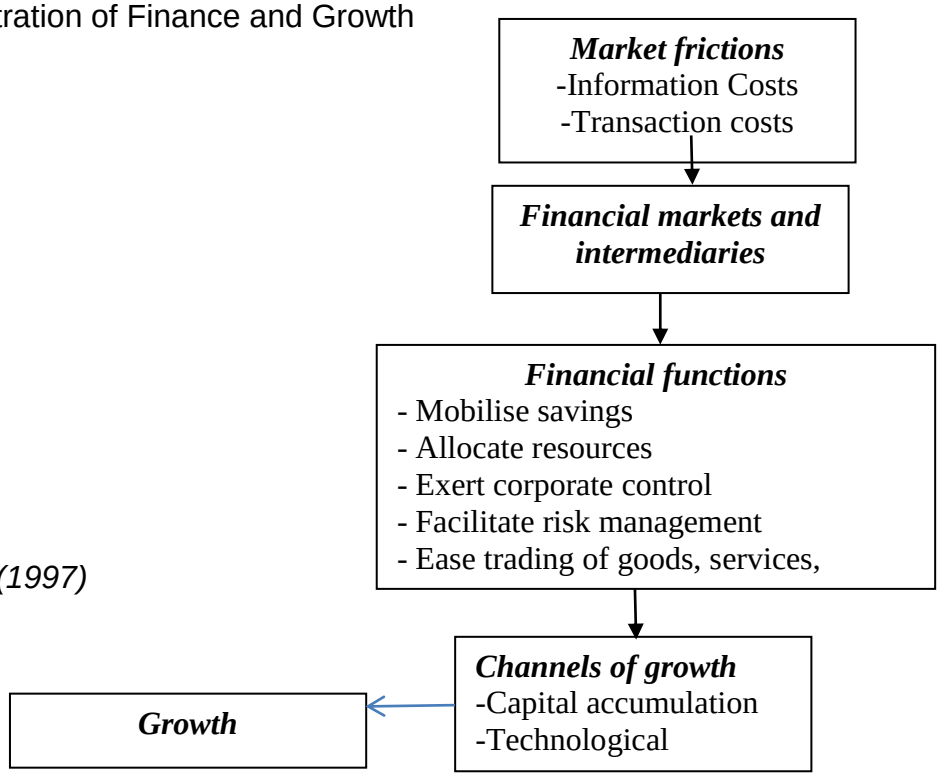
The five functions to be examined in this section are: facilitating risk amelioration; acquiring information about investments and allocating resources; monitoring

managers and exerting corporate control; mobilising savings; facilitating exchange. According to Merton and Bodie, (1995:12), the financial markets and institutions serve the function of ameliorating some problems associated with frictions in terms of information and transactions. Thus the combined type of information and transaction costs determines the nature of the different financial contracts, institutions and markets. In the same vein, the main function of financial markets is to assist in the allotment of resources, across space and time, in an uncertain environment. This main function can be broken down into five basic functions according Levin and Ross, (1997), as indicated on the opening statement of this section.

These five functions of the financial system were examined in terms of how they affect economic growth through two channels, capital accumulation and technological innovation. Regarding capital accumulation, a set of growth models draws on either capital externalities or capital goods produced using constant returns to scale but without the use of non-reproducible factors to generate steady-state per capita growth (Romer, 1986; Lucas, 1988; Rebelo, 1991).

In such models, the financial system serves the function of promoting steady growth by influencing the rate of capital formation. As the financial system alters and redistributes the savings and the savings rate amongst diverse capital- producing technologies, the financial system influences capital accumulation. The second set of growth models, technological innovation, focuses on the invention of new production processes and goods (Romer, 1990). In these models, the financial system, as it performs its functions, influences the stability of economic growth by changing the technological innovation.

2.9.0 Theoretical illustration of Finance and Growth



Adapted from Levin (1997)

2.9.1 Facilitating Risk Amelioration

Where there are specific information and transaction costs in the economy, the financial markets and institutions come in to facilitate commercial activities such as trading, hedging, and pooling of risk. The two types of risks identified in this case are liquidity risk and idiosyncratic risk. Liquidity risk is when a company or bank becomes unable to pay up short-term financial demands, usually because it cannot change a security or any other asset to cash without loss of capital or income in the process. Idiosyncratic risk is the kind of risk that is unsystematic or uncorrelated with the overall market risk. Hence it is a kind of risk that is specific to the firm.

Normally, real estate tends to be less liquid than equities; hence equities in the developed countries such as the United States tend to be more liquid when compared to those traded in developing countries such as South Africa (the Johannesburg Stock Exchange). Uncertainties associated with turning assets into cash leads to liquidity risk. For instance, information asymmetries and transaction costs are likely to restrain liquidity and build up liquidity risk. Such uncertainties give rise to the creation of financial markets and institutions that enhance liquidity. Therefore, liquid capital markets are markets where it is comparatively cheap and ease to exchange financial instruments because market uncertainties about timing in

those markets are reduced. The significance of liquid capital markets in economic development arises because some high- performing projects need some kind of long-term dedication of capital, however, some economic agents with excess cash to save may not be prepared to lose control of their savings for a prolonged time. It implies that if the financial markets do not support the liquidity of long-term investments there will be little or no investment in high -performing projects in the long-term. This complements the proposition by Hicks, (1969:143–45) that capital market enhancement lessens liquidity risk hence leading to England's industrial revolution. The products manufactured during the industrial revolution in England were invented much earlier, implying that technological innovation did not spur persistent growth then. It follows that much of the earlier and existing inventions needed huge long-term committed injections of capital. Capital market liquidity was very critical in starting and spurring economic growth in England during the eighteenth century industrial revolution, (Hicks, 1969).

Where capital markets are liquid, savers can hold assets such as stocks, bonds and deposits because they can convert them quickly and easily access their savings. At the same time, capital markets change these liquid financial instruments in capital to long-term liquid investments in production activities. Due to the fact that the Industrial Revolution required long-term large capital commitments it means that the industrial revolution could not have taken place without financial market transformation in terms of liquidity. Hence the industrial revolution had to wait for the financial revolution (Bencivenga, et al., 1986:243).

Some researchers have suggested that financial markets emerge in response to liquidity risk and have even studied how the former affect economic growth. For example, a fraction of savers get some shocks after making choice from the two forms of investment project; the first one tends to be high- performing and illiquid, and the second one tends to be liquid with low performance (Diamond and Dybvig,1983). The investment projects experiencing shocks would want to get back their savings before the projects start producing. This motivates investment in low performing projects which are liquid.

Players in the market do not care to check if market players also experience shocks or not. Where stock markets are liquid, the stock holders can dispose their equities

with ease while businesses can access their capital invested permanently. Thus equity markets eliminate some liquidity risk. More investment happens in the illiquid, high-performing projects as the transaction costs decline. When illiquid investment projects receive huge inflows it follows that greater stock market liquidity stimulates quick and stable economic growth. The existence of equity markets has been motivated by the need to know the information costs on whether savers experienced shocks or not, while trading cost reflects the role liquidity plays.

As banks avail demand deposits and select a suitable combination of liquid and illiquid investments, full insurance is provided to savers to curb liquidity risk and at the same time promote investment in long-term investment. When the banks remove liquidity risk, they have the potential to boost investment in high-performing projects and illiquid asset while speeding up economic growth (Bencivenga and Smith 1991). According to Jacklin (1987), the problem that arises when banks reduce liquidity risk is that the banking system may not have well-matched incentives where agents can trade in liquid equity markets; if equity markets exist, all agents will use equities, none will use banks. It follows that banks may only come in to grant liquidity when there are huge barriers to trading in securities markets (Gorton and Pennacchi, 1990).

Apart from lowering liquidity risk, financial systems also lessen the risks specific to individual projects, businesses, industries, areas, countries, and other institutions. Financial institutions such as banks, mutual funds, and equities markets offer mediums for pooling, diversifying risk, and trading. Thus, the ability of the financial system to offer diversified risk services can stimulate long-term growth by redistributing the saving rates.

2.9.2 Acquiring Information about Investments and Allocating Resources

Without developed financial markets, savers may not be able, to collect and understand information on economic conditions, or businesses or managers of businesses. This is because it tends to be difficult and costly to evaluate businesses and managers concerned in the market. Moreover, savers tend to be unwilling to invest in activities where there is little or no trustworthy information, (Carosso, 1970). Subsequently, an increased cost of information is likely to hold back the flow of capital and its maximum utilisation. Assuming the presence of fixed cost of getting

information on production technology, this can cause incentives for financial intermediaries to surface, without which each investor has to pay fixed cost, (Diamond, 1984) Boyd and Prescott, 1986). However, individuals may form groups in using financial intermediaries to economise on the costs of acquiring and processing information about investments, in response to this information cost structure. The intermediary acquires evaluation skills and then conducts evaluations on behalf of individual member. Because many businesses will seek capital, financial intermediaries together with financial markets are better at selecting the most promising companies and managers to encourage efficient capital allocation and quicker economic growth, Greenwood and Jovanovic (1990).

Financial intermediaries may also identify the best production technologies and advance the rate of technological innovation by identifying those entrepreneurs with the best chances of successfully initiating new goods and production processes (King and Levine 1993). Stock markets may become larger, more liquid and influential in the acquisition and dissemination of information about firms, (Grossman and Stiglitz 1980) (Kyle, 1984; Holmstrom and Tirole, 1993). Furthermore market players may have greater incentives to acquire information about the businesses.

2.9.3 Monitoring Managers and Exerting Corporate Control

Above and beyond reducing the costs of getting information before, financial system may arise to alleviate the information acquisition and enforcement costs of monitoring firm managers and exerting corporate control after financing the project. Thus companies will create financial arrangements that require firm managers to manage the business in the best interests of the shareholders. Moreover, all other creditors who do not manage the company on a day-to-day basis will create financial arrangements to force inside owners and managers to run businesses in agreement with the expectations of external creditors. Where there are no such financial arrangements that promote corporate control it may hamper the mobilisation of savings from other potential creditors which hinders the flow of capital to high-performing investment projects (Stiglitz and Weiss, 1983). Checking and monitoring all circumstances on the returns of an investment project can be costly and socially inefficient for an outsider investor, where insider investors have incentives to misrepresent project returns, (Townsend 1979; Gale and Hellwig 1985). A certain

equilibrium interest rate has to be paid by insiders to outsiders when the project returns are doing well so that the outsiders do not need to monitor the firm. If the investment project is not doing well and the insider investors want capital from outsiders, there is a tendency to default by the borrower whereas the lenders have to pay the monitoring costs to confirm the performance of the project. Investment decisions and economic efficiency is slowed down by these verification costs. The implication is that external creditors hold back businesses from lending to enlarge investment because of greater default risk and higher verification costs by outsider lenders (Williamson 1987b; Bernanke and Gertler 1989, 1990; v/n Thadden 1995).

Furthermore, if borrowers have to acquire finances from scores of external lenders, financial institutions can save on monitoring expenditures. This is because the financial intermediary can mobilise the savings from several members and extend these resources to project owners in the form of loans. Diamond (1984) calls it the "delegated monitor" since the intermediaries are able to monitor the borrowing behaviour of project owners, something that cannot be done by individual savers.

In addition, the financial system also facilitates corporate control, which makes efficient separation of ownership from management of the company possible. This in turn also makes efficient specialisation in production according to the principle of comparative advantage possible (Merton and Bodie 1995:14). However, Krasa and Villamil (1992) highlight that the delegated monitor arrangement raises the question of who will monitor the monitor. However, well-diversified financial intermediaries can promote efficient investment by lowering monitoring costs. Also financial intermediaries and firms develop long-run relationships, leading to further the lowering of information acquisition costs. This in turn eases external funding constraints and facilitates better resource allocation as information asymmetries fall (Sharpe, 1990). Thus faster capital buildup and economic growth can be achieved by improving the allocation of capital (Bencivenga and Smith, 1993). Moreover, debt contracts, banks, and stock markets may also promote corporate control by investors, Jensen and Meckling (1976).

2.9.4 Mobilising Savings

Savings mobilisation is necessary to ensure the accumulation of capital from savers for different purposes of investment. The growth of financial markets involves access to numerous investors; many production processes will be restrained to economically inefficient scales (Sirri and Tufano,1995). On the other hand, mobilisation involves the creation of small denomination instruments which offer opportunities for families to have diversified portfolios, invest in efficient enterprises, and to increase liquidity assets. Otherwise each family would have to buy and sell businesses. Therefore, owing to risk diversification, liquidity, and the size of the viable businesses, savings mobilisation improves resource allocation (Sirri and Tufano 1995). Mobilising savings from many and various savers is expensive as it entails the need to overcome the transaction costs associated with collecting the savings of various individuals and overcoming the information asymmetry where the savers feel comfortable in giving up control of their savings. According to Carosso (1970), a large part of the history of investment banking in the United States of America is a description of the various complex means used by investment banks to increase their capital. Around the mid-1880s, some investment banks used their European connections to increase foreign capital investment in the United States. Other investment banks established close connections with the major banks and industries of the United States to mobilise capital, while others used advertisements in newspapers, pamphlets, and a large sales force that travelled through every state and territory selling securities to each home, (Levin, 1997). Therefore, the mobilisation of the resources involved a series of transaction costs. In addition, whoever assumes the responsibility of mobilising had to convince the savers of the soundness of the investments, therefore savers should feel comfortable to entrust their savings to a broker (Long 1991; and Lamoreaux, et al., 1994). In particular, mobilisation may involve several bilateral contracts between the units of production and capital expansion agents with surplus resources. To cut back on the information and transaction costs associated with the use of multiple bilateral contracts, the combination can also occur through intermediaries such as mentioned above, in which many investors entrust their riches to the intermediaries that invest in many of enterprises (Sirri and Tufano 1995:83). Effective financial systems in collecting savings from individuals can strongly impact on economic development. In addition to the direct effect of increased savings mobilisation in the accumulation of capital, a

better mobilisation of savings can improve the allocation of resources and promote technological innovation (Bagehot 1873:3-4).

2.9.5 Facilitating Exchange

The links between the objective of facilitating the transaction, specialisation, innovation and economic growth were basic tenets of Adam Smith in his book entitled 'The Wealth of Nations' (1776). With a greater degree of specialisation the workers are more likely to invent better machines or production processes. In his book, (Smith 1776:7) argued that the division of labour, and specialisation are the main determinants of productivity improvements. The fundamental issue has been whether the financial system can promote economic growth through specialisation or not. It is also argued that the reduction of transaction costs and technological innovation are evident in terms of the benefits of the money in the barter. Also, the costs of information may motivate the emergence of the money. The barter trade is costly as it requires traders to have coincidence of wants, and the goods traded must be of the same value, therefore money as the medium of exchange had to emerge in order to facilitate the exchange (King and Plosser 1986; and Williamson et al., 1994). However, the transaction and information costs may continue to fall through a variety of financial mechanisms, thereby enhancing the institutional development of specialisation and innovation through the same channels highlighted more than two centuries ago by Adam Smith. Modern theorists have sought to illuminate more precisely the links between trade, specialisation, and innovation (Greenwood and Smith 1997). Increased specialisation involves more operations and because each operation is expensive, the financial arrangements that reduce transaction costs will facilitate greater specialisation. It follows that the markets that promote the exchange uphold productivity. Furthermore, there may also be information about these productivity improvements to financial market development. In case of the existence of fixed costs associated with establishing markets, the higher per capita income would imply that these fixed costs form part of the per capita income. Therefore, economic development can lead to the development of financial markets, (Levin and Ross, 1997). This approach to linking the financial markets with specialisation seemingly is not yet formally completed, given Adam Smith's history of innovation. In addition, the model best defines "market" as a support system to the production processes which are more specialised. However, this does not explain the emergence of

financial instruments or institutions that reduce transaction costs and therefore produce an environment that encourages the technologies for the production of specific products. Of importance is the need to understand the links in terms of what incentives the economic environment creates for the financial arrangements that arise, and to work well or poorly, and the likely implications for the economic activity of the new financial set up.

2.10 Theoretical background of global financial crisis

This section attempts to explore the literature surrounding the problem statement laid out in the proposal for this dissertation i.e. that as financial market growth and financialisation processes transform the operation of the economic systems, they carry some undesirable seeds that are affecting the South African economy at both large- and small- scale levels. The main undesirable effects of financialisation evident in the South African Economy are: the serious indebtedness of some members of society; the elevated significance of the financial sector compared to the real sector; the shift of income from the real sector to the financial sector as the financial sector makes more profit than the real sector; and reduced economic equity in terms of income inequality and contribution to wage stagnation as the economy guards against ruinous wage inflation.

Many different explanations have been put forward to account for global financial crisis, as a concept. These approaches are called heterodox economics and most of them have been reliant on the conventional opinion of the political economics of Karl Marx. Characteristically these approaches stressed the significance of the accumulation of large volumes and decreasing rates of profit. Other schools of thought have emphasised the financialisation of the capitalist economies, pointing out the extraordinary responsibility of the financial sector in being the source of financial predicaments such the one which occurred during the 2007 to 2009 period. However the traditional approaches seem to be less convincing in explaining the existing financial crisis. This implies that the notion of financialisation is amongst a small number of pioneering thoughts to come out of the fundamental Marxist political economy. A significant implication is evident since the financialisation concept is associated with some features characteristic of financial crisis owing to the expansion of the financial sector. Furthermore, the notion of financialisation and

financial sector growth allows an in-depth understanding of the structural transformations in respect of capitalism in the economies together with its accompanying social implications. While the concept of financialisation is still fresh and can be developed even further, this research project makes use of the existing level of understanding of the concept, which nevertheless incorporates or involves financial sector development in the analysis of its impact on economic growth. The theoretical analysis of financialisation is situated within the context of Marxist political economy. As already indicated earlier in this research, financialisation involves a universal change in respect of a capitalism- based economy which has reached maturity and is composed of: a rising gap linking banks with non-financial institutions; transforming of the banks in the direction of intervening in the financial markets as well as extending credit to the public; and the growing involvement of the public within the sphere of financial sector equally in terms of debtors as well as creditors.

2.11 Marxist political economy's fundamental approach

Sweezy and Magdoff (1970), asserted that one of the fundamental approaches to financialisation and the financial crisis emanates from the financial expansion in the political economy in line with Marxist views. Sweezy (1997), states in their Monthly Review that capital accumulation by capitalists during the 20th century was associated with three tendencies: a decrease in economic growth rate; an ensuing expansion of monopolistic multinational companies; financialisation. According to Baran and Sweezy (1966) such tendencies are related to the so-called 'absorption of the surplus' basic problem that most accurately describes capitalist economy at its maturity. To be more precise, monopolies tend to create continuous growth in surplus, which however will most likely not be absorbed into the production sphere, leading to stagnation of the economy. To lighten stagnation, some form of wasteful expenditure by consumers inevitably increases in a mature capitalist economy. However, it is noticeable that this point of view tends to differ quite substantially from the study of amassing and lessening rates of profit in terms of the classical Marxist philosophy. Of significance to note in this instance is the use to which the above point was applied in the Monthly Review existing when economic mayhem occurred during the time around 1970. Put differently and in short, as prolonged low production and high unemployment coexisted when there had already been surplus in place, the capital started seeking a safe haven as it circulated in the economy, and

hence speculation was inevitable in the financial sector. It follows that financialisation appears as the production sphere becomes flooded with surplus funds not invested owing to the continual shortage of investment outlets in the real sector, (Magdoff and Foster 2014). The general idea of this argument has been widely discussed although the Monthly Review examination was not totally adopted. Thus the explanations of financial crises such as that of 2007-2009 emanating from the political economies characteristically emphasise the difference between stagnant or falling production and a successful financial sector. Seemingly a presupposition is that the extra capital has been trying to solve the profitability problems in the sphere of production by looking for profits in the financial sector. In addition, at one point the strength of the financial breakout decreased and the financial crisis became noticeable.

Brenner, (2009) provided a powerful, if somewhat complicated, alternative on the same case by linking economic stagnation in the production sphere to the Marxist hypothesis of the propensity for profit rates to fall. Accordingly, a decreasing rate profit has been evident from the time around late 1960 when continued excess capacity in the sphere of production had intensified competition. It followed that the current businesses tended to protect the status quo thereby sustaining profit rate, which however led long-lasting disaster in the sphere of production. However, the real predicament could then be escaped by soothing activities like enhancing demand in the course of manipulating rates of exchange and thereby promoting easy access to credit at low cost. Around 2001 the Federal Reserve prompted the creation of easy credit. However, the fundamental challenge in the real sector became evident hence the whole international community found itself in the financial turmoil since individuals with high potential of default had ease access to credit.

The report by Brenner regarding the propensity of the profit rate to decrease shared some common aspects with Marx's account but to a lesser extent. Significant to note in this regard was the preparedness by Brenner to view the economic disorders of certain years as having negative long-run consequences in the form of excess-accumulation and declining rates of profit. Harman and Callinicos, (2010) also share the same sentiments, although they are not in total agreement with the main hypothetical analysis by Brenner. Together, the financial sector growth and

provision of credit could create affluence, however, with these developments, the financial sector crisis began to be felt in the economy.

In particular, Harman and Callinicos have been willing to protect the descriptive supremacy of Marx's notion of the decreasing rate of profit especially with reference to the 2007 - 2009 financial crisis. Harman and Callinicos shared a robust main observation that except when the actual source of the problem was exposed as located in the real sector, the problem might seem to be non-systemic, and perhaps the consequence of policy mistakes or excess speculation. However, differently to Brenner, Harman and Callinicos explicitly recognise that financialisation is a distinguishing tendency of modern capitalist economy. Despite the fact that Harman and Callinicos do not present a methodical meaning of financialisation, they present financial sector growth in terms of excess capital accumulation. However, suffice it to note that the string of Marxist text whose objective is to show how applicable the over-accumulation hypothesis is to the present crisis is not exceptionally influential, since it is a clear description of the existing financial crisis. Note for example, how Marxist writings are commonly tied with points of reference to Marx's (1981: 567) concept of pretended capital. Central to this view is the notion that the perfect amounts of money originate from disposable present value bookkeeping, in other words, the perfect amounts of money emanating from discounting flows of potential payments linked to the financial assets. The perfect amounts correspond to financial prices, which can vary without the help of what has happened to the money capital that was initially spent to pay for the financial asset. Thus in this sense, the financial prices, chiefly the ones on the stock market, characterise pretended capital. Pretended capital can reveal in-depth processes of finance which however can also just be an inexhaustible supply of unusual points of view concerning the financial sector. It follows that large market values linked to some financial markets, for example, will possibly present the fake reflection of the state lacking the inputs for helpful involvement. Furthermore, Harman, (2010) gives an example of how the fake reflection of enlarged market values entail unrealistic profit was made throughout the financial sector. This implies that the profit on record might have been inflated; hence the actual rate of profit was possibly far less. The ending result was that players in the financial sector seemed to be making profit, however, the real sector suffered most since people could now make profit without real production.

The misunderstanding also arose involving the pretended capital and Marx's (1981) key thoughts. This is a particular kind of capital that is on hand for loans and is compensated through the interest as remuneration. Trading money available for loan as capital could definitely lead to pretended capital. To a certain extent it comes from the investment as well as consumption activities linked to over-accumulation in the capitalist economies, which in the first place take the form of unused money. Money available for loan as capital is a rigid truth in the capitalist society and gives the people possessing it direct claims from the national output. In brief, though the notion of financialisation has substantial origins in the Marxist political economy, the focal point of a number of Marxist theories on the propensity of profit rate to fall over the past thirty years had not help ease development of financialisation. This implies that the idea was advanced by some other schools of schools of thought, generally linked to Marxist political economy, and only in modern years has it begun to come back to Marxism.

2.12 Post-Keynesian analysis of financialisation

The analytics of the association between stagnant or falling production and a thriving financial sector also exist in the post-Keynesian analyses of financialisation. According to Epstein, (2005) for example, emphasis has been put on the rising impacts of financial sector activities in the economy whereby money available for loan as capital is profitably invested in the financial sector instead of in the real sector. Different from the Marxist approaches outlined above, the post-Keynesians focus their attention on the harmful effect of a flourishing financial sector on production. In this context, it follows that declining performance in the real sector is largely attributable to activities in the financial sector. Of importance to emphasise is that the post-Keynesian analytics of financialisation do not originate from Minsky, since only slight reference is made to his writings. However, a brief reference was made to what was called 'money manager capitalism' referring to huge amounts of output, (Minsky and Whalen 1996).

Instead, the analysis of the concept of financialisation according to the post-Keynesians is reliant on the notion of the rentier, and to be more specific, on the money lender as a rentier. The same line of thought is apparent in many prominent writings, such as by Crotty, (1990), Pollin (2007), and Epstein (2005). The re-

surfacing of the rentier, to a certain extent owing to neoliberal economic policies, has nurtured financial profits at the expense of real production profits. As a result, financialisation has led to declining economic performance through investment channels, hence reduced rates of production and growth in advanced economies.. It follows that policy interventions are needed to control the financial sector, for example, liquid reserves kept by the bank, credit direction, restrictions on investments and banking activities, leading to enhanced production, employment, and income (Crotty 2008, 2009; Crotty and Epstein 2008, 2009). The notion of a rentier is very familiar and of significance to the Keynesian analysis of mature capitalism (Keynes, 1973). A rentier is figuratively named a parasitical economic entity, and tends to take out the profit- taking advantage of the insufficiency of capital, and hence tends to discourage real investment as well as profitability. To Keynes, a flourishing capitalism needs the 'euthanasia of the rentier' that is, painless killing of the rentier effected via lower rates of interest. According to Marx's writings, conversely, a rentier only makes a short-lived appearance, yet there is no apparent reference to a social stratum of rentiers. However, considering some of the writings by Marx (1981) what one can conclude from the analyses of the so-called rich capitalists is undoubtedly suggestive of the rentier. The term 'rich capitalists' refers to that part of a capitalist group that is not investing the accumulated capital in the sphere of production but rather prefers to loan it to others. Therefore it follows that the amount of capital on hand for loans belongs to the rich capitalists only. Nevertheless, from Marx's line of thought on capital there is an additional and quite dissimilar method of financial analysis. To be precise, the amount of capital available for loans is perceived as budding unexpectedly from the working of the industrial capital, considering the nature and kind of unused money in the first case in point. Therefore, the unused capital does not necessarily belong to the rich capitalists, and neither does the receiving of interest income describe a distinctive segment falling within the capitalist social class. Instead, in the financial sector, the system is made up of a collection of markets as well as institutions that operate as separate capitalist going concerns and that mobilise the funds available for capital and sustain the capitalist accumulation. The present approach, logically, is reluctant to consider financialisation as an accomplishment on the part of the rentier greater than the capitalist in the sphere of production. Seemingly this proffers a richer and more insightful understanding of the existing capitalism. Nevertheless, the post-

Keynesians emphasise that the rentier tends to find a universal position though with difficulty according to the Marxist theory.

The work by Crotty clarifies this and some modern writings also support it, for example, Stockhammer, (1994) and Orhangazi, (2009). A great deal of this production has a robust empirical aspect, which seeks to prove that the rentier has a discouraging consequence in the sphere of production, characteristically by holding back the existing investment funds and/or lessening the rate of return by the industrial capitalists. The general similarity between post-Keynesian and Marxist theories alongside comparable elements is also clear in the production of the finance-led capitalism (Hein, et al., 2008; Evans 2009).

2.13 Other heterodox and sociological approaches to financialisation

There are also two other theoretical explanations of financialisation worth mentioning which are generally allied to the Marxist theory and linked to economic sociology. The first method is one which is related to the works of Arrighi, (1994), which places the notion of financialisation in terms of an ambitious cyclical theory of the global economy beginning with the premature contemporary period. The dominant formation of the capitalists follows a cyclical blueprint of evolution, coming one after the other. The concept of financialisation represents the situation of domination whereby as productive efforts grow weaker the sphere of financial sector expands. The economies Italy; Netherlands; the UK and the USA got into financialisation after losing their competency in productivity and trade. During the time of their decrease in production, they became lenders, for the most part to young and upcoming economies which appeared to go beyond them.

From this point of view, the present predicament is just an additional occurrence in the long-run decrease of US domination. However, a stubborn difficulty within Arrighi's theory, as it was put into practice in the present period, is the lack of an observable dominant stand-in for the US. The same applies to China in terms of its chances, which are still very remote. The US economy has since been an immense net borrower and net lender, for several years, involving China as well as Japan and the rest of the world. Nevertheless, the work by Arrighi opened the way to positioning financialisation within an extensive chronological point of view. In addition, Krippner, (2005) was motivated to embark on his front-line empirical work

on the US financialisation. Krippner's work establishes the growing significance of financial profit for non-financial institutions over the past fifty years. It follows that drawing attention to profits accruing to the financial sector is a point of critical significance in the analysis of financialisation.

The Regulation School in the 1990s put forward an approach to financialisation which has become known as so-called the Regulation approach, which partly originated in the long-established curiosity of this School in money as well as finance. Whereas Fordism refers to the use made by the manufacturing industry of techniques initiated by Henry Ford, characterised by large scale, mechanical production in large masses, the Regulation School pointed to the breakdown of Fordism and began to look for an innovative system of regulation, involving the financial sector. According to Boyer, (2000) the new-fangled system of regulation began to be fashioned in the sphere of financial sector, typically in the stock exchange. Furthermore, regulation via the financial sector can have a challenging effect, especially for economic performance and economic growth rates, (Aglietta 2000; Aglietta and Breton 2001).

This approach of the Regulation School theorists has a resemblance to the substantial body of literature on alterations in governance corporations from around the 1970s. It follows that the Shareholder value theory together with the related short-run financial investments by corporate businesses have engrossed the interest of political economists and business school writers Lazonick and O'Sullivan, (2000).

This hypothetical landscape of the financialisation concept clearly involves sociological economics, mostly with respect to the challenging consequences of financialisation in the area of work and employment. According to Thompson, (2003) the downfall of Fordism gave rise to a diverse form of innovations to bargain between employers and workers, whereby the latter tend to be more interested in better work safety. However, financialisation stops employers from caring for their side of the negotiation. Citing writings on shareholder value, Thompson emphasises that the business enterprises relying on the capital market are required to change the focus of decision-making attention away from workers. The capital is disconnected from recognised establishments as well as from corporate systems. In these circumstances, work and employment have a propensity to become short-run and

unstable, and therefore the employers do not succeed in realising their side of the negotiation.

According to Clark, (2009) the same approach is developed even more by suggesting that the corporate model of private equity forcefully declares the interests of the shareholder over those of other equity owners in the capitalist firm. It implies that the workings of capital become even more disengaged from the activities of employment, predominantly as the awareness of the firm's competence might have less to do with the effect of business activities on workers. Of interest is observing at this point that financialisation, besides contributing to greater instability of employment, has also been unsuccessful in creating important levels of new employment opportunities in the financial sector as Krippner, (2005) indicated. But seemingly financialisation bounces back alongside labour in a number of respects, as Dore (2008) revealed in respect of disproportionate increase in unemployment versus financial sector growth and the skills distribution across industries.

Lastly, suffice is to note that geography economists and sociology economists have been following the additional social impact of financialisation. Together with its implications for the regional development of capitalism (Leyshon et al. 2007) research has been done on the financialisation of personal life (Langley 2008) and also on the traditional features of finance in modern-day capitalism (Pryke et al. 2007).

2.14 The South African Financial Sector Developments

Profound transformations have been a common feature across the world economies including South Africa. These transformed economies were characterised by neoliberalism, globalisation, and financialisation. Thus the role of government diminished while the role of markets took the lead. Put differently, market- based policies dominated rather than government regulatory policies, Epstein, (2005). South Africa also applied the classical economics- based central bank restructuring that has been adopted by many developed and developing countries for the past few decades, but those reforms have been riddled with elements of neoliberal policy. Deserving attention in the case of South Africa is the association of the establishment of restrictive monetary systems with the worldwide increase in the financialisation, economic growth and political hegemony of the financial sector and

rentier interests. In the case of South Africa as an emerging economy such trends are particularly interesting.

This research will make use of the South Africa experience to explore and unearth the spread of some of the neoliberal monetary policies and their impact in terms of financialisation in the economy. Off course, the South African Reserve Bank (SARB) as the central bank had a key role to play in its influence on the financial sector. Also the reforms that the SARB initiated emanated from direct and indirect pressure on the government by the local financial sector and international agents such as the International Financial Institutions. The reduced inflation rate and high real interest rate provided by the reformed SARB has, in turn, supported the expansion of the financial sector and its speculative investments in the pursuit of short-term gains, (Carnegie, 2007) .

2.15 The Neoliberal Central Bank

The neoliberal central bank is most generally understood to be made up of central bank independence, a sustained concentration on generating a situation of stable and low levels of inflation through the formal adoption of inflation targeting, and the use of only indirect methods of monetary policy such as short-term interest rates instead of more interventionist procedures (Epstein, 2006:1). The basic neoliberal recommendations concerning monetary policy have been applied gradually in most countries in the world. Among the set of recommendations some writers have stressed the commitment to floating exchange rates under this liberalism (Filho, 2005:1). Epstein, (2006) points out that this convention is unique in history, in the sense that the central banks in the developed economies of today are closely linked to the government and they take an active part in the economy through financing governments, managing the exchange rate and directly supporting some sectors of the economy. In the late 1970s as the interventionist age came to a close (Filho, 2005), the monetarist idea began gradually to spread worldwide.

In countries where there was financial crisis, the International Monetary Fund (IMF) recommended the adoption of flexible exchange rates and a reduced role for government in guiding monetary policy as central to the immediate stabilisation measures; central bank independence and official inflation targeting were only

approved where inflation had already been reduced and neoliberalism had reached maturity stage.

Around 1990 New Zealand initiated inflation targeting policy which has since been adopted by twenty-three countries, including South Africa as one of a few transition and middle-income economies such as, Chile, and Brazil (Epstein, 2002). Inflation targeting policy entails establishing an obligation to a suitable range of inflation rate targets that provide price stability. According to Carnegie, (2007) these institutional commitments to restrictive monetary policies and high real interest rates have had the most dramatic effects on the interclass income redistribution in South Africa. However, the inflation targeting policy in South Africa has been doing quite well at reducing inflation. Some authors, such as Harvey, (2005:56) note that the reduction and control of inflation is the only systematic success neoliberalisation can claim. Epstein and Yeldan, (2008) state that although many central banks, including the SARB, trace asset prices, no inflation targeting plan has included the targeting of asset price inflation, which is important to rentiers.

In South Africa the neoliberal central bank has promoted the interests of rentiers over those of capital and labour. To elaborate on this, it is important to distinguish between orthodox economists and Keynesians. In brief, the transmission mechanism according to classical economics is one where prior savings lead to investment, which increases. Subsequently, the neoliberals suggest that to begin the investment process, high real interest rates should push for greater saving.
However, structuralists and interventionists disagree with this analysis, and assert that savings depend on income and that high rates of interest in fact depress investment (Edwards, 1998). In an econometric study of South Africa by Wilkins, (1993) the conclusion was that there was little evidence that savings were determined by interest rates, and instead suggested that the Keynesian model better explains levels of savings and investment. According to structuralists and interventionist (Keynesians) tight monetary policies involves a trade off in terms of a valuable policy tool and this entails limitation of the ability of the central bank to respond to exogenous shocks (Maxfield, 1997). In addition to averting the use of monetary policy to strive for full employment, the bank is not capable of supporting industrial policy or of providing credit to sectors where there is the highest social

need. Epstein (2006:11-13) highlighted that using a few restricted and indirect policy tools, like only short-term interest rates can downsize the premeditated use of direct strategic credit provision through subsidised interest rates, capital controls and credit ceilings. The World Bank report (1993: 235-239), focusing on Asian economies, acknowledged that the direct targeting of credit at low interest rates played a role in the successful development of the these economies. In South Africa there has been no shortage of empirical studies investigating the effects of monetary policy (Carnegie, 2007). Unlike Carnegie's writings, this study is largely interested in how the financialisation and financial sector development have affected the South African economy. According to Carnegie, (2007) the elevated levels of real interest rates that are required to maintain price stability in South Africa have slowed short-run real economic growth, as is expected. However, a redeployment of resources to financial assets owners has been evident as it has benefited the financial sector.

2.16 Financialisation

As has been noted earlier in this study Epstein, (2002:2) defines financialisation as the growing influence of financial markets, financial institutions and the middle class in the financial operations of the economy and its institutions of government, both at the national and international levels. By efficiently allocating resources between firms and individuals, financial markets and the financial services sector play an extraordinarily essential economic role in the economy over time. They reduce production and transaction costs and collect and distribute market information. Carnegie, (2007) also notes that what is worrying about current financialisation is that extra-large financial sectors have led to decreased real investment and economic growth rate, contributing to the development of inequalities by excluding some groups in society from access to the income, and focussing on short-term speculative gains.

Harvey, (2005:161) asserts that financialisation has been marked by its speculative and predatory style during the neoliberal time and a dramatic increase in the total daily turnover of financial transactions in international markets from around $2.3 billion in 1983 to $130 billion during 2001. Harvey (2005: 157) also asserts that the spreading out and increase in the impact of finance and financial services has resulted in well-defined inequalities through largely speculative gains. Various economies worldwide have been characterised by financial services claiming

escalating shares of private debts and as a percentage of GDP). However, the financial sector expansion contributed very little as a percentage of total employment (Palley, 2008).

Financialisation is also dangerous because it is an unsustainable growth model.
In their financial accelerator theory Bernanke and Gertler (1996) state that asset prices increase until firms become reluctant to continue debt-financed investment, thereby leading to an economic downturn causing a drop in asset prices and a credit crunch. The suggestion from this is that financialisation will eventually lead to increasingly unstable business cycles. Furthermore, according to Zhu et al (2002), in transition economies with underdeveloped industrial sectors, there has been very little evidence that development of the financial sector, chiefly when based in stock markets, leads to quicker economic growth or more development. In this respect owners of labour and capital earn rentier income through their own financial assets.

The global rise in importance of financial interests worldwide is not limited to only central bank policy as the factor behind this. Other factors, as noted by Epstein & Jayadev (2004:9-10) in the OECD include: liberalisation of the financial sector; stressed fiscal austerity, until reduced inflationary pressures becomes evident; and the political and economic power transition away from labour (and in some cases, industry) to the rentier class, culminating in continued financialisation and its consequences. In South Africa, although these factors were pertinent, the central bank activities have been very significant and effective in support of funding. Since March 1995, South Africa's capital account has been liberalised, implying that interest rate fluctuations are now tied to exchange rate policies though the focus is on monetary policy.

2.17 The Transformation of the SARB

Aaron and Muelbauer, (2007) identified three phases of policy pursued in the history of South African monetary policy since 1960. At first there was a liquid asset ratio-based system which used quantitative controls on interest rates and credit. A cash reserves-based system ensued which began operating fully in mid-1985 including pre-announced money targets by 1986. Around 1990, the third phase began, bringing in a number of further targets for the lately autonomous central bank to trace the exchange rate, output gap, balance of payments, wage settlements, credit

growth, and the fiscal stance. Furthermore, the adoption of formal inflation targeting was underway. As the SARB tightened the money supply, nominal interest rates fell slightly and real interest rates rose in response to these central bank reforms. During de Kock's governorship (1981-1989), nominal rates dropped from an average of 17.1 percent to 14.2 percent during Mboweni's first five tenure as governor (1999-2004). In the second half of Stals's governorship that in part covers with the initiation of the post-apartheid era (1994-1999), real interest rates escalated from 3.3 percent though 7.7 percent, to as high as 11.5 percent (Aaron and Muellbauer, 2007). Over this time, real rates dropped until a rapid depreciation of the rand in late 2001 which pushed nominal rates up, with the real rates picking up again following the rand depreciation shock. Equally the nominal and real interest rates became stable around 1980 and inflation, as measured by both CPI, has gradually dropped (Aron & Muellbauer, 2007).

As indicated before, the explanation of the South African central bank reforms lies in the mainstream neoclassical economists' support of the adoption of monetary reforms in line with Epstein's perspective, (2002:3-4). For instance, with specific regard to inflation targeting, they suggest that inflation reduction without long-term impact on real variables augment the central bank's credibility, and that macroeconomic growth and stability will be improved. What is interesting is the uncertain economic growth record subsequent to these policies in practice which has led many political economists to give a number of different explanations for their implementation.

According to Semler, (1994) some political expositions suggest that governments limit their influence over central bank policies to reduce blame for causing economic downturns to determine and stop disagreements over policy. Some explanations emphasise the influence of pressure groups outside of government, and advise that dominant ideas may build up some views which may be taken-for granted, and push for an independent central bank directed by monetarist guidelines (Marcussen, 2000), or it may be that the governments are open to the influence of domestic and international financial interests (Goodman, 1991; Bowles & White, 1994).

In South Africa, seemingly, the implementation of monetarist regulations for central bank operations, among other things, was part of major move to neoliberal principles

in the African National Congress (ANC) government reflecting, the influence of local financial interests and foreign investors, organisations, and governments that upheld neoliberal ideas from other countries. This coming together of local and global pressures has closely approximated what Epstein and Gintis, (1992) called the "International Credit Regime". As the reduction or removal of capital controls and financial liberalisation amplified prospects for capital flight, the so-called International Credit Regime involved the local rentier interests which have directly supported adoption of inflation targeting and central bank independence to reduce the influence of labour over central bank policy as well as extra pressures from the international community. According to Peet (2002), the subtle influences from foreign and domestic components of this system are examples of domination. After the government became more informed over to the necessity of sustaining access to foreign credit, overall, in the same context, neoliberal central banks arose. Maxfield (1997:6) suggested that holders of financial assets who advocated for these reforms are more eager to invest in countries with independent central banks, as this assists in creating a more stable and predictable investment climate.

In the early 1990s, the ANC government based its economic policies on a strong pledge to increasing growth through redistribution (MERG, 1993). According to Peet (2002) the ANC stated its intention to pursue an essentially neoliberal development approach as stipulated in the 1996 Growth, Employment, and Redistribution (GEAR). Seemingly in the interim, the financial interests and their associates had persuaded the incoming democratic leaders to ditch the use of monetary policy as a macroeconomic instrument. On the other hand Business Leadership South Africa, particularly the South African Foundation, whose affiliates based outside of South Africa are mainly the sources financial services and international corporations, called for fiscal and monetary austerity by the newly elected government.

According to Marais, (1998:146), when Mandela was released from prison in 1990, there were indications of the ANC's intention to nationalise the mines, banks, and monopolies. The Johannesburg Stock Exchange traders began a selling spree within a few hours of hearing the ANC's intention. Thus, at an early point, the ANC leadership was made aware of the risks of even discussing fundamental reforms and threatening the autonomy of financial markets. Subsequently, while attending the

World Economic Forum in February, Mandela officially abandoned the idea of nationalisation (Peet, 2002:71). The international financial institutions (IFIs) gave little help to South Africa, and the conditionality leverages were not the same compared to assistance extended to other neoliberal developing economies. Handley, (2005:222-223) asserts that despite amplified inflows of aid which came with the economic reforms, the South African government never relied on them and conditionalities could not be attached by donors. So the IFIs, through the process of trust building, influenced South African economic policy of pursuing neoliberal austerity measures and their benefits. Thus the World Bank took part in developing the Growth Employment and Redistribution (GEAR) report which became the roadmap for the country's macroeconomic policy.

2.18 The SARB's Promotion of Financial Interests

Based on Epstein's perspective, the main impact of implementing SARB's restrictive monetary policy reforms like inflation targeting was to reduce inflation and redistribute income to rentiers in many parts of the world (Epstein, 2002:5). The old notion that stable prices mainly impact the financial interests, had been the source of criticisms made by Keynes regarding the neoclassical view of inflation in his book 'The General Theory'. According to Keynes a rentier is one that generates income through ownership of financial assets, instead of through ownership of real assets like productive capital or real estate. Thus rentier income can be viewed as that income earned by owners of financial institutions like banks, stock brokers, and insurance companies and the return to individual holders of financial assets (Kalecki, 1990:202). Basically, there have been financial sector gains from neoliberal monetary policies since they proffer high real interest rates. Carnegie, (2007) notes that the restrictive monetary policies that were embedded in SARB policy in the course of a number of institutional alterations, as delineated, above led to the transfer of resources and investment to the domestic and international financial interests operating in South Africa and away from the real economy. Two major points of interest arise from the predatory and speculative behaviour and Harvey associated them with the expansion of economic and political power of the financial class in the neoliberal era. The neoliberal monetary policies have been considered to have promoted the expansion of the financial markets at the expense of the real economy. Secondly, it has been dealt with at length how the maintenance of the

SARB high real interest rates has fed into the importance of short-term gains and speculative investment.

2.19 The Growth of the Financial Sector

Muellbauer (2005:19) asserts that the South African financial services sector has expanded exponentially compared to others in southern Africa. A contribution of 22.6 percent to the country's GDP has been recorded, followed by the Namibia financial industry in the region with 14.4 percent of its GDP to the sector. The market capitalisation of the Johannesburg Stock Exchange in total recorded US$267.7 billion in 2003. Thus the South African financial markets are apparently significant given the size of the economy. South African markets are ranked 19th worldwide in size. Furthermore, South Africa's existing credit administration is considered among the most liberal globally, thus leading to increased consumption expenditure propelled by simple debt accessibility. External involvement in the economy has also been very significant in South Africa, however the largest contributions were from portfolio investments whereas inflows from foreign direct investment (FDI) were very few. South Africa among the 16 emerging economies with the same credit ratings between 1994 and 2004 shows that the FDI flows as a percentage of GDP were below half of the sample average, however portfolio investments peaked at three times larger (IMF, 2004). According to the World Bank report (2003) South Africa got 22 percent of the net total portfolio equity flows to developing countries between 1995 and 2005.

Undoubtedly, greenfield investments in productive capital boost real output in the economy when compared to financial investments. Seemingly, foreign direct investment in South Africa has been expensive, or otherwise the returns from FDI are not so good. Nordas (2001) states that most of the FDI inflows are from mergers and acquisitions of the productive capacity already in place, hence this may not expand the economy's capital stock though some technology transfers and productivity improvements may accompany them.

According to Simkins, (2004:9) the South African Gini coefficient rose from 0.608 in1995 to a peak of 0.669 in 2000, implying an increased inequality and worsening poverty owing to accelerated financialisation. Too much activity in the financial sector eliminates the poor and promotes increased inequalities in three ways. To

start with, those who are poor in South Africa benefit very little from the expansion of the financial markets (Klasen, 2004:81). In addition, the financial sector creates limited job opportunities as it expands, and even far less for the unskilled labour force (BER, 2004:16). Thirdly, according to Armijo et al., (2005:36) the movement of financial capital and the global perspective of investors tend to stress international inequalities.

Just as industry has gained little from financialisation in South Africa compared to elsewhere in the world, so it is essential differentiate rentier and industrial capitalist interests in South Africa. As non-financial firms were increasingly driven by rentier motives worldwide in his study of the developed economies Epstein, (2002:8) notes that some developments was evident through the merging of financial and industrial interests in the United States as well as other European economies. Epstein (2002:18) also states that in these economies financialisation has included a greater than previously share of industrial wealth created through portfolio capital benefit, instead of through the usual profit-making. Thus, according to Epstein's model, it is proposed that when production levels are low, inflation is less of an issue to industry, and concern is rather on financial interests. At the same time an increase in output and price level is likely to boost profits, but most assets lose value. Thus industrial capitalists rest at a lower optimal interest rate compared to rentiers. With expanded employment and financialisation of nonfinancial firms, this setup changes as both parties become concerned about inflation. At such a point of convergence, divergence over monetary^^^^ between the two parties subsides (Epstein, 2002).

Kalecki, (1990:355) asserts that such merging of industrial and financial class interests is mainly limited to growing economies operating close to or beyond full capacity; unrelenting surplus capacity mostly owing to high unemployment that has continued from apartheid times has prohibited the integration of interests in South Africa. According to Weeks, (1999) estimates for capacity utilisation in the manufacturing sector were placed around 80 percent in the 1990s. On the other hand, Kingdon, (2005) states that unemployment rate in South Africa for 2005 was at 26.7 percent when defined as those actively seeking work.

Various leaders in industry have complained about high interest rates. These industries including the construction industry South Africa's large auto sector,

commercial agriculture, and food processing (Cockayne, 2007; Mutikani, 2003), (Nicanor, Roberts, & Walker, 2006:43). Thus though the majority elements initially supported flexible exchange rates and capital account liberalisation, there have been rising complaints against the central bank reforms (Gleb, 2004:397). Since then, it has been uncertain whether industry's omission from financialisation in South Africa would reduce financial supremacy or possibly stop generic allocation of its benefits.

2.20 Speculative Investment Behaviour

Several writers have noted that high short-term real interest rates encourage large inflows of speculative investment in as much as investors' confidence is maintained in the country and the value of assets will continue to increase and at least that a stable exchange rate remains. Also, high and increasing interest rates, and years of international isolation, mean that South African assets were relatively underrated in the mid-1990s, making them more attractive to foreign investors in 1994 (Edwards, 1998:63;Mohamed, 2003:10). However, the highly unstable flows have not been supportive of continued economic growth, as evidenced in 2001 by a more than 35 percent drop in the rand against the US dollar owing to loss of investor confidence in the country leading to quick withdrawal of their funds (Mohamed, 2003:19). Edwards, (1998:63) asserted that high interest rates ahead of the 1985 financial crisis may also have led to speculative investments. According to Carmody, (2003) around 2001, the commonly cited explanation for the unstable value of the rand included the health of the former President Mandela coupled with the Union Bank of Switzerland's report. Mohamed, (2003:10) states that seemingly the Switzerland's Union Bank report was accurate, as the speculative bubble in the South Africa market arose from huge inflows of portfolio investments for speculative purposes emanating from the tight monetary policy. The portfolio investment inflows rose from fairly lower levels in the 1990s to around $8.5 billion in 1999.

Aaron and Muelbauer, (2007:727) highlighted that though the 2001 sudden drop in exchange rate was comparatively gentle from a global point of view, it significantly impacted the South African economy and led to a short-lived, but severe, drop in economic growth. This was worsened when the SARB increased interest rates in 2002 by 4 percent so as to slow the inflation that ensued the devaluation. Thus the rentier class was able to lessen its losses following the first phase, and most of the

associated problems largely affected the low income class who had no choice (Mohamed, 2006:4). After risking financial crisis Edwards, (1998:63) notes that short-term capital inflows may also be destructive as they are used for raising real exchange rate, which can harm primary and manufactured export industries. According to Botha, (2005:5) that had been the situation before the 2001 fall, and with time, though the rand recovered, the country's competitiveness globally has been battered once more and numerous industrial units forced shut down.

Subsequent to financialisation in the economy, according to Fine, et al., (2011) South Africa is formally, one of the most unequal societies in the world. According to the South African Government's Development Indicators 2009, the 20 per cent of South Africa's underprivileged earn just 1.6 per cent of total national income whereas the wealthy 20 per cent benefit from 70 per cent. From the United Nation's Human Development Index of welfare (2015), South Africa dropped by one position to 129th over 182. Prior to the global economic crisis, the unemployment rate in South Africa was recorded as being among the highest globally. Seemingly, the continuing significance of Karl Marx's view that capital engenders and draws upon labour is without doubt confirmed by South Africa, although Marx might not have foretold that its associates would fight to stay alive where there are high levels of HIV infection rate worldwide. According to the UN, this explains the average life expectancy of about 51.5 years for South Africans, in spite of the country being considered a middle- income economy. In terms of South African production, financialisation led to a mixture of short-term capital inflows coupled with an increasing consumer debt mainly used up on lavishness things and a huge long-term outflow of capital as key local companies chose to buy shares from other countries and to internationalise their processes whilst focusing on the so-called core profitable Mining-Energy Complex sectors in South Africa. In South Africa the system was code named 'Minerals-Energy Complex' (MEC) in which profit seeking was the main goal. The end result was increasing unemployment in other sectors while the economy grew based on the Minerals-Energy Complex.

Furthermore, there was the prolonged poverty experienced by the majority coupled with growing standards of living for a minority part of the total South African population which included new black elite. Thus, subsequent to this unequal society

in South Africa, and also worldwide, concentration was on the so-called the 'triple challenge' of job creation, poverty reduction, and inequality eradication (Fine et al., (2011). The main response to all three challenges is increased support for education and skills. Fine, (2011) also states in support of Marx's views that there are around three billion people, either unemployed or underemployed on the planet, largely because full employment is neither a feature nor a goal of capitalism. Hence the underlying skills discourse is called 'human capital discourse' whereby around the 1950s and before, the neoclassical school of thought emphasised capitalist philosophy and practice that left out labour. Although generally the neoclassical framework was encompassed in mathematical models of supply and demand, it has not been transparent on how to adopt labour employment and work. Rather during that time, labour economics was more sociological and based on the real world, trying to understand institutions such as unions and large companies, and phenomena such as strikes, collective bargaining and public policy. The1960s marked the arrival of human capital theory which offered a way to deal with labour in terms of supply and demand (largely supply) as a commodity like any other. Thus education has been taken as an investment in individual skills and learning thereby increasing labour productivity and employability.

2.21 Conclusion

To conclude this chapter of literature review, several theoretical issues have been outlined. The definitions of financialisation and financial sector growth were provided in the first part of the chapter. The subsequent parts were provided to explain the two hypotheses in terms of the finance-growth nexus, namely, Schumpeter's Supply-leading hypothesis and the Demand-following hypothesis (Robinson, 1952). Following this was an outline of the Role of Financial markets;, Financial sector developments and Financialisation, a global perspective, South African Financial Sector developments, Financialisation in South Africa, Economic growth theory, and the Solow growth model.

CHAPTER 3
EMPIRICAL LITERATURE REVIEW

3.0 Introduction

In the previous chapter, focus was on the background theories dealing with the relationship between financial market growth, financialisation and economic growth. These theories included the traditional perspectives on endogenous economic growth, for example the classical Cobb-Douglas production function, the Schumpeterian supply-leading hypothesis (1911) indicating that finance leads to economic growth, and the demand-following hypothesis by Robinson, (1952) which suggests that it is economic growth that leads to expansion in the financial sector. Lastly there was an explanation as well as definitions of financial markets and financialisation.

This chapter further looks at the empirical literature aspects of the reviewed theories from chapter two together with different methods that were used in the empirical work. Section 3.1 takes up on the empirical aspects of endogenous models, while section 3.2 outlines the vanishing of finance-growth link and the emergence of financial crises. Section 3.3 provides some empirical work done on financial development and economic growth focusing on developing countries. Section 3.4 looks at the development of the financial sector and economic growth in South Africa, and section 3.5 gives an outline of some empirical work on financial development and economic growth in respect of developed economies.

3.1 Financialisation reviewed

The growing dominance of the capital market (through an explosion of new financial instruments) over bank-based financial systems describes financialisation. The distinguishing feature of financialisation is an increase in the volume of debt, especially long-term debt sourced from the capital market. It follows that financialisation raises public policy concerns at both the macroeconomic and microeconomic levels. At the macro level, it is associated with moderate and slow real economic growth associated with increased financial fragility (Palley, 2007). The scenario of financialisation in economy should raise the following fundamental question: is the capital market evolving in response to the demand for its services (demand-following), or is the economic environment responding to the capital market (supply-leading)? In this regard, it is relevant to study causality in order to increase

our understanding of the interdependence between the real sector and the financial system.

Many writers, Mishel, (2000)Bernstein, (2003) and Allegreto, (2007) among others, have argued that changes in macroeconomic patterns and income distribution are significantly attributed to developments in the financial sector. Such developments increase access to finance and the influence of the financial sector ahead of the non-financial sector. For the non-financial sector, (generally households and businesses), financialisation leads to high indebtedness and changed behaviour. These consequences result in variations in the performance of the economy.

Gallagher, (2014), asserted that increased stability and competition from the foreign exchange rate are important in achieving a diversified open economy. In Brazil as well as other emerging market economies there has been a notable rise in the number of exogenous economic and political factors making it difficult for the economies concerned to move to development -oriented economic policies. However, in the last ten years or so, the Brazilian government has come up with a varied set of policy tools in order to address the exogenous factor to do with foreign exchange, which has been moderately successful.

Rodrik, (2014) notes that subsequent to globalisation, policy aimed at the global financial sector had been expected to increase fixed capital formation and macroeconomic stability, but the results were actually the reverse in most of the global emerging and developed economies, due to a variety of reasons related to fiscal, monetary and other economic policies.

Cheng and Xiong, (2014) argued that financialisation has largely transfigured the commodities markets as investors could quickly get information concerning risk from the financial markets rather than the real sector. This was following the huge influx of capital investment to the markets for commodity futures in the last ten years which brought about a debate regarding the impact of financialisation on commodity prices. This is in spite of the fact that many other economists like Fattouh, Kilian and Mahadeva, (2012); Krugman, (2008); Irwin and Sanders, (2012); and Stoll & Whaley, (2010) argued there is almost no evidence to suggest that a commodity price bubble

is caused by speculators in the commodity market and hence should be considered by policy makers.

While a host of studies on financialisation have cross-examined the impact of global finance on the industrial economies and society at large, v/d Zwan, (2014) in her research conducted and in-depth analysis of financialisation for the past ten years. Three approaches were adopted: the rise of the capital accumulation regime; the rise of the shareholder value tendency; and the financialisation in daily life. Van der Zwan's argument was that an insightful understanding of financialisation brings about a clear understanding regarding welfare state politics, as well as institutional evolution processes. Krippner, (2005) provides empirical evidence of the financialisation of the American economy since the time around the 1970s. Whereas most the researchers of the time emphasised the increasing importance of the financial sector to the growth of the economy, Krippner concludes that financialisation is more freely used along with other concepts and their impacts on the economy such as globalisation, neo-liberalisation, capitalisation, among many other related post- industrialisation developments.

Demir, (2008) adopted a firm-level panel data approach, and analysed the effects of rates of return gap amid the financial investments and the fixed investments in conditions of doubt regarding how the real investment performs, given the emerging markets in three countries, namely Argentina, Mexico and Turkey. Demir, (2008) also adopted a model called a portfolio choice model to elaborate on the reduced rate of fixed investment in less developed economies around 1990. They propose that instead of investing in irrevocable long-term fixed investments, business can opt for revocable short-run financial investments given the rate of return and the general uncertainty in the economy. Their findings reveal that rising uncertainty and the rates of return gap significantly reduce fixed investment, whereas the reverse holds when considering the investments in the financial sector.

Hardie, (2012) questions why some emerging economy governments more than others afford new funds and refinance the current debt via the private markets with no problem. In his research, Hardie (2012), relaxed the complications regarding the public sector borrowing capacity. His findings are that the huge disparity in government borrowing capacity amongst the emerging economies is accounted for

by the extent of financialisation, the degree of internationalisation as well as liberalisation.

3.2 Endogenous models of growth: some empirical aspects

Testing of the relationship between finance and economic growth has prompted the expansion of an extensive variety of methods for ranging from composite and challenging VAR and VECM analyses to dynamic panel data estimation. According to Wachtel, (2003:34) and Temple, (1999), for the purposes of exposing the vagueness related to particular methods connecting increased money supply to the growth of the economy, the testing is enlarged to diverse subdivisions of the financial sector markets as well as transmission mechanisms with the use of a diversified set of indicators measuring developments in the financial sector. According to Fink et al,. (2009), different researchers concentrate on comparing the growth patterns in groups of countries for the purpose of avoiding bias when studying the relationship between finance and growth. As the data become increasingly available, the macroeconomic methods are still dominating when it comes to empirical or practical research studies, however Wachtel (2003:43-44) states that there has been an increase in curiosity about disaggregated data. According to Beck et al. (2000), as well as Sahay and Fischer (2000), an increasing number of research workers have been focusing on institutional, legal and governance factors. In due course, the financial institutions and the accompanying financial markets became critical environs in which to operate. Ang, (2008: 569) cites one disadvantage which happened to be the issue of coming up with suitable proxies to represent each factor in the above- mentioned approach. Based on the Schumpeterian main tenets and assumptions emerged from the findings of King and Levin (1993) financial sector development cultivates growth of the economy. King and Levin conducted an investigation of eighty different countries using different proxies for financial development in an economic growth model which is endogenous. The findings were that developments in the financial sector change in the same direction as economic growth as measured by real GDP of the economy. Accumulation of capital coupled with improved and efficient allocation of capital was the main enhancer of economic growth from the financial development side. Thiel (2001) notes that King and Levin's work served as the foundation for some thorough research work that even expanded as quality data became increasingly available. Several writers have also set up

economic growth regressions using Barro, (1991) as a starting point and as a typical practical structure to do their research studies. Whereas King and Levine, (1993) made use of the degree of intermediation by the banks as an indicator for developments in the financial markets, subsequent researchers added further financial market parts. In some research it was revealed that the market for shares tends to pose an even greater threat on economic growth whereas little to no support was noted regarding the effect of banking sector intermediaries on the growth of the economy, (Atje and Jovanovic, 1993). However, Harris, (1997) adopted a similar method to the one used by Atje and Jovanovic, (1993) in a selection of forty nine countries, but his findings were totally the opposite in that the stock markets had a very weak effect on economic growth. Cooray, (2010) conducted some research on thirty five third-world countries and came up with the finding that stock markets play a critical role in long run economic growth. In his findings, he cites liquid markets, market capitalisation as well as activity as important in forecasting long run growth of the economy with a stable macroeconomic environment allowing reduced capital costs and an enlarged diversification of risk. An increasing number of studies focusing on whether long-term economic growth emanates from expansion in the banking sector or is due to stock market growth then followed. The banking sector makes the biggest contribution to businesses in terms of supply of funding which gives the right to financial intermediaries to monitor and control their corporate affairs. It also follows that this link with the corporate affairs implies that the financial agreements should last long and thus the banking sector is more interested in accessing convincing information on the borrowers. On the other hand, financing the business from the stock market tends to provide the value of the investments in terms of their prices.

Most of the empirical research cited above focussed on the relationship between financial sector development and economic growth; some focussed on the effect of financial development on industry -specific or certain groups of businesses. However, there was no mention of the issue of financialisation in their research studies. This research study will contribute to this knowledge gap. In addition, this research also focusses on analysing the relationship between financial sector growth, financialisation and economic growth in South Africa specifically, considering the negative consequences that might arise. Analysis and assessment of this nature

in respect of interrelationships between financial market growth, financialisation and economic growth have not been conducted at length in the South African context. Hence this research study will be contributing to this knowledge gap. The main aim of our research study is to analyse and evaluate the relationship between financial market growth, financialisation and economic growth in South Africa, while paying attention to the inherent seeds that might lead to undesirable impacts in the economy owing the interaction of the financial and real sectors of the economy.

To illustrate the financial constitution of the country some researchers adopted the expressions bank-oriented and securities-oriented whereas traditionally it used to be bank-oriented and market-oriented. However, the conventional expression could be confusing in this regard, but the majority of writers are still using it. Different from their research orientation, while our research also looks into the link between finance and growth, we are not interested in whether the greatest impact is coming from the bank-based or from securities based. Instead, this study attempts to analyse the impact of financial sector growth and financialisation on economic growth in the South African economy.

According to some practical research findings by Beck et al., (2000), and Platek (2002), cited by Fink et al., (2005: 12) there was no proof to attest to the pre-eminence of either of the two kinds of financial systems, that is, the bank-oriented and market-oriented. In general, development in the financial sector may emanate from the capital market or from the financial intermediary alike. For that reason the credits as well as the equities market are complementary to each other instead of them being alternatives. Levine (2005: 34-35) states that this kind of link between markets and banks reinforces the whole financial sector development and this spurs long-term economic growth. However, some writers held slight different views in this regard after comparing an in-depth growth impact of the same selection of countries focussing on the empirical link between finance and growth. There was a claim that the structure of the financial system is still key to determining economic growth in the long-term, (Fink et al., 2005). Having done an analysis of bank-based and market-based association, Deidda and Fattouh (2008) reveal that restructuring the banking system to facilitate market-based finance tends to create a negative impact on growth of the economy. These researches simply indicate that market-based finance

tend to have negative effect on economic growth, but this study will make use of selected financialisation proxies as well as financial sector development proxies as exogenous variables to assess the effects on the growth of the South African economy.

As an alternative Levine, (2005:85) asserts that several, if not all empirical and analytic research studies, using a variety of techniques clearly display a sturdy positive relationship between the functionality of a financial system and long-term growth of the economy. However, as an all-inclusive appraisal of experimental work, the general picture is not so simple (Thiel, 2001; Ang, 2008). The inquiry regarding the characteristics of a developed and well-progressing financial sector system as well as how this well- functioning can be accurately measured is still subject to clarity, (Wachtel, 2003). To cover this knowledge gap, our research study will try to measure and quantify financial sector growth and financialisation and analyse the responsiveness of South African economic growth to changes in the latter.

Haiss, et al. (2011) argue that regardless of what the actual practical relationship between the financial sector and economic growth might look like, the integration of the financial sector and its development was one of the priority aims for the European Union economic policy. It is presumed that the progression towards closer financial integration in terms of the then emerging economies has been nurtured for the past twenty years and aims at boosting the growth of the regional economy. As the local savings restrictions are loosened it creates an increased accessibility of the credit extension facility, thereby enhancing the developments in the financial sector to spur expansion of the corporate sector as well as academic programmes. The consequent improvements in terms of creating stable macroeconomic conditions attract additional foreign direct investments FDI from worldwide. In turn, this FDI helps to make possible the transmission of skills and skills development, and technical know-how as well as technology to the local business community, thus speeding up the growth of emerging economies.

Haiss, at al., (2011) also note that prior to the evolution of the European Union, several studies emphasised the need to also have emerging economies in the Europe community. After the assessment of an unstable and early evolving stage of the European Union (EU), a number of research works on the European area started

before the EU extension in 2004. Whereas general developments in the market for finance does not seemto influence economic growth in the advanced market economies, Jaffee & Levonian (2001) conducted a cross -sectional analysis of twenty three countries that are undergoing transition from centrally planned to market economies and found out that there is a sturdy relationship between the development of the banks and economic growth. Alternatively, Drakos (2002) used the panel data analysis method and recorded that the competition inherent in the banking sector tends to have some kind of efficiency which impacts positively on economic growth. A positive relationship between stock market growth and economic growth was also confirmed by Platek, (2002). However Fink et al., (2005:8) investigated the impact of expansion of stock markets and the market for bonds and found a mixture of results. According to Eller et al., (2006), as the foreign banking sector was opened to domestic financial markets positive effects were realised in the early moments.

Haiss, et al., (2011) noted that there was a claim whereby the institutional setup, a below- standard legal framework and institutional environment, in conjunction with the poor imagination of the privatised parastatals including banks, laid the foundation for the expansion of the financial sector. However, high levels of inflation were experienced such as was the case for Romania in 1996, and insolvency and crisis in the banking sector, as was the case for Bulgaria 1996 and Croatia 1998. It followed that the instability in the financial sector generated huge losses in production as well as a notable decrease in investment throughout the European Union region. However, some authors such as Mehl et al., (2006) regard the quality of the financial sector as low owing to a below- standard legal framework and institutional environment, as well as a regulation for negligence. Their argument was that qualitative indicators require being complementary to the quantitative indicators as the financial sector expands in due course, and this would enhance an assessment of the impact of the financial sector growth on the growth of the economy. In the years before around 2006, a negative effect was acknowledged to be existing on economic growth in respect of both variables for monetisation as well as for domestic credit (Mehl et al., 2006). On the other hand, with the coming in of foreign banks, some positive effects on the growth of the economy became evident. Stable macroeconomic environments as well as highly protected creditors' rights have been

confirmed to be statistically relevant in almost every respect. Their statistical findings indicate that financial deepening only is inadequate to prop up growth of the economy. Thus, based on these results, the implication is that being confident in the structure of the financial sector points toward its critical function in the long-term growth and development of the economy. It has been generally accepted that the standard growth regression framework has been inappropriate under specified condition in various countries. The same issues have also been raised when the irrelevant coefficients were assigned to the initial income as well as human capital (Fischer & Sahay: 2000). This heterogeneity of findings was addressed by Fink et al. (2005), when they looked at variations in the relationship between the financial sector and economic growth in a selection of twenty two market economies and eleven transitional economies. After using the growth accounting framework, their conclusion was that generally the financial sector strongly affects the transition economies, but in market economies it tends to be weak. The degree or extent of the economic growth effect also apparently differed within the subgroups of countries. For testing whether the effects stem from the productivity line or from the accumulation of factor line, the economies were grouped into smaller sub-groups of six with approximately the same strength of relationship between finance and growth. Their results reveal that five of the six sub- groups of countries the channel of productivity was dominating the accumulation of factor channel. Findings by Beck et al., (2000) are similar to the above- mentioned characteristic. It follows that just having large absolute number of financial assets in the financial structure might be of less importance in contributing to economic growth compared to the pre-eminence of financial sector intermediation in economic growth. This is however in contradiction to some earlier work carried out by Beck et al. (2000) and Fink et al., (2005) who did not foresee long-run effects of developments in the financial sector.

3.3 The vanishing of the finance-growth link & the ensuing of financial crises

King and Levine, (1993) assert that many researchers found up until the 1990s accepted as valid a substantially positive relationship connecting finance with economic growth. However, in trying to test the strength of the findings by King and Levine many other researchers exposed a considerably declining effect emanating from financial deepening as well as intermediation with passage of time (Rousseau and Wachtel, 2011). Rousseau and Wachtel, in their research study for the period

after the 1980s showed that the coefficient for finance tends to lose relevance by mid 1990s. With the use of techniques for panel data estimation for a wide selection of countries, it was shown that all the adopted financial indicators tend to be relevantly weak in comparison to a classical approach. In their test of the sudden change in the relationship between finance and growth, Rousseau and Wachtel conducted an investigation of two possible claims concerning the growing trend. From the first claim, their finding was that the crisis in the financial sector is strongly linked to the disappearing effect of the financial sector. For the second claim, their finding was based on the well-known critique by Lucas, (1975) which assumed that the policy-led liberalisation in the financial sector mainly transformed in terms of the finance-growth relationship. However, the ideas from the work by Rousseau and Wachtel are in tandem with the findings by Kaminsky & Reinhard (1999) who also recorded that increasing local credit as well as monetary aggregates can well be used to predict crises in the banking sector.

Demirgüç-Kunt & Detragiache (1998) performed an all-inclusive assessment of a practical association linking banking crises and the liberalisation of the financial sector for a wide selection of countries. According to Demirgüç-Kunt and Detragiache (1998: 3), the time period when they did their test from 1980 to 1995 was associated with global attempts to have local financial systems liberalised, and during the same period there were some cases of crises in the banking sector in both developed and developing countries. From their findings, subsequent to the adoption of liberalisation measures, a negative consequence was noticeable in many control variables in macroeconomics which counteracted the constructive force emanating from the developments in the financial sector particularly in the developed countries.

3.4 Financial development and economic growth: Developing countries

Orlik, (2014) carried out a study in Mexico which revealed that the impact of financialisation in developing economies with weak capital markets is explained in terms of external capital mobility, which, increased financial debt and changed the structure of the productive sector. In the Mexican economy it was a period during which financial capital was dominant, so much so that it changed the operation of the financial and productive sectors of that economy. Exports were a driving force

behind economic activity and became the main engine of economic growth thereby displacing investment activity and eventually real GDP. This situation worsened in the Mexican economy under such circumstances, and developing countries kept on relying on external capital flows, which caused a fall in their capacity to create stability in the growth of the economy, holding wages lower than those of international competitors, and financial returns above the international average. Subsequently, the domestic markets dried up, labour as a percentage of GDP or as a contributor to total income fell, and the financial upheavals were the result of external capital outflows that were set off by exogenous variations, especially elevated interest rates, in the developed countries. While Orlik, (2014) looked at the effect of financialisation on economic growth in Mexico, there was no clear cut explanation on how the financial sector growth would also impact on economic growth. Our study covers this knowledge gap within the context of South Africa.

Adeniyi et al., (2015) conducted an investigation on how financial development manipulates the association involving foreign direct investment (FDI) and economic growth in a selection of Sub-Saharan Africa (SSA) countries. In their study, they took into consideration selected measures of financial development, and assessed their consequences in relation to foreign direct investment FDI and economic growth. Their findings revealed a positive influence of foreign direct investment on economic growth. Additionally, financial sector system developments had prompted impacts on economic growth in the presence of foreign direct investment flows. What captivates is that these results remained healthy when potential endogeneity (existence of correlation between an independent variable 'X' and the error term) was explained in terms of a familiar instrumental variable (IV) estimator. Digging deeper, the findings also supported the existence of non-linearities in the role of FDI in the FDI-growth association. In policy terms, these SSA countries would reap more growth benefits from foreign capital flows especially if financial reforms were sustained. Based on their discussions, Adeniyi et al (2015), with regard to the FDI-growth linkage through the financial sector, provided the empirical model for his study. The model was specified as follows:

$$GROWTH_{it} = f\,(CAP_{it}\ ,FD_{it}\ ,FDI_{it}\ ,FD_{it} * FDI_{it}\ ,CONTROLS_{it}\ )\ ,\ (1)$$

where $GROWTH_{it}$ is real per capita GDP, CAP_{it} is the gross fixed capital formation expressed as a percentage of GDP, FD_{it} proxies financial sophistication, and three

measures are employed for this study - the ratio of M3 to GDP, domestic credit to the private sector as a share of GDP, and total domestic credit provided by the banking sector as a percentage of GDP. FDI_{it} refers to the ratio of foreign direct investment to GDP while FD_{it} * FDI_{it} is the interaction term between these two variables. In the same vein, $CONTROLS_{it}$, in line with the growth literature, includes some conditioning factors such as inflation, government expenditure as a share of GDP and a measure of trade openness.

The extent to which the potential growth-promoting effects of foreign direct investment can be appropriate has in recent times been linked to the development of the financial system especially in developing countries - SSA included. To empirically pursue this line of reasoning, this study examined the influence of financial development on the relationship between FDI and economic growth in a sample of 11 SSA countries over the period 1970 to 2005. Panel data estimation techniques, the Ordinary Least Squares (OLS) and the Fixed Effects (FE) were employed to address the key questions. In general, as the findings showed, foreign direct investment positively impacts on economic growth, while inflation exerts a negative influence in line with the macroeconomic instability suggested by continuously soaring domestic prices. Nevertheless, the impact of FDI on economic growth appeared to be statistically insignificant in most models. This outcome is plausibly due to the nature and associated destination of foreign direct investment flows into developing countries in general and SSA in particular. It is no longer news that FDI goes primarily into the extractive sector in these countries on the one hand, while the challenges of economic, political and corporate governance distortions distinctive to SSA resource-rich states are equally common knowledge on the other. This fact may delink the resource sector from the rest of the economy, implying that the growth effects of FDI flows may be hindered. Nonetheless, financial development also has a positive effect on growth both in the pooled as well as FE models. However, somewhat surprisingly, only the credit to the private sector to GDP measure had statistical significance. It is equally noteworthy that all conventional growth regression control variables returned the expected signs save for the negative, albeit insignificant, coefficient on government expenditure. Moreover, controlling for endogeneity using the 2SLS estimator did not alter these findings overall, indicating little or no bias in the estimates from both OLS and FE in all the models. Digging

further into the likelihood of non-linearities, the results indicated that the intervening role of financial development in the FDI-growth association became apparent only after a certain threshold of FD is exceeded. At least two subtle policy inferences can be drawn. First, these countries would benefit - in growth terms - more from foreign capital flows if existing financial sector reforms are broadly implemented and subsequently sustained. Second, driving financial sector development more towards enhancing the domestic private sector's access to credit would be beneficial for brighter economic prospects for these countries. This was the view of Adeniyi et al., (2015). Unlike their approach of looking at a group of countries in Sub- Saharan Africa, our research study looks at South Africa specifically, with the main aim of analysing, and evaluating the relationship between financial market growth, financialisation and economic growth in South Africa, while paying attention to the intrinsic problematic aspects that might lead to undesirable impacts in the economy subsequent to the interaction of the financial and real sectors of the economy.

Kumar (2014) in India tried to map out the connection between finance and growth. There are quite a lot of indicators which represent the level of financial intermediation, for instance M3, Real Rate of Interest (RR) and growth of the economy. In their work, they adopted the time-series methodology, for example Unit Root (ADF and Phillips-Perron Tests), Cointegration (developed by Johansen and Juselius), and Granger Pairwise causality. In the first place they tested out the existence of unit roots in the available data, together with the other three variables, which are: Financial Development, RR and Growth Rate. As given in their studies, the variables were found to be integrated at first difference.

In the second place, they adopted the Johansen co-integration test and the results confirmed the presence of a long-run equilibrium relationship among the variables. In the third and final place, the Granger causality supports the hypothesis of 'Finance-led Growth' indicating that the finance is a leading sector in India and is poised for development. Those results supported the supply-leading hypothesis for the economy of India in terms of the sample time period. Findings like the above - mentioned had significant implications for the implementation of economic policies in India.

In order to find whether financial development is causing economic growth in India, Kumar (2014) constructed a model: *FD = f(GDP,RR)……1*

The econometric specification the form of their equation was as follows:

$Y = \alpha + \beta FD + \beta_1 RR + e$ ……..2

In the log form, their equation is as follows:

$\log\ y = \log \alpha + \log FD + \beta_1 \log RR + e$ ……..3

where FD represents Financial Development (C+DD+TD/GDP)/M3, GDP represents Gross Domestic Product at factor cost, and RR represents Real Interest Rate. In their paper the financial depth was measured by the ratio M3/GDP, which is an indicator of how well developed the country's financial system is. When the ratio is relatively low, the flow of loanable funds from lenders is restricted. The reverse is true when the ratio is relatively high. Our research study adopts a similar research methodology to the one followed by Kumar, (2014) in their empirical research study. However Kumar did not look at the issue of financialisation which will be dealt with at length in our research study. Moreover, Kumar focussed on financial development and economic growth whilst our study looks at the link between financial sector growth and financialisation with economic growth within the context of South Africa. This makes our research study different from the related work already done by other researchers such as Kumar, (2014).

In his work "Schumpeter might be right again: the functional differentiation of credit" Bezemer, (2014) asserts that in modern research it is customary to gauge growth-promoting financial development by looking at the credit volume as a percentage of the gross domestic product (GDP), to apply the Schumpeterian assumption of credit and development. Some interesting recent research findings indicate an inverse relationship between this growth-promoting financial development and economic growth. According to Bezemer , Schumpeter drew a sharp distinction between the credit volume of development financing as well as the characteristically bigger volume of the so-called 'secondary wave' of consumption credit financing, investment-in-excess and speculative behaviour, and a subsequent 'primary wave' for innovations credit financing. When combined with the circuit theory, this facilitates clarification of growth and the consequences of the credit/GDP ratios in the present time. Secondly, it was found that a rise in terms of the credit/GDP ratio was attributable to a rise in the 'secondary wave' of credit, which is not necessarily a

productive credit hence since a credit entails a debt; the implication is that an increase in credit/GDP ratio would be negative and not positive in respect of economic development. Thirdly, the five modern-day methods where the use of credit for consumption, financial investment and speculation has been institutionalised are discussed. The message of this paper is that, as Schumpeter wrote, “distinction between debts according to purpose, however difficult to carry out, is always relevant to diagnosis and may be relevant to preventive policy”.

Nurudeen, (2009) using the error correction model (ECM), carried out an investigation to find out if developments in the stock market cause an increase in economic growth in the Nigerian economy. According to the econometric findings there was evidence that developments in the stock market in terms of market capitalisation to GDP ratio did cause an expansion in the growth of the economy. In his introductory remarks Nurudeen, (2009) prior to his investigation clearly states that the function of the financial system to promote the economic growth and development is an obvious one. The financial system is made up of among others the reserve bank, all commercial banks in the country, mutual funds, brokerage firms, discount houses, and the stock exchange. All the financial institutions mentioned above engage in buying and selling financial instruments, for example stocks, bonds, foreign exchange, local currency, and derivatives and in due course the same institutions muster finances from units where they are in excess (that is, savers to units) and where there is a dearth of finances, (that is, the investors). Thus the businesses and the corporate world at large tend to enlarge investment and spread out their production activities, and eventually speed up growth in the economy. Like many other researchers on the same topic of the relationship between financial sector development and economic growth Nurudeen, (2009) did not mention the issue of the possibility of the incidence of financialisation. This aspect will be covered in this dissertation where the issue of financialisation is analysed in terms of its impact on economic growth in the context of the South African economy. However, our research will also make use of the error correction model (ECM) as used by Nurudeen.

Nurudeen, (2009) recommended the removal of impediments to stock market development which include tax, legal, and regulatory barriers; development of the

nation's infrastructure to create an enabling environment where business can thrive; as well as creation of policies that will increase the productivity and efficiency of firms. Nurudeen, (2009) also advised enhancement of the capacity of the Nigeria Security and Exchange Commission to facilitate the growth of the stock market, restore the confidence of stock market participants and safeguard the interest of shareholders by checking sharp practices of market operators especially the speculators.

Meily, et al., (2011) carried out an analysis focussing on the function of financial developments on economic growth in the Indonesian economy. In their work they used the vector autoregressive (VAR) method, and their findings substantiate that there is a positive effect on growth of output due to developments in the financial sector. The synergy or reciprocal action between the developments in the financial sector and the upset in either the real or the financial sector reveals that financial development plays a significant role in dampening the reverse effects of upset in the growth in production, whilst at the same time reinforcing the positive impact. Some of the variables in their model which had a notable impact on the growth in output are the excess supply of money, term of trade (TOT), as well as the price. As compared to these mentioned variables, the marginal impact of developments in the financial sector on production tends to be less. This research study will also adopt the vector autoregressive (VAR) method, just like the one used by Meily, et al (2011). Our research is only different to theirs in that we now include financialisation as an independent variable impacting on the performance of the economy as measured by real GDP.

However other researchers such as Nkoro and Uko, (2013) highlight the existence of a disagreement regarding the relationship between financial development and economic growth on whether the former is really a way of promoting long run growth of the economy. However, in their empirical study they examined the developments in the financial sector linking to economic growth in the Nigerian economy. In their study they made use of the co-integration and the Error Correction Mechanism (ECM) using the yearly data over the time period 1980 to 2009. There are five variables that they used in their research: private sector credit as a percentage of GDP; broad money supply (M3) to GDP ratio; the banks deposit liability as a

percentage of GDP; market capitalisation to GDP ratio; and the prime interest rate had been employed as proxies for financial sector growth whereas the economic growth was proxied by the real gross domestic product. Their practical findings reveal a positive impact of financial development on the growth of the Nigerian economy. In addition, credits to private sector as well as the financial sector depth have proved to be unsuccessful and not up to required standard to hasten economic growth. This was a sign of the consequence of state borrowing, shortened above-board systems in the private sector, and the difficulty of massive non-performing loans. The above three cited reasons seem reveal an insignificant contribution of the financial sector development to economic growth in Nigeria.

Haruna, (2012) carried out an empirical examination to determine the relationship between the capitalisation of market effects of financialisation and growth of the Nigerian economy in terms of the direction of causality between 1986 and 2010. The composite indices which were used as proxies for financialisation were Value Traded Ratio (VTR) and Turnover Ratio (TR). GDP at constant basic prices and at GDP at constant purchasers' prices were used as proxies for growth of the economy. Haruna used the multivariate autoregressive model and the Granger Causality Test to reveal a two-way directional causality relating the above-mentioned capital market variables and the real production in the Nigerian economy. The suggestion is that financialisation is not dominating, maybe because it is at the undeveloped stage, in contrast to the advanced markets of the European countries as well as that of the USA.

In an attempt to establish the influence of stock market growth on economic growth, Gupta, and Paramati, (2011), examined if there is a reciprocal relationship between growth and stock markets. In their study they also investigated the short-term and long-term changes in the stock market. Regarding the variables, they made use of the Index of Industrial Production observable every month and the Gross Domestic Product figures observable every quarter of the year for the time period running from 1996 in April to 2009 in the month of March. The methodologies used in their empirical investigations included the Unit root tests, which include the Augmented Dickey Fuller test (ADF), the Phillips and Peron test (PP), the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, the Granger Causality test, the Engle-Granger Co-

integration test, as well as the Error correction model. Findings from the Granger causality test based on month on month observation showed that there is a two-way association between the Index of Industrial Production (IIP) and the Prices for stocks as measured in terms of the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE). However, regarding the NSE and the GDP a two way association was established which moves from the GDP to the NSE. On the other hand Gupta and Paramati, (2011) also found out that the Engle-Granger residual test for co-integration recommended that a long-term association existing between the growth of the economy and stock market performance. In the same way, the empirical findings from the error correction model (ECM) disclose that as the long-term balance digresses the growth of the economy tends to move towards equilibrium, thereby correcting the disequilibrium. Hence, the investigation by Gupta and Paramati avails proof in support of the 'demand-following' proposition in the short-term.

3.5 Financial sector development and economic growth in South Africa

In some related work regarding the link between financial sector development and economic growth Gondo, (2009) conducted an examination in an attempt to expose the effect development in the financial sector had had on the growth of the economy in South Africa during the period 1970 -1999. Their work is based on an economic growth model using the time series statistical analysis approach incorporating instrumental variables where estimated causal relationships are estimated when controlled experiments are not possible, with heteroskedasticity or Huber-White standard errors. In their work Gondo introduced the political index, the polarisation of the economy index, and the inflation tax index as tools to identify and compensate for the bias of events happening at the same time regarding the financial development independent variables. Their findings reveal that as the household sector and corporate sector get credit, at the same time the equities market growth impacts positively on how the economy performs with the passage of time. However, in the short-term at the minimum, monetised liabilities tend to exert an inverse effect on the performance of the economy. From their findings they also concluded that organisations coupled with the laws and regulations that are put in place by the government in order for them to have control over the private sector, influence the growth of the economy and development in the financial sector. According to Gondo

there was evidence of sustained economic growth in South Africa for the past ten years from around 2009 but before that the South African economy was experiencing high unstable prices (inflation), unequal distribution of resources, low levels of economic growth rate, economic international sanctions imposed on the then government, and civil disorder.

Subsequent to 1994, the South African financial sector went through some considerable transformations including, financial repression, and market protection policies moving towards the adoption of a capitalist economy (Gondo, 2009). Their results as provided entail that financial deepening encouraged growth of the economy whilst credit easing, and accessibility to indexed securities enhanced improved financial regulatory framework in South Africa. Adusei, (2012) embarked on a study with the aim of testing the soundness and validity of the Schumpeterian prediction that finance promotes growth, using annualised time series data from South Africa. His work was in the form of a Case Study based on the South African economy. The time series data ranged from 1965 to 2010. Regarding his methodology, the case study made use of unit root testing, co-integration analysis, the Fully Modified Ordinary Least Squares (FMOLS) regression, the Two-Stage Least Squares (2SLS) regression, the Error Correction Model and the Pairwise Granger Causality test to investigate annual time series data from South Africa. In their study two proxies of financial development were employed: domestic credit as a share of GDP to measure the extent of financial intermediary services proffered to households; and broad money supply as a share of GDP to measure in general scope of the financial intermediary sector. The control variables incorporated in their model were inflation, government size, openness of the South African economy, as well as a dummy variable to account for financial reforms adopted in the South African economy around the year 1980. Their findings were in contradiction to the Schumpeterian prediction that the financial sector supports economic growth, their empirical findings imply that financial sector developments do not advance economic growth either in the short-run or long-run. Rather, the Pairwise Granger Causality test findings maintain the claim that there is a unidirectional (involving, functioning, moving, or responding in a single direction) causality from the financial sector developments to economic growth in the case of South Africa. Adusei, (2012) hence

concludes that Joseph Schumpeter might not be right in his theory that financial development spurs growth of the economy.

3.6 Financial market development versus economic growth: in South Africa

According to the Strate, (2016) report of Global Competitiveness Index (GCI) published by the World Economic Forum (WEF) reveals that the South African economy is placed among the top ten global economies in terms of financial market development. Subsequent to the study of 144 countries, the South African was ranked number seven in respect of financial market development. The same study also respectively ranks Hong Kong and Singapore on the first and second position, whilst New Zealand shifted a step upwards to a third position. In case of South Africa, the main contributors to this development involve the performance regarding the regulation of the securities exchange which was ranked on the first position, followed by financing through the local equity market (positioned on number three), and lastly the availability of financial services and the soundness of banking sector were both ranked number six respectively. Remarkably, the regulation of securities exchanges rank sustained its first place position for the fourth consecutive year. The Financial Services Board (FSB) which assumes the responsibility to regulate securities exchange, and the JSE in South Africa, applauds its mandate in view of these developments as a paint of success picture in the South African economy. The FSB notes that due to these positive signs, the people can feel safe and confident when they look at investing in South African securities. The FSB also views the South African financial market as well-regulated and as providing an attractive investment destination both locally and internationally. Market initiatives are on-going to advance improvement in the country's image and continue to align it to international best practices, recommendations and standards. Overally, the Global Competitiveness country rating, South Africa was placed at position 56 out of 144 countries. The Global Competitiveness Index takes into account 12 drivers, which involve the institutions, macro-economic environment, infrastructure, goods market efficiency, health and primary education, higher education and training, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation. In respect of all these pillars, South Africa is the second highest placed sub-Saharan economy following Mauritius.

According to Statistics South Africa, for the past three years the South African economy has been growing at an average annual rate of 1.7% in 2014, followed by average annual rate of 1.4% in 2015, and recently average annual rate of 0.6% in 2016. This is rate of economic growth is viewed in comparison to the growth rate of the financial markets in South Africa. Thus, the South African economy has been declining although the financial markets have been said to be shining through the same period of 2014 to 2017, as indicated by the FSB whereby the well-regulated financial markets are said to be providing an attractive investment destination both locally and internationally.

3.7 Financial development and economic growth: Developed Economies

Haiss, et al., (2011) complemented the work by Rousseau and Wachtel, (2011) and found a declining effect of the banking sector on economic growth. Haiss, et al., (2011) carried out a re-examination of the results for a sampled set of 30 European countries for the period ending 2009. Their work was commended for bringing together the literature on financialisation, financial crisis, and the finance-growth nexus. They adopted the panel data analysis technique in investigating thirty European Union region countries. In their approach they estimated the three segments of financial markets - private credit market, the stocks market and the

bonds market - as well as an aggregated quantification of the financial development. The findings in their research were that the expansion of the financial sector is not supportive of the growth of the economy in the European Union region, hence no desirable consequences were noticeable for real production following growth of the financial markets.

Tomaskovic-Devey et al., (2015) investigated the effects of amplified financial investments among non-financial corporations. Their results showed some consistency in that there was confirmation that financialisation amongst the non-finance firms trims down real production in that industry in terms of its percentage contribution to GDP. In their research work Tomaskovic-Devey et al used the so-called expanded conceptualisation of value added, identifying domestic factors like capital and labour, and the outside stakeholders such as the creditors, charities, and the government which have a say on the worth engendered in the process of production and trade. Their results were that a decreasing value addition emanating from financialisation was intuitively by workforce and the government, whereas the rising worth was directed towards corporate bond and shareholders. The charities from the corporate sector also witnessed overall improvement connected to enhanced financial assets by the non-financial corporations. It follows that the changing of investment activities by non-financial businesses to trading in financial assets and ahead of the real sector of the economy reduced the aggregate added value in the latter. Thus the premise that financialisation in the economy, specifically in the non-finance corporations, decreases the net growth is supported by these cross examinations, with the exceptions that capital in terms of debt, as well as equity holders were safeguarded from these adverse effects.

The findings by Tomaskovic-Devey et al., (2015) have led to some kind of attractive and straightforward, if upsetting, outcomes. Changing from the manufacturing and market volume or value to trading in financial investments as well as equity holder value investment methods on main-street culminated in the decreased growth of the economy in the United States. This shifting from the production sector has been borne for the most part by the labour force through missing employment opportunities as well as the stagnation of wages, alongside government departments, through reduced revenues from taxes.

A business entity with many stakeholders has a perspective that financialisation is beneficial to capital but to the detriment of the state and labour. In addition some charity organisations also benefited from financialisation, however, they suffered together with the general public since economic growth as well as the capacity of governments and households taking part in economic activities declined. The different levels of competition among the economic agents in society have created some disparities with regard to the distribution of excess resources in the country pertaining to the movement of shareholder value, neoliberalism, and particularly financialisation. This can be reaffirmed as the corporate sector does not aim at maximising the shareholder value, instead they aim at maximising income as well as capital. Furthermore, the demand for labour as a factor of production was negatively affected and diluted. Since the corporate world, as they are the equity, and debt holders benefited and enjoyed their investment strategies. They sought to make interest using their capital, hence they negatively affected markets for labour as emanating from declining investment in the production sector.

Some considerable substantiation has been reaffirmed where the services of the financial sector involved large amounts of income from the production sector in terms of payments for interest. Philippon, (2012), notes that there has been no recorded increase in productivity as emanating from the financial services sector. On the same note, Krippner, (2011), Tomascovic Devey and Lin, (2011), and Philippon and Reshef (2012) also found that huge movement of proceeds into the financial sector has been confirmed.

The movement of the shareholder value has motivated the businesses to put debt in place of equity and hence decrease employment. Subsequently, reduced employment was considered as an indicator of some commitment by the managers and hence is worthy of being credited with favourable prices of stock. The replacement of equity with debt for the purpose of financing production in the real sector as well as for buying excellent stocks prompted an immediate increase in the return to equity which is the main variable used by the analysts of stock when assessing the performance of a business entity. Whilst heightening the prices of shares and the returns on equity, it follows that the movement of shareholder value had negative inducements, reducing aggregate production and possibly long-term

profit in the real sector. Thus their findings imply that the movement of shareholder value and the investment plans in the financial sector, in conjunction with plans to reward corporate management tends to lower the long run worth of the real sector and reassign the income to the financial sector institutions as well as the rentier capital in general. According to Piketty, (2014) this transfer of income is in line with a well recorded increase in the dividends going to the top earners and holders of wealth in the United States. Although financialisation is a reflection of a spread of investments plans, it also reflects the value of shareholder interest for the corporate sector to have competitiveness focussing on increasing the returns to owners.

Guiso et al., (2004) asserted that the assortment in the present extent of developments in the financial sector in the European Union region presents a huge opening at a point in time when the EU is on the brink of turning into progressively more financially all- inclusive. It was believed that if financial markets which were still behind in the European Union became more integrated with the advanced financial markets this would provide firms from backward countries with increased accessibility to funds from the advanced markets. Thus if financial markets become more integrated, this would promote economic growth in the whole European Union region. The estimations by Guiso, et al., (2004) had the implication that the missing links in the financial development do affect the production sector negatively. Nevertheless, in other financially developed economies these negative economic growth impacts tend to be working, and significantly. The services in the financial sector as well as the professional sector of the United Kingdom, in particular, might be benefiting to a great extent due to the integration of the European Union financial sector. By contrast, the financial sector businesses in less financially advanced economies tend to be unable to find competitive market share hence they tend to experience reduced activity. Thus it implies that the same process of increased financial sector integration, although it enhances economic growth in other economies, might be harmful in the less developed financial economies. In their conclusion, they echoed the potential benefits emanating from increased financial integration within the most advanced European Union countries and the United States of America.

According to Wong and Zhou, (2011) the empirical evidence suggests that the development of stock markets in China, the USA, the United Kingdom, Japan and Hong Kong individually have a sturdy and encouraging relationship with their respective economic growth. Their findings moved the support for the suggestion that development in the equities market spurs economic growth in both advanced and less advanced economies, regardless of the form of financial structure, level of the development of the economy, or the kind of economic system. With the use of cross- country data, Wong and Zhou assessed the issue of development in the equities market as a significant aspect in growing the economy. Their finding from the study was that developments in the stocks market do have a strong relationship with production in the industrial sector.

Ayadi et al., (2013) in another study re-examined the association of developments in the financial services sector and economic growth with the use of a sample of countries in the northern as well as the southern Mediterranean region for the time spanning 1985 to 2009. In their research many variables were used as proxies for financial services sector development to explain quantity as well as quality consequences. The outcome points out that credit extension to private individuals, as well as the bank deposits made, have an inverse relationship with economic growth, and this reaffirms dearth with regard to the allocation of credit, thus suggesting feeble regulation and supervision in the financial sector. With regard to the market for stocks, their findings point out that if the market for stocks is big with high liquidity economic growth tends to be spurred by that. Increased investment activity, be it local or in terms of foreign direct investment, makes a significant contribution to the growth of the economy. Other critical economic growth factors include strong and firm organisations as well as stable price levels.

3.8 Conclusion

In conclusion to this chapter, a considerable amount of empirical literature has been reviewed, based on theories from chapter two focussing on the relationship between the financial sector and economic growth in a number of economies. Apparently, from the reviewed empirical studies, the issue of financialisation has largely not been dealt with. Most of the research studies dwelt on the impact of financial development on economic growth with a view to determining whether it is critical to have financial

development as a prerequisite for achieving economic growth as a macroeconomic objective. Other research studies focussed on the direction of causality, i.e. whether the causal relationship runs from finance to growth or vice versa. From the above there is however consideration of the issue of financialisation by Orlik, (2014) who carried out a study in Mexico. Orlik, (2014) found out that the impact of financialisation in developing economies that have weak capital markets is explained in terms of external capital mobility. The external capital mobility is said to be increasing financial debt thereby promoting financial crisis.

Whereas section 3.1 looked at the empirical considerations in terms of the endogenous models explaining the relationship between finance and economic growth, the following section 3.2 provided an outline and analysis in respect of the vanishing of the finance-growth connection and the emergence of financial crises. From the above there is however consideration of the issue of financialisation by Orlik, (2014) who carried out a study in Mexico. Orlik, (2014) found out that the impact of financialisation in developing economies that have weak capital markets is explained in terms of external capital mobility. The external capital mobility is said to be increasing financial debt thereby promoting financial crisis. Finally, section 3.5 presented a detailed outline of some empirical studies conducted on financial development and economic growth focussing on the developed economies.

CHAPTER 4
METHODOLOGY AND MODEL SPECIFICATION

4.0 Introduction

The thrust of this chapter is to provide an outline of the methodologies, model specification and research strategies as well as empirical techniques that will be adopted in chapter 5. As indicated in chapter one of this research, the main objective of this study is to analyse the effect of financial market development and financialisation on economic growth in South Africa. Specifically, the study intends to unearth the separate effects associated with financialisation and financial market growth on economic growth. The other objectives are to analyse and assess the interrelationship between economic growth and financial market growth, that is, testing for the prevalence of the demand-following or supply-leading hypothesis in the South African economy; and to determine the long run relationship between financialisation, growth in financial markets and economic growth involving the short run adjustments arising from disequilibria in the previous period to the long run relationship.

Chapter four will unfold as follows: section 4.1 gives a synopsis of the time series statistics; section 4.2 looks at stationarity and unit root testing, covering the Augmented Dickey Fuller test. Section 4.3 looks at the concept of cointegration and testing for cointegration. Section 4.4 will discuss the Vector Autoregressive (VAR) model, while section 4.5 covers the Vector Error Correction Model (VECM) outline and the circumstances under which the model is applicable. Section 4.6 looks at the single equation techniques while section 4.7 and 4.8 cover model specification and justification of choice of variables respectively. Capturing and coding of the time series data, relevant data transformations, data issues in the model specification, data frequency, and model sample size are covered in the remaining sections of the chapter. Lastly, in section 4.13, the conclusion of chapter four is provided.

4.1 Time Series basics

Time series statistics refers to a data set that is gathered in a given period of time. To give some cases in point of time series data, one can think of the records of things such as (a) prices of equities recorded regularly over a period of time, (b) exchange rate readings recorded daily over a month or year, and (c) quarterly real

GDP recordings over a number of years. So many examples of time series can be provided across many fields of study. The ordering of time point in time series is one key aspect regarding the time series data as it imposes the structure of the data, for instance when looking at how the observation varies at a certain point in time. An element in the time series is treated as a random variable with a probability distribution. In a time series, it may be assumed that the distribution of individual elements of the series have parameters in common. For instance, it might be assumed that the variance of each observation x_t is the same, and that the variance of the nearby pair of elements is also the same, and the cov (x_t, x_{t-1}) is the same. Assuming the same distribution of all observations of x_t then it can be said that the time series x_t is stationary (defined in section 4.2, below). It is standard practice to identity the stationarity status of individual time series and thereafter to test for cointegration (defined in section 4.3, below) in order to avoid the problem of spurious regressions. Spurious regressions arise when regressed nonstationary times series show statistically significant results which are due to trends in the data instead of there being meaningful long run relationships between the variables justified by economic theory.

4.2 Stationarity and Unit root testing

Basically, the theoretical characteristic of all estimation processes involving time series is based on stationary time series. In this instance, a time series will be said to be weakly or covariance stationary when the statistical properties such as the mean, variance and autocorrelation are constant over time. That is, these statistical properties are not dependent on time. On the other hand if these statistical properties are not constant or are time dependent, the time series will be said to be non-stationary. The random walk is an example commonly used to represent a non-stationary variable as follows:

$$x_t = x_{t-1} + e_t \qquad 4.1$$

where e is a random disturbance term which is stationary. Thus, time series x tends to have a forecast value which is constant, depending on time, and also the variance tends to increase with the passage of time. Hence, a random walk is in effect a stationary series which is a difference series because the 1st difference of variable x is stationary as illustrated below:

$$x_t - x_{t-1} = (1 - L)x_t = e_t \qquad 4.2$$

A stationary series difference is said to be integrated or to have some interoperation characteristic and is labeled as I(*d*), where *d* represents the order of integration. It is all about the number of unit roots found in the time series, which is referred to as the order of integration, in other words it is the number of operations involving differencing required to make a time series stationary. In terms of the above example of the random walk above there is only one unit root so it is said to be integrated of order one, written as I(1). In the same way, a stationary time series is said to be integrated of order zero, represented as, I(0).

A formal way of testing for stationarity is by unit root testing. There are a number of unit root testing methods that can be found in most econometric software packages including Eviews and Stata.

In terms of the basic theoretical aspects of unit root testing, considering a simplified autoregressive process such as:

$$x_t = \rho x_{t-1} + y_t'\delta + e_t \qquad 4.3$$

where y are exogenous optional regressors which possibly will be made up of: a constant; or a trend and constant; δ and ρ which are parameters to be estimated; and the e_t , which are expected to be the white noise error term. When the absolute value of ρ is greater than or equal to one, that is, $|\rho| \geq 1$, x is a non-stationary time series and the variance of variable x increases with passage of time and tends to approach infinity (∞). When the value of $|\rho| < 1$, then x tends to be a trend-stationary time series. Consequently, in terms of the hypothesis of trend-stationarity, evaluation has to be conducted by testing whether the absolute value of ρ is strictly less than one. Generally, the unit root testing provided by the EViews tests the null hypothesis H_0:$\rho = 1$ together with the one-sided alternative hypothesis H_0: $\rho < 1$. In other instances, the null hypothesis is tested together with a point alternative hypothesis.

4.2.1 Augmented Dickey-Fuller (ADF)

According to MacKinnon, et al., (1996) the DF test is normally conducted by estimating the equation 4.1 after subtracting x_{t-1} from both sides of the equation to get:

$$\Delta x_t = \alpha x_{t-1} + y_t'\delta + e_t \qquad 4.4$$

where $\alpha = \rho - 1$. The respective null hypothesis and alternative hypothesis can be presented as:

$H_0: \alpha = 0$ or $\rho = 1$ (implying that there is a unit root since ρ is equal to one)

$H_1: \alpha < 0$ or $\rho < 1$ (implying that there is no unit root)

An evaluation can also be conducted using the conventional t-statistic for α, presented as:

$$t_\alpha = \hat{\alpha}/(se(\hat{\alpha}) \qquad 4.5$$

where $\hat{\alpha}$ stands for the estimated value of the coefficient , and $(se(\hat{\alpha})$ stands for the coefficient standard error.

According to Dickey and Fuller (1979), it is revealed that considering the null hypothesis of a unit root, the above-mentioned statistic is not trailing the usual student's t-distribution, hence they develop an asymptotic result or outcome and simulate the critical values for different tests as well as sample sizes. More recently, MacKinnon (1991; 1996) has adopted much bigger sets of simulations compared to those previously presented by Dickey and Fuller. Moreover, MacKinnon approximates response surfaces in terms of simulation results, allowing the computing of Dickey-Fuller critical values as well as the p -values for indiscriminate sample sizes. These critical value calculations of the p as adopted by MacKinnon are the same used by the E-views in calculating or constructing the test results.

The unit root test by Dickey-Fuller described above is binding only if the time series is an autoregressive AR(1) process. When the time series is correlated at higher order lags, the notion of the white noise disturbances denoted by e_t is dishonoured. Hence, the Augmented Dickey-Fuller (ADF) test comes in to construct a parametric rectification in cases of higher-order correlation by supposing that the x series trails the AR(p) process and counting the p lagged difference terms of the regressand variable x to the right side of the regression test model:

$$\Delta x_t = \alpha x_{t-1} + y_t'\delta + \beta_1 \Delta x_{t-1} + \beta_2 \Delta x_{t-2} + \cdots + \beta_p \Delta x_{t-p} + \vartheta_t \qquad 4.6$$

The augmented or transformed specification in 4.6 above will then be used for testing the unit root test with the use of t-statistic for α presented as: $t_\alpha = \hat{\alpha}/(se(\hat{\alpha})$ also above in 4.5. A vital end result acquired by Fuller involves that the asymptotic distribution of the t-ratio for α not being dependent on the number of lagged first differences encompassed in the ADF regression. Furthermore, whereas the supposition that x follows an auto-regressive (AR) process might seem to be restrictive, Said and Dickey (1984) prove that the ADF test is a good representation of a large sample, that is to say, it is asymptotically usable, especially where there is a moving average (MA) component, as long as adequate lagged difference footings are contained within the regression test.

4.3 Cointegration

Cointegration is a concept that refers to the presence of a long-term equilibrium connection amongst the time series variables. Cointegration is a characteristic associated with more than one variable changing, together with passing of time, and in spite of the tendency to follow their own specific trends without drifting afar from each other, they do have some kind of a link which makes them move together. Establishing cointegration amongst variables helps solve the problem of spurious regression whereby a long run relationship between variables is said to be existing when in fact they are not related in any form. For example in this research we will test for cointegration amongst the proxies of economic growth, labour, investment, financial development and financialisation.

Running a regression of a nonstationary time series on another nonstationary variable tends to produce a spurious regression. If two or more variables are subjected to unit root testing individually we observe that they are integrated of order one; that is, they are I(1), in other words they contain a stochastic trend. It is possible that two or more variables may share the same trend in such a way that the regression of one time series on another variable may not necessarily be spurious, (Gujarati and Porter, 2011). Considering an example of two time series, we run an equation of the logarithm of real gross domestic product (LY) on the logarithm of real investment expenditure (LK), such that:

$$LY_t = \beta_1 + \beta_2 LK_t + u_t \qquad 4.7$$

where the letter L denotes the logarithm elasticity, $\beta_2$represents the responsiveness of the real gross domestic product with respect to real investment expenditure, meaning that it can be called the responsiveness of economic growth to change in investment expenditures. Equation 5.1 above can be rewritten as follows:

$$u_t = LY_t - \beta_1 - \beta_2 LK_t \qquad 4.8$$

if u_t is subjected to unit root testing and found to be stationary, in other words, it is I(0). Thus the conclusion is that although LY_t and LK_t have a stochastic trend or are I(1), their linear combination in equation 5.2 tends to be I(0). In other words the linear combination cancels out the stochastic trends in the two variables, that is, LY_t and LK_t. Taking investment expenditure and real GDP (measured by income) as two time series that are integrated of order one, I(1), where the difference between growth and investment theoretically refer to the residual error term and is I(0). This implies that running a regression of real gross domestic product on investment expenditure would be meaningful and not spurious. Hence it can be said that the two variables, that is real GDP and gross fixed capital formation, are co-integrated, meaning they vary together and that they have a long run equilibrium or relationship.

The three main methods of cointegration testing are the Engle Granger two step method, the Johansen test, and the Phillips-Ouliaris cointegration test. In brief, the Engle-Granger two step method of testing for cointegration can be applied where for example two variables y_t and x_t are non-stationary and are co-integrated, then as explained above, the linear combination of the two variables tends to be stationary. In other words, an equation such as $u_t = y_t - \beta x_t$ requires testing for unit root, if one knows the value of the residual term u_t, using the Augmented Dickey Fuller (ADF), or the Phillips Peron test or any other method. However, not knowing the value of the residual term u_t requires firstly running the equation through the ordinary least squares (OLS) so as to estimate the value of u_t , often denoted as $\hat{u}_t$, and then we can test for stationarity based on the residual estimates. The second regression will then be run on the first differenced time series from the first regression wherein the lagged residual $\hat{u}_{t-1}$ is incorporated as a regressor.

4.3.1 Engle Granger two step procedure

The so-called Engle-Granger (EG) two step method was suggested by Engle and Granger (1987) as a test for cointegration that involves the estimation of cointegration using OLS, finding the error term $\hat{\mu}_t$ and adopting unit root testing for

the residual term $\hat{\mu}_t$. In order to test an assertion for equilibrium, Engle and Granger suggest testing the null hypothesis that $\hat{\mu}_t$ has a unit root versus the alternative hypothesis that it has a root that is less than one. A table of new critical values has to be created since $\hat{\mu}_t$ values are themselves estimates. Therefore the corrected MacKinnon critical values have to be used. Given the equation:

$\hat{\mu}_t = y_t - \hat{\alpha} * x_t$ where $\hat{\mu}_t$ tends to follow an autoregressive process

$$u_t = \hat{\rho}_t * u_{t-1} + \hat{\varepsilon}_t \qquad 4.9$$

with $\hat{\varepsilon}_t \sim \text{i.i.d}\ (0, \delta^2)$

three possibilities can be assumed: that $\hat{\rho}$ is greater, or equal to, or smaller than one.

If the absolute value of $\hat{\rho}$ is greater than one, then $y_t \sim \text{I}(1)$ and $x_t \sim \text{I}(1)$ then $u_t \sim \text{I}(2)$.

If the absolute value of $\hat{\rho}$ is equal to one, then $y_t \sim \text{I}(1)$ and $x_t \sim \text{I}(1)$ then $u_t \sim \text{I}(1)$.

If the absolute value of $\hat{\rho}$ is less than one, then $y_t \sim \text{I}(1)$ and $x_t \sim \text{I}(1)$ then $u_t \sim \text{I}(0)$.

It is only if the absolute value of $\hat{\rho}$ is less than one that cointegration is said to exist. In this case if one has to develop additional evidence about the dynamic performance of the variables application of the Error Correction Model (ECM) has to be adopted. This is called the Granger Representation Theorem, whereby Engle and Wei (1983) demonstrate that if some form of cointegration exists amongst the variables they can be regarded as being generated from the ECM.

4.3.2 Testing for Cointegration

Testing for cointegration can be done following three methods: (a) Cointegrating Regression Durbin-Watson (CRDW) Test, (b) Augmented Engle-Granger (AEG) Test, and (c) the Johansen test for Cointegration or the Johansen Method. This research will adopt the Johansen test for Cointegration, which is described below.

4.3.3 The Johansen Test for Cointegration

Many software packages, including EViews, support the cointegration tests that are based on the vector autoregressive (VAR) models which adopt the methods developed by Johansen (1991, 1995). Considering a VAR model of order p as stated below:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + B x_t + \varepsilon_t \qquad 4.10$$

where y_t stands for a k-vector which has non-stationary, integrated of order one or I(1) variables, x_t denotes a d-vector composed of deterministic variables, and ε_t represents a vector of innovations. The above VAR model may be rewritten in the following manner:

$$\Delta y_t = \prod y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-1} + B x_t + \varepsilon_t \qquad 4.11$$

where

$$\prod = \sum_{i=1}^{p-1} A_i - I\,, \qquad \Gamma_i = -\sum_{j=i+1}^{p} A_j \qquad 4.12$$

The Granger's representation theorem proclaims that when the coefficient matrix denoted by $\prod$ has reduced rank $r < k$, it follows that a $k \times r$ matrix α and β each with rank r do exist such that $\prod = \alpha\beta'$ as well as $\beta' y_t$ is integrated of order zero or I(0). Whereas Γ is the number that shows the cointegrating relations, that is the cointegrating rank and each column of β represents the cointegrating vector.

4.3.4 Performing a Johansen Cointegration Test

Firstly, the data to be tested might be situated in a positive quadrant, and have non-zero means as well as deterministic trends and stochastic trends. Thus, in the same way, the cointegrating equations might be having intercepts as well as deterministic trends. Also, the asymptotic distribution of the Likelihood Ratio (LR) test statistic for cointegration has no usual X^2 distribution, hence it relies on the assumptions made in terms of the deterministic trends. It follows that to make the cointegration test we need to make assumptions regarding the trend underlying our data (Startz, 2013).

There are a number of things to keep in mind when performing a cointegration test according to the Johansen method. The critical values are provided for about $k = 10$ series. In addition the critical values are based on the assumptions that are made regarding the nature of the trend. Sometimes the trace statistic result might be in contrast to the maximum eigenvalue statistic results. Under such circumstances it is recommended that the estimated cointegrating vector must be examined and the decision made to adopt the trace statistic result or the maximum eigenvalue statistic; and the choice must be based on the interpretability of the cointegrating relations. Sometimes, a single stationarity test or unit root test shows that some of the time series are integrated, however with the cointegration test, there is an indication of full

rank (r=k) which the ∏ matrix is having. This obvious conflict of results might be due to lack of power emanating from the cointegration test, maybe because of small sample size (Startz, 2013).

Depending on the outcome of the cointegration test, if the results show that there is cointegration amongst the variables in the model used as proxies for economic growth, financial sector development, financialisation, labour, and investment, then we can proceed with testing vector error correction models (VECM). However, if the cointegration test results show that there is no cointegration amongst the variables in the model in respect of the proxies for economic growth, financial sector development, financialisation, labour, and investment, then we can proceed with testing vector autoregressive (VAR) models (Startz, 2013).

4.4 The Vector Autoregressive (VAR) model Analysis

The method of vector autoregressive (VAR) model analysis is usually adopted when forecasting the time series that has an interrelationship of some kind as well as when intending to analyse the lively effect of stochastic disturbances on a system of variables. The vector autoregressive technique avoids the requirement of the use of structural modeling as it treats every dependent variable (endogenous variable) in the system of equation as determined by the lagged values of all of the same dependent variables in that system.

Mathematically, a VAR can be represented as follows:

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + B x_t + \varepsilon_t \qquad 4.13$$

where y_t represents a k vector of dependent variables, x_t stands for a d vector of explanatory variables (exogenous variables), $A_1, \ldots, A_p$ and B are representations of the matrices of the coefficients that are to be estimated, and ε_t stands for the vector of innovations that possibly will be simultaneously correlated but on their own tend to be uncorrelated to their lagged values and also uncorrelated with all the variables on the right-hand side.

Subsequently, as only the lagged values of the dependent variables are located on the right-hand side in the system of equations, concurrence is not an issue and hence the OLS gives reliable estimates. Moreover, even though the innovations ε_t may be simultaneously correlated, the OLS tends to be efficient as well as

equivalent to the GLS because all of the equations have the same explanatory variables (Startz, 2013).

The concept of vector autoregressive (VAR) models was started by Sims (1980) as an approach which could be adopted by economists for the purposes of understanding the operations of the macro economy. This could be achieved by analysing the combined performance of an assortment of macroeconomic variables without the need to have solid limits of some sort to recognise fundamental structural parameters. Since then, the VAR has become one of the most dominant methods of modeling the time-series (Startz, 2013).

Thus a VAR system of equation comprises a collection of *m* variables, which are all presented as dependent on the past variables of the same variables, in other words each variable is expressed as a function of p-lags of itself plus the error term. In a VAR model it is conceivable to take in the independent variables like the seasonal dummies or time trends. A simplified two variable, order-p VAR model of, *x* and *y*, will comprise two equations as follows:

$$y_t = \beta_{10} - \beta_{12}x_t + \gamma_{11}y_{t-1} + \gamma_{12}x_{t-z} + \varepsilon_{yt} \qquad 4.14$$

$$x_t = \beta_{20} - \beta_{21}y_t + \gamma_{21}y_{t-1} + \gamma_{22}x_{t-z} + \varepsilon_{xt}$$

An important feature to note from the above equations is that there are no present-day variables recorded on the right-hand side of either of the two equations. This makes it plausible that the independent variables affecting the independent variables are weakly exogenous and also that they are ergodic and stationary.

The structural shocks which are represented by ε_{yt} and ε_{xt} are called the white noise improvements or innovations and have standard deviations denoted as σ_y and σ_y and have a zero covariance. The two variables on the right- hand side of the equation y and x are the dependent variables or the endogenous variable. The structural VAR is not a reduced form. When in the reduced form, the representation of y and x are just a function of the lagged values of y and x. In order to solve for the reduced form we write the structural VAR in matrix form as follows (Startz, 2013):

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ x_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ x_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{xt} \end{bmatrix} \qquad 4.15$$

$$BY_t = \Gamma_0 + \Gamma_1 Y_{t-1} + \varepsilon_t \qquad 4.16$$

If we multiply the above equation by B^{-1} we get a standard VAR(1) as in the following illustration:

$$BY_t = \Gamma_0 + \Gamma_1 Y_{t-1} + \varepsilon_t$$
$$BY_t B^{-1} = B^{-1}\Gamma_0 + B^{-1}\Gamma_1 Y_{t-1} + B^{-1}\varepsilon_t$$
$$Y_t = B^{-1}\Gamma_0 + B^{-1}\Gamma_1 Y_{t-1} + B^{-1}\varepsilon_t$$
$$Y_t = \theta_0 + \theta_1 Y_{t-1} + a_t \qquad 4.17$$

This last equation is the so-called reduced form and can now be estimated in terms of the VAR. Before estimating such an equation in reduced form, the stability conditions for a VAR(p) have to be presented to check if there are some roots of some characteristic polynomial which are not outside of the unit circle. If the VAR that is estimated is stable or stationary, then all roots are said to be having the modulus that is less than a unit and are found inside the unit circle. It follows that if the VAR is unstable, then some of the results like the impulse response standard errors are tantamount to having limited to no validity.

4.4.1 The Impulse Responses

If a shock is imposed to the nth variable it does not only impact the nth variable directly, nonetheless it is likewise diffused indirectly to the rest of the endogenous variables via the VAR dynamic lag-structure. In this respect, the impulse response function tracks the consequence of a once- off single occasion of a shock to one of the innovations on the present day as well as up-coming values of the dependent variables. Where the innovations denoted as ε_t are simultaneously dissociated, the reading of the impulse response outcome is straight forward. The nth innovation or invention $\varepsilon_{i,t}$ is modestly a shock to the nth dependent variable $y_{i,t}$. Inventions or innovations, are however, normally linked, and can be viewed as having a conjoint element that may not be linked to any other specific variable. If one is to interpret the impulse response functions one normally has to apply the conversion P to the inventions and innovations in order for them to become dissociated:

$$v_t = P\varepsilon_t \sim (0, D) \qquad 4.18$$

where D is a diagonal covariance matrix.

4.4.2 Variance decomposition

It is assumed that all variables are stationary in nature because the VAR model requires that all variables have to be stationary in order to run it. Also the lag selection criteria recommend taking a certain number of lags in the VAR model to be

optimum lags. It is from the VAR outcome that one can proceed to develop the variance decomposition. The notion of variance decomposition is valuable in gauging how shocks echo through a system of equations that is to measure the pass through of external or explanatory factors or shocks to each economic variable.

4.4.3 The Law of total variance

For the purposes of clarification of the idea of the decomposition of variance, it is important to have an understanding of the concept of total variance. it is necessary to understand the law of total variance. Assuming that there are two, namely, the Y = dependent variable or response variable, and X = independent variable or explanatory factor. Generally, in a linear equation the two variables can be presented as follows:

$$Y = a + bX + c \qquad 4.19$$

In other words, for any change in the variable X, there will be a corresponding move in Y. The focal point of variance decomposition is given by the following equation:

$$Var(Y) = E(Var[Y|X]) + Var(E[Y|X]) \qquad 4.20$$

Such an association between X and Y in terms of the variance can be read as: the variance of Y (endogenous variable) is composed of (a) the estimated variance of Y with respect to X, plus (b) the variance of the 'estimated variance of Y' with respect to X. In simple terms, the variance of Y is its expected variance value plus the variance of this expected variance value. This is sometimes shortened to:

$E(Var[Y|X])$ = explained variation directly due to changes in X
$Var(E[Y|X])$ = unexplained variation comes from somewhere other than X

Thus the decomposition of variance is useful when dealing with a dynamic-stochastic system. Inasmuch as a stochastic system is a random value process, this random value or the stochastic system can be defined in the following manner:

$Y(t)$ = the value of the system at a time t

H_{it} is the historical that correspond to (t) where

$$H_{it} = H_{(1t)}, H_{(2t)}, \ldots, H_{(c\text{-}1,t)} \qquad 4.21$$

From the above equation, the same can be presented in terms of $Y_{(t)}$ = Y as well as $H_{(it)}$ = X in the following manner:

$$Var[Y_{(t)} = E\left(Var\left[Y_{(t)}\middle|H_{(1t)}, H\left(2_{(t)}, \dots, H_{(c-1,t)}\right)\right]\right) + sum([Var(Y_{(t)}]|H_{(1t)}, H\left(2_t, \dots, H_{(j-1,t)}\right] + Var(E[Y_t]|H_{(1t)} \quad 4.22$$

To interpret the meaning of the result, it is recalled that the stated conditions as above are:
$E(Var[Y|X])$ = explained variation directly due to changes in X
$Var(E[Y|X])$ = unexplained variation comes from somewhere other than X.
Thus the outcome of the variance decomposition helps the researcher to recognise the fact that the response in the dependent variable Y has some variation and that this variation is made up of two components, such that when these components are decomposed they form a type of variation that is explained by the changes of X, which is an explanatory or independent variable, as well as another variance that is totally owing to coincidental stance, and which is not explained. One meaning is that $Var(E[Y|X])$ = randomness, and moreover randomness tends to follow an erratic pattern.

4.5 The Vector Error Correction Models (VECM)

The vector error correction (VEC) model is in effect a restricted VAR model that is designed for use with non-stationary time series that are understood to be co-integrated. It follows that the VEC models have cointegration relations built into the model specification such that it limits the long-run performance of the endogenous variables to join to their cointegrating relationships while allowing for short-run adjustment dynamics. Through a series of fractional short-run adjustments, the deviance from long-run equilibrium is rectified; hence the cointegration term is also referred to as the error correction term.

To take a simple example, assume a two- variable equation system with a single cointegrating equation as well as no- difference terms that are lagged. A cointegrating equation looks as follows:

$$y_{2,t} = \beta y_{1,t} \quad 4.23$$

The subsequent VEC model will be as follows:

$$\Delta y_{1,t} = \alpha_1\left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{1,t} \quad 4.24$$

$$\Delta y_{2,t} = \alpha_2\left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{2,t}$$

The error correction term is simply the one on the right-hand side of the above equation, of which in the long-term the same term tends towards zero. Nevertheless, if y_1 and $y_2 y$ digress from the equilibrium long run position, the error correction term will be not zero and hence partial restoration to the equilibrium relation will be the tendency of each of the variables. Furthermore, the coefficient α_j traces the rate at which adjustment of the j^{th} dependent variable tends towards the equilibrium position.

When estimating the VEC model it is critical to bear in mind that the model specification only applies where there is cointegration of the time series data. Thus there is need to conduct the Johansen cointegration test first in terms of the description provided above in order to determine the quantity of cointegrating associations. The first step involves estimating the cointegrating relations in terms of the Johansen procedure and in line with the cointegration test. Thereafter, the error correction terms can be constructed from the estimated cointegrating relationships and then estimating the VAR after differencing only once, and including the error correction terms as independent variables.

4.5.1 Output from the Johansen Vector Error Correction Model (VECM)

The estimation of the VEC output is made up of two parts. Firstly, there is a part involving reporting the outcome of step number one of the Johansen cointegration testing method. If restrictions are not imposed, the EViews system usually adopts the default normalisation that tries to identify all cointegrating relations. What the default normalisation does is to express the first r time series in the VEC as dependent on the rest $k - r$ variables, whereby r stands for the number of the cointegrating relations and k represents the number of dependent variables. The asymptotic standard errors which are corrected for the degrees of freedom are normally reported for the parameters that the EViews identifies under the restrictions. When providing restrictions, the standard errors tend not be reported except where the restrictions tend to identify all cointegrating vectors.

In the second part of the VEC output, reports on the results of step number two of the VAR in the first differences are provided, in addition to the error correction terms that were estimated from the first step. Normally the error correction terms are represented by the signs CointEq1, CointEq2, and so forth, in the VEC output. It is

moreover critical to take note that this part of the VEC output inclines to have a similar layout as for the output from the unrestricted VARs as lightened earlier in this chapter.

The dynamics between real output, capital, labour, financial development and financialisation can practically be analysed by means of the following VAR model, as summarised in the equation below:

$$\begin{pmatrix} y_t \\ l_t \\ k_t \\ f_t \\ fz_t \end{pmatrix} = \begin{bmatrix} a_{10} \\ a_{20} \\ a_{30} \\ a_{40} \\ a_{50} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix} \begin{pmatrix} y_{t-1} \\ l_{t-1} \\ k_{t-1} \\ f_{t-1} \\ fz_{t-1} \end{pmatrix} + \begin{bmatrix} a_{16} & a_{17} & a_{18} & a_{19} & a_{110} \\ a_{26} & a_{27} & a_{28} & a_{29} & a_{210} \\ a_{36} & a_{37} & a_{38} & a_{39} & a_{310} \\ a_{46} & a_{47} & a_{48} & a_{49} & a_{410} \\ a_{56} & a_{57} & a_{58} & a_{59} & a_{510} \end{bmatrix} \begin{pmatrix} y_{t-2} \\ l_{t-2} \\ k_{t-2} \\ f_{t-2} \\ fz_{t-2} \end{pmatrix} + \begin{pmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \\ e_{5t} \end{pmatrix} \quad 4.25$$

The equation above represents a reduced form second order vector autoregression (VAR) model which treats the natural logs of real output (*y*), labour (*l*), capital (*k*), financial development (*f*) and financialisation (*fz*) as endogenous variables and assesses them jointly in the system. The above VAR model can only be estimated in that form if all the variables are I(0). But, since the mentioned variables are most likely to be I(1), equation 4 cannot be estimated in its existing form. However, if the variables in question are cointegrated they can be estimated using the Johansen (1991) VAR/VECM methodology whereby a pth order (second order in the current case) reduced- form VAR system, as represented by equation 1, can be represented by the following Johansen (1991) and Johansen and Juselius (1990) augmented VECM that is used in this study, and shown in difference form in equation. Note that the VAR order=2 is an arbitrary selection. The study will use the Akaike information criterion, the Swartz Bayesian criterion and the Hanna Quinon criterion to develop the appropriate *p*th VAR model.

Equation 4 can be used to conduct Granger Causality tests in order to ascertain whether GDP can best be predicted by past developments in the financial sector or vice versa. Moreover, other causal relations can also be established through testing whether financialisation can predict stock market growth or GDP growth and vice versa.

As noted before, equation 4.25 above represents a reduced- form VAR model which treats the vector of variables entering it as endogenous and assesses them jointly in

the system. A p[th] order reduced -form VAR system as represented by equation 4 above can be represented by the following Johansen and Johansen and Juselius augmented VECM:

$$\Delta\mu_t = \mu_0 + \prod x_{t-1} + \sum_{i=1}^{p-1} \tau_{ix}\, \Delta x_{t-1} + \Psi D_t + \varepsilon_t \qquad 4.26$$

x_t is a k x 1 vector of endogenous I(1) variables, viz., $x_t = [y_t \quad l_t \quad k_t \quad f_t \quad fz_t]$, μ represents the intercepts coefficient, $\prod$ is a k x k long run multiplier matrix and τ_{ix} are k x k coefficient matrices describing the short run dynamics effects. The p is the VAR order (or lag length, w.r.t equation 4, p=2), and since the VECM representation is in differenced form the lag order reduces to p-1. The ε is a vector of independently and identically distributed innovations with zero mean. The D_t denotes a vector of I(0) exogenous variables and or dummies to accommodate for the short run shocks. These variables play more of a part in determining the long run cointegration relationships. They may have contemporaneous feedback(s) on the cointegrating variables and hence are included in the short run VECM.

While the D_t contains a dummy variable representing structural breaks in the data, (for example, transition to democracy, adoption of inflation targeting, the credit crunch episode),

Within the context of equation 5 above, the presence of cointegration is tested for by examining the rank of the $\prod$ matix. The presence of the reduced rank of $\prod$ (i.e. where the rank of $\prod$ =r<n, where the number of endogenous variables implies that there exist r cointegrating vectors and the matrix can be written as $\prod = \alpha\beta'$, with β containing the r cointegrating vectors and α describing the speed of adjustment to the long run equilibrium. If r>1, then the issue of identification arises. The study also adopts the economic theory to identify the r cointegating vectors that might be present within the VAR system.

Assuming r=3 (not implausible for a 5 variable vector) and in the light of the preceding discussions, the $\prod x_{t-1}$ term, which is also known as the vector error correction mechanism (VECM), captures the long run cointegrating relationships between the vector of variables and the short run adjustments consistent with the long run relationship as follows:

$$\Pi x_{t-1} = \begin{bmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} \\ \alpha_{61} & \alpha_{62} & \alpha_{63} \end{bmatrix} \begin{bmatrix} 1 & \beta_{21} & \beta_{31} & 0 & 0 \\ 1 & 0 & 0 & \beta_{42} & \beta_{52} \\ \beta_{11} & 0 & 0 & 1 & \beta_{53} \end{bmatrix} \begin{pmatrix} y_t \\ l_t \\ k_t \\ f_t \\ fz_t \end{pmatrix}_{t-1} \quad 4.27$$

Note that three restrictions (corresponding to r=3) have been placed on each of the three cointegrating vectors so that they can be identified. The first long run cointegrating vector is assumed to be the traditional Cobb-Douglas aggregate output equation, while the second tests whether stock market growth and short run financial inflows (or other proxies of financialisation) affect economic growth. The last equation assess whether stock market growth is affected by both real aggregate output and financialisation. Alternatively, if only one cointegrating equation (r=1) is found then the following VECM specification will arise:

$$\Pi x_{t-1} = \begin{bmatrix} \alpha_{11} \\ \alpha_{21} \\ \alpha_{31} \\ \alpha_{41} \\ \alpha_{51} \\ \alpha_{61} \end{bmatrix} \begin{bmatrix} 1 & \beta_{21} & \beta_{31} & \beta_{41} & \beta_{51} \end{bmatrix} \begin{pmatrix} y_t \\ l_t \\ k_t \\ f_t \\ fz_t \end{pmatrix}_{t-1} \quad 4.28$$

Embedded in the above cointegrating vectors are the hypotheses the study wishes to test. F and t tests as well as the Wald test will be used to assess the statistical validity of the identified vectors. Therefore, in this research, there is only one normalisation restriction i.e. B11=1, and the alpha coefficients, that is, $\alpha_{11}\alpha_{21}\alpha_{31}\alpha_{41}\alpha_{51}\text{and}\,\alpha_{61}$, are the short run adjustment of each variable in the system to correct output overstepping its long run equilibrium relationship.

4.6 Single Equation Techniques.

This section looks at the single equation model estimation methods which include the Fully Modified Ordinary Least Squares (FMOLS) estimation technique, the Dynamic Least Squares (DOLS), and the Canonical Cointegration Regression (CCR). These three single equation estimation and testing methods will be adopted in view of the thrust of this dissertation, which, as we have already said, is the impact of financial development, and financialisation on economic growth in South Africa.

4.6.1 Fully Modified Ordinary Least Squares (FMOLS)

According to Phillips and Hansen (1990) a proposal was considered for an estimator that makes use of the so-called semi-parametric correction to remove the teething troubles instigated by the long-term association or correlation amongst the cointegrating equation as well as the stochastic explanatory variables inventions and innovations. Phillips and Hansen (1990) recognised that the resulting FMOLS estimator is basically asymptotically unbiased and also that it had fully efficient mixture normal asymptotics which allow for standard Wald tests using asymptotic Chi-square statistical inference.

In addition, the Fully Modified Ordinary Least estimator adopts the initial estimates of the symmetric as well as the single-sided long-term co-variance matrices of the residuals directly from the difference regressions such as the following:

$$\Delta X_t = \tau_{21'}\Delta D_{1t} + \tau_{22'}\Delta D_{2t} + \partial_{2t} \qquad 4.29$$

If we let Ω and λ be the long-term covariance matrices calculated adopting the residuals such as $\partial_t = (\partial_{1t}, \partial'_{2t})'$ then the modified data may be defined as follows:

$$y_t^+ = y_t - \widehat{\in}_{12}\, \Omega_{22}^{-1}\partial_2. \qquad 4.30$$

Also, the estimated bias correction term may be defined as follows:

$$\forall_{12}^+ = \forall_{12} - \widehat{\in}_{12}\, \Omega_{22}^{-1}\lambda_{22}. \qquad 4.31$$

Thus the FMOLS estimator is presented as follows:

$$\widehat{\nabla} = \begin{bmatrix} \beta \\ \widehat{\gamma_1} \end{bmatrix} = (\sum_{t=2}^{T} Z_t Z_t')^{-1}\left(\sum_{t=2}^{T} Z_t y_t^+ - T\begin{bmatrix} + \\ \forall_{12'} \\ 0 \end{bmatrix}\right) \qquad 4.32$$

where $Z = (X_t', D_t')'$. Central to the FMOLS estimation is the creation of long-run covariance matrix estimators, represented by Ω and λ.

Prior to describing the choices available for the purposes of calculating the matrices represented by Ω and λ, it would be critical to provide the meaning of the following scalar estimator:

$$\widehat{\in}_{1.2} = \widehat{\in}_{11} - \widehat{\in}_{12}\, \Omega_{22}^{-1}\, \widehat{\in}_{21} \qquad 4.33$$

which is basically understood as the estimated long-term variance in terms of the μ_{1t} conditional on μ_{2t}. We may, if desired, apply a degree-of-freedom correction to $\widehat{\epsilon}_{1.2}$.

Hansen (1992) showed that the Wald statistic in terms of the null hypothesis may be presented as $R\emptyset = r$

$$W = (R\emptyset - r)'(RV(\emptyset)R')^{-1}(R\emptyset - r) \qquad 4.34$$

where $V(\emptyset) = \widehat{\epsilon}_{1.2}\ (\sum_{t=2}^{T} Z_t Z_t')^{-1}$

tends to have an asymptotic X_g^2-distribution, whereby g represents the quantity of restrictions executed by R.

Hansen (1992) asserts that the theoretical claims are not always obvious hence the need for testing nonlinear hypotheses in models with trend regressors, however EViews provides for the tests with nonlinear restrictions since others, such as Phillips and Loretan (1991) and Park (1992) provide results in the absence of the trend regressors. Accordingly, caution should be exercised when interpreting the nonlinear restriction test findings or results when dealing with equations that involve such explanatory variables.

4.6.2 Canonical Cointegration Regression (CCR)

Park (1992) came up with the so-called Canonical Cointegrating Regression (CCR) which is however very closely like linked to the FMOLS. The notable difference is that it makes use of the stationary alterations of the (y_{1t}, X_t') data to acquire the least squares estimates and to eliminate the long-run dependency amongst the cointegrating equation and the stochastic independent variable innovations. Just like the FMOLS, the CCR estimations trail a mixture of normal distribution that is free from non-scalar trouble parameters and allows asymptotic Chi-square testing.

In addition, just like in the case of FMOLS, step one in the CCR involves getting the estimations of the $\partial_t = (\partial_{1t}, \partial_{2t}')'$ inventions and innovations as well as the parallel and steady estimations of the long-term covariance matrices represented by Ω and λ,. Furthermore, unlike the FMOLS, the CCR calls for a reliable estimator of the simultaneous covariance matrix ∑.

Subsequent to the suggestions of Park, the columns of λ are extracted as they correspond to the biased long-term covariance matrix of ∂_t as well as the levels and lags of ∂_{2t}.

$$\lambda_2 = \begin{bmatrix} \forall_{12} \\ \lambda_{22} \end{bmatrix} \quad 4.35$$

The $(y_{1,t}, X_t')$ can be transformed by the use of the following:

$$X_{t^*} = X_t - (\sum^{-1} \lambda_2)' \partial_t \quad 4.36$$

$$y_{t^*} = y_t - \left(\sum^{-1} \lambda_2 \hat{\beta} + \begin{bmatrix} 0 \\ \Omega_{22}^{-1} \hat{\partial}_{21} \end{bmatrix}\right)' \partial_t \quad 4.37$$

where $\hat{\beta}$ refers to the estimates of the equation coefficients that are cointegrating, characteristically, the single equation ordinary least squares estimates employed to get the residuals ∂_{1t}.

Thus the CCR estimator refers to an OLS that is applied to the altered data

$$\begin{bmatrix} \beta \\ \forall_1 \end{bmatrix} = (\sum_{t=1}^{T} Z_{t^*} Z_{t^*}')^{-1} \sum_{t=1}^{T} Z_{t^*} y_{t^*} \quad 4.38$$

where $Z_{t^*} = (Z_{t^*}', D_{1t}')'$.

Hence, Park reveals that the CCR alterations asymptotically remove the endogeneity resulting from the long-term correlation of the cointegrating equation error terms as well as the stochastic regressor innovations, and at the same time correct for asymptotic bias emanating from the concurrent correlation amongst the regression as well as the stochastic regressor error terms. It follows that the estimates resulting from the CCR are fully efficient and also have the same impartial, fusion and normal asymptotics as the FMOLS.

4.6.3 The Dynamic Ordinary Least Squares (DOLS)

Saikkonen (1992) and Stock and Watson (1993) developed a modest method to building an asymptotically efficient estimator which removes the response in the cointegrating system. The approach is the so-called Dynamic OLS (DOLS), which involves augmenting the cointegrating regression with lags and leads of ΔX_t in such a way that all the historical stochastic transformations on the regressors are orthogonal to the resulting cointegrating equation error term.

$$y_t = X_t'\beta + D_{1t}'\forall_1 + \sum_{j=-q}^{r} \Delta X_{t+j}'\delta + \vartheta_{1t} \qquad 4.39$$

Thus given such an assumption whereby addition of q lags and r leads in terms of the differenced regressors tend to cause all of the long-term correlation amongst u_{1t} and u_{2t}, least-squares estimates of $\emptyset = (\beta', \forall')'$ tend to have similar asymptotic distribution to the ones obtained from FMOLS and CCR.

The estimator from the asymptotic variance matrix denoted as $\emptyset$ possibly will be calculated by working out the typical OLS coefficient covariance, but substituting the standard estimator for the residual variance of ϑ_{1t} with an estimator of the long-term variance of the residuals.

In addition, forecasting and modelling a solution by means of equations estimated through the DOLS approach is also grounded in the long-term associations. Thus if one wishes to build forecasts that include short-term dynamics, the least squares can be adopted for estimating an equation that clearly embraces the lags and leads with regard to the cointegrating regressors.

4.7 Model Specifications

Specifying the model involves the process of determining which of the available explanatory variables should be used or left out in a regression equation. Generally, the process of regression model specification is based chiefly on theoretical considerations instead of methodological or empirical considerations. It follows that a multiple regression model refers to a hypothetical proclamation in respect of the causality association amongst the selected explanatory variables as well as the dependent variable. In fact, three distinct stages are observable in the process of regression analysis. These stages are the model specification, the estimating of the parameters in the specified model, and thirdly, the interpreting of the identified parameters. Of these stages, model specification is the leading and most important of these stages. Accordingly, the estimation of the parameters of a specified model as well as the interpretation of the same is based on the accurate specification of the regression model. Subsequently, difficulties can arise each time we do not specify a model correctly. The two most likely types of errors which can be made in model specification are: firstly, the inclusion in the regression model of an explanatory variable that is theoretically irrelevant and can result in model misspecification;

secondly, a model can be mis-specified by leaving out a theoretically explanatory variable in the regression model.

Regression analysis is adopted using advanced time series with cointegration analysis (both single and multiple equation methods). As indicated earlier in this chapter, in order to avoid spurious regressions, the study first establishes whether the variables are stationary by conducting a variety of stationarity tests that are programmed in Eviews 9 econometrics software. Chief among these approaches is the augmented Dickey Fuller test. A-priori, we expect all the variables to be non-stationary with the order of integration being I(1), I.e., requiring just first differencing to render the series stationary, as is typical for most time series variables.

After that, the Johansen test for cointegration is used to establish long run relationships between the variables. If long run relationships do exist then the study will attempt to test the various hypotheses outlined above. Moreover, the study will attempt to estimate the exact magnitudes of causal associations between the variables. In this study, we employ the following Cobb-Douglas endogenous growth model to study the long run relationship between economic growth and financial development and financialisation:

$$GDP_t = AL^{\beta_1}K^{\beta_2}FIN^{\beta_3}u^{e_t} \qquad 4.40$$

Equation 1 assumes that real output is a function of labour (L), capital (K) and a proxy for financial development (FIN). Financial development will be represented by market capitalisation, real stock market growth, and growth in M3. Note that A represents the level of technology in the economy.

Furthermore, in order to assess whether financialisation has an impact on economic growth, the study will expand equation 1 as follows:

$$GDP_t = AL^{\beta_1}K^{\beta_2}FIN^{\beta_3}FZ^{\beta_4}u^{e_t} \qquad 4.41$$

Equation 2 is an extension of equation 1, for it now includes the additional variable (FZ) to represent financialisation and will be proxies by variables such us household credit growth, household debt, net foreign purchases of stocks and bonds. Capital and labour will serve as control variables in this study. Equation 2 can be log linearised as follows, in order to enable it to be econometrically analysed:

$$y_t = \beta_0 + \beta_1 l_t + \beta_2 k_t + \beta_3 f_t + \beta_4 fz_t + e_t \qquad 4.42$$

where, β_0=lnA (natural log of A), and l and k denote the natural logs of labour and capital respectively, while f and fz indicate the natural logs of financial development and financialisation respectively, and e_t is assumed to be random error terms with a mean of zero and constant variance. Note that time subscripts have been added to the variables.

VAR analysis has been widely practically applied to impact analysis of the monetary policy transmission mechanisms to the rest of the economy. However, not much in terms of VAR application has been used to analyse financial sector developments in relation to economic growth as measured by real GDP. On the empirical side, using a time-series cross-section data set of 13 countries over the time period from 1986 until 2007, Dunhaupt et al (2013) explored and analysed financialisation as it relates to labour's share of income.

4.8 Justification of the choice of variables

The variables in the model were chosen based on the theoretical and empirical considerations as covered in chapters two and three of this dissertation respectively. In view of the topic focussing on the impact of financial market development and financialisation on economic growth variables have been selected due to suitability and relevance. The change in the GDP was used as an indicator of the economic growth rate because it a popular choice of the performance level economic growth indicator in many economies and in the South African economy where the data is available on a quarterly and yearly basis. Labour is a very important factor of production in any economy because theoretically it cannot be separated from its owners and its use does not only contribute to the growth of the economy but also to improving the welfare of the owners of this factor. In this regard the index of employment in the public and private sector was adopted as measures of labour. In addition, the gross fixed capital formation represents contribution of capital in the economy, so it measures capital investment. On the same note, it is critical to point out that dynamics in the financial markets are key drivers of investment growth in every economy. The three variables which are the total turnover value of shares in money terms, the bank liabilities, as well as the broad money supply, denoted as M3, were selected as measures of financial sector development; last but not least we

selected private credit to households and bond purchases by non-residents as a ratio of market capitalisation as proxies for measuring financialisation.

The bond purchase by non-residents expressed as a ratio of market capitalisation was adopted in this research as a proxy for financialisation, based on the perception that since market capitalisation refers to the market value of a company's outstanding shares it follows that any increased lending instruments not for productive purposes would constitute financialisation. Thus, increased property ownership by non-residents as well as permanent residents is likely to lead to increased demand for financial lending facilities including bonds**.** The consideration of bond purchases as a proxy for financialisation has not been used in any research so far. However, Lapavitsas, (2012) observed that financialisation of developed countries includes increased lending to individuals in the form of bond purchase as well as the adoption of investment banking by commercial banks, thus contributing directly to the crisis of 2007-9. On the other hand, Bezemer and Samarina, (2015) note that this is a potentially alarming trend as the literature reveals that if bank balance sheets are increasingly dominated by household credit creates macro vulnerabilities and adverse economic growth effects.

Ekpu and Paloni, (2015) also conducted some research motivated by the consequences of the process of financialisation in the United Kingdom. It has been argued that one of the effects of financialisation is a sporadic transformation in the business strategies emanating from the financial institutions, which have diverted to new areas of profitability involving transactions in open financial markets and household/consumer lending, thereby moving away from the traditional business lending focussing on productive purposes. This also serves to justify selecting household credit as a suitable variable for measuring financialisation.

TABLE 4.1: LIST OF VARIABLES CONSIDERED IN THE MODEL

Variable	Variable in log form	Code	Unit of measure	Description
Bank liability	LB	KBP1077M	Million rands	Liabilities of banking institutions/ banking deposits.
TTVR	LVA	KBP2039M	Million rands	Secondary market stock exchange transactions. Total value (turn over) of shares traded on the JSE.
M3	LM	KBP1374N	Million rands	Monetary aggregates/money supply denoted as M3.
Pvt Lbr I	-	KBP7008L	Index	Total employment at 2010 as base year in the private sector index.
Pub Lbr I	-	KBP7002L	Index	Total employment at 2010 as base year in the public sector index.
*Total Labour	LL		Total Index	Total employment index in South Africa with 2010 as base year.
GFKF	LK	KBP6009D	Million rands	Gross fixed capital formation/ Investment.
Real GDP	LY	KBP6006D	Million rands	Gross domestic product at 2010 constant prices.
PCrHDs	DLC	KBP1505M	Million rands	All monetary institutions: credit extended to the domestic private sector/ loans and advances to households.
BPNR	RBPNR	KBP2553M	Million rands	Purchases of bonds by non-residents on the Bond Exchange of South Africa.

Notes: *Total labour was constructed as a weighed sum of (70% weighting) total employment in the private sector index PLUS (30% weighting) total employment in the public sector index. Weights were chosen as the approximate share of the respective sectors' contribution to total employment in the South African economy.*

However, before undertaking the preliminary stationarity tests the table above shows all the variables used in this research and described in terms of how they will be represented in all respects hereafter in this dissertation. For example, we have time series data that is presented in log form or otherwise as noted in Table 4.1.

4.8.1 Real Gross Domestic Product (GDP)

By economic growth we mean the increase in the quantity of output in terms of goods and services, implying that the GDP, or rather the real GDP, which indicates or informs us about economic growth excluding the inflationary effects. The GDP has been selected specifically for the purpose of measuring economic growth or production in the economy. Gross Domestic Product refers to the monetary sum of all final goods and services produced within a country over a period of time, without the effect of double counting of other products that are used somewhere else in other production. From this we can see that GDP provides an all-inclusive measure,

encompassing the manufacturing of consumption goods and services, and government services as well as capital goods. Hence in a single number in terms of GDP one can see how the economy is fairing over a period of time, that is, whether the economy is expanding or contracting. A Nobel laureate and author of many text books, Paul Samuelson, pronounced that GDP as actually amongst the great developments of the twentieth century, a guiding light that aids economists and the policymakers to navigate the economy towards crucial economic goals. In this research we use the GDP code KBP6006D as provided from the South African Reserve Bank statistical research; it is measured in millions of rands.

4.8.2 Index of employment in the public and private sector

The statistics in the public sector as well as in the private sector are primarily used for monitoring variations in terms of numbers of individuals employed in the South African public sector as well as the private sector. Total employment with the code KBP7008L provides an index for all persons who are employed in the private sector. Total employment with the code KBP7002L is an index of all persons who are employed in the public sector. According to Bosch Adél (2015), in South Africa, on average, the public sector absorbs one third of total employment while the private sector takes up two thirds although there has been a rise in employment in the government sector since 2006. Thus in this study an allocated weight of 70% was given to private sector employment and a weight of 30% of the total employment in the public sector.

4.8.3 Gross Fixed Capital Formation

The notion of Gross fixed capital formation, formerly called gross domestic fixed investment, involves things such as: land improvements, for instance, fences, ditches, and drains; plant and machinery; equipment bought; road and railway construction; construction of schools, hospitals, clinics, residential private homes, offices, and industrial and commercial buildings. In terms of the 1993 system of national accounts (SNA), the net acquisitions of valuables are also considered capital formation. In this dissertation gross fixed capital formation is coded KBP6009D, as per the South African reserve bank online statistical data.

4.8.4 Total value turnover of shares traded on the JSE

The value of shares traded refers to the sum of all shares that were traded, domestically as well as internationally, and is multiplied by their corresponding equivalent prices. On the Johannesburg Stock Exchange(JSE), the secondary market stock exchange transaction as measured by the total value turnover of shares trade at the JSE has a code KBP2039M and is measured in millions of rands. In this research the total value turnover of shares traded on the JSE is used as a proxy for financial sector development.

4.8.5 Broad money supply, M3

Kumar (2014) also used M3 as a proxy for financial intermediation in the growth of the economy, hence it is treated as an alternative proxy for financial development. The broad money supply (M3) refers to all the currency circulating in the economy plus short-term deposits and long-term deposits with a maturity of up to three years, plus demand deposits that can be redeemed with maturity of up to ninety days, together with repurchase agreements plus the money market fund shares or units as well as the debt securities of up to three years. Theoretically, the money supply (M3), or the broad money supply, entails the utmost comprehensive description of the supply of money in the economy. But as money can be traded for numerous and diverse financial instruments and placed in countless restricted accounts, it poses a challenging task for policy makers such as economists to determine how much currency is presently circulating in the economy, whereas a financial instrument is just a paper or document that represents a permissible covenant linked to some kind of financial value. Nowadays in the financial markets, the financial instruments are grouped as equity- based to represent the ownership of an asset, or they can be grouped as debt- based to represent loans made by investors to the owners of assets. Hence, supply of money is measured in several and diverse ways. On the SARB system, M3 is coded KBP1374N and in this dissertation broad money supply is used as a proxy for financial development.

4.8.6 Bank liabilities

The liabilities of a bank refer to the debts that the bank incurs, and they constitute what the bank owes to cash depositors. Whilst banks are guaranteed to have customary business liabilities and debts for items such as electricity, office supplies

and employee wages, the main part of the banks' liabilities represent financial and legal claims or the IOUs that the banks issue to the public. In this research, the liabilities of banking institutions are in the form of total deposits and are coded KBP1077M on the SARB system and are a proxy for financial sector development in one of the models since banking innovations are considered to be correlated with the growth and development of the financial sector. To complement the adoption of bank liabilities as a proxy for financial development, Valverde, del Paso and Fernandez, (2004) in their cross- country results, confirmed that there is a significant and positive correlation between financial deepening in the banks and regional economic growth. Zhuang, (2009) also referred to bank liabilities as a proxy for financial development in concluding that it is extensively established that financial sector development, supports the reduction of poverty by extending the access to finance by vulnerable groups and the poor. Accordingly, the availability of finance enhances the facilitation of transactions, reduces the cost involved in remitting funds, provides an opportunity for assets accumulation and increase consumption, and empowers the poor households to better manage the shocks, hence alleviating the poverty risk. Moyo, (2014) in her studies, concludes that macroeconomic, bank-specific and institutional factors are significant in envisaging periods of bank distress.

4.8.7 Private credit to households

The credit extension provided by the domestic banks is normally to the rest of the sectors of the economy, including to non-residents. With regard to financial instruments, the concept of credit encompasses principal debt, debt securities *as* well as cash and other forms of deposits. Many reasons can be identified as to why households enter into credits transactions. Basically, consumer credit is linked to the willingness of consumers to sacrifice their future consumption in order to satisfy their current consumption. Future consumption is given up mainly because consumers will be using income to be received in future in order to pay for the debts as well as the interest charges so they will be having even less money available to spend in future. In our research, private credit to households is used as a proxy for financialisation. On the South African reserve bank, private credit to households is code- named KBP1505M and can be described as all monetary institutions' credit extended to the domestic private sector involving loans and advances to the households.

4.9 Capturing and coding of time series data

The capturing and coding of time series data from secondary sources is done on an Excel spreadsheet. In this research study we rely on secondary data obtained from institutions such as the South African Reserve Bank, the Statistics South Africa bulletins, and the Johannesburg Securities Exchange (JSE).

4.10 Relevant data transformations

Data are gathered and transformed, as appropriate, by converting all the variables monthly to quarterly data. Thus in this study, for the total employment in South Africa from both public and private sectors, an allocated weight of 70% was given to the private sector employment and a weight of 30% to the public sector. This was based on the proposition that the private sector absorbs more of the labour force than the public sector, as indicated in section 4.7.2 above. In addition, log-linear transformation of variables results in the computations of new variables for the purposes of checking the elasticities of our coefficient variables. Thus log transformation is done in order to interpret coefficients as elasticity values. The series for domestic credit in our model was also a transformed result of *lc-lc(-1).* The letters *dlc* in this case represent the value for domestic credit.

4.11 Data Issues in the model specification

The proxy for financialisation in this research is private credit to households. Household debt-income ratios and corporate debt-equity ratios across industries are therefore analysed in the light of the existence of financialisation. From the Reserve Bank of South Africa (SARB) website, the data on private credit to private sector starts from the month of March 1994 to June 2015 is used in this study. In addition, three proxies are used in this research to represent development in the financial sector, namely, the total value turnover of shares trade on the Johannesburg Stock Exchange (JSE), broad money supply (M3), and bank liabilities (which are also retrieved from the SARB website). The proxy for economic growth is represented as Gross Domestic Product (GDP) at constant prices or real GDP, and the proxies for the two control variables which are labour and capital are, respectively, total index of employment in the public and private sector, and Gross Fixed Capital Formation. Time series analysis of the abovementioned proxies will enable us to see the rate of financialisation, or growth of financial sector developments, in relation to the rate of

economic growth as measured by real GDP and whether the two are moving in the same direction over time.

4.12 Data frequency and sample size.

This research will make use of quarterly data (1988:Q1-2015:Q4). Thus the number of observations as implied by the time period will be 180 quarterly observable variables.

4.13 Conclusion

This chapter provided an outline of the various econometric techniques adopted in this research project, which are: the time series basics; stationarity and unit root testing; Augmented Dickey-Fuller (ADF); cointegration; testing for cointegration; Vector Autoregressive (VAR) model Analysis; the Vector Error Correction model (VECM); the single equation techniques of analysing the relationships between the variables; specification of the model to be estimated and the description as well as justification of the variables. The remaining sections involved: capturing and coding of time series data; relevant data transformations; data Issues in the model specification including the frequency and the sample size and, lastly, the conclusion.

CHAPTER 5

MODEL ESTIMATION, DATA ANALYSIS AND PRESENTATION OF RESULTS

5.0 Introduction

The key focus of this chapter is to conduct an analysis of the effect of financial market development and financialisation on economic growth in South Africa, with a view to unearthing the consequences. In this chapter, the research findings are presented subsequent to conducting the estimation of the models as well as data analysis. The whole of chapter five will proceed as follows: section 5.1 gives an outline of the descriptive statistics; section 5.2 looks at correlation matrices while section 5.3 looks at stationarity and unit root testing, particularly the Augmented Dickey Fuller. The VAR/VECM applications are conducted in 5.4. The testing and interpretation of cointegration and VECM analyses of results are dealt with in section 5.5 together with the presentation of findings. Section 5.6 looks at single equation techniques, namely, are the Fully Modified Ordinary Least squares (FMOLS), the Dynamic least squares (DOLS) and the Canonical Cointegration Regression (CCR). Section 5.7 provides the conclusion.

5.1 Descriptive Statistics and data issues

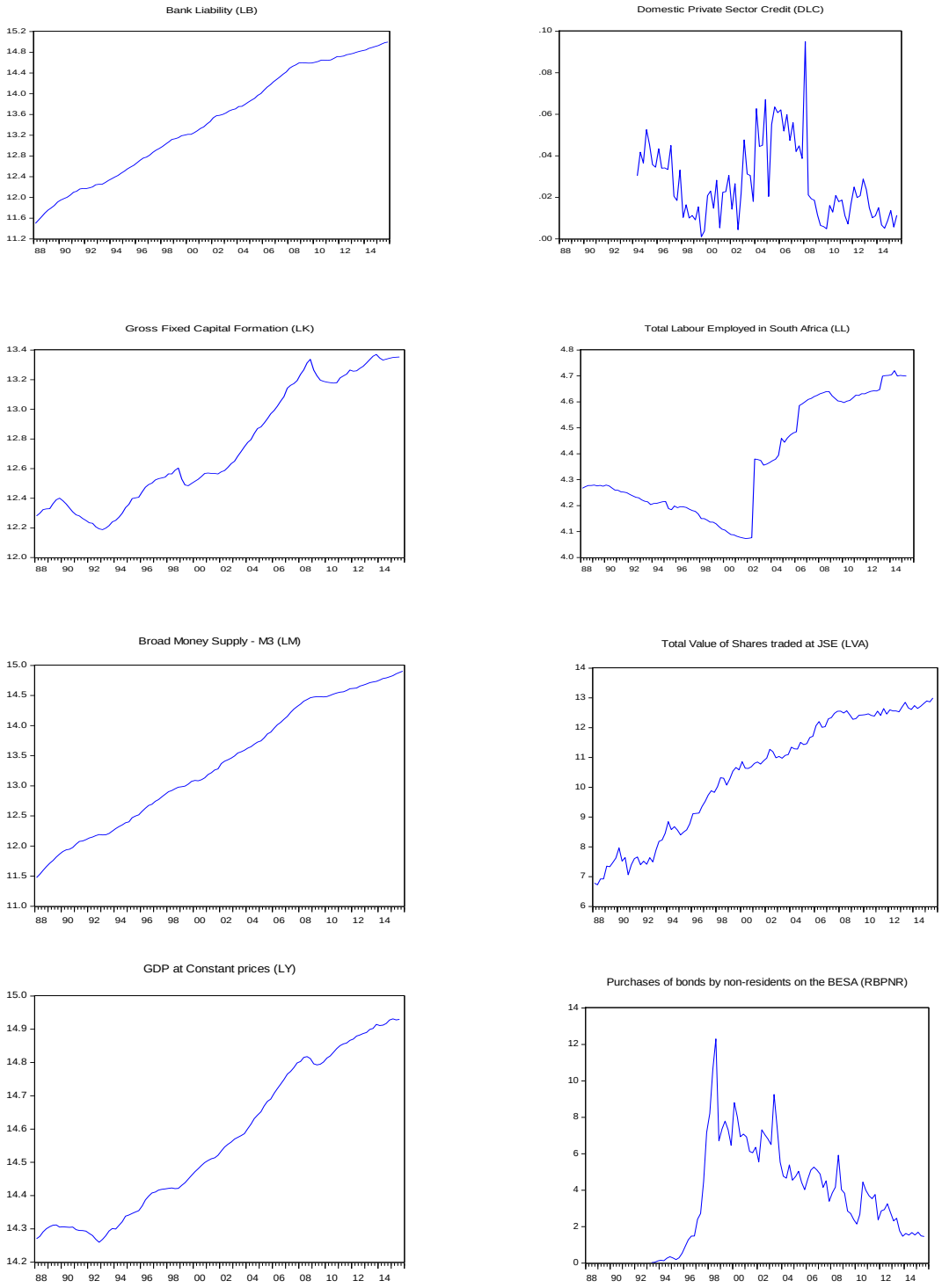
It is always critical to undertake a preliminary assessment of the characteristics of the data under investigation for the purposes of grasping a picture of the key tenets of the data before undertaking the actual practical processes.

5.1.1 The graphical plot of our time series data:

The graphical presentation of the time series data in this research study is shown below. From a panel of graphs in 5.1. below, the seven variables are plotted against time, and in levels. Generally, the graphs show that the time series data of the seven variables, that is, the natural logs of bank credit for financial development (LB), the differenced domestic credit (DLC), capital (LK), labour (LL), national output (LY), total value (turn over) of shares traded on the JSE (LVA), the purchases of bonds by non-residents on the Bond Exchange of South Africa (RBPNR) and broad money supply (LM) are either not stationary or they tend to vary with time and a drift. Overall, they are all characterised by an upward trend, with the exception of LL, which starts with a general falling from 1988 until 2002 when there was a sharp increase which stabilised and lasted until 2015. Section 5.3 below will provide

extensive and practical testing of unit root of testing for stationarity, such as the Augmented Dickey-Fuller test for the purposes of confirming what has been presented in the graph plots in this section.

Panel of Graphs 5.1: graphical presentation of the variables in levels



Source: Generated by Author using SARB data

Notice that all the variables show strong positive trends except for purchases of bonds by non-residents which illustrates a negative trend from 1998 onwards, and domestic private sector credit which does not display a distinct trend over the period.

Regarding the descriptive statistics, Table 5.1 below shows an abridged version.

Table 5.1: Descriptive Statistics

	DLC	LB	LK	LL	LM	LVA	LY	RBPNR
Mean	0.027222	13.84322	12.87611	4.408147	13.73021	11.29428	14.64237	4.269335
Median	0.021179	13.83581	12.86984	4.444414	13.72592	11.43223	14.64179	4.153097
Maximum	0.094976	14.95904	13.36999	4.720105	14.86142	12.89810	14.93118	12.29997
Minimum	0.000998	12.39383	12.27208	4.073121	12.32383	8.400060	14.31047	0.129671
Std. Dev.	0.018580	0.793051	0.354620	0.229786	0.794204	1.322236	0.197882	2.577993
Skewness	0.987361	-0.215227	-0.000599	-0.148686	-0.165568	-0.675534	-0.070434	0.482460
Kurtosis	3.804951	1.681908	1.394944	1.370490	1.629719	2.336677	1.540650	2.970536
Jarque-Bera	16.10563	6.809409	9.124062	9.717381	7.038427	8.023240	7.612971	3.300610
Probability	0.000318	0.033217	0.010441	0.007761	0.029623	0.018104	0.022226	0.191991
Sum	2.313837	1176.673	1094.469	374.6925	1167.068	960.0141	1244.602	362.8935
Sum Sq. Dev.	0.028997	52.83014	10.56343	4.435341	52.98385	146.8580	3.289210	558.2682
Observations	85	85	85	85	85	85	85	85

5.2 Correlation Matrices

In order to investigate the correlation between many variables at the same time, the correlation matrix is adopted in this research and is presented in table form showing correlation coefficients between all of the variables. The notion of correlation measures the strength of statistical relationship between a variable and other variables. The value of the correlation coefficient ranges between negative one and positive one. A correlation coefficient of positive one implies a perfect movement of one variable and another variable in the same direction, whereas a correlation coefficient of negative one implies a perfect movement of one variable and another variable in the opposite direction. On the other hand, a correlation coefficient of zero implies there is no association regarding the movement of two variables assumed to be correlated.

The correlation matrix Table 5.2 below shows the various correlation coefficients between each variable and the rest of the variables.

Table 5.2: Correlation Matrix

	DLC	LB	LK	LL	LM	LVA	LY	RBPNR
DLC	1.000000	-0.193305	-0.139593	-0.015696	-0.189916	-0.171657	-0.158862	-0.105266
LB	-0.193305	1.000000	0.978909	0.913349	0.999539	0.977352	0.994867	-0.170309
LK	-0.139593	0.978909	1.000000	0.952147	0.982705	0.937503	0.986453	-0.267918
LL	-0.015696	0.913349	0.952147	1.000000	0.921724	0.844249	0.935390	-0.404856
LM	-0.189916	0.999539	0.982705	0.921724	1.000000	0.972871	0.996759	-0.189397
LVA	-0.171657	0.977352	0.937503	0.844249	0.972871	1.000000	0.961344	-0.000325
LY	-0.158862	0.994867	0.986453	0.935390	0.996759	0.961344	1.000000	-0.239930
RBPNR	-0.105266	-0.170309	-0.267918	-0.404856	-0.189397	-0.000325	-0.239930	1.000000

5.3 Stationarity and unit root testing

In the previous section, the preliminary graphical inspection of the presence of unit root test or stationarity checks on the available data was reflected. However, it is critical to undertake formal unit root testing of all the variables entering the VAR system in order to observe the integration characteristics of the time series data for the purposes of avoiding the generation of spurious regression results. In this section, a formal stationarity test using the Augmented Dickey Fuller (ADF) is conducted. Observation of the panel graphs 5.1, reveals that most of the variables in this study are nonstationary and have a trend. However, their non-stationarity can be converted to stationarity by first differencing the data, indicated as I(1). Subsequently, table 5.3 shows the unit root testing results of the time series data in levels. Hence, it is expected to render stationarity to the time series data upon first differencing of the data as shown in table 5.4.

Table 5.3: Augmented Dickey Fuller unit root Test Results

	Test in levels		Test after 1stdifference		
Variable	**ADF test (levels)**	**Critical Stat**	**ADF test (1st difference)**	**Critical Stat**	**Order of integration**
LY	-2.448345	-3.451568	-4.920728	-3.451568	I (1)
LK	-2.442463	-3.451568	-5.188441	-3.451568	I (1)
LL	-1.727868	-3.451568	-10.25206	-3.451959	I (1)
LVA	-1.730876	-3.451184	-12.86179	-3.451568	I (1)
LM	-0.870402	-3.451184	-6.561678	-3.451184	I (1)
LB	-0.754072	-3.451184	-5.896150	-3.451184	I (1)
LC	-2.258800	-3.464865	-2.677836	-3.464198	I (2)
DLC (LC_t-LC_{t-1})	-2.677836	-3.464198	-10.30739	-3.464865	I (1)
RBPNR	-1.012463	-1.944487	-10.01838	-1.944530	I (1)

Notes:

*LC variable was found to be I(2), however upon differencing twice it was rendered I(0).

*All tests were conducted at 5% level of significance.

5.4 The VAR/VECM applications and techniques

From the above section it is concluded that all the variables considered in the model are non-stationary in levels, however, after first differencing it is observed that they all become stationary. In this section the development of the VAR/VECM model is considered. Steps involved in development of the Vector Error Correction Model (VECM), include lag structure selection, the deterministic components and the Johansen test of cointegration, and, lastly, the conducting the Vector Error Correction Model (VECM).

5.4.1 Lag Structure selection

Before performing the VAR or the VECM estimation, it is always critical to first determine the selection of the VAR order (p). Basically, the autoregressive models or the vector autoregressive models are normally used for the analysis of multivariate time series. Hence, structurally, each variable tends to assume a linear function of its past lags and of the past lags of the other variables.

The effect of lag length on inference has been demonstrated by Lutkepol, (1993) i.e. that choosing a higher lag order than the true lag structure causes a higher mean square forecasting error of the VAR. On the other hand, under-fitting the lag length structure results in the generation of auto-correlated errors. Maringer and Winker, (2014) also assert that where the lag is too short, it leaves some information unexplained in the disturbance error term, thereby generating a kind of a statistical model where only a subset of the information is adopted to represent the data, and hence giving spurious relevance to the coefficients.

In this research, the chosen variables are economic growth (LY), capital formation (LK), labour (LL) financial development as measured by money supply (LM), and financialisation which is proxied by (DLC).

Table 5.4: VAR Lag Order Selection Criteria in a model involving M3 (LM)

Endogenous variables: LY LK LL LM DLC
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	582.0769	NA	4.46e-13	-14.24881	-14.10101	-14.18951
1	1166.604	1082.457	4.47e-19	-28.06429	-27.17746*	-27.70848*
2	1196.654	51.93896	3.97e-19	-28.18899	-26.56313	-27.53668
3	1222.863	42.06295*	3.92e-19*	-28.21883*	-25.85394	-27.27001
4	1240.018	25.41508	4.93e-19	-28.02513	-24.92122	-26.77980

* 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

Five criteria can be used for lag structure selection. As indicated in the table above, the five criteria are: LR: sequential modified LR test statistic (each test at 5% level), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ). According to Hossain (2015), all five criteria are equally important in selecting the lag order. However, in order to select an optimal number of lags it is advisable to consider the frequent lag order according to different criteria. The lag orders highlighted in yellow from table 5.4 above are the ones chosen by different criteria. Accordingly, LR, FPE, and AIC suggest lag order three, while HQ and SC select lag order number two. Thus the optimal lag structure is lag order number three.

The significance of determining the lag length was revealed by Braun and Mittnik, (1993) who found that the estimates of any VAR whereby the lag length tends to vary from the actual lag length are not consistent compared to the impulse response functions and variance decompositions that are derived from the VAR estimation. However, Hafer and Sheehan, (1989) asserted that the accuracy of forecasts from VAR models differs substantially for unconventional lag lengths. Accordingly, in this research we adopted the optimal lag order as recommended by the SC: Schwarz information criterion, and the HQ: Hannan-Quinn information criterion. Subsequently, the optimal number of lags to be adopted in the cointegration test and the successive VAR/VECM models is acknowledged by the Schwarz, and Hannan-Quinn information criteria. Appendix D of this dissertation provides the details of all the VAR Lag order selection criteria.

Table 5.5: VAR Lag Order Selection Criteria: a model involving bank credit (LB)

VAR Lag Order Selection Criteria
Endogenous variables: LY LK LL LB DLC
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	565.3314	NA	6.75e-13	-13.83534	-13.68754	-13.77604
1	1171.724	1122.949	3.94e-19	-28.19072	-27.30388*	-27.83491*
2	1204.241	56.20156*	3.29e-19*	-28.37631*	-26.75045	-27.72400
3	1224.487	32.49487	3.77e-19	-28.25895	-25.89406	-27.31013
4	1240.573	23.82986	4.86e-19	-28.03883	-24.93491	-26.79350

* 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

From the table above, which involves banking credit as a proxy for financial development, the five criteria adopted in selecting the lag structure are LR: sequential modified LR test statistic (each test at 5% level), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ). In order to select an optimal number of lags it is advisable to consider the frequent lag order according to different criteria. The lag orders highlighted in yellow in table 5.5 above are the ones chosen by the five criteria. Subsequently, LR, FPE, and AIC suggest lag order two, while HQ and SC select lag order number one. Thus the optimal lag structure is lag order number two.

The study assessed a VAR(3) and VAR(2) and all these produced plausible results. The estimation of VAR(1) was not necessary for the purposes of estimating a VECM, but the VAR needs to be first differenced in order to derive the VECM, i.e. a $VAR_{(p)}$ results in a $VECM_{(p-1)}$ specification. The study attempted all specifications from VAR(5) to VAR(2). The VAR(2) and the resulting VECM(1) specifications provided the most plausible results although the resulting VACM(1) was not identified by the VAR lag order selection criteria.

Three proxies for financial development were experimented with in this research: money supply (LM); the total value (turn over) of shares traded on the JSE (LVA); and the liabilities of banking institutions, that is banking deposits (LB). However, the model involving LVA did not give good results. Therefore only the models

incorporating broad money supply (LM) and the banking deposits (LB) were considered for further analysis since they provided credible results. However, the details of the model involving LVA are attached as appendixes to this study.

5.4.2 The Deterministic Components

This section deals with the determination of whether an intercept and the trend should be included in the model. Asteriou and Hall (2007) and Harris (1995) maintain that five different cointegration assumptions or deterministic models, also-called cases, can be considered:

Case 1: No intercept or trend in the cointegrating equation or VAR. However, this case rarely exists in practice since the intercept is needed in order to account for the adjustments in the unit of measurements.

Case 2: Involve the VAR model with intercept but with no trend. In actual practice, the intercept is confined to the long run model.

Case 3: In this model there is an intercept in the cointegrating vector with no trend in the cointegrating vector and VAR model. It is assumed that there exists an intercept in the cointegrating vector and VAR model. The assumption is that the intercept in the cointegrating equation is cancelled out by the intercept in the VAR, hence leaving only one interception in the short run.

Case 4: In this case, there is the intercept in both the cointegrating equation and the VAR model, a linear trend in the cointegrating equation but not in the VAR model. In this case there is no time trend existing in the short run.

Case 5: The intercept and the quadratic trend in the cointegrating equation, and the intercept and linear trend in the VAR model. This is also not a plausible option as it tends to be problematic in its interpretation from an economics point of view.

5.5 Cointegration tests, VECM analyses and presentation of results

Turning to the Johansen test for cointegration, it is an approach that accommodates more than one cointegrating relationship, which makes it different from the Engle Granger method. However, the Johansen test is subject to asymptotic properties whereby if the sample size is too small the results will not be reliable, hence one should consider adopting the Auto Regressive Distributed Lag (ARDL).

The other method is the Phillips-Ouliaris cointegration test, named after the proponents around the 1990s. According to this method it is revealed that the residual based unit root testing applied to the estimated cointegration residuals do not have the normal Dickey-Fuller distributions where the null hypothesis is that there is no cointegration. For the reason of spurious regression under the null hypothesis, the distribution of the said tests tends to have asymptotic distributions that depend on firstly, the number of deterministic trend terms and secondly, the number of variables with which cointegration is being tested.

Whereas The discovery that several macroeconomic time series data may possibly have a unit root prompted the evolution of the notion of stationarity as well as the analysis of time series. According to Engle and Granger, (1987) it was realised that an association of at least two variables that are not stationary can be established through time series analysis. Where such a linear relationship between two or more variables exists, the non-stationary time series data may be stationary. Accordingly, such a stationary linear association exists and as such the non-stationary time series is said to be co-integrated. Thus we end up having cointegrating equations, which can be interpreted as the long run equilibrium association among the variables under study.

5.5.1 Johansen test of cointegration: model involving LM

In this section, the Johansen cointegration testing is conducted and the results are presented and interpreted. The precondition for Johansen test of cointegration is that all variables in the model must be nonstationary at level, but converting all the said variables into first differenced makes them stationary, implying that all these variables must be integrated of the same order. Consequently, a formal stationarity test for existence of the unit root was conducted, (see part 5.3 of this chapter) and it was found that all our variables are non-stationary in level and they became stationary after first differenced.

While testing for cointegration, three models have been run: the model involving the variables LY; LL; LK; LM; and LDC; the model involving LY; LL; LK; LVA; and LDC; and a third one using LY; LL; LK; LB; and LDC. So, in essence, proxies for financial development have been changed in each model. Thus, in the second model, LVA, which is the total value (turn over) of shares traded on the JSE, is a proxy for

financial development. In the first test, LM was used, representing the monetary aggregates or broad money supply denoted as M3 to express a proxy for financial development. Lastly, the third model included LB, which represents bank deposits as a proxy for financial development. However, in all three models: LDC is maintained, that is representing all monetary institutions - credit extended to the domestic private sector/ loans and advances to households or just domestic credit, as a proxy for financialisation; LY representing real gross domestic product (GDP) as a proxy for economic growth; LL as a proxy for total employment index in South Africa; and LK representing fixed capital formation in South Africa. Accordingly, the study proceeded to perform the Johansen test of cointegration and the table below shows the results thereof.

Table 5.6: Summary of cointegrating assumptions: model involving LM

Included observations: 82
Series: LY LK LL LM DLC
Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	2	2	1	1
Max-Eig	2	2	1	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)

Table 5.6, above provides the five possible assumptions that are made in respect of the cointegrating equations that are possibly present among the variables in the dataset. The study attempted to estimate cases 2, 3 and 4. Case 4 proved to provide the most plausible results according to the Pantula Principle. As indicated above, practically case 1 and case 5 are regarded as incredible and are not often realistic given the data on macroeconomic time series. On the other hand, case 2, case 3 and case 4 represent three different models. The model represented by case 3 is different from cases 2 and 4 in that the trace statistic shows that there are two cointegrating equations and Maximum-Eigen reveals that there is only one cointegrating equation. However case 2 suggest that there are two cointegrating equations according to both trace and Maximum-Eigen, whereas case 4 suggests that there is one cointegrating equation according to both trace and Maximum-Eigen. Thus in cases 2 and 4, both trace and maximum-Eigen confirm the existence of one

cointegration model. However, case 2 has no intercept and no trend whilst case 4 has intercept and trend. Case 4 is therefore the only case that gives acceptable outcomes that are in line with economic theory. Subsequently, this study proceeds with case 4 that has intercept and trend and that suggests that there is only one cointegrating equation. The findings from the tests of cointegration on Trace as well as Eigen Maximum reveal that the time series variables are co-integrated with only one vector. These findings are in line with the results found by Harris, and Sollis, (2003) among others. Thus, the findings suggest a long-term equilibrium or relationship existing amongst all the variables in the model.

Table 5.7: Johansen test of cointegration results: model involving LM

Trend assumption: Linear deterministic trend
Series: LY LK LL LM DLC
Lags interval (in first differences): 1 to 2
Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.465924	101.1777	69.81889	0.0000
At most 1 *	0.233871	49.74596	47.85613	0.0329
At most 2	0.169241	27.90079	29.79707	0.0814
At most 3	0.092668	12.69673	15.49471	0.1264
At most 4 *	0.055964	4.722462	3.841466	0.0298

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.465924	51.43177	33.87687	0.0002
At most 1	0.233871	21.84517	27.58434	0.2284
At most 2	0.169241	15.20406	21.13162	0.2749
At most 3	0.092668	7.974267	14.26460	0.3813
At most 4 *	0.055964	4.722462	3.841466	0.0298

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5.7 above presents the cointegration test results, and it is evident that the trace statistic of 101.1777 is greater than the critical value of 69.81889 at the 5% level of significance, therefore the null hypothesis which assumes that there is no cointegrating equation in the system is rejected and also the probability value of 0.0000 is less than the significance level of 5% so the hypothesised number of

cointegrating equations that says no cointegrating equation can be rejected. Also, given the hypothesised number of cointegrating equations that says at most one cointegrating equation, the trace statistic of 49.74596 is again greater than the critical value of 47.85613 and the probability value of 0.0329 is less than the significance level of 0.05, hence the conclusion is that there are, at most, two cointegrating equations. So the trace test indicates that that there are two cointegrating equation at the 5% level of significance.

The Maximum-Eigen value test tells a different story, that is there is only one cointegrating equation at the 5% level of significance. This is evident given the results table above where it can be observed that the Max-Eigen statistic of 51.43177 is greater than the critical value of 33.87687 at the 5% level of significance; therefore the null hypothesis saying there is no cointegrating equation in the system is rejected. Also the probability value of 0.0002 is less than the significance level of 5% so it supports the rejection hypothesised number of cointegrating equations that says no cointegrating equation. Hence, going ahead with checking another hypothesised number of cointegrating equations that says at most one cointegrating equation, it can be concluded that there is at most one cointegrating equation. In this case, the Max-Eigen statistic of 21.84517 is less than the critical value of 27.58434 and the probability value of 0.2284 is greater than the significance level of 0.05.

5.5.2 VECM Analysis and Results

This subsection reports both the long run cointegrating vector – involving national output, capital, labour, financial development and financialisation – and the short run adjustment equation for national output relative to the selected variables as well as the error correction mechanism which captures the readjustment of the system due to deviations from the long run equilibrium. In chapter four the VAR/VECM was discussed under the following generic equation which is repeated here for convenience:

$$\Delta \boldsymbol{Y_t} = \boldsymbol{u_0} + \boldsymbol{\Pi Y_{t-1}} + \sum_{i=1}^{p-1} \boldsymbol{\Gamma_{iY} \Delta Y_{t-i}} + \boldsymbol{\varepsilon_t} \qquad (5.1)$$

It was established earlier in this chapter that the rank of matrix $\boldsymbol{\Pi}$ is one (ie., r=1, implying there exists just one long run cointegrating vector), hence the matrix can be written as $\boldsymbol{\Pi} = \boldsymbol{\alpha \beta'}$, with $\boldsymbol{\beta}$ containing the r cointegrating vectors and $\boldsymbol{\alpha}$ describing the speed of adjustment to the long run equilibrium. Additionally $\boldsymbol{\Gamma_i}$ are k x k coefficient

matrices capturing the short run dynamic effects. However since the study used a second order VAR model (p=2) and in VECM form it is differenced to result in a first order VECM model (i.e., p-1) $\boldsymbol{\Gamma_{iY}}$ becomes a single k x k coefficient matrix capturing just the first order lags. Additionally, $\boldsymbol{\mu_0}$ captures the vector of constants. Moreover $\boldsymbol{\Pi y_{t-1}}$ can be expanded as follows:

$$\boldsymbol{\Pi y_{t-1}} = \begin{bmatrix} \alpha_{11} \\ \alpha_{21} \\ \alpha_{31} \\ \alpha_{41} \\ \alpha_{51} \end{bmatrix} [1 \quad \beta_{11} \quad \boldsymbol{\beta_{12}} \quad \boldsymbol{\beta_{13}} \quad \boldsymbol{\beta_{14}} \quad \boldsymbol{\beta_{15}}] \begin{pmatrix} LGDP \\ 1 \\ LCapital \\ LLabour \\ Lfinancial\ Development \\ Lfinancialisation \end{pmatrix}_{t-1}$$

Note that *L* denotes the natural log of: GDP (*LY*), Capital (*LK*), Labour (*LL*), financial development indicator represented either by LM3 (broad money supply) or LB (bank deposits) and the first difference of domestic credit to the households (DLC) is the proxy for financialisation, while the $[1 \quad \beta_{11} \quad \boldsymbol{\beta_{12}} \quad \boldsymbol{\beta_{13}} \quad \boldsymbol{\beta_{14}} \quad \boldsymbol{\beta_{15}}]$ term in equation (5.2) represents the cointegrating vector which captures the long run relationship in the form of deviations of output from its long run equilibrium relationship with the other variables. Notice that the 1 in the variable vector represents the constant variable in the cointegrating vector and the corresponding constant term β_{11} appears in the coefficient vector. This vector can be seen as an error correction mechanism and is represented as follows:

$$\boldsymbol{ECM = \varepsilon_t = LY - \beta_{11} - \beta_{12}LK - \beta_{13}LL - \beta_{14}Lfinancial\ develoment + \beta_{15}financialisation} \quad (5.3)$$

Equation (5.3) captures deviations of output from its long run relationship with the other variables in the cointegrating vector. Furthermore, the $\boldsymbol{\alpha_{ij}}$ coefficients in equation (5.3) are the short run adjustment coefficients, for example, if output over-shoots its long run relationship with the other variables in the previous period then $\boldsymbol{\alpha_{11} < 0}$ captures the readjustment of output downwards in order to restore equilibrium in the next period, while all the other variables (that share a positive relationship with output) in the next period have to adjust upwards in order to restore equilibrium, ie., $\boldsymbol{\alpha_{12}, \alpha_{13}, \alpha_{14} > 0}$, while the variable that shares a negative long run relationship with output will adjust in a negative direction, i.e., $\boldsymbol{\alpha_{15} < 0}$

As mentioned above. equation (5.3) captures the long run cointegrating vector in error correction format, however if it is rewritten in its normal regression format the relationship takes the following form:

$$LY = \beta_{11} + \boldsymbol{\beta_{12}LK} + \boldsymbol{\beta_{13}LL} + \boldsymbol{\beta_{14}Lfinancial\ development} - \boldsymbol{\beta_{15}financialisation} + \boldsymbol{\varepsilon_t} \quad (5.4)$$

Notice the long run coefficients now take on a positive sign, except for the financialisation coefficient. This is the format in which the rest of this study interprets these coefficients. Further note that the constant in the cointegrating vector has been excluded but it can be easily included by adding a scalar = 1 as the fifth variable and variable vector and then including the constant term in the long coefficient vector of equation 18.

5.5.3 Results of VECM with LM3 as the Financial Development Indicator

The following section will discuss the long and short run results of the VECM which involves LM3 representing the monetary aggregates or broad money supply denoted as M3 which is interpreted as an indicator of financial development. The following table which presents the mentioned VECM results will first be discussed and thereafter its diagnostic tests will be assessed.

Table 5.8 Long and short run results of VECM involving LM3

Cointegrating Eq:	CointEq1				
LY(-1)	1.000000				
LK(-1)	-0.334961*** (0.10638) [-3.14858]				
LL(-1)	-0.085114 (0.08108) [-1.04976]				
LM(-1)	-0.087354** (0.03657) [-2.38841]				
DLC(-1)	3.403037*** (0.47110) [7.22356]				
C	-8.847320				
Error Correction:	**D(LY)**	**D(LK)**	**D(LL)**	**D(LM)**	**D(DLC)**
CointEq1 (α_{ij})	0.056173 (0.01688) [3.32732]	0.257549 (0.05638) [4.56813]	0.030634 (0.13312) [0.23012]	0.280353 (0.05217) [5.37366]	-0.082666 (0.04864) [-1.69959]

D(LY(-1))	0.354982	0.237690	1.501367	-0.285103	0.908887
	(0.12075)	(0.40324)	(0.95211)	(0.37314)	(0.34787)
	[2.93991]	[0.58946]	[1.57689]	[-0.76406]	[2.61269]
D(LY(-2))	0.026700	0.482007	-0.029618	0.084177	0.242804
	(0.12857)	(0.42938)	(1.01384)	(0.39734)	(0.37043)
	[0.20766]	[1.12256]	[-0.02921]	[0.21185]	[0.65547]
D(LK(-1))	-0.038381	0.333178	-0.163566	-0.077417	-0.078416
	(0.03335)	(0.11138)	(0.26298)	(0.10306)	(0.09609)
	[-1.15082]	[2.99146]	[-0.62198]	[-0.75115]	[-0.81611]
D(LK(-2))	-0.067695	-0.289373	-0.074072	-0.082965	0.024369
	(0.03172)	(0.10592)	(0.25010)	(0.09802)	(0.09138)
	[-2.13435]	[-2.73198]	[-0.29617]	[-0.84645]	[0.26668]
D(LL(-1))	0.000181	0.007594	-0.067070	-0.019693	0.003247
	(0.01462)	(0.04882)	(0.11527)	(0.04517)	(0.04212)
	[0.01238]	[0.15556]	[-0.58186]	[-0.43592]	[0.07709]
D(LL(-2))	0.023137	0.010936	-0.008157	0.014871	0.083725
	(0.01427)	(0.04767)	(0.11256)	(0.04411)	(0.04113)
	[1.62082]	[0.22941]	[-0.07247]	[0.33710]	[2.03583]
D(LM(-1))	-0.024293	-0.293502	-0.031283	0.035904	0.061042
	(0.03650)	(0.12190)	(0.28783)	(0.11280)	(0.10516)
	[-0.66552]	[-2.40772]	[-0.10869]	[0.31829]	[0.58045]
D(LM(-2))	-0.025552	0.005078	0.627586	-0.076907	-0.088993
	(0.03709)	(0.12386)	(0.29245)	(0.11461)	(0.10685)
	[-0.68895]	[0.04100]	[2.14597]	[-0.67101]	[-0.83286]
D(DLC(-1))	-0.105648	-0.757816	-0.146050	-0.664276	-0.489167
	(0.05592)	(0.18676)	(0.44096)	(0.17282)	(0.16111)
	[-1.88919]	[-4.05780]	[-0.33121]	[-3.84380]	[-3.03614]
D(DLC(-2))	-0.023112	-0.244974	-0.287092	-0.460876	-0.216609
	(0.04342)	(0.14500)	(0.34238)	(0.13418)	(0.12510)
	[-0.53228]	[-1.68942]	[-0.83852]	[-3.43470]	[-1.73155]
C	0.007056	0.014789	-0.019727	0.034667	-0.008170
	(0.00190)	(0.00634)	(0.01496)	(0.00586)	(0.00547)
	[3.71774]	[2.33340]	[-1.31827]	[5.91102]	[-1.49420]
R-squared	0.456706	0.581629	0.162266	0.481195	0.446031
Adj. R-squared	0.371331	0.515885	0.030622	0.399669	0.358979
Sum sq. resids	0.001506	0.016792	0.093616	0.014379	0.012497
S.E. equation	0.004638	0.015488	0.036570	0.014332	0.013362
F-statistic	5.349425	8.846874	1.232615	5.902315	5.123723
Log likelihood	330.7624	231.8840	161.4332	238.2442	243.9940
Akaike AIC	-7.774694	-5.363025	-3.644711	-5.518152	-5.658391
Schwarz SC	-7.422491	-5.010822	-3.292509	-5.165949	-5.306188
Mean dependent	0.007192	0.012379	0.005910	0.030180	-0.000376
S.D. dependent	0.005849	0.022260	0.037143	0.018498	0.016689

With reference to the above table, the following long run cointegrated endogenous Cobb-Douglas growth model obtains, based on the reasoning captured in equation (5.5):

$$LY_t = 8.85 + 0.34LK_t + 0.09LL_t + 0.09LM_t - 3.4DLC_t \quad (5.5)$$

t statistic (3.15) (1.05) (2.39) (-7.22)

The signs of the coefficients for the long run cointegrating relationship are in accordance with theoretical expectations where capital, labour and financial development have a positive effect on national output, while financialisation (in the form of logged first difference domestic credit households) has a negative impact on long run GDP growth. The magnitudes of the coefficients are plausible except for the financialisation coefficient which seems quite large.

Turning to the interpretation of the coefficients, a 1 percent rise in fixed capital formation causes output to rise by 0.34 percent; this coefficient is significant at the 1% level. The labour elasticity is statistically insignificant at the conventional levels. A 1 percent rise in financial development (in the form of M3 money supply) results in an approximately 0.1 percent rise in national output; the elasticity is significant at the 5% level. Finally, a 1 percent rise in financialisation (in the form of log differenced domestic credit to households) causes a 3.4% fall in national output; the coefficient is significant at the 1% level.

In regard to the short run adjustment coefficients(α_{ij}), it is very puzzling that the short run adjustment of output possesses an incorrect positive sign (highlighted in blue) and is statistically significant at the 1% level. A 1% over-shooting of output in the previous period causes output in the current period to further disequilibriate by a small magnitude of 0.06% hence over a year the disequilibrium is about 0.24%. Understandably, labour's adjustment is statistically insignificant since it plays no role in the long run relationship while the other variables show statistically significant results at the conventional significant levels (their coefficients are highlighted in yellow). Concerning the short run adjustment of financial development, a 1% over-shooting of output in the previous period causes financial development to rise in this period by 0.26% in an attempt to restore equilibrium. Likewise, a 1% over-shooting of output in the previous period causes financial development in the succeeding period to fall by 0.08% in an attempt to restore equilibrium.

The short run dynamic adjustment of the variables as captured by the Γ_{iY} are highlighted in green. In regard to the short run adjustment of output (the first column) it is affected by its previous period's change in itself, i.e., a 1 percent change in

output in the previous period will cause this period's output to change by 0.36%. A 1% change in capital over two periods causes current output to fall by 0.07%, perhaps due to frictions in the system. A 1% rise in financialisation in the previous period will cause this period's output to adjust downwards by 0.11%.

Columns 2, 3, 4 and 5 represent the short run adjustments of capital, labour, financial development and financialisation, respectively, to a previous period change in the normalised variable (output). Interestingly, in regard to the theme of this study, the first and second period lags of the financialisation variable (see column 4) have a net negative (-1.12%) effect on changes in financial development. Moreover, short run adjustment in financialisation (see column 5) is positively affected by lagged output and two period lagged labour. Perhaps these variables serve as an indicator of positive future financial returns, and negatively affected by their own lags, possibly due to risk aversion effects.

5.5.4 Johansen Test of cointegration: model involving Banking Deposits

In this subsection, a description of the cointegration testing results containing the natural log of banking deposits (LB) as a proxy for financial development is provided. The model involved the following variables: national income (LY); total employment (LL); investment (LK); banking deposits (LB); and the differenced domestic credit (DLC). So in essence the proxies for financial development have been changing in each model; in the previous model LM was used as a proxy for financial development, however in this specification LB was used as an alternative indicator for financial development. Note that in all of the models estimated in this subsection, DLC – the difference of credit extended to the domestic private sector/ loans and advances to households – is used as the sole proxy for financialisation; LY representing real gross domestic product (GDP) as a proxy for economic growth; LL as a proxy for total employment index in South Africa; and LK representing fixed capital formation in South Africa. Accordingly, the study proceeded to perform the Johansen test of cointegration and the table below shows the results thereof.

Table 5.9: Summary of cointegrating assumptions involving LB

Included observations: 82
Series: LY LK LL LB DLC
Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	2	1	1	1
Max-Eig	2	1	1	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)

Table 5.9, above provides the five possible assumptions that are made in respect of the cointegrating equations that are possibly present in the dataset amongst the variables. Nonetheless, practically case 1 and case 5 are regarded as incredible and are not often realistic, given the data on macroeconomic time series. Put differently, case 2, case 3 and case 4 represent three different models. The model represented by case 2 is different from cases 3 and 4 in that the former model trace statistic shows that there are two cointegrating equations but Max-Eigen reveals that there is only one cointegrating equation. However cases 3 and 4 suggest that there is only one cointegrating equations according to both trace and Max-Eigen. Thus in cases 3 and 4, both trace and maximum confirm the existence of one cointegrating model. However, case 3 has intercept and no trend whilst case 4 has intercept and trend. Case 4 is therefore the only case that gives acceptable outcomes that are in line with economic theory. Subsequently, this study proceeds with case 4 that has intercept and trend and that suggests that there is only one cointegrating equation. The findings from the tests of cointegration on trace as well as Eigen Maximum reveal that the time series in this study are co-integrated with only one vector.

Table 5.10: Johansen test of cointegration results: model involving LB

Trend assumption: Linear deterministic trend
Series: LY LK LL LB DLC
Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.424533	91.64945	69.81889	0.0004
At most 1	0.262712	45.78581	47.85613	0.0773
At most 2	0.132063	20.48934	29.79707	0.3903
At most 3	0.061754	8.733492	15.49471	0.3906
At most 4	0.040631	3.442822	3.841466	0.0635

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.424533	45.86363	33.87687	0.0012
At most 1	0.262712	25.29648	27.58434	0.0954
At most 2	0.132063	11.75585	21.13162	0.5719
At most 3	0.061754	5.290670	14.26460	0.7048
At most 4	0.040631	3.442822	3.841466	0.0635

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Given the cointegration test result table 5.10 above, one can see that the trace statistic of 91.64945 is greater than the critical value of 69.81889 at the 5% level of significance, therefore the null hypothesis is rejected as it assumes that there is no cointegrating equation in the system. Moreover, the probability value of 0.0004 is less than the 5% level of significance so the hypothesised number of cointegrating equations that says no cointegrating equation is rejected. Thus the procedure is to the check another hypothesised number of cointegrating equations that says at most one cointegrating equation. In this instance, the trace statistic of 45.78581 is less than the critical value of 47.85613 and the probability value of 0.0773 is greater than the significance level of 0.05, hence the conclusion is that there is at most one cointegrating equation. So the trace test indicates that that there is one cointegrating equation at the 5% level of significance.

The Maximum-Eigen value test also tells same story that there is only one cointegrating equation at the 5% level of significance. This is evident given the results table above where it can be observed that the Max-Eigen statistic of 45.86363 is greater than the critical value of 33.87687 at the 5% level of significance, therefore the null hypothesis suggesting no cointegrating equation in the system is rejected. Also, the probability value of 0.0012 is less than the significance level of 5% so the hypothesised number of cointegrating equations that says no cointegrating equation is rejected. Hence one can proceed with checking another hypothesised number of cointegrating equations that says at most one cointegrating equation. In this case, the Maximum-Eigen statistic of 25.29648 is less than the critical value of 27.58434 and the probability value of 0.954 is greater than the significance level of 0.05, hence the conclusion is that there is at most one cointegrating equation as hypothesised.

5.5.5 Results of VECM Involving LB as the Financial Development Indicator

Subsequent to the confirmation that there is cointegration in the variables within the model and also that there is one co-integrating vector, in this research the procedure is to adopt the restriction stated in the previous section in this chapter, in order to conduct an estimation of the Vector Error Correction Model (VECM) involving the long-term cointegrating relations within the ECMs. When estimating the VECM, all the endogenous variables selected in the model were set for running and the lag order was selected as advised by the criteria under lag structure selection. Subsequently, the number of cointegrating equations is adopted in line with the outcome from the Johansen test of cointegration results above. The outcome of this process provided the VECM which can be interpreted in view of the coefficients, standard error, the t-values as well as the p-values.

Table 5.11: The VECM results involving LB as a proxy for financial development

Vector Error Correction Estimates

Included observations: 83 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LY(-1)	1.000000
LK(-1)	-0.150968

	(0.12471)
	[-1.21056]
LL(-1)	-0.245169
	(0.10364)
	[-2.36554]
LB(-1)	-0.127039
	(0.04034)
	[-3.14953]
DLC(-1)	3.554977
	(0.50881)
	[6.98689]
C	-9.956765

Error Correction:	D(LY)	D(LK)	D(LL)	D(LB)	D(DLC)
CointEq1	0.033081	0.189819	0.087955	0.148828	-0.118738
	(0.01371)	(0.04559)	(0.10366)	(0.03969)	(0.03760)
	[2.41268]	[4.16320]	[0.84853]	[3.74998]	[-3.15814]
D(LY(-1))	0.479857	0.728120	1.275325	-0.185692	1.019192
	(0.11472)	(0.38149)	(0.86730)	(0.33207)	(0.31458)
	[4.18274]	[1.90860]	[1.47046]	[-0.55919]	[3.23982]
D(LK(-1))	-0.052462	0.292286	-0.165965	-0.002739	0.037193
	(0.03042)	(0.10116)	(0.22997)	(0.08805)	(0.08342)
	[-1.72460]	[2.88942]	[-0.72167]	[-0.03111]	[0.44588]
D(LL(-1))	0.003133	0.035525	-0.017748	-0.003095	-0.012968
	(0.01506)	(0.05009)	(0.11388)	(0.04360)	(0.04131)
	[0.20797]	[0.70922]	[-0.15586]	[-0.07098]	[-0.31395]
D(LB(-1))	-0.020673	-0.345204	0.045501	0.279761	0.005167
	(0.03878)	(0.12895)	(0.29316)	(0.11225)	(0.10633)
	[-0.53312]	[-2.67701]	[0.15521]	[2.49241]	[0.04859]
D(DLC(-1))	-0.035533	-0.418871	-0.105261	-0.287459	-0.306643
	(0.04020)	(0.13366)	(0.30387)	(0.11635)	(0.11022)
	[-0.88399]	[-3.13376]	[-0.34640]	[-2.47070]	[-2.78209]
C	0.005002	0.013692	-0.002814	0.023387	-0.008682
	(0.00157)	(0.00523)	(0.01189)	(0.00455)	(0.00431)
	[3.18104]	[2.61827]	[-0.23670]	[5.13772]	[-2.01330]
R-squared	0.365577	0.507829	0.072773	0.442964	0.396310
Adj. R-squared	0.315491	0.468973	-0.000429	0.398987	0.348651
Sum sq. resids	0.001813	0.020049	0.103624	0.015191	0.013633
S.E. equation	0.004884	0.016242	0.036925	0.014138	0.013393
F-statistic	7.298985	13.06963	0.994135	10.07274	8.315421
Log likelihood	327.5872	227.8564	159.6898	239.3726	243.8629
Akaike AIC	-7.724992	-5.321842	-3.679273	-5.599341	-5.707539
Schwarz SC	-7.520993	-5.117843	-3.475275	-5.395342	-5.503540
Mean dependent	0.007304	0.012677	0.005876	0.030550	-0.000434
S.D. dependent	0.005904	0.022289	0.036917	0.018237	0.016595

Determinant resid covariance (dof adj.)	2.23E-19
Determinant resid covariance	1.44E-19
Log likelihood	1211.712
Akaike information criterion	-28.23403

Schwarz criterion	-27.06832

With regard to the above table, the following long run cointegrated endogenous Cobb-Douglas growth model obtains, based on the reasoning captured in equation (5.6).

$$LY_t = 9.96 + 0.15LK_t + 0.25LL_t + 0.13LB_t - 3.56DLC_t \quad (5.6)$$

t-statistic (1.21) (2.37) (3.15) (-6.97)

The signs of the coefficients for the long run cointegrating relationship are in accordance with presupposed expectations where capital, labour and financial development impact positively on national output. However, financialisation (in the form of lagged first difference domestic credit households) has a negative impact on long run GDP growth. The magnitude of the coefficients are reasonable, except for the coefficient associated with the financialisation variable which appears to be quite high and is similar in magnitude to that in equation 5.5 where broad money supply was used as an alternative proxy for financial development.

Fixed capital formation in the long run relationship is statistically insignificant although it possesses the correct sign, while labour, banking deposits and change in household credit are statistical significant at the conventional levels of significance.

A 1 percent rise in financial development (in the form of LB: banking deposits) results in approximately 0.13 percent rise in economic growth; the elasticity is significant at the 5% level. Finally, a 1 percent rise in financialisation (in the form of log differenced domestic credit to households) causes a 3.5% fall in economic growth; the coefficient is significant at the 1% level.

Turning to the short run adjustment coefficients (α_{ij}), it is very confounding that the short run adjustment of output possesses an incorrect positive sign (again highlighted in blue) and is statistically significant at the 1% level. Thus a 1 percent over-shooting of output in the previous period causes output in the current period to further tend towards disequilibria by a magnitude of 0.03%, hence over a year the disequilibrium is about 0.12%, which is negligible, hence the incorrect sign is not a serious problem. Understandably, labour's adjustment is statistically insignificant since it plays no role in the long run relationship while the other variables show statistically significant results at the conventional significant levels (their coefficients

are highlighted in yellow). Capital, and bank credit extension respond positively to a 1% overshooting of output in the previous period by 0.19% and 0.15% respectively, while the financialisation variable responds negatively by a magnitude of 0.12%.

The short run dynamic adjustments of the variables, as captured by the Γ_{iY} are highlighted in green. In regard to the short run adjustment of output (the first column), it is affected by its previous period's change in itself, i.e., a 1 percent change in output in the previous period will cause this period's output to change by 0.48%. A 1% change in capital one's period before causes current output to fall by 0.05%, perhaps due to frictions in the system. A 1% rise in financialisation in the previous period will cause this period's output to adjust downwards by 0.04%. Columns 2, 3, 4 and 5 represent the short run adjustments of capital, labour, financial development and financialisation respectively.

5.6 Single Equation Model Estimation methods

This section looks at the single equation model estimation methods which include the Fully Modified Ordinary Least Squares (FMOLS) estimation technique, the Dynamic Least Squares (DOLS), and the Canonical Cointegration Regression (CCR). These three single equation estimation and testing methods were adopted in view of the thrust of this dissertation, which is the impact of financial development, and financialisation on economic growth in South Africa. In this, research three proxies for measuring financial development were selected and tested in each of the three testing methods, namely, FMOLS, DOLS and CCR. The three proxies for measuring financial development are: broad money supply: M3 denoted as LM; total value (turn over) of shares traded on the JSE, denoted in this research as LVA; liabilities of banking institutions/ banking deposits, denoted as LB. In the case of financialisation, the purchase of bonds by non-residents on the Bond Exchange of South Africa was adopted as a proxy and is denoted as RBPNR. Note that this proxy never features well in the context of the VAR/VECM modelling approach but fared much better in the single equation context.

Nine equations were tested using FMOLS, DOLS and CCR. In all of the nine models estimated, financialisation has a negative impact on economic growth, as reflected by the sign of the coefficient of the respective proxy of financialisation that is RBPNR. In the same manner, financial development has a positive impact on

economic growth, as reflected by a positive sign of the coefficients of the respective proxies of financial development which are LVA, LM and LB. However, out of the nine estimated equations only four models provided desirable results in terms of economic theory. The other five models had labour as factor of production impacting negatively and this is in contrast to economic theory.

5.6.1 Fully Modified Ordinary Least Squares (FMOLS)

The following equation presents the outcome according to the estimation method of FMOLS.

$$LY = 10.1 + 0.064LK + 0.0039LL + 0.22LB - 0.0047RBNPR \quad (5.7)$$

t-Statistic (1.7) (0.1) (14.9) (-4.5)

In equation 5.7 above it can be observed that private investment and labour input, as well as financial development have a positive influence on economic growth, which is the dependent variable LY. However, when looking at financialisation, which is denoted as RBPNR, it can be concluded that there is a negative impact on economic growth in the long run though at a very small rate of 0.0047. The positive signs of the coefficients associated with capital investment, labour input and financial development suggest that there will be an increase in economic growth in the long run due to an increase in these variables. Accordingly, we can also see that the coefficient of the financialisation proxy is negative, implying a long-term negative impact on economic growth.

Table 5.12 FMOLS with LB for Financial Development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.064351	0.038934	1.652846	0.1021
LL	0.003890	0.032869	0.118351	0.9061
LB	0.216860	0.014560	14.89456	0.0000
RBPNR	-0.004677	0.001042	-4.486292	0.0000
C	10.81434	0.254612	42.47376	0.0000
R-squared	0.996037	Mean dependent var		14.63064
Adjusted R-squared	0.995847	S.D. dependent var		0.204336
S.E. of regression	0.013169	Sum squared resid		0.014394
Long run variance	0.000365			

In the table above, LB was used as a proxy for financial development and the results, as indicated before, are desirable and are in line with economic theory.

Furthermore, estimating an equation using the FMOLS method and including LVA as a proxy for financial development also gives results with the same signs of coefficients as outlined in the above equation (5.1) where LB was a proxy for financial development. The following equation (5.2) provides the estimated model in which LVA is a proxy for financial development, together with the respective coefficients of the explanatory variables which are also in line with economic theory.

$$LY = 11.22 + 0.18LK + 0.019LL + 0.1LVA - 0.011RBNPR \quad (5.8)$$

t-Statistic (3.3) (0.4) (8.6) (-5.5)

In equation (5.8), the value of R^2 is also very high, with the value of 0.99, while the long run variance is very low with the value of 0.00099. While this model provides excellent t-statistics and R-squared, from the diagnostic perspective they suffer from serious deficiencies and hence must be treated with caution. The Phillips Ouliaris tests for all the models suggest that there is no strong evidence for cointegration.

Table 5.13 FMOLS with LVA for Financial Development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.178792	0.054825	3.261165	0.0016
LL	0.018999	0.054363	0.349493	0.7276
LVA	0.095982	0.011165	8.596424	0.0000
RBPNR	-0.011696	0.002126	-5.501229	0.0000
C	11.22341	0.472181	23.76930	0.0000
R-squared	0.990684	Mean dependent var		14.63064
Adjusted R-squared	0.990235	S.D. dependent var		0.204336
S.E. of regression	0.020192	Sum squared resid		0.033842
Long run variance	0.000994			

From another FMOLS result, although unwelcome, where the labour coefficient sign is negative and not in line with economic theory, the signs of the coefficients of financial development and financialisation are positive and negative respectively and this is also in line with economic theory. This model places broad money supply (M3) as a proxy for financial development and the following is the equation with results from the FMOLS testing method.

$$LY = 11.0 + 0.04LK - 0.01LL + 0.23LM - 0.004RBNPR \quad (5.9)$$

t-Statistic (1.1) (-0.5) (16.3) (-4.2)

5.6.2 The Dynamic Least Squares (DOLS)

The results from the Dynamic Least Squares (DOLS) are given in the equation below.

$$LY = 11.5 + 0.15LK + 0.007LL + 0.11LVA - 0.013RBNPR \quad (5.10)$$

t-Statistic (1.9) (0.1) (6.4) (-4.8)

Here, LVA is used as a proxy for financial development in the Dynamic Least Squares (DOLS) method. The above equation 5.10 provides a summary of the outcome of the model with expected signs of the coefficients in line with economic theory. Capital investment, labour input and financial development have positive impacts on economic growth. This is again reflected by the positive signs of the coefficients of the explanatory variables. However, looking at the coefficient sign of financialisation proxy, that is, RBPNR, it can be observed that it is negative, implying a negative impact of financialisation on economic growth in the long-term.

Table 5.14 DOLS with LVA proxy for Financial Development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.153913	0.081115	1.897481	0.0619
LL	0.007255	0.071091	0.102050	0.9190
LVA	0.104805	0.016334	6.416468	0.0000
RBPNR	-0.013134	0.002749	-4.777678	0.0000
C	11.50239	0.693984	16.57444	0.0000
R-squared	0.994643	Mean dependent var		14.63110
Adjusted R-squared	0.993401	S.D. dependent var		0.200899
S.E. of regression	0.016320	Sum squared resid		0.018377
Long run variance	0.000847			

The following two equations, (5.11 and 5.12), also reveal that financialisation has a negative impact on economic growth while financial development has a positive effect on economic growth, which is reflected by the sign of the coefficient of financialisation proxy.

$$LY = 10.97 + 0.05LK - 0.05LL + 0.24LM - 0.005RBNPR \quad (5.11)$$

t-Statistic (1.1) (-1.6) (14.8) (-5.1)

In equation 5.11, broad money supply M3 is used as a proxy for financial development. However, the problem with this equation is that labour input is implied

to have a negative impact on economic growth, which is not in line with economic theory.

$$LY = 10.79 + 0.07LK - 0.03LL + 0.23LB - 0.006RBNPR \quad (5.12)$$

t-Statistic (1.3) (-0.8) (12.2) (-5.0)

In equation 5.12 above, the bank deposit takings or bank liability, denoted as LB, was used as a proxy for financial development.

5.6.3 Canonical Cointegration Regression (CCR)

The results found from the Canonical Cointegration Regression (CCR) estimation method are similar to the findings from FMOLS and DOLS outlined above. Adopting LVA as a proxy for financial development using the Canonical Cointegration Regression estimation method yields the following equation 5.13.

$$LY = 11.0 + 0.19LK + 0.014LL + 0.09LVA - 0.01RBNPR \quad (5.13)$$

t-Statistic (3.5) (0.2) (8.8) (-5.5)

Thus in the same manner capital investment, labour input, and financial development impact positively on economic growth in the long run. Table 5.15 gives a summary of the results from the CCR estimation method.

Table 5.15 CCR with LVA proxy for Financial Development

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.188218	0.053611	3.510837	0.0007
LL	0.013596	0.055660	0.244267	0.8076
LVA	0.094376	0.010742	8.785878	0.0000
RBPNR	-0.011555	0.002094	-5.518706	0.0000
C	11.14320	0.452727	24.61351	0.0000
R-squared	0.990751	Mean dependent var		14.63064
Adjusted R-squared	0.990305	S.D. dependent var		0.204336
S.E. of regression	0.020120	Sum squared resid		0.033598
Long run variance	0.000994			

Adopting broad money supply M3, and bank liability as proxies for financial development in different equation estimations the following respective equation 5.14 and 5.15 estimations result.

$$LY = 11.0 + 0.04LK - 0.02LL + 0.23LM - 0.004RBNPR \quad (5.14)$$

t-Statistic (1.2) (-0.6) (17.1) (-4.2)

$$LY = 10.8 + 0.07LK - 0.001LL + 0.22LB - 0.005RBNPR \quad (5.15)$$

t-Statistic (1.8) (-0.03) (15.7) (-4.5)

Equation 5.14 and 5.15 give unfavourable results where the coefficient of labour input is negative, suggesting a negative impact on growth of the economy, which is not in line with economic theory. However, the two equations also suggest a positive impact of financial development and capital investment on economic growth and a negative impact of financialisation on economic growth in the long run.

5.6.4 A synopsis of VECM and single equation coefficient magnitudes

This section provides a composite summary of single equation and VECM results from the two models involving private investment, employment, financial development and financialisation as they impact on economic growth. This section also serves the purpose of simplifying the discussion and the comparison of research results from the two VEC models where one model adopts LB as a proxy for financial development and the second model places LM as a proxy for financial development. Table 5.16 below presents a summary of short run (SR) and long run (LR) relationships in the single equation and the VECM involving economic growth represented as LY and the coefficients of each independent variable represented as LK, LL, LB, LM, LVA, DLC and RBPNR.

Table 5.16: Short Run (SR) and Long Run (LR) Relationships

Variable ↓	VECM with LB as a proxy for Financial Development		VECM with LM as a proxy for Financial Development		FMOLS with LB as a proxy for financial development	FMOLS with LVA as a proxy for financial development	CCR with LVA as a proxy for financial development	DOLS with LVA as a proxy for financial development
	SR	LR	SR	LR				
LK	-0.052462	0.150968	-0.038381	0.334961*	0.064351	0.178792*	0.188218*	0.153913***
LL	0.003133	0.245169	0.000181	0.085114	0.003890	0.018999	0.013596	0.007255
LM	-	-	-0.024293	0.087354**	-	-	-	
LVA	-	-	-	-	-	0.095982*	0.094376*	0.104805*
LB	-0.020673	0.127039**	-	-	0.21686*	-	-	-
DLC	-0.035533	-3.554977*	-0.105648	-3.403037*	-	-	-	-
RBPNR	-	-	-	-	-0.00468*	-0.01170*	-0.01156*	-0.013134*

- SR and LR respectively represent short and long run.
- *, ** and *** denote levels statistical significance at 1%, 5% and 10% respectively.

As reflected in the presentation of VECM results, the researcher concluded that the VECM method suggests the presence of a long run cointegrating association between economic growth, private investment, employment, financial development and financialisation. In both the VEC models which separately involve LB and LM as proxies for financial development, the signs of the coefficients for the long run cointegrating relationship are in accordance with a priori economic theory expectations where capital, labour and financial development have a positive effect on national output, while financialisation (in the form of logged first difference domestic credit households) has a negative impact on long run GDP growth. The magnitudes of the coefficients are plausible except for the financialisation coefficient which seems quite large in both models. Accordingly, the responsiveness of economic growth to a 1% increase in private investment ranges from 0.2 to 0.3. Real GDP rises by a figure ranging from 0.1 to 0.3 due to a 1% increase in labour input. In addition a 1% increase in financial development leads to an increase in real GDP at a rate ranging from 0.09 to 0.13. However, a 1% increase in financialisation culminates in a drop of economic growth at a rate ranging from -3.6 to -3.4 though the magnitudes seem to be too large. The single equation methods also tell the same story regarding the magnitudes of the long run elasticities of private investment, labour, financial development and financialisation. A 1 percent increase in private investment brings about a positive increase in economic growth at a rate ranging from 0.06 to 0.18 according to the Fully Modified Ordinary Least Squares (FMOLS) method. However, the Canonical Cointegration Regression (CCR) and the

Dynamic Ordinary Least Squares (DOLS) methods indicate that a 1 percent increase in private investment brings 0.19 and 0.15 change in economic growth respectively. The impact of labour on economic growth is statistically insignificant with the negligible elasticity magnitudes ranging from 0.004 to 0.019 throughout the FMOLS, CCR and DOLS. With regards to financial development as proxied by LVA, the responsiveness of economic growth hovers around 0.1 and is also positive at the 1% level of significance. Where financial development is proxied by LB, the coefficient magnitude is 0.22 and is also significant at the 1% level. Lastly, the impact of financialisation as proxied by RBPNR is also negative, in line with economic theory, at the 1% level of significance throughout the FMOLS, CCR and DOLS and the absolute magnitudes of coefficients range from 0.005 to 0.013 respectively.

As indicated in in the previous section on the presentation of results, the interpretation of the coefficients of the two models involving bank credit and money supply as proxies for financial development, show that a 1 percent rise in fixed capital formation causes output to rise by a percentage ranging from 0.15% to 0.36%, which is significant at the 1% level. In the two VEC models, labour elasticity is statistically insignificant at all conventional levels. In addition, a 1 percent rise in financial development (in the form of both bank credit and M3 money supply) results in approximately a 0.1 percent rise in national output; the elasticity is significant at the 5% level. Lastly, a 1 percent rise in financialisation in the form of log differenced domestic credit to households causes between a 3.4% and 3.6% fall in national output, with the elasticities are significant at the 1% level.

With regards to the magnitudes of short run coefficients (the alpha coefficients) for the two models, the responsiveness of investment as a result of a disequilibrium arising in the cointegrating relation (output overstepping its long run equilibrium value with rest of the variables) is negative, ranging from 0.04% to 0.05%, and is of the wrong sign but is also of a negligible magnitude. The response of labour to the disequilibrium as measured by the alpha coefficient has the correct sign but is statistically insignificant in the short run, ranging from 0.0002% to 0.003%. In addition, the magnitudes pertaining to financial development hover around 0.02%. Lastly, the short run impact of financialisation stretches from -0.1 to -0.04 and is statistically significant.

5.7 Conclusion

Chapter five provided the practical analytical approaches adopted in assessing and presenting the findings of this study. The empirical research findings were presented following the estimation of the models together with interpretation and analysis of data. Accordingly, an outline of the descriptive statistics together with the preliminary inspection of all the variables to be considered in the model was given. The correlation matrix was presented and explained while in section 5.3 stationarity and unit root testing, particularly the Augmented Dickey Fuller test, was conducted. The VAR/VECM applications and techniques together with the lag structure selection were carried out in section 5.4. Subsequently, the testing and interpretation of cointegration was done in section 5.5 together with the presentation of findings indicating that there existed some cointegration amongst our variables. Also in section 5.5 the Vector Error Correction Models (VECM) was dealt with and the results presented, as per the outcomes from the E-views. In section 5.6, the single equation techniques of the Fully Modified Ordinary Least squares (FMOLS), the Dynamic least squares (DOLS) and the Canonical Cointegration Regression (CCR), were looked at. In all of the models estimated using FMOLS, DOLS and CCR, financialisation has a negative impact on economic growth, as reflected by the sign of the coefficient of the respective proxy of financialisation that is RBPNR. In the same manner, financial development has a positive impact on economic growth, as reflected by a positive sign of the coefficients of the respective proxies of financial development which are LVA, LM and LB. Finally, a synopsis of the single equation and the VECM results was provided in part 5.6.4, focussing on the magnitudes of elasticities of the different variables.

CHAPTER 6

DISSERTATION CONCLUSION

6.0 Introduction

This chapter gives a synoptic presentation of this research study coupled with the presentation of the research findings and the policy recommendations as well as challenges and suggestions for future research. Section 6.1 consists of a summary of the research study and findings; section 6.2 gives the policy prescriptions and recommendations; section 6.3, identifies the strengths and weaknesses observed in this research project; section 6.4 gives suggestions for future researchers; and lastly, section 6.5 provides the conclusion to the dissertation.

6.1 Summary of research study and findings

The core objective of this study was to establish the impact of financial market development and financialisation on economic growth in South Africa. Subsequently, a review of theoretical and empirical literature was provided in chapters two and three respectively. Chapter four outlined the research methodology adopted in this study. An empirical study was done in chapter five together with the analysis and presentation of results.

A time series graphical representation of the eight variables involving the log of money supply (M3) (log bank credit, (LB) and the log of volume traded stock market at the Johannesburg stock exchange (LVA), as alternative proxies) as proxy for financial development, the domestic credit denoted as (DLC), (the bond purchases by non-residents (RBPNR) an alternative proxy) as an indicator of financialisation effects in the South African economy, the log of investment denoted as (LK), the log of labour input represented by (LL) and the log of real GDP (LY), The presentation shows that the time series data of these eight variables are not stationary in level, hence they tend to vary with time and a drift. In general, they are all characterised by an upward trend, with the exception of the employment index which starts with an overall decreasing from year 1988 until year 2002 when there was a sudden upsurge which stabilised until 2015. Section 5.3 of chapter five presents an extensive and empirical testing of unit root testing for stationarity using the Augmented Dickey-Fuller test for the reason of confirming what has been graphically presented in section 5.1 of the chapter. Hence, a formal stationarity test was conducted in levels

using Augmented Dickey Fuller (ADF) testing. The outcome of this test shows that almost all of the variables in this study are non-stationary and have a trend. Nevertheless, the non-stationarity of the selected variables was converted to stationarity by first differencing the data in the model. Consequently, the results of the unit root testing results of the time series reveal that the data was rendered stationary after first differencing of the data, with the exception of domestic credit which only became stationary after second differencing, and the issue was solved after taking the values of the differences of domestic credit.

Thereafter, cointegration tests were done and the findings reveal that there was some kind of cointegration. Hence, the research study considered the adoption of VECM in order to analyse the relationship amongst the variables under study. The signs of the coefficients for the long run cointegrating relationship are in accordance with expectations where capital, labour and financial development impact positively on national output. However, financialisation (in the form of lagged first difference domestic credit households) has a negative impact on long run GDP growth. The magnitudes of the coefficients are reasonable, except for the coefficient associated with the financialisation variable which appears to be quite high. Assuming the analysis is not flawed, the implication is that financialisation has debilitating effects for a small open economy like that of South Africa, consistent with the perspectives of Epstein (2005) and others.

In addition, single equation testing models were conducted. Nine equations were tested using the Fully Modified Ordinary Least Squares (FMOLS), the Dynamic Least Squares (DOLS) and the Canonical Cointegration Regression (CCR). In all of the nine models estimated, financialisation had a negative impact on economic growth, as reflected by the sign of the coefficient of the respective proxy of financialisation, that is RBPNR. In the same manner, financial development had a positive impact on economic growth, as reflected by a positive sign of the coefficients of the respective proxies of financial development which are denoted by LVA, LM and LB. However, out of the nine estimated equations only four models provided desirable results in terms of the economic theories outlined in chapter two of this dissertation. The remaining five models showed that employment as factor of production is affecting negatively and this is in contradiction to economic theory. Nonetheless, all nine

equations supported the findings of the Johansen VECM method that financial development has a positive impact on economic growth while financialisation has a negative impact. These results are consistent with prior expectations which were informed by the theoretical perspectives discussed in chapter two.

6.2 Policy prescriptions and recommendations

In a study by Tomaskovic-Devey et al, (2015) their findings on the study of financialisation of the American economy underpin the results in this research in that they also found that amplified financialisation in advanced economies such as the USA can impair economic growth. This view is especially true taken from a macroeconomic perspective, in that the search for financial investment strategies by non-financial firms has led to lower growth. From the microeconomic perspective, whereby a firm tends to have multiple stakeholders, financialisation is said to have largely benefited capital at the expense of labour and the government. This is because the movement of shareholder value stimulates the businesses to substitute equity with debt and hence reduce employment. It follows that reduced employment has been considered as a signal of the seriousness of management and was compensated with a surge in the prices of stock. In the American economy it was also found out that the movement of shareholder value had also created an attractive set of inducements leading to reduced total production in the economy and perhaps, in the long-term, reduced total profit as well, whilst on the other hand increasing stock prices as well as the dividend overheads on the outstanding equity.

During periods of increased money supply or inflows of capital into the country, it is recommended that the monetary authorities such as the South African Reserve Bank (SARB) should put in place credit control measures to ensure that the economy is safe from the negative impact of financialisation. Given the negative impacts implied by the process of financialisation in the economy, it is imperative that the fiscal and monetary policies have to differentiate between fixed and financial investment, and should therefore focus more on providing incentives to promote investments in production and employment creation. From the fiscal policy side, the practice of higher marginal tax rates on capital gains would possibly discourage speculation in financial assets over production investment, and hence result in reduced shares of

income to capital and growing rate of employment as well as tax revenue to the government.

Moreover, the state should focus on policies that make it attractive for foreign investors to choose FDI options instead of short-term financial inflows of the financialisation variety. These incentives include: clarity on private property rights especially in respect of mining and agriculture land ownership rights; reducing red tape, especially in regard to Black Economic Empowerment and corporate social responsibility requirements; removing uncertainties inherent in the new bilateral investment treaties, especially concerning the protection of foreign investors assets; and, lastly, substantial tax breaks and labour concessions within the special industrial zone framework.

Industrial concentration is a serious challenge in the South African economy where a few large companies are horizontally and vertically integrated across the economy making it difficult for potential new entrants from setting foot in the local economy. Institutions such as the Competition Commission of South Africa should strongly enforce competition policy with a view to promoting increased production, employment creation and price stability. A monopolist's grip on the economy prevents foreign investors from entering local markets because of the barriers to entry that such tremendous market power is able to exercise.

Short-term capital inflows increase the money supply in the economy and commercial banks which have access to such funds favour high return on loans are incentivised to make short-term loans to households, which results in high consumer indebtedness and low saving. The National Credit Act has forced lending institutions to assess the credit worthiness of clientele but this has done little to reverse the situation. Policies ought to be introduced to encourage banks to engage in a higher proportion of long-term lending to the industrial sector and put in place moral suasion mechanisms to curtail excessive lending to households.

6.3 Strengths and weaknesses

One of the strengths of this study is that it is the first of its kind to examine the combined impact of financial development and financialisation on economic growth in South Africa. The dissertation aimed at analysing the effect of financial market

development and financialisation on economic growth in South Africa, with a view to unearthing the negative effects associated this effect. Given this objective it can be confirmed that the analysis in terms of the interrelationships between the variables was successfully completed (see chapters four and five of this study).

In addition, whereas cointegration is a notion that implies the presence of a long-term equilibrium connection amongst the time series variables, in this research it has been established that there is some cointegration amongst the variables. The establishment of cointegration amongst the variables helped to solve the problem of spurious regression whereby a long run relationship between variables could be said to exist when in fact they are not related in any form. Hence, accordingly in this research, after testing for cointegration amongst the proxies of economic growth, labour, investment, financial development and financialisation, it was found that there are some cointegrating equations, which is a strength of this research.

Three weaknesses were identified. The first concerns the two VECMs where positive signs on the short run adjustment coefficients for output's readjustment to the long run equilibrium as defined by the cointegrating relation. Although the coefficients were negligibly small and did not compromise the overall findings, it is nonetheless puzzling and warrants further investigation. The second weakness is that the study employed just two proxies for financialisation, viz., credit to households in the VECM and net purchases of bonds by foreigners in the single equation models. These proxies never worked well when the techniques were swapped, i.e., bank credit to households never produced good results in the single equation context and vice versa for the net purchases of bonds by foreigners. Moreover, this study dwelt on the South African context only though the study could possibly be extended to other emerging economies as well as other developed countries.

6.4 Further research recommendations

Much larger data sets, possibly retrieved from archives, ought to be adopted for future studies in order to conduct the VAR/VECM- type models which are best suited for sample sizes which are much bigger. Moreover, future researchers should consider adopting other econometric methodologies such as dynamic stochastic general equilibrium models with a strong base on microeconomics. In addition, future research ought to consider other proxies of financialisation and financial

development for economic growth, than the ones used in this study. Future research should also consider the dynamic association between capital, labour input, and growth of the economy as well as how financialisation and financial sector development affect these relationships. Furthermore, the study could possibly be extended to both emerging and developed countries, using panel data approaches, instead of just focussing on one country such as South Africa.

6.5 Conclusion

Chapter six provided an outline of the core dissertation of the whole study, gave a synopsis of the research findings, provided the policy prescriptions and recommendations, emphasised the strengths as well as the weaknesses in this study and also suggested future research recommendations. In view of this study's findings that financial sector development is critical for growth in the economy in the long-term, it is vital for the government of South Africa to also highlight and tie together other policy suggestions that address financialisation because it is already exhibiting long run effects on the economy.

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APPENDIX A: UNIT ROOT TEST RESULTS

Null Hypothesis: DLC has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.677836	0.2484
Test critical values:	1% level	-4.071006	
	5% level	-3.464198	
	10% level	-3.158586	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(DLC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.30739	0.0000
Test critical values:	1% level	-4.072415	
	5% level	-3.464865	
	10% level	-3.158974	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LB has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.754072	0.9659
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LB) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.896150	0.0000
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LK has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.442463	0.3560
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LK) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.188441	0.0002
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.727868	0.7322
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.25206	0.0000
Test critical values:	1% level	-4.045236	
	5% level	-3.451959	
	10% level	-3.151440	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LM has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-0.870402	0.9549
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LM) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.561678	0.0000
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LVA has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.730876	0.7309
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LVA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.86179	0.0000
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LY has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.448345	0.3530
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	

	10% level	-3.151211

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LY) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.920728	0.0006
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: RBPNR has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.012463	0.2777
Test critical values:	1% level	-2.591204	
	5% level	-1.944487	
	10% level	-1.614367	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(RBPNR) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.01838	0.0000
Test critical values:	1% level	-2.591505	
	5% level	-1.944530	
	10% level	-1.614341	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LC has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.258800	0.4511
Test critical values:	1% level	-4.072415	
	5% level	-3.464865	
	10% level	-3.158974	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=11)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.677836	0.2484
Test critical values:	1% level	-4.071006	
	5% level	-3.464198	
	10% level	-3.158586	

*MacKinnon (1996) one-sided p-values.

APPENDIX B: LAG ORDER SELECTION CRITERIA

VAR Lag Order Selection Criteria
Endogenous variables: LY LK LL LB DLC
Exogenous variables: C
Date: 10/06/16 Time: 15:56
Sample: 3/01/1988 12/01/2015
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	565.3314	NA	6.75e-13	-13.83534	-13.68754	-13.77604
1	1171.724	1122.949	3.94e-19	-28.19072	-27.30388*	-27.83491*
2	1204.241	56.20156*	3.29e-19*	-28.37631*	-26.75045	-27.72400
3	1224.487	32.49487	3.77e-19	-28.25895	-25.89406	-27.31013
4	1240.573	23.82986	4.86e-19	-28.03883	-24.93491	-26.79350

* 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

VAR Lag Order Selection Criteria
Endogenous variables: LY LK LL LM DLC
Exogenous variables: C
Date: 10/06/16 Time: 10:49
Sample: 3/01/1988 12/01/2015
Included observations: 81

Lag	LogL	LR	FPE	AIC	SC	HQ
0	582.0769	NA	4.46e-13	-14.24881	-14.10101	-14.18951
1	1166.604	1082.457	4.47e-19	-28.06429	-27.17746*	-27.70848*
2	1196.654	51.93896	3.97e-19	-28.18899	-26.56313	-27.53668
3	1222.863	42.06295*	3.92e-19*	-28.21883*	-25.85394	-27.27001
4	1240.018	25.41508	4.93e-19	-28.02513	-24.92122	-26.77980

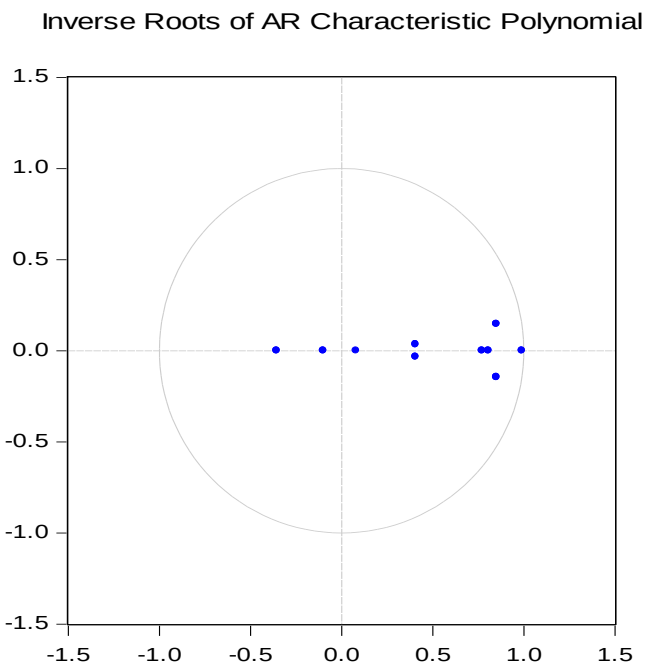
* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX C: AUTOREGRESSIVE CHARACTERISTIC POLINOMIAL

Roots of Characteristic Polynomial
Endogenous variables: LY LK LL LB DLC
Exogenous variables: C
Lag specification: 1 2
Date: 10/06/16 Time: 15:59

Root	Modulus
0.990733	0.990733
0.849494 - 0.145044i	0.861788
0.849494 + 0.145044i	0.861788
0.805877	0.805877
0.770655	0.770655
0.407016 - 0.034914i	0.408511
0.407016 + 0.034914i	0.408511
-0.356395	0.356395
-0.099985	0.099985
0.079161	0.079161

No root lies outside the unit circle.
VAR satisfies the stability condition.

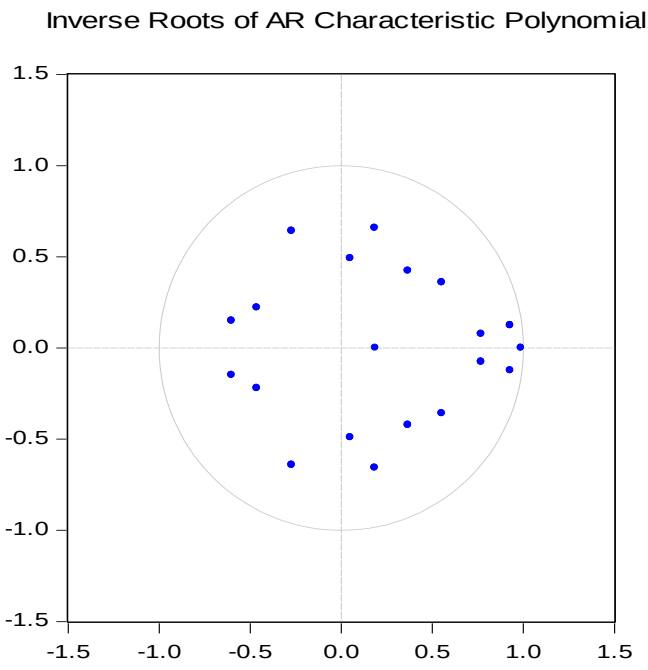


Roots of Characteristic Polynomial
Endogenous variables: LY LK LL LM DLC
Exogenous variables: C
Lag specification: 1 4
Date: 10/06/16 Time: 12:06

Root	Modulus
0.987349	0.987349
0.928061 - 0.123838i	0.936287
0.928061 + 0.123838i	0.936287
0.769336 - 0.075385i	0.773020
0.769336 + 0.075385i	0.773020

-0.271671 + 0.641812i	0.696942
-0.271671 - 0.641812i	0.696942
0.184010 + 0.657653i	0.682911
0.184010 - 0.657653i	0.682911
0.551785 - 0.359250i	0.658428
0.551785 + 0.359250i	0.658428
-0.601906 - 0.148966i	0.620065
-0.601906 + 0.148966i	0.620065
0.366795 + 0.422521i	0.559520
0.366795 - 0.422521i	0.559520
-0.462950 - 0.221038i	0.513011
-0.462950 + 0.221038i	0.513011
0.050213 - 0.491585i	0.494143
0.050213 + 0.491585i	0.494143
0.187167	0.187167

No root lies outside the unit circle.
VAR satisfies the stability condition.



APPENDIX D: VECTOR ERROR CORRECTION MODELS RESULTS

Vector Error Correction Estimates
Date: 10/06/16 Time: 17:43
Sample (adjusted): 12/01/1994 6/01/2015

Included observations: 83 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LY(-1)	1.000000
LK(-1)	-0.150968 (0.12471) [-1.21056]
LL(-1)	-0.245169 (0.10364) [-2.36554]
LB(-1)	-0.127039 (0.04034) [-3.14953]
DLC(-1)	3.554977 (0.50881) [6.98689]
C	-9.956765

Error Correction:	D(LY)	D(LK)	D(LL)	D(LB)	D(DLC)
CointEq1	0.033081 (0.01371) [2.41268]	0.189819 (0.04559) [4.16320]	0.087955 (0.10366) [0.84853]	0.148828 (0.03969) [3.74998]	-0.118738 (0.03760) [-3.15814]
D(LY(-1))	0.479857 (0.11472) [4.18274]	0.728120 (0.38149) [1.90860]	1.275325 (0.86730) [1.47046]	-0.185692 (0.33207) [-0.55919]	1.019192 (0.31458) [3.23982]
D(LK(-1))	-0.052462 (0.03042) [-1.72460]	0.292286 (0.10116) [2.88942]	-0.165965 (0.22997) [-0.72167]	-0.002739 (0.08805) [-0.03111]	0.037193 (0.08342) [0.44588]
D(LL(-1))	0.003133 (0.01506) [0.20797]	0.035525 (0.05009) [0.70922]	-0.017748 (0.11388) [-0.15586]	-0.003095 (0.04360) [-0.07098]	-0.012968 (0.04131) [-0.31395]
D(LB(-1))	-0.020673 (0.03878) [-0.53312]	-0.345204 (0.12895) [-2.67701]	0.045501 (0.29316) [0.15521]	0.279761 (0.11225) [2.49241]	0.005167 (0.10633) [0.04859]
D(DLC(-1))	-0.035533 (0.04020) [-0.88399]	-0.418871 (0.13366) [-3.13376]	-0.105261 (0.30387) [-0.34640]	-0.287459 (0.11635) [-2.47070]	-0.306643 (0.11022) [-2.78209]
C	0.005002 (0.00157) [3.18104]	0.013692 (0.00523) [2.61827]	-0.002814 (0.01189) [-0.23670]	0.023387 (0.00455) [5.13772]	-0.008682 (0.00431) [-2.01330]
R-squared	0.365577	0.507829	0.072773	0.442964	0.396310
Adj. R-squared	0.315491	0.468973	-0.000429	0.398987	0.348651

Sum sq. resids	0.001813	0.020049	0.103624	0.015191	0.013633
S.E. equation	0.004884	0.016242	0.036925	0.014138	0.013393
F-statistic	7.298985	13.06963	0.994135	10.07274	8.315421
Log likelihood	327.5872	227.8564	159.6898	239.3726	243.8629
Akaike AIC	-7.724992	-5.321842	-3.679273	-5.599341	-5.707539
Schwarz SC	-7.520993	-5.117843	-3.475275	-5.395342	-5.503540
Mean dependent	0.007304	0.012677	0.005876	0.030550	-0.000434
S.D. dependent	0.005904	0.022289	0.036917	0.018237	0.016595

Determinant resid covariance (dof adj.)	2.23E-19
Determinant resid covariance	1.44E-19
Log likelihood	1211.712
Akaike information criterion	-28.23403
Schwarz criterion	-27.06832

Vector Error Correction Estimates
Date: 07/12/16 Time: 19:39
Sample (adjusted): 12/01/1994 6/01/2015
Included observations: 83 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LY(-1)	1.000000
LK(-1)	-0.635615 (0.13147) [-4.83476]
LL(-1)	0.106826 (0.13106) [0.81508]
LVA(-1)	0.001418 (0.01828) [0.07758]
DLC(-1)	3.039333 (0.50282) [6.04459]
C	-7.027925

Error Correction:	D(LY)	D(LK)	D(LL)	D(LVA)	D(DLC)
CointEq1	0.043116 (0.01211) [3.56152]	0.196488 (0.03966) [4.95407]	0.079621 (0.09298) [0.85629]	0.490719 (0.33913) [1.44701]	-0.076002 (0.03540) [-2.14697]
D(LY(-1))	0.402203 (0.11808) [3.40610]	0.271397 (0.38686) [0.70153]	0.877234 (0.90696) [0.96722]	2.006694 (3.30785) [0.60665]	1.062880 (0.34529) [3.07822]
D(LK(-1))	-0.058204 (0.02817) [-2.06606]	0.248708 (0.09230) [2.69468]	-0.059603 (0.21638) [-0.27546]	-1.135857 (0.78917) [-1.43931]	-0.049598 (0.08238) [-0.60209]
D(LL(-1))	-0.007962 (0.01457) [-0.54656]	-0.002358 (0.04772) [-0.04941]	-0.042087 (0.11188) [-0.37617]	-1.282043 (0.40805) [-3.14186]	0.014247 (0.04259) [0.33447]

D(LVA(-1))	-0.000471	0.021817	0.057249	-0.098334	-0.021548
	(0.00393)	(0.01289)	(0.03021)	(0.11019)	(0.01150)
	[-0.11968]	[1.69298]	[1.89491]	[-0.89242]	[-1.87346]
D(DLC(-1))	-0.050841	-0.451501	-0.153322	-1.919144	-0.358265
	(0.03773)	(0.12360)	(0.28976)	(1.05682)	(0.11032)
	[-1.34763]	[-3.65298]	[-0.52913]	[-1.81597]	[-3.24762]
C	0.005113	0.006207	-0.002672	0.062554	-0.006775
	(0.00101)	(0.00332)	(0.00778)	(0.02838)	(0.00296)
	[5.04761]	[1.87040]	[-0.34341]	[2.20440]	[-2.28708]
R-squared	0.410162	0.555845	0.110160	0.158485	0.361745
Adj. R-squared	0.363596	0.520780	0.039910	0.092050	0.311356
Sum sq. resids	0.001686	0.018093	0.099446	1.322814	0.014414
S.E. equation	0.004710	0.015430	0.036173	0.131930	0.013772
F-statistic	8.808148	15.85189	1.568109	2.385554	7.179102
Log likelihood	330.6112	232.1165	161.3979	53.99990	241.5522
Akaike AIC	-7.797859	-5.424494	-3.720431	-1.132528	-5.651861
Schwarz SC	-7.593860	-5.220495	-3.516432	-0.928529	-5.447862
Mean dependent	0.007304	0.012677	0.005876	0.050497	-0.000434
S.D. dependent	0.005904	0.022289	0.036917	0.138456	0.016595

Determinant resid covariance (dof adj.)	1.99E-17
Determinant resid covariance	1.28E-17
Log likelihood	1025.275
Akaike information criterion	-23.74157
Schwarz criterion	-22.57587

Vector Error Correction Estimates
Date: 10/06/16 Time: 10:47
Sample (adjusted): 3/01/1995 6/01/2015
Included observations: 82 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LY(-1)	1.000000
LK(-1)	-0.334961
	(0.10638)
	[-3.14858]
LL(-1)	-0.085114
	(0.08108)
	[-1.04976]
LM(-1)	-0.087354
	(0.03657)
	[-2.38841]
DLC(-1)	3.403037
	(0.47110)
	[7.22356]
C	-8.847320

Error Correction:	D(LY)	D(LK)	D(LL)	D(LM)	D(DLC)

CointEq1	0.056173	0.257549	0.030634	0.280353	-0.082666
	(0.01688)	(0.05638)	(0.13312)	(0.05217)	(0.04864)
	[3.32732]	[4.56813]	[0.23012]	[5.37366]	[-1.69959]
D(LY(-1))	0.354982	0.237690	1.501367	-0.285103	0.908887
	(0.12075)	(0.40324)	(0.95211)	(0.37314)	(0.34787)
	[2.93991]	[0.58946]	[1.57689]	[-0.76406]	[2.61269]
D(LY(-2))	0.026700	0.482007	-0.029618	0.084177	0.242804
	(0.12857)	(0.42938)	(1.01384)	(0.39734)	(0.37043)
	[0.20766]	[1.12256]	[-0.02921]	[0.21185]	[0.65547]
D(LK(-1))	-0.038381	0.333178	-0.163566	-0.077417	-0.078416
	(0.03335)	(0.11138)	(0.26298)	(0.10306)	(0.09609)
	[-1.15082]	[2.99146]	[-0.62198]	[-0.75115]	[-0.81611]
D(LK(-2))	-0.067695	-0.289373	-0.074072	-0.082965	0.024369
	(0.03172)	(0.10592)	(0.25010)	(0.09802)	(0.09138)
	[-2.13435]	[-2.73198]	[-0.29617]	[-0.84645]	[0.26668]
D(LL(-1))	0.000181	0.007594	-0.067070	-0.019693	0.003247
	(0.01462)	(0.04882)	(0.11527)	(0.04517)	(0.04212)
	[0.01238]	[0.15556]	[-0.58186]	[-0.43592]	[0.07709]
D(LL(-2))	0.023137	0.010936	-0.008157	0.014871	0.083725
	(0.01427)	(0.04767)	(0.11256)	(0.04411)	(0.04113)
	[1.62082]	[0.22941]	[-0.07247]	[0.33710]	[2.03583]
D(LM(-1))	-0.024293	-0.293502	-0.031283	0.035904	0.061042
	(0.03650)	(0.12190)	(0.28783)	(0.11280)	(0.10516)
	[-0.66552]	[-2.40772]	[-0.10869]	[0.31829]	[0.58045]
D(LM(-2))	-0.025552	0.005078	0.627586	-0.076907	-0.088993
	(0.03709)	(0.12386)	(0.29245)	(0.11461)	(0.10685)
	[-0.68895]	[0.04100]	[2.14597]	[-0.67101]	[-0.83286]
D(DLC(-1))	-0.105648	-0.757816	-0.146050	-0.664276	-0.489167
	(0.05592)	(0.18676)	(0.44096)	(0.17282)	(0.16111)
	[-1.88919]	[-4.05780]	[-0.33121]	[-3.84380]	[-3.03614]
D(DLC(-2))	-0.023112	-0.244974	-0.287092	-0.460876	-0.216609
	(0.04342)	(0.14500)	(0.34238)	(0.13418)	(0.12510)
	[-0.53228]	[-1.68942]	[-0.83852]	[-3.43470]	[-1.73155]
C	0.007056	0.014789	-0.019727	0.034667	-0.008170
	(0.00190)	(0.00634)	(0.01496)	(0.00586)	(0.00547)
	[3.71774]	[2.33340]	[-1.31827]	[5.91102]	[-1.49420]
R-squared	0.456706	0.581629	0.162266	0.481195	0.446031
Adj. R-squared	0.371331	0.515885	0.030622	0.399669	0.358979
Sum sq. resids	0.001506	0.016792	0.093616	0.014379	0.012497
S.E. equation	0.004638	0.015488	0.036570	0.014332	0.013362
F-statistic	5.349425	8.846874	1.232615	5.902315	5.123723
Log likelihood	330.7624	231.8840	161.4332	238.2442	243.9940
Akaike AIC	-7.774694	-5.363025	-3.644711	-5.518152	-5.658391
Schwarz SC	-7.422491	-5.010822	-3.292509	-5.165949	-5.306188
Mean dependent	0.007192	0.012379	0.005910	0.030180	-0.000376
S.D. dependent	0.005849	0.022260	0.037143	0.018498	0.016689

Determinant resid covariance (dof adj.)	2.24E-19
Determinant resid covariance	1.02E-19
Log likelihood	1211.285

Akaike information criterion	-27.95816
Schwarz criterion	-26.05040

APPENDIX E: JOHANSEN COINTEGRATION TEST RESULTS

Date: 10/06/16 Time: 17:58
Sample (adjusted): 12/01/1994 6/01/2015
Included observations: 83 after adjustments
Trend assumption: Linear deterministic trend
Series: LY LK LL LB DLC
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.424533	91.64945	69.81889	0.0004
At most 1	0.262712	45.78581	47.85613	0.0773
At most 2	0.132063	20.48934	29.79707	0.3903
At most 3	0.061754	8.733492	15.49471	0.3906
At most 4	0.040631	3.442822	3.841466	0.0635

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.424533	45.86363	33.87687	0.0012
At most 1	0.262712	25.29648	27.58434	0.0954
At most 2	0.132063	11.75585	21.13162	0.5719
At most 3	0.061754	5.290670	14.26460	0.7048
At most 4	0.040631	3.442822	3.841466	0.0635

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Date: 10/06/16 Time: 11:01
Sample (adjusted): 3/01/1995 6/01/2015
Included observations: 82 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: LY LK LL LM DLC
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.466517	111.0198	88.80380	0.0005
At most 1	0.252733	59.49688	63.87610	0.1105
At most 2	0.219295	35.60755	42.91525	0.2209
At most 3	0.120336	15.30784	25.87211	0.5490
At most 4	0.056789	4.794187	12.51798	0.6261

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.466517	51.52289	38.33101	0.0009
At most 1	0.252733	23.88933	32.11832	0.3560
At most 2	0.219295	20.29971	25.82321	0.2263
At most 3	0.120336	10.51366	19.38704	0.5641
At most 4	0.056789	4.794187	12.51798	0.6261

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Included observations: 82
Series: LY LK LL LM DLC
Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	2	2	1	1
Max-Eig	2	2	1	1	1

*Critical values based on MacKinnon-Haug-Michelis (1999)
Date: 10/06/16 Time: 16:07
Sample: 3/01/1988 12/01/2015
Included observations: 82
Series: LY LK LL LB DLC
Lags interval: 1 to 2

Selected (0.05 level*) Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	2	1	1	1
Max-Eig	2	1	1	1	1

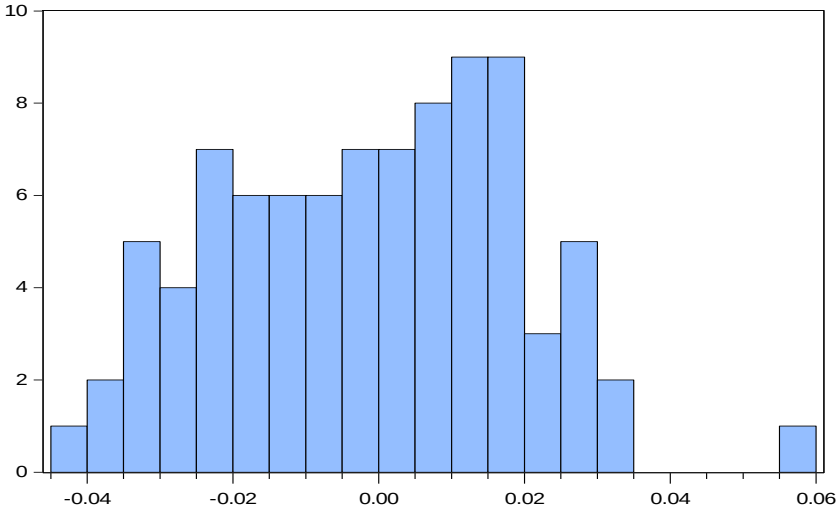
*Critical values based on MacKinnon-Haug-Michelis (1999)

APPENDIX F: SINGLE EQUATION MODELS

Dependent Variable: LY
Method: Fully Modified Least Squares (FMOLS)
Date: 07/21/16 Time: 20:38
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.178792	0.054825	3.261165	0.0016
LL	0.018999	0.054363	0.349493	0.7276
LVA	0.095982	0.011165	8.596424	0.0000
RBPNR	-0.011696	0.002126	-5.501229	0.0000
C	11.22341	0.472181	23.76930	0.0000

R-squared	0.990684	Mean dependent var	14.63064
Adjusted R-squared	0.990235	S.D. dependent var	0.204336
S.E. of regression	0.020192	Sum squared resid	0.033842
Long run variance	0.000994		



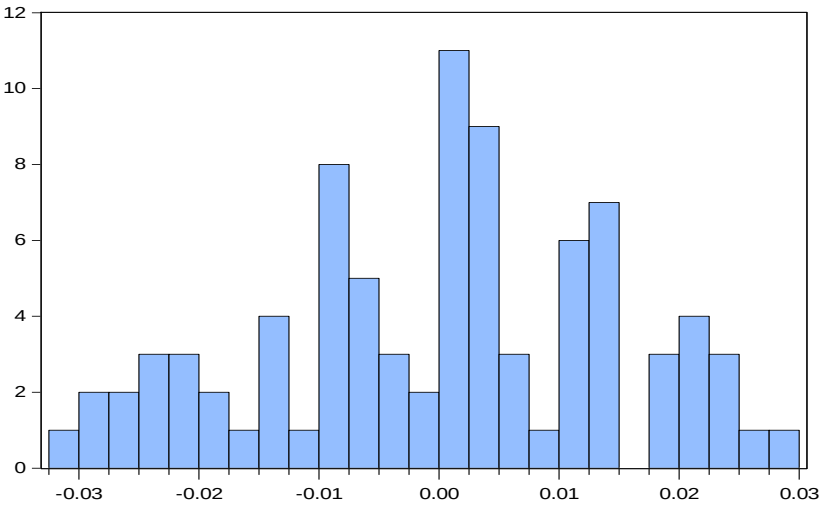
Series: Residuals
Sample 9/01/1993 6/01/2015
Observations 88

Mean	-0.001296
Median	-0.000107
Maximum	0.055622
Minimum	-0.041348
Std. Dev.	0.019680
Skewness	0.054946
Kurtosis	2.489302
Jarque-Bera	1.000591
Probability	0.606352

Dependent Variable: LY
Method: Dynamic Least Squares (DOLS)
Date: 07/21/16 Time: 20:41
Sample (adjusted): 12/01/1993 3/01/2015
Included observations: 86 after adjustments
Cointegrating equation deterministics: C
Fixed leads and lags specification (lead=1, lag=1)
Long run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.153913	0.081115	1.897481	0.0619
LL	0.007255	0.071091	0.102050	0.9190
LVA	0.104805	0.016334	6.416468	0.0000
RBPNR	-0.013134	0.002749	-4.777678	0.0000
C	11.50239	0.693984	16.57444	0.0000

R-squared	0.994643	Mean dependent var	14.63110
Adjusted R-squared	0.993401	S.D. dependent var	0.200899
S.E. of regression	0.016320	Sum squared resid	0.018377
Long run variance	0.000847		



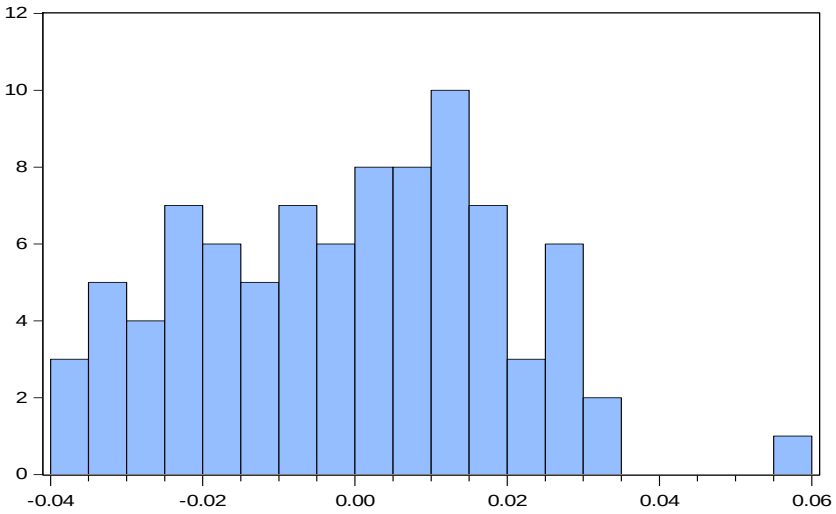
Series: Residuals
Sample 12/01/1993 3/01/2015
Observations 86

Mean	2.36e-15
Median	0.001280
Maximum	0.029805
Minimum	-0.030358
Std. Dev.	0.014704
Skewness	-0.159576
Kurtosis	2.355845
Jarque-Bera	1.851843
Probability	0.396166

Dependent Variable: LY
Method: Canonical Cointegrating Regression (CCR)
Date: 07/21/16 Time: 20:43
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.188218	0.053611	3.510837	0.0007
LL	0.013596	0.055660	0.244267	0.8076
LVA	0.094376	0.010742	8.785878	0.0000
RBPNR	-0.011555	0.002094	-5.518706	0.0000
C	11.14320	0.452727	24.61351	0.0000

R-squared	0.990751	Mean dependent var	14.63064
Adjusted R-squared	0.990305	S.D. dependent var	0.204336
S.E. of regression	0.020120	Sum squared resid	0.033598
Long run variance	0.000994		



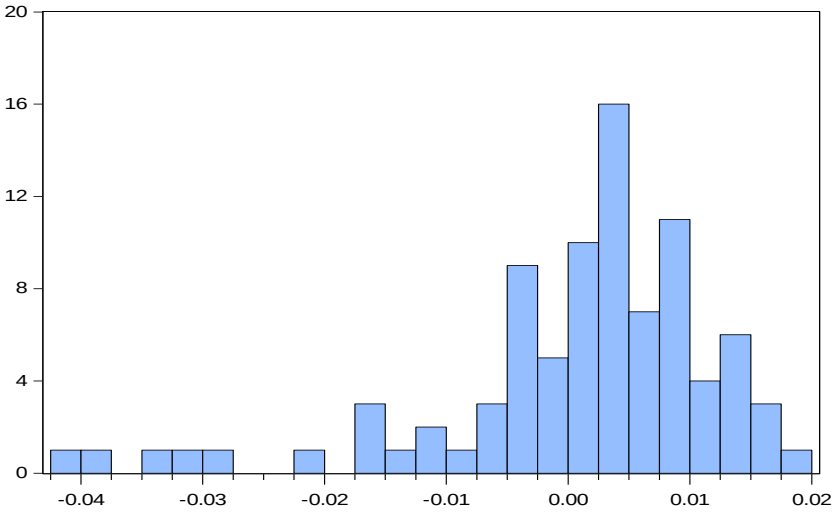
Series: Residuals
Sample 9/01/1993 6/01/2015
Observations 88

Mean	-0.001070
Median	0.000786
Maximum	0.056129
Minimum	-0.039689
Std. Dev.	0.019622
Skewness	0.060482
Kurtosis	2.500589
Jarque-Bera	0.968161
Probability	0.616264

Dependent Variable: LY
Method: Fully Modified Least Squares (FMOLS)
Date: 07/21/16 Time: 20:44
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.041795	0.036644	1.140579	0.2573
LL	-0.013894	0.029949	-0.463920	0.6439
LM	0.231565	0.014177	16.33343	0.0000
RBPNR	-0.003934	0.000936	-4.201419	0.0001
C	11.00230	0.242034	45.45774	0.0000

R-squared	0.996638	Mean dependent var	14.63064
Adjusted R-squared	0.996476	S.D. dependent var	0.204336
S.E. of regression	0.012130	Sum squared resid	0.012212
Long run variance	0.000304		



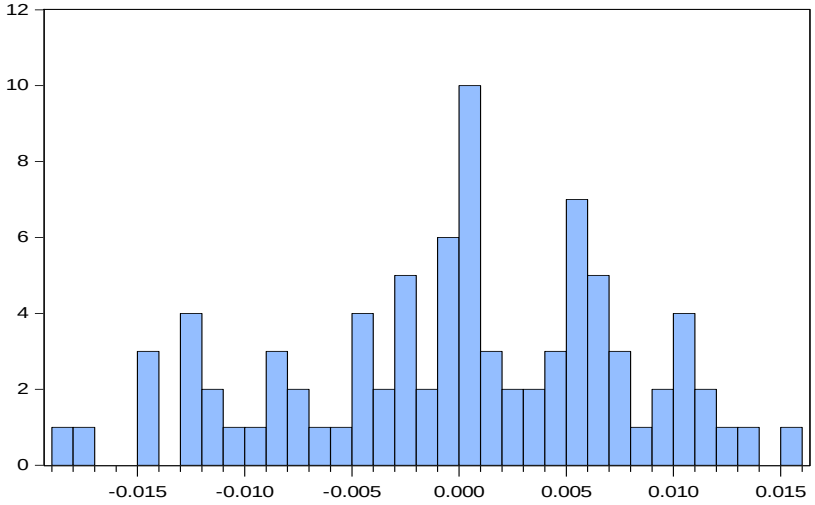
Series: Residuals
Sample 9/01/1993 6/01/2015
Observations 88

Mean	0.000734
Median	0.003082
Maximum	0.019107
Minimum	-0.040215
Std. Dev.	0.011825
Skewness	-1.489561
Kurtosis	5.507774
Jarque-Bera	55.60167
Probability	0.000000

Dependent Variable: LY
Method: Dynamic Least Squares (DOLS)
Date: 07/21/16 Time: 20:46
Sample (adjusted): 12/01/1993 3/01/2015
Included observations: 86 after adjustments
Cointegrating equation deterministics: C
Fixed leads and lags specification (lead=1, lag=1)
Long run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.046527	0.042674	1.090302	0.2794
LL	-0.054227	0.034703	-1.562611	0.1227
LM	0.241793	0.016363	14.77696	0.0000
RBPNR	-0.005004	0.000981	-5.099331	0.0000
C	10.97490	0.272149	40.32675	0.0000

R-squared	0.998492	Mean dependent var	14.63110
Adjusted R-squared	0.998142	S.D. dependent var	0.200899
S.E. of regression	0.008659	Sum squared resid	0.005173
Long run variance	0.000210		



Series: Residuals
Sample 12/01/1993 3/01/2015
Observations 86

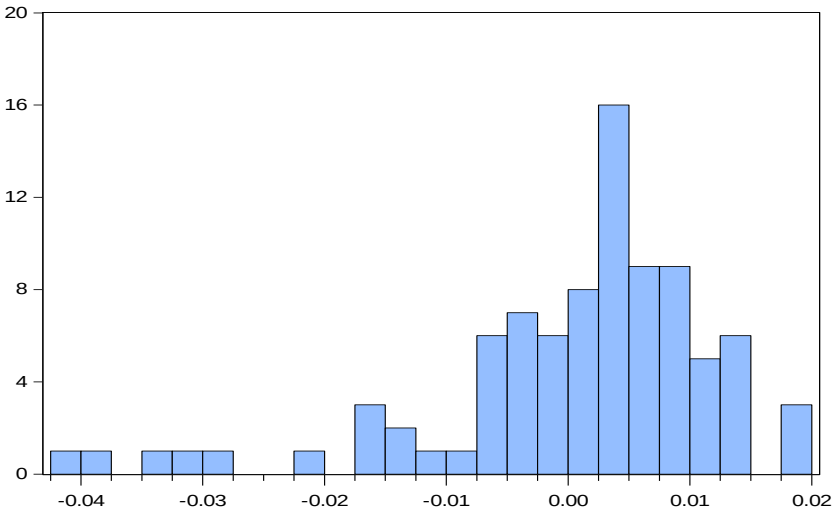
Mean	2.20e-15
Median	0.000657
Maximum	0.015668
Minimum	-0.018514
Std. Dev.	0.007801
Skewness	-0.344873
Kurtosis	2.503282
Jarque-Bera	2.588877
Probability	0.274052

Dependent Variable: LY
Method: Canonical Cointegrating Regression (CCR)
Date: 07/21/16 Time: 20:47
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.041953	0.034609	1.212217	0.2289
LL	-0.017733	0.031351	-0.565641	0.5732
LM	0.232290	0.013579	17.10609	0.0000
RBPNR	-0.004109	0.000977	-4.204829	0.0001

C	11.00813	0.226330	48.63744	0.0000

R-squared	0.996610	Mean dependent var	14.63064
Adjusted R-squared	0.996447	S.D. dependent var	0.204336
S.E. of regression	0.012180	Sum squared resid	0.012313
Long run variance	0.000304		



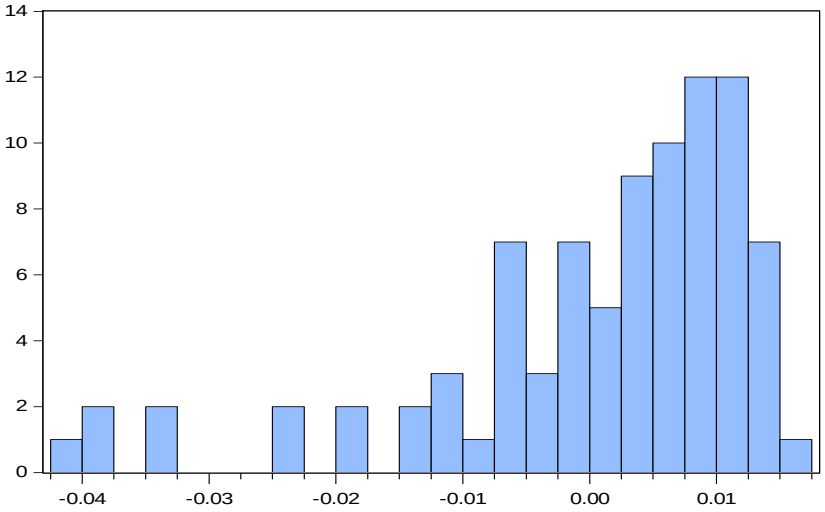
Series: Residuals
Sample 9/01/1993 6/01/2015
Observations 88

Mean	0.000589
Median	0.002999
Maximum	0.019506
Minimum	-0.040409
Std. Dev.	0.011882
Skewness	-1.466935
Kurtosis	5.451495
Jarque-Bera	53.59721
Probability	0.000000

Dependent Variable: LY
Method: Fully Modified Least Squares (FMOLS)
Date: 07/21/16 Time: 20:51
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.064351	0.038934	1.652846	0.1021
LL	0.003890	0.032869	0.118351	0.9061
LB	0.216860	0.014560	14.89456	0.0000
RBPNR	-0.004677	0.001042	-4.486292	0.0000
C	10.81434	0.254612	42.47376	0.0000

R-squared	0.996037	Mean dependent var	14.63064
Adjusted R-squared	0.995847	S.D. dependent var	0.204336
S.E. of regression	0.013169	Sum squared resid	0.014394
Long run variance	0.000365		

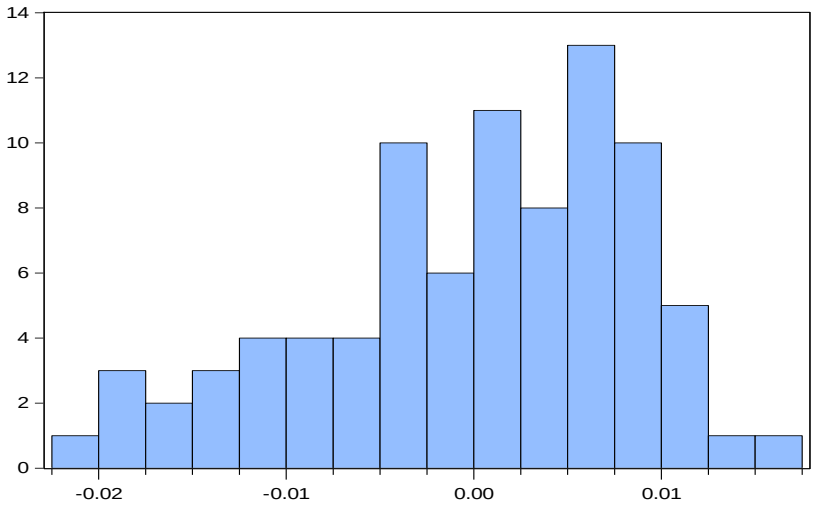


Series: Residuals	
Sample 9/01/1993 6/01/2015	
Observations 88	
Mean	0.000482
Median	0.004038
Maximum	0.015674
Minimum	-0.042328
Std. Dev.	0.012854
Skewness	-1.545180
Kurtosis	5.070157
Jarque-Bera	50.73155
Probability	0.000000

Dependent Variable: LY
Method: Dynamic Least Squares (DOLS)
Date: 07/21/16 Time: 20:52
Sample (adjusted): 12/01/1993 3/01/2015
Included observations: 86 after adjustments
Cointegrating equation deterministics: C
Fixed leads and lags specification (lead=1, lag=1)
Long run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.067739	0.050509	1.341124	0.1843
LL	-0.032892	0.040574	-0.810669	0.4203
LB	0.226413	0.018623	12.15759	0.0000
RBPNR	-0.005717	0.001144	-4.997872	0.0000
C	10.79918	0.315568	34.22139	0.0000

R-squared	0.998150	Mean dependent var	14.63110
Adjusted R-squared	0.997720	S.D. dependent var	0.200899
S.E. of regression	0.009592	Sum squared resid	0.006348
Long run variance	0.000273		

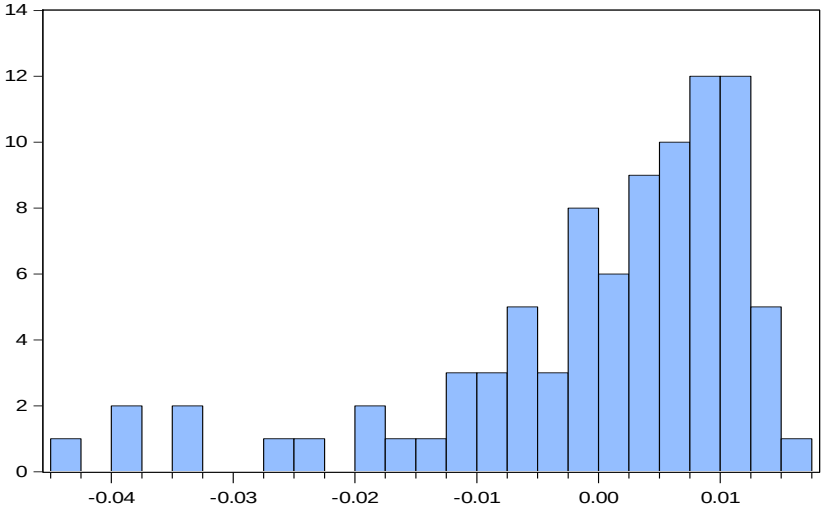


Series: Residuals	
Sample 12/01/1993 3/01/2015	
Observations 86	
Mean	5.66e-15
Median	0.001537
Maximum	0.015926
Minimum	-0.022488
Std. Dev.	0.008642
Skewness	-0.609731
Kurtosis	2.674533
Jarque-Bera	5.708303
Probability	0.057605

Dependent Variable: LY
Method: Canonical Cointegrating Regression (CCR)
Date: 07/21/16 Time: 20:53
Sample (adjusted): 9/01/1993 6/01/2015
Included observations: 88 after adjustments
Cointegrating equation deterministics: C
Long run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LK	0.066189	0.036833	1.797015	0.0760
LL	-0.001010	0.034583	-0.029213	0.9768
LB	0.217099	0.013846	15.67950	0.0000
RBPNR	-0.004851	0.001080	-4.493130	0.0000
C	10.80992	0.237964	45.42677	0.0000

R-squared	0.996001	Mean dependent var	14.63064
Adjusted R-squared	0.995808	S.D. dependent var	0.204336
S.E. of regression	0.013230	Sum squared resid	0.014527
Long run variance	0.000365		



Series: Residuals	
Sample 9/01/1993 6/01/2015	
Observations 88	
Mean	0.000266
Median	0.004228
Maximum	0.015380
Minimum	-0.042602
Std. Dev.	0.012919
Skewness	-1.530104
Kurtosis	5.013613
Jarque-Bera	49.20488
Probability	0.000000