



# **The Impact of Financial Development on Private Investment in South Africa**

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by  
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## **ABSTRACT**

The study analysed the impact of financial development (measured by depth, stability, efficiency and access) on private investment in South Africa over the period 1977 (Q1) to 2015 (Q4). Autoregressive distributive lag model was used in addition to conducting further tests to establish the efficiency of the model using standard diagnostics which confirmed the overall significance of the model. The results find the relationship between financial development and private investment in South Africa to be long-run in nature. The statistically significant variables found to explain the variance of private investment for South Africa in both the short- and long-run are market capitalization, domestic credit, growth in output as well as trade openness. Interest rate spread was found significant only in the short-run.

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## LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARDL	Auto Rgressive Distributive Lag
DFIs	Development Financial Institutions
DOLS	Dynamic Ordinary Least Squares
ECM	Error Correction Model
EU	European Union
FMOLS	Fully Modified Ordinary Least Squares
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HQC	Hannan-Quinn criterion
KPSS	Kwiatkowski, Phillips, Schmidt, and Shin
LSDV	Least Square Dummy Variables
NBFI	Non-Banking Financial Intermediaries
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PCB	Private Credit Bureaus
PCR	Public Credit Registries
PP	Phillips Perron
SACU	Southern Africa Customs Union
SADC	Southern Africa Development Community
SARB	South African Reserve Bank
SIC	Schwarz information criterion
SSA	Sub-Saharan Africa
SURE	Seemingly Unrelated Regressions Equation
SYS-GMM	System Generalized Methods of Moments
UECM	Unrestricted Error Correction Model
VAR	Vector Auto Regression
VECM	Vector Error Correction Model

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# 1 INTRODUCTION

## 1.1 Background of the study

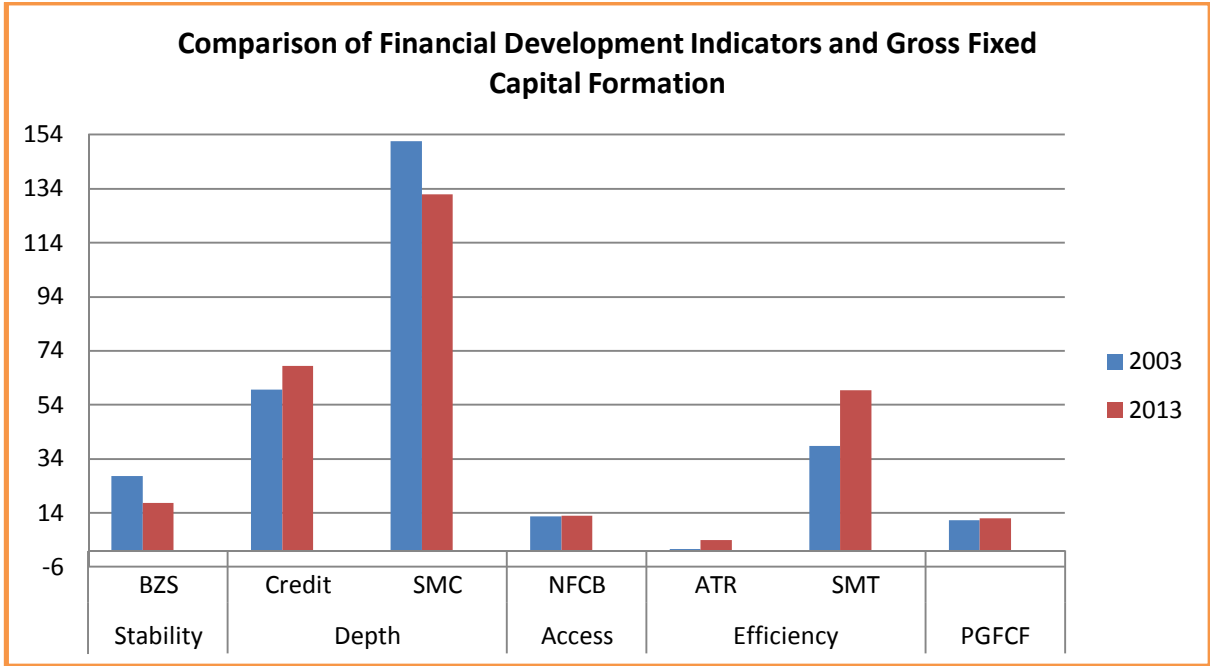
Studies have found that financial development positively affects economic growth, financial inclusion and private investment (Allen, Carletti, Cull, Qian, Senbet & Valenzuela, 2012; Andersen, 2003; Falahaty & Hook, 2013; Misati & Nyamongo, 2011a). It also improves financial market depth, greater access to international markets, efficiency and financial stability (Cihák, Demirgüç-Kunt, Feyen & Levine, 2013).

South Africa maintains financial stability by means of strong, efficient and effective regulatory infrastructure, financial markets and financial institutions (South Africa Reserve Bank, 2015a). However, the country's bank z-score has decreased from 27.7 in 2003 to 17.7 in 2013 (World Bank Group, 2015a) reflecting a fall in stability.

Figure 1 below compares different financial indicators for South Africa over the period 2003 - 2013. As can be seen, financial depth in South Africa, measured as the credit to private individuals from banks that receive deposits, increased from 59.7% in 2003 to 68.5% in 2013, whereas the percentage of stock market capitalization to Gross Domestic Product (GDP) declined from 151.5% to 132.0% during the same period (World Bank Group, 2015a). The percentage of non-financial corporate bonds to total bonds and notes outstanding increased by 0.2 percentage points from 12.7% in 2003 to 12.9% in 2013, suggesting an increment in loans granted to non-financial sectors such as households and non-financial corporations, which is an indication of greater access to finance.

With regard to financial efficiency, there was an increase of the after-tax returns to shareholders from 0.7% in 2003 to 3.9% in 2013, as well as the stock market turnover ratio from 38.7% to 59.3% in 2003 and 2013 respectively (World Bank Group, 2015b). Private investment measured as gross fixed private capital formation as a percentage of GDP increased from 12.8% in 2005 to 13.1% in 2013 (World Bank Group, 2015a). Thus, these statistics indicate a boost of investment in physical assets which may be attributed to the accessible, depth, stability and efficiency in the financial market.

**Figure 1.1 Financial Development Indicators and Gross Fixed Capital Formation**



**Key:**

- BZS = bank z-score
  - Credit = % of credit to private individuals from banks that receive deposits
  - SMC = % of stock market capitalization to GDP
  - NFCB = % non-financial corporate bonds to total bonds and notes outstanding
  - ATR = % of after tax returns to shareholders
  - SMT = stock market turnover ratio
  - PGFCF = gross fixed private capital formation as a percentage of GDP
- Source: Adapted from World Bank Little Data Book on Private Sector Development (2015a) and Little data book on Financial Development (2015b)

According to the Oxford Business Group, South Africa’s financial sector has a high concentration of banks, with a registered total of 17, relative to those registered in the region. In addition, the country has financial intermediaries, a stock exchange and numerous non-banking institutions including Development Financial Institutions (DFIs) targeted to fill the gap in the financial market and serve as a financial resource for supporting investment shortfalls and funding non-bankable projects. These institutions provide access to finance, thus improving the quality of life through job creation and public service enhancement, they also improve infrastructures and increase economic growth (Qobo & Soko, 2015).

The Financial Stability Report (2015b) posits that the main challenges that the country and other emerging market economies are currently facing relates to the normalization in the US interest rates, financial and monetary policy dynamics in the eurozone, growth developments

in China as well as the outlook for commodity prices. These challenges in turn have implications for business confidence, and have increased instability in the financial markets. Additionally, the weakening of the GDP growth performance, shortages of electricity supply, and weak business confidence have led to South Africa's credit rating downgrade, possibly to sub-investment grade in the near future, which would limit institutional investors and thus result in shallow financial markets (Peyper, 2016).

Hence, this study is among the first to focus on the impact that financial development has on private investment in South Africa. Private investment in this study refers to investments made by businesses, financial institutions, private investors, local and/ or foreign. Theory indicates that investment is stimulated by low interest costs, reduction in taxes, increase in public spending, sound economic planning, a policy of wage cuts and an increase in competition (Chand, 2016; Jain & Khanna, 2010). These factors promote private investment. Financial development is defined as a process that facilitates and improves the direct or indirect interaction between economic agents trading in the financial market (World Economic Forum, 2012).

## **1.2 Problem statement**

According to Huang (2006), financial development leads to an increase in private investment, which in turn leads to economic growth. Financial development is characterized by lower costs of funds, a wider variety of financial instruments and lower agency costs. This implies that a well-developed financial system stimulates and mobilizes savings, making funds available for investment, decreasing innovation costs, expands the range of products and services, and reduces both information asymmetry and transaction costs (Levine, 1997). Financial development, particularly financial intermediation, is important for private investment as it is the main conduit; for this reason, a higher level of financial development is expected to promote private investment in an economy (Sineviciene & Deltuvaite, 2014). Four measures of financial development have been identified in the literature namely; financial market depth, access to international markets, efficiency, and stability (Cihák *et al.*, 2013).

The mandate of the South African Reserve Bank is to promote financial stability, development of micro-prudential instruments and policies as well as implementing

discretionary policies to mitigate financial risk. The South African Reserve Bank uses bank regulation and supervision to achieve a sound and efficient banking system<sup>1</sup>.

The South African Reserve Bank has been proactive in maintaining price stability, and promotes financial efficiency through bank regulation and supervision. In terms of financial access, the National Credit Act, 2005 (Act No. 34 of 2005) promotes consumer credit access (mainly unsecured lending for short-term use) which is unlikely to promote private investment. The amount of credit to the private sector (financial depth) has increased at a slower pace than that of 2015 (South Africa Reserve Bank, 2016). This is an indication of increasing private investment. Although the above sheds light on financial development, the country's mandate on ensuring and maintaining financial stability, efficiency and access is clear while that for depth is silent.

However, it is unclear whether the policies enacted to promote financial development have resulted in an increase in private investment. Also, no studies have utilized the autoregressive distributive lag (ARDL) model to analyse financial development and private investment in South Africa. The advantage of using this model is that it considers both the short-run and long-run effect of financial development on private investment provided that the variables happen to be integrated from different orders. Identifying such effects would assist in streamlining policy formulation. For these reasons, this study will examine the impact of financial development on private investment in South Africa over the period of 1977 - 2015.

### **1.3 Purpose and significance of the research**

This study seeks to shed light on the relationship between financial development and private investment in South Africa. The relationship obtained can be used to evaluate the effectiveness of the government policies of financial development on private investment. If the positive relationship holds, then it means there is a high likelihood that financial development will lead to an increase in economic growth facilitated by an increase in private capital. Economic growth is important for economic development which entails poverty eradication, access to health, education and sanitation just to name but a few.

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<sup>1</sup> The Banks Act 1990 and the Mutual Banks Act 1993 are legislations governing South African financial sector and ensure financial efficiency in the country. The South African government promulgated the National Credit Amendment Act, 2014 (Act 19 of 2014) to improve access to credit. Financial access is further enhanced through the Financial Sector Charter as well as through the Black Economic Empowerment Act.

The study will also provide the short-run and long-run relationship between private investment and financial development. The outcome of the study will bring to light the impact of financial development on private investment in South Africa. The finding may be used by the government for policy enhancement and, as for the general public, the findings add to the literature.

#### **1.4 Research questions and scope**

Given the above background, the study seeks to answer the following primary question:

- *How does financial development impact on private investment in South Africa?*

In addition to the primary research question, the study will also answer the following secondary question:

- Which of the four measures of financial development (depth; stability; efficiency; and access) are most significant in the short- and long-run?

The sample period for the study is from 1977 quarter one to the last quarter of 2015 (156 observations). The choice of variables will be based on the literature and the availability of data.

#### **1.5 Proposed structure of the study**

In investigating the research questions stated above, the study is divided into five chapters. Following this chapter, is a presentation of the literature review on financial development and private investment. In Chapter 3 the data and empirical methodology used are discussed. In Chapter 4 the results obtained from the empirical exercise are reviewed. This is followed by Chapter 5, which will conclude the study and give some recommendations for future research.

## 2 LITERATURE REVIEW

### 2.1 Introduction

In this chapter the literature on financial development and private investment are discussed; firstly cross-country studies are considered, and thereafter the focus is on country-specific studies, starting with developed countries; this starts with emerging country studies, and ends with studies of South Africa.

Financial development has been researched dating back to the 1800s. Bagehot (1873) emphasizes the important role financial systems play in economic growth and in spurring investments. The theory of economics developed by Schumpeter (1912) posits the crucial role that bank credit (which serves as financial access) plays in the drive for innovation and the foundation of new firms. The emergence of new firms is a form of private investment. Gurley and Shaw (1955) in the liquidity theory of money, broaden the scope/definition for money supply by including the liabilities of Non-Banking Financial Intermediaries (NBFI). NBFI arise as a form of financial development which mobilizes savings from savers to investors.

The theory of financial structure and development has emerged from Goldsmith's (1969) assessment of the link between financial structure and development on economic growth. Similarly, through the theory of economic development, McKinnon (1973) examines the relationship between money and capital and sheds light on the effects of domestic capital markets on economic development. More recently, Fiesta and Sinha (2011) argue that the level of financial sector development exerts a positive influence on the access to finance by firms. This is because a striking investment climate tends to yield profitable investment returns, which then not only becomes attractive to firms but to households as well, resulting in higher levels of private investment and a positive feedback loop.

Dima and Opris (2013) add that in developing economies financial sector development boosts capital accumulation, and the resulting financial intermediation acts as a contributor to an increase in saving and investment rate. In addition, Wale (2015) posits that in less financially developed economies, financial access is likely to be a constraint on private investment.

## 2.2 Cross-country studies

Ndikumana (2003) tested the effect of financial development on domestic investment using cross-section and panel data regressions on a sample size of 99 of developed and developing countries covering the period of 1965-1997. The results found a positive relationship between the two, indicating that financial development facilitates domestic investment, and as financial systems become more sophisticated and efficient, output demand is boosted, thus increasing investment.

Moreover, Yu and Hassan (2007) evaluated the relationship between economic growth and financial development on the Organisation for Economic Cooperation and Development (OECD) countries from 1960-2005 using impulse response functions, Granger causality tests, and forecast error variance decompositions. The results showed evidence of a significant relationship between financial development and economic growth in high income OECD countries and very weak relationships in Southern Asia and sub-Saharan Africa (SSA) regions. Yu and Hassan thus concluded that enhanced financial development, especially in SSA regions, needs to be complimented by enforcing policies accross regions. Regardless of the level of countries development, financial development stimulates economic growth.

Furthermore, Afonso and Aubyn (2008) analysed the macroeconomic effects of public and private investment on 14 European Union (EU) countries as well as on Canada, Japan and the USA from 1960 to 2005 using a Vector Auto Regression (VAR) model. The results indicate that public investment crowds-out private investment in countries such as Belgium, Ireland, Canada, the United Kingdom and the Netherlands. It has a crowding-in effect in countries such as Austria, Germany, Denmark, Finland, Greece, Portugal, Spain and Sweden. A crowding-in effect is expected to stimulate private investment, whereas crowding-out is expected to distort private investment. Raising public investment might have negative effects on financial development if public investment is financed through capital markets or increased taxes; this raises interest rates and makes private investment more expensive. On the other hand, raising public investment may become favourable to private investment through the provision of sufficient public infrastructure, such as roads, water and electricity, that is prerequisite to public investment.

The relationship between financial development and economic growth in addition to the banking and financial sector of ten EU countries was examined over the period 1994-2007 by Caporale, Rault, Sova and Sova (2009) using the Generalized Method of Moments (GMM) and Granger causality tests. They grouped the countries into Central and Eastern Europe, Baltic and Southeastern European countries, and then conducted the GMM analyses and Granger causality tests. The results found that Central and Eastern Europe had more developed financial sectors than the Baltic and Southeastern European countries. Furthermore, the analysis finds no evidence of financial depth in any of the ten countries. Additionally, the analysis finds stock and credit markets underdeveloped, leaving less room for public and private investment to grow at favourable rates in order to foster economic growth. However the Granger test found a unidirectional causality from financial development to economic growth, implying that financial development determines economic growth.

Falahaty and Hook (2013) studied the determinants of financial market development in nine Middle Eastern and North African countries during the period 1991-2009 using Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) methods. The results of the FMOLS method show that financial development is affected by economic growth, trade openness, bank concentration, institutional quality and the government ownership of banks, while the results of the DOLS method show that trade openness and bank concentration promotes financial development. The findings further suggest that, by improving business environments, the quality of institutions, macroeconomic stability, banking systems concerning inflation control, and monetary policies can promote financial development. The findings also suggest that privatization of banks can equally promote financial development.

Sineviciene and Deltuvaite (2014) assessed the relationship between private investment and financial system development in EU countries over the period 2000-2011 using hierarchical cluster analyses, descriptive statistics and correlation analysis. The analysis shows that countries with higher GDPs per capita have more developed financial systems, whereas countries with lower developed financial systems have higher private investment growth rates and private investment GDP ratios. Furthermore, the study found private investment more volatile in countries with less developed banking sectors and financial markets. Sineviciene and Deltuvaite conclude that countries with higher levels of banking sectors and financial

markets have lower growth increases of private investment compared with countries with lower banking sector levels and financial markets.

Mehrara and Ghamati (2014) studied financial development and economic growth in ten developed countries, namely: Canada, England, Japan, Spain, Germany, America, the Netherlands, Switzerland, Italy and Russia over the period 1999-2007. The empirical study used panel data and general econometric model. The study found that there was a positive effect of financial development on economic growth in the sampled countries, but that the extent of economic growth depended on the level of each country's financial sector development and economic condition.

Thus these cross country studies indicate that financial development stimulates economic growth regardless of the countries' levels of development. These studies have further revealed that private investment tends to be more volatile in countries with less developed banking sectors and financial markets. The issue of crowding-in and out also emerged; crowding-out is prone to occur in instances where public investments are funded through capital markets and increased taxes, while crowding-in may occur by raising public investment through the provision of sufficient public infrastructure that is prerequisite to public investment.

Some studies have sampled both developed and developing economies. Mauro (1995) studied corruption and growth over the period 1970-1985 using Ordinary Least Squares (OLS) methodology in 70 developed and developing countries. The study found corruption to have a strong negative association with investment. Corruption is said to lower investment, thereby lowering economic growth. Mauro revealed that corruption is prevalent in countries with weak financial systems and might create loopholes for illegal financial resources to be channelled through. Red tape, the efficiency of judicial systems and categories of political stability help measure levels of corruption within countries. Well-developed and well-regulated financial systems were found to minimize the level of corruption in both developed and developing countries.

Ahmed and Miller (1999) considered developed and developing countries in examining the effects of government expenditure on investment by estimating two equations with OLS, fixed-effects and random effect models for three sets of data sets. One set comprises the full 39 countries, another set comprises 23 developing countries and the last set comprises 16

developed countries over the period 1975-1984. Ahmed and Miller found a positive and significant effect of openness on investment in developing countries; crowding-in of transport and communication expenditure by government on investment for developing countries only; crowding-out of tax financed government expenditure on investment more than debt financed; as well as crowding-out of government expenditure on social security and welfare on investment in all samples. They thus concluded that investment is hampered by social security and welfare expenditure across all three data sets used while private investment is stimulated by transport and communication expenditure in developing countries. This study is relevant in determining whether government expenditure stimulates or crowds-out investment in developed and developing countries. As previous studies have highlighted (Ndikumana, 2005; Pereira & Andraz, 2012), expenditure on transport and communication is expected to enhance financial development.

An analysis that compared political and financial development in the twentieth century (Rajan & Zingales, 2003) covering the period 1913-1990 reveals that countries were more financially developed in 1913 than in 1980 and had only recently surpassed 1913 levels. The study used the Spearman rank correlation test to measure the levels of financial development in emerging and developed countries over the period reviewed. Indicators that were used show that trade openness increases the level of financial development through cross-border capital flows. Also policies that promote efficient and competitive industries within countries are found to contribute positively to financial development.

Domaç and Peria (2003) investigated the linkages between banking crises and exchange rate regimes in 95 developed and developing countries over the period 1980-1997. The multivariate logit model, OLS and Cox proportional hazard models were used to analyse the link. The empirical results suggest that adopting a fixed exchange rate regime after controlling a host of macroeconomic, financial and external fundamentals reduces the possibility of a banking crisis. The results further indicate that the real cost of crisis is likely to be higher in countries with high inflation and interest rates. The duration of the crisis does not appear to be affected by the exchange rate regime. The banking sector and exchange rates form part of financial development. The financial crisis of 2008 ó 2009 has shaken the global economy greatly and left developed and developing countries on the brink of bankruptcy. Financial stability is of outmost importance to both developed and developing countries.

In order to establish the relative significance and determinants of financial development, Huang (2005a) used a Bayesian Model to examine financial sector development in 17 East Asian and Pacific countries, 16 Middle Eastern and African countries, five South Asian countries, 27 SSA countries, 23 Latin American and Caribbean countries, as well as 19 West European and North American countries over the period 1960-2003. His results show that the most significant determinants are trade openness policies, financial liberalization, access to ports and income level. Hence, he concludes that more open trade policies, proximity to centres supplying capital goods, higher income levels and better institutions are associated with better financial intermediary development.

In another study, Huang (2005b) investigated whether political liberalization brings about financial development on a sample of 90 developed and developing countries over the period 1960-1999. The methodology used OLS, Least Square Dummy Variables (LSDV) and System Generalized Methods of Moments (SYS-GMM). The empirical evidence shows a positive effect of political liberalization on financial development in the short run, particularly in lower income countries. The before-after event study approach was also employed to explore the impact of democratic transitions on financial development and found democratic transformation to be typically followed by an increase in financial development.

Erden and Holcombe (2005) examined the effects of public investment on private investment using a sample of 19 developing and 12 developed economies over the period 1980-1997. Erden and Holcombe used the OLS model to estimate the parameters and report that public and private investment, as well as the availability of credit affects investment positively, and that public and private investment are negatively related in developed economies. The study thus concludes that public investment crowds-out private investment in developing economies. The effects of public investment on private investment is essential for governments at any stage of development and policy makers.

Chinn and Ito (2005) analysed the links between capital account liberalization, legal and institutional development, as well as financial development using panel data analysis and the Chinn ó Ito Index Model on 108 industrialized and emerging market countries between 1980 and 2000. Their empirical results in the quest to determine the effect of capital account liberalization on the development of equity markets in less developed and emerging market countries suggest that higher financial openness contributes to the development of equity

markets but only if legal systems and institutions are the foundation on which equity markets are built. It further went on to find that development in the banking sector is vital and is a prerequisite for capital account liberalization.

Demetriades and Andrianova (2005) studied the sources and effectiveness of financial development in 72 countries between 1990 and 2001 using the cross-country OLS robust standard estimator model. The study found that both institutions and political economy factors might be the true fundamental sources of financial development. The study has also found evidence which suggests that institutional quality may influence the effectiveness of financial development in delivering economic growth.

In order to gain an understanding of the motive behind financial decisions made by investors, Love and Zicchino (2006) analysed the investment decisions made by firms across 36 different countries and the level of financial development using orthogonalized impulse response functions between 1988 and 1998 . The results indicate that the allocation of capital by firms is inefficient and exhibits slower growth rates in countries with underdeveloped financial markets. The study concludes that financial development plays a significant role in improving capital allocation and economic growth. This conclusion supports the study conducted by Bialowolski and Weziak-Bialowolska (2013) on different external factors that influence companies investment choices.

Aggarwal and Goodell (2008) analysed the national preference determinants of the financial intermediation of 30 countries between 1996 and 2003 using the panel data regression technique. The results indicate that a country`s preference for market financing as opposed to bank financing increases with political stability, societal openness, and equity market concentration. Regulatory quality and policy stability are found to decrease national preferences for market financing.

Law and Azman-Saini (2008) undertook a study on the quality of institutions and financial development covering 63 developed and developing countries between 1996 and 2004. The GMM methodology was used and the empirical results show that, institutional quality is significant in enhancing financial development, especially the banking sector development in both developing and developed countries. The study also found the rule of law, political

stability and government effectiveness to be vital tools in promoting banking sector development.

Estrada, Park, and Ramayandi (2010) analysed the relationship between financial development and economic growth in developing Asia, using econometric modelling techniques based on cross-country panel data from 1987 to 2008. The econometric analysis on the panel data of 125 countries confirmed that financial development has positive effects on economic growth especially in developing countries. These empirical results support the general theoretical statement of a positive relationship between financial development and economic growth as identified by Khan and Kumar (1997) as well as Padilla and Mayer (2002).

In establishing measures of financial development, Adnan (2011) sampled 41 countries over the period 1988-2009. The principal component analysis method found that financial development could be measured by a number of factors such as depth, size, access and the soundness of the financial system. The data was further analysed using the descriptive statistics KOREAN Index and show that financial stability and soundness of financial systems to be important for measuring financial development.

Thus in summary, these cross-country studies indicate that trade and financial openness, financial stability and soundness, policies that promote efficient and competitive industries within countries, proximity to centres supplying capital goods, higher income levels and institutional quality tend to increase the level of financial development. These studies indicate that financial development plays a significant role in improving capital allocation and economic growth and that regulatory quality and policy stability tend to decrease national preferences for market financing. These cross-country studies also indicate that well-developed and well-regulated financial systems minimize levels of corruption.

With regard to developing countries, Khan and Kumar (1997) analysed the effects of private and public investment and the growth process in 95 developing countries from 1970-1990 using the Two Stage Least Squares method. The results show a positive impact of private and public investment on growth; private investment had a more significant impact when compared with public investment especially during the 1980s. Therefore this implies that more emphasis should be placed on enhancing private investment to accelerate faster

economic growth. These results are in accordance with Haque (2013) whose results show that private and public investment impacts economic growth with private investment having a greater effect in the long-run compared with public investment.

Servén (1998) undertook an empirical investigation on macroeconomic uncertainty and private investment in 94 developing countries over the period 1970-1995 using OLS, Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and SYS-GMM methodologies. The empirical results show a negative impact of uncertainty on investment, more so in terms of real exchange rate volatility which negatively impacts investment at any rate of economic condition.

Gelbard and Leite (1999) measured financial development in SSA between 1987 and 1997 using growth equation methodology. The results show an advancement and development in the sub-Saharan African countries, specifically regarding the deregulation of domestic financial markets and the adoption of indirect instruments of monetary policy during the period under review. The study revealed that some countries are still faced with wide interest rate spreads, the limited scope of financial products and capital adequacy ratios, challenges with judicial loan recovery and a large share of non-performing loans, implying low measures of financial development.

Bailliu (2000) examined the link between private capital flows, financial development and economic growth in 40 developing countries during 1975-1995 using the GMM estimation technique. Bailliu found evidence that capital flows promote economic growth given any effects on the investment rate provided the banking sector has reached a certain level of development. He thus concluded that the domestic financial sector plays an important role in the link between international capital flows and promotes economic growth in developing countries.

Ndikumana (2001) undertook a study on financial markets and economic development in 42 African countries over the period 1970-1998. The study found a positive relationship between financial development and economic growth. The study also found that the majority of African countries were underdeveloped, but that some had made significant good progress in developing their financial markets through macroeconomic reforms, especially through fiscal disciplines.

Sioum (2002) examined the link between private investment and public policy in SSA over the period 1970-1998. Using a LSDV model, the results show that private investment has a positive impact on aggregate demand, while political instability and increased government borrowing deters private investment. Furthermore, the study revealed that apart from efforts to diversify exports domestically, the need for developed countries to open up markets for African export is deemed crucial, as investors in SSA are prone to shocks occurring in the external sector. Sioum concludes that fiscal discipline and strictness of the monetary sector may no longer be effective policy tools, in terms of stimulating private investment in SSA, as the cost of poor infrastructure and liquidity constraints investors incur is far more than what they benefit from stable macroeconomic policies.

Aziakpono (2003) analysed the significance of financial development and economic growth, specifically the national financial intermediaries in the increasingly Southern Africa Customs Union (SACU) countries` financial markets during the period of 1965 and 2001. Aziakpono used Seemingly Unrelated Regressions Equation (SURE) methodology and found domestic financial intermediation to be relevant to economic growth, and smaller SACU countries to be associated with less developed financial institutions which may hinder effective promotion efforts of economic growth. Among the SACU member states, South Africa demonstrates strong evidence of significance in relation to domestic financial intermediation in the promotion of economic growth.

The Policy Division Working Paper (2004) on the importance of financial sector development for growth and poverty reduction revealed a significant impact of financial sector development on economic growth and poverty reduction. This is to a greater degree more probable in underdeveloped financial sectors in developing countries. The study further found limited access to ongoing formal financial services in poor countries which are forced to rely on risky and expensive informal services. Some countries were found to have semi-formal channels such as microfinance institutions which contribute positively to the provision of financial services thus increasing access to funds, growing financial sector development and reducing poverty.

Detragiache, Gupta and Tressel (2005) explored the link between the characteristics of 89 low income countries, financial sector development and performance during the period 1991-2001

using OLS. Detragiache *et al.* posit that corruption and inflation are linked to a shallower and less efficient financial system while improved enforcement of contracts and information symmetry boosts credit to the private sector. Additionally, the study found that more access to foreign banks does not cure the shallowness and efficiency of financial sectors relative to concentrated state-owned banks characterized by more bank deposits and low overhead costs. The researchers concluded that political instability and corruption are obstacles to financial development and that keeping inflation under control might improve bank efficiency and development.

In understanding how financial development and private investment are linked, Huang (2006) analysed the relationship between financial development and private investment on a sample of 43 developing countries over the period 1970 ó 1998. Huang employed GMM analysis with five-year overlapping periods and found a positive causal relationship in both directions. Further analysis also showed that there is evidence of cointegration between financial development and private investment. Huang thus concludes that sound macroeconomic policies, favourable economic and legal environments facilitate private investment and are favourable for the development of financial markets.

Baltagi, Demetriades and Law (2008) investigated the relationship between financial development, openness and economic institutions in 21 developing countries over the period 1980-2003 using the GMM estimation methodology. The findings suggest that openness and economic institutions can explain the differences in financial development across countries and over time since the 1980s. These findings provide limited support to other studies on the assumption following the need to open trade and capital accounts concurrently in the quest to promote financial development (Rajan & Zingales, 2003).

Beck, Feyen, Ize and Moizeszowicz (2008) conducted a benchmark study on financial development in which they sampled 155 countries over the period 1960-2006, using OLS methodology. The study found GDP per capita significant in explaining the positive relationship between financial and economic development. The study further found a strong and significant impact of interaction between income and size, population density, poverty gap and off-shore investment on financial development. A return to scale as a proxy for population size strongly echoes the hurdle faced by capital markets in smaller economies in

developing and attaining critical mass. The findings on return to scale are consistent with that of Bossone Honohan and Long (2001).

Similarly, Misati and Nyamongo (2011b) examined the relationship between financial sector development and private investment in SSA over the period 1991-2004 using a simple accelerator model of investment where capital is proportional to GDP. They found that interest rates on deposits and institutional factors are negatively related to private investment while private sector credit and the turnover ratio are positively related. Misati and Nyamongo thus concluded that accelerating inter-regional stock market integration rather than individual stock exchange development and enhancing quality of institutions improves financial liquidity, efficiency and competitiveness in SSA. Their conclusions entails an inter-regional approach which contradict the sentiments of Detragiache *et al.* (2005) of limiting foreign bank access owing to their shallow and not necessarily more efficient financial sectors compared with more state-owned banks.

In another study Aggarwal, Demirgüç-Kunt and Pería (2011) analysed the relationship between remittances and financial development, focusing on bank deposits and bank credit in the private sector of 109 developing countries between 1975 and 2007. Using dynamic GMM, they found a strong positive and significant relationship between remittances and bank deposits and credit to GDP. The relationship found may have a positive influence on the recipient country's financial development. Remittances increase cross border transfers and are seen as an encouraging factor for receiving residents to open bank accounts, especially in developing countries.

Nyamongo, Misati, Kipyegon and Ndirangu (2012) assessed the link between financial development and remittances in relation to economic growth in 36 African countries. The assessment employed panel econometrics framework methodology over the period 1980 ó 2009 and found remittance to be an important source of growth in the sampled countries whereas financial development is found to be weak in boosting economic growth for these countries.

Luca and Spatafora (2012) accessed the determinants and relationship between capital inflows, domestic credit and domestic investment in 103 developing countries between 2001 and 2007 using a GMM dynamic panel estimator. They found net capital inflow and domestic

credit to exert a positive effect on investment. Furthermore, the results indicate a decrease in the global risk price and domestic borrowing costs as the main determinants of net capital inflow and domestic credit. Luca and Spatafora also found large cross-country differences in international and domestic finance resulting from institutional quality, access to international export markets and an appropriate macroeconomic policy. These findings are supported by Huang (2006) who found that sound macroeconomic policies and favourable economic and legal environments facilitate private investment and are favourable for developing financial markets.

Sghaier and Abida (2013) studied the relationship between foreign direct investment, financial development and economic growth in Tunisia, Morocco, Algeria and Egypt between 1980 and 2011 using GMM panel data analysis. The empirical result indicates that, foreign direct investment is a significant determinant of economic growth while the development of a domestic financial system is an important prerequisite for foreign direct investment in these countries. The study recommends the proper development of domestic financial systems in order to maximize the benefits of the presence of foreign direct investment and the expected increase in economic growth.

Christopoulos and Tsioba (2014) examined the link between the financial development and economic growth of 10 developing economies using panel unit root tests and co-integration analysis over the period 1979-2000. The results show significant long-run causality from financial development to growth, but no evidence of bi-directional causality. These findings are in line with those of Khan and Senhadji (2000) but contradict those of Demetriades and Hussein (1996) who found bi-directional causality.

In studies in African countries, Gwama (2014) evaluated the determinants of weak financial development in 48 African countries over the period 1984-1995 using GMM analysis. He found that openness to trade and remittances are positively related to financial development and inequality is negatively related, while the traditional endowment theory in the African continent is unrelated, implying the failure of traditional theories in explaining Africa's slow development. This is in line with the conclusion of Allen *et al.* (2012).

Asongu, Nwachukwu and Tchamyu (2015) explored information asymmetry and financial development dynamics in Africa over the period 2004-2011 using the GMM methodology.

The study found that Public Credit Registries (PCR) and Private Credit Bureaus (PCB) have negative effects on financial depth as well as on the efficiency of banking systems. The study concludes that PCR and PCB have negative impacts on financial activity and that introducing financial information sharing offices in Africa, as a policy of increasing financial access, has led to a positive effect on financial activity.

Mbulawa (2015) examined the determinants of credit on private sector and financial development for 11 Southern Africa Development Community (SADC) countries from 1996 to 2010 using panel data estimations. He found that public credit, growth per capita GDP, financial openness, inflation and institutional factors significantly and positively related to financial development whereas government debt and savings related negatively. Mbulawa concluded that institutional quality, private and public partnerships and rule of law should be enhanced while corruption and political violence should be kept at low levels.

Lastly, Mlachila *et al.* (2016) studied financial development in SSA in the quest to promote inclusive and sustainable growth. The GMM methodology was used in the study covering the period 1980 to 2013. The study found financial development to have progressed well during the past decade. The empirical results showed that financial development has supported growth and reduced its volatility in SSA but its level has remained below its benchmark. The study concluded that the provision of strong legal and institutional frameworks and the promotion of sound corporate governance, strengthening supervision (including cross-border oversight on a consolidated basis) and introducing an enabling regulatory environment to broaden financial inclusion policies could accelerate financial development within SSA, therefore increasing growth and reducing its volatility.

Thus these studies indicate that private sector credit, the turnover ratio, net capital inflow as well as expenditure on transport and communication stimulate private investment in developing countries while rates on deposits and institutional factors are negatively related. Regarding financial development, these studies reveal that the majority of African countries are underdeveloped: some countries have made significant good progress in developing their financial markets through macroeconomic reforms, financial liberalization and the adoption of indirect instruments of monetary policy. Some studies indicate the provision of strong legal and institutional frameworks, promoting sound corporate governance and strengthening supervision to accelerate financial development within SSA which in turn increases growth.

Other studies conclude that institutional quality, private public partnerships and the rule of law should be enhanced while corruption and political instability is kept at low levels. Keeping inflation under control is also found to improve bank efficiency and development. Moreover, these studies have recorded a positive causal relationship between financial development and private investment as well as significant long-run causality from financial development to growth, but no evidence of bi-directional causality.

## **2.3 Country-specific studies**

### ***2.3.1 Developed country studies***

Erenburg (1993) investigated the relationship between public and private investment in the United States during the period 1952 to 1990 using Accelerator-Cash Flow, Securities Valuation-Cash Flow and Neo-Classical models. The empirical results found that investments in equipment made by the private sector are inversely and directly related to government investment spending and to public capital stock respectively. The results further reveal that public provision of capital is more responsive to investments in equipment made by the private sector than structural investment or measures of total investment.

Dehejia and Lleras-Muney (2003) analysed the link between financial development and components of economic growth such as farm and manufacturing sectors, human capital and child labour in the United States during the period 1900-1940. The methodology used in the analysis was that of descriptive statistics; changes in the state banking regulation were found to have a significant impact on financial development. Financial development was also found to endorse the use of intensive machinery and lessen the extent of farm land, increase employment, wages and value addition in relation to the manufacturing sector, increase school enrolment and attendance in relation to human capital and contribute to wealth acquisition by increasing home ownership.

Fuss and Vermeulen (2004) assessed the investment decisions made by firms regarding the uncertainty in demand and price. The Belgian Business Cycle survey, OLS and SYS-GMM estimator models were used to construct the measure of uncertainty during the period 1987 to 2000. Their results show that price uncertainty is insignificant and that demand uncertainty weakens planned and realized investment. Fuss and Vermeulen also found that firms revise

their investment plans very little, mainly in response to new information on sales growth, but not as a result of uncertainty. Firms' investment is found to be directly impacted by the level of financial development within an economy.

Pereira and Andr az (2012) evaluated public investment, specifically railroad infrastructure, on private investment, employment and output on an aggregate Portuguese economy as well as on each of the five administrative regions, namely: North, Centre, Lisbon, Alentejo and Algarve. The evaluation used a VAR model on the empirical data during the period 1989-2003. The findings at an aggregate level were that public investments have a positive effect on private investment, employment and output. At regional levels, the findings showed public investment positively affected private investments in all regions while employment had an effect in Lisbon as well as in the North. Pereira and Andr az further find output to have an effect in all regions except in Alentejo. These results suggest an uneven distribution of effects regionally and that investing in public enterprises such as railroad infrastructures has a crowd-in effect on private investment. This is supported by Afonso & Aubyn (2008) who found that public investment on public infrastructure has crowd-in effects on private investment.

Thus these studies indicate that private investment is sensitive to public investment. Studies have found private investment to be adversely related to public investment while in some instances private investment is found to be positively impacted by public investment especially in public infrastructures. The investment decisions of firms are negatively affected by demand uncertainty and investment decisions, and are directly impacted by the level of financial development within an economy. Financial development has a direct positive influence on economic growth components such as manufacturing, farm land development and human capital.

### ***2.1.1 Developing Country Studies***

With regard to Latin America, Ramirez (1994) investigated the relationship between public and private investment in Mexico over the period 1950-1988 using a modified accelerator model and pair-wise Granger causality tests. The results showed an overall positive and significant effect of public investment on gross private investment expenditures. The results further revealed a negative effect of deflationary measures implemented throughout the 1980s on gross private investment.

Padilla and Mayer (2002) investigated whether financial development was important for economic growth in Slovenia over the period 1993 to the second quarter of 2001 using the Granger causality test. The results found financial depth to have had an unidirectional causality on economic growth. The results imply that financial development had a significant and positive effect on economic growth and investment in Slovenia. Also capital account liberalization was positively affected by increased credits in the private sector, while financial depths indicated positive effects on economic growth and investment. The study further shows that financial deepening is achieved through development of adequate institutions and sustained macroeconomic policies. It is important to set stable and sustainable financial systems in order to realize capital account liberalization and to increase economic growth and investment.

Acosta and Loza (2005) analysed the short- and long-run causal elements of private investment in Argentina between 1970 and 2000. The analysis used the co-integration technique of the Engle and Granger test methodologies. The results indicated that private investment was determined in the short-run by exchange rate, trade liberalization, and aggregate demand shocks while the external debt level and domestic credit market degree of restrictions was significant in the long run. Acosta and Loza concluded that the poor efficiency of financial credit systems may have been an important obstacle to economic growth in Argentina and that an exchange policy, an enhancement of the business environment as well as trust recovery in the domestic financial institutions might restore growth in the economy.

Syed and Majeed (2007) assessed how private investment related to public policy in Pakistan during the period 1970-2004. The study used OLS and found that public sector investment, bank credit to the private sector and the degree of capacity in the economy were significant determinants of private investment. The study also found the level of expected GDP to have a positive effect on private investment and that public infrastructure investment was complementary to private investment. Syed and Majeed further found that increase of the public sector in domestic financial resources, foreign financing and public borrowing to be substitutes for private investment. In conclusion, Syed and Majeed advises the public sector not to increase its domestic financial resources share as it crowds out private investment and rather to increase the infrastructure investment in order to provide a sound foundation for new investment opportunities.

Boopen, Kesseven, Jashveer and Binesh (2010) studied the determinants of financial development in Mauritius using an ARDL model for the period 1970-2008. The results show that trade openness and trade liberalization are important determinants of financial development. Moreover, Boopen *et al.* found investment rate per capita and literacy rate are important factors influencing financial stimulation while inflation has an adverse influence on financial development in the short- and long-run. Referring to laws governing human rights and government regulation in Mauritius, the findings show that financial development is dependent on institutional quality.

Bialowolski and Weziak-Bialowolska (2013) examined the different external factors that possibly influenced the investment choices of companies in Poland. The results indicated the problem of payment delay as the main investment decision effect. Macroeconomic factors and law-related factors were found to be the driving forces influencing investment decisions. Good law and order and rapid turnaround time (efficiency) were expected to increase external investment choices and in turn increase financial development. Bialowolski and Weziak-Bialowolska posit that knowledge of various factors that drive firms' investment choices and behaviour served as a guide to assessing information transparency and trustworthiness in a country or market, as uncertainty makes firms under- invest.

Güngör, Çiftçio lu and Balcilar (2014) examined the relationship between financial development and private savings in Turkey during the period 1970 to 2008 by employing an ARDL model. The results showed that private savings had a positive effect on financial development. Private savings contributed to the funds available for investing in a financial system because the money saved through financial institutions was lent out to those who wanted to invest. The saved money also determined the lending price calculated through the interest rate and the availability of saved funds.

Abdin (2016) investigated the effect of financial development and financial instability on poverty reduction using evidence from Bangladesh over the period 1974-2013. The investigation used OLS and GMM estimators and found a positive and significant impact of financial development on poverty reduction, directly and indirectly through economic growth in Bangladesh. Additionally, Abdin found a negative effect of financial instability on poverty reduction. He thus concluded that financial development helps reduce poverty by providing

greater credit access and saving opportunities for the poor and through promoting economic growth while financial instability is unfavourable for poverty reduction and hinders financial development.

Thus these studies indicate that public investment has a positive and significant effect on gross private investment expenditures, capital account liberalization positively affected by increased credits to the private sector while financial depths indicated positive effects on economic growth and investment. In addition trade openness and trade liberalization were found to be important determinants of financial development while inflation was found to have an adverse influence on financial development in the short- and long-run. The poor efficiency of financial credit systems was also found to hinder economic growth while exchange policy, the enhancement of the business environment as well as trust recovery in the domestic financial institutions were found to restore growth in the economy. Other studies discouraged the public sector from increasing its domestic financial resources share as it crowds out private investment and rather increases the infrastructure investment in order to provide a sound foundation for new investment opportunities. Good law and order and financial efficiency was found to increase external investment choices which in turn increased financial development.

### ***2.1.2 Studies in Africa***

Lesotlho (2006) studied the causal elements of private investment in Botswana from 1976 to 2003 using co-integration and the Error Correction Model (ECM) regression methodologies. The empirical investigation found public investment, bank credit to the private sector and real interest rate to have a significant and positive effect on private investment in the short run. The study found GDP growth and real exchange rate to be significant and that they affect private investment in the long-run. Other determinants such as inflation and changes in trade were found to be insignificant in explaining private investment. Lesotlho concluded that macroeconomic factors are important determinants of private investment both in the short- and long-run.

Adenutsi (2011) analysed the relationship between financial sector development, remittance inflow and endogenous growth in Ghana over the period 1987-2007. Using the Johansen cointegration procedure, Adenutsi found a bidirectional causality between financial

deepening and international migrant remittance inflows while remittance and endogenous growth was found to have an unidirectional causality. He thus concluded that financial development could be beneficial to endogenous growth in Ghana, provided it succeeded in attracting non-debt foreign capital in the form of migrant remittances. Eshun, Adu and Buabeng (2014) researched the financial determinants of private investment in Ghana between 1970 and 2010 using ARDL regression methodology. The empirical results showed a positive increase in real interest rate and the user cost of capital to such an extent that the net profits of investors become negative in both the short- and long- run. The results further found a reduction in private investment when the real interest rate is high and investors face financing constraints. The study concludes that exchange rate stabilization policies are important in rectifying the possible volatilities and effects of the depreciation of the exchange rate on private investment.

Mbaye (2012) examined the determinant of domestic private investment in Kenya over the period 1970-2010 using OLS and cointegration test methodologies. The results show that real GDP growth rate, real exchange rate, and broad money supply have a positive and significant effect on private investment. Other determinants such as trade policy, domestic savings, lending rates and foreign aid have a positive but insignificant effect on private investment. Private sector credit and political regimes were found to have a negative but significant influence on private investment. Public investment, real deposit rates, public debt, inflation, foreign exchange reserves and financial liberalization were found to have a negative but insignificant impact on private investment. The researcher posits that an increase in public investment on infrastructure, security and human capital formation improve the investment climate, engage in structural reform programs, encourage economic partnerships and increase productivity in order to entice private investment. Allen *et al.* (2012) studied a cross-country and an intra-country comparison of Kenya in an attempt to understand the gap faced in Africa regarding financial development as well as the way African countries can overcome barriers such high financial costs in order to develop sound financial systems. Allen *et al.* used panel and cross-sectional regression models on financial variables covering the period 1990-2006 and found Equity Bank, a leading private commercial bank which provides banking service access to lower income people, to have a positive and significant impact on financial inclusion and development in African countries. These results suggest that it is possible to provide financial access to the lower income segments of the African population while generating sustainable profits which could potentially resolve Africa's financial

development gap. Kingori (2015) analysed the determinants of private investment in Kenya between 1971 and 2011 using an ARDL approach. The study found GDP and trade openness to be the main determinants of private investment in the long run. Other determinants such as credit to the private sector, inflation, public investment, interest rates and exchange rates were found to be insignificant in explaining private investment in Kenya. Some of these variables were suggested by other studies to have had a positive effect on private investment; the study by Atoyebi, Adekunjo, Kadiri and Falana (2012) revealed that an increase in credit to the private sector increased private investment.

Atoyebi *et al.* (2012) researched the determinants of domestic private investment in Nigeria over the period 1970-2010 using the OLS model. The results revealed private investment rates to be significantly determined by GDP, credit to the private sector and private sector output. Interest rates were found to be significant and inversely related to private investment. These results suggest an inverse relationship between adequate sector credit and the level of private investment and that private investment in Nigeria was limited by the availability of financing. Ayeni (2014) undertook a study on the macroeconomic determinants of private investment in Nigeria between 1979 and 2012 using ARDL and cointegration approaches. The study found that real interest rate, real exchange rate, real gross domestic product, inflation rate and credit to private sector when used as determinants of private investment, did not contribute effectively to private investment in Nigeria. The study concluded that the government needed to focus on the overall institutional framework of private investment in order to facilitate growth and development in the country. Adeniyi *et al.* (2015) examined how economic growth and financial development were related in Nigeria between 1960 and 2010, using the ARDL model. Adeniyi *et al.* found that economic growth and financial development are negatively related. The study concluded that efforts at deepening the financial system in terms of size and level of activity needed to be deployed and sustained. A developed financial system was expected to increase private investment and economic growth.

Assa and Abdi (2012) studied selected macroeconomic variables affecting private investment in Malawi over the period 1979-2009. The results suggest that private investment is positively influenced by public investment, bank credit to the private sector and by real interest rates in the short-run. The study further found GDP growth and real exchange rates to have affected business decisions in the long-run. Assa and Abdi concluded that real GDP growth leads to

increases in investment and that when the private sector experiences a credit pinch, private investment levels drop, affecting mainly the short term productive capacity of the sector.

Ambaye, Berhanu and Abera (2014) modelled the determinants of domestic private investment in Ethiopia over the period 1992-2010 using the ARDL model and Bounds test approach. The study found that exchange rate, domestic saving and domestic credit had a negative effect on domestic private investment. The study further found that external debt and government expenditure had a positive and significant effect on domestic private investment. Ambaye *et al.* concluded that government expenditure stimulates domestic private investment while domestic credit and saving seems to constrain the sector.

Mbellenge (2013) analysed the causal relationship between financial development and economic growth in Tanzania over the period 1980-2010 using co-integration, the Vector Error Correction Model (VECM) and the Granger causality tests. The co-integration results found significant evidence of a long-run equilibrium between financial development and economic growth, while the causality analysis showed that there was an unidirectional causality running from financial development to economic growth.

Thus these studies indicate that public investment, bank credit to private sector, real interest rate, real GDP growth rate, real exchange rate and broad money supply had a significant and positive effect on private investment in some African countries such as Botswana, Ethiopia, Ghana and Malawi, but that these determinants were found to have had a negative effect on financial development in other countries such as Nigeria and Kenya. Financial development and economic growth were found to have had a positive relationship especially in Tanzania. Thus it is concluded that financial development can be positively influenced by some of its determinants in some countries and at the same time the same determinants can affect it negatively in other countries. This could be the case, depending on the level of development, public policies, and financial institutions, rule of law and the macroeconomic environment of each country.

### ***2.1.3 South African studies***

Ndikumana (2005) explored the relationship between private investment and macroeconomic policies in South Africa between 1970 and 2001, using GMM analysis. The result reports that low domestic demand constrains investment expansion and relaxed monetary policies positively affects private investment, while higher profitability stimulates investment. The study also found significant crowding-in of public investment on private investment, implying that private investment could be stimulated by relaxing monetary policies and maintaining macroeconomic stability.

Kollamparambil and Nicolaou (2011) researched the nature and relationship between public and private investment in South Africa over the period 1960-2005 using the VAR modelling approach. The study found that South Africa had a low investment to GDP ratio compared with other developing countries. The study further found a strong policy implication and, although public investment was not crowding-in/out private investment, it exerted an indirect impact on private investment through the accelerator effect.

Sunde (2012) examined the link between financial sector development and economic growth in South Africa over the period 1975-2010 using co-integration, ECM and the Granger causality tests. He found bidirectional causality between economic growth and financial sector development, implying that if the economy grew the financial service sector grew as well. Financial sector development entailed enhancing financial efficiency and access by overcoming transaction costs incurred in the financial system as well as by extending credit.

Thus these studies indicated that relaxed monetary policies and maintained macroeconomic stability were good for private investment in South Africa. It was also found that public investment exerted an indirect impact on private investment through the accelerator effect and that financial development had positive impacts on economic growth especially through financial efficiency and access by overcoming transaction costs and by extending credit.

## **2.4 Conclusion**

The literature review indicates that financial development stimulated economic growth regardless of a country's level of development. It further revealed that private investment tended to be more volatile in countries with less developed banking sectors and financial markets. In addition, a positive causal relationship between financial development and private

investment was recorded, as well as a significant long-run causality from financial development to economic growth. The studies found that the positively significant determinants of financial development and private investment varied from country to country depending on the level of development, public policies, financial institutions, rule of law and the macroeconomic environment of respective countries. Some studies revealed that most underdeveloped African countries had made significant good progress in developing their financial markets through macroeconomic reforms, financial liberalization and the adoption of indirect instruments of monetary policy. Others studies concluded that fiscal discipline and strictness of the monetary may no longer be effective policy tools in terms of stimulating private investment in SSA as the cost of poor infrastructure and liquidity constraints investors incurred was far more than how much they benefitted from stable macroeconomic policies. The issue of crowding-in and out also emerged, whereby crowding-out was prone to occur in instances where public investments are funded through capital markets and increased taxes while crowding-in may occur by raising public investment through the provision of sufficient public infrastructure that is a prerequisite to public investment.

### **3 RESEARCH METHODOLOGY**

#### **3.1 Research Approach and Strategy**

This study adopted a deductive approach, which has been widely used in scientific investigations and entails dissecting, summarizing and synthesizing information across multiple sources in the quest to test theoretical implications using an empirical examination. Soiferman (2010) posits that deductive approaches search for evidence to either support or disprove the hypothesis being tested. Thus, a deductive approach is deemed appropriate for this study as it accords with the literature, and thus will use general to specific testable hypotheses, which will not be possible if inductive approach is used (which entails working from a specific observation to a general theory).

The strategy used in this study involves measuring the relationship between a selection of time series variables using econometric techniques. The data used in the study are numerical and not ordinal, and thus quantitative analysis is the appropriate approach as it allows for testing of hypothesis directly on numerical numbers.

Thus this study does not make use of inductive and qualitative approaches as the data to be used are in numerical form and the hypotheses are testable using econometric techniques.

#### **3.2 Research Design, Data Collection and Research Instruments**

This study makes use of secondary time-series data for South Africa covering the sample period from quarter 1 of 1977 to quarter 4 of 2015. The choice of variables was based on the literature and the availability of data. All the data was obtained from the South African Reserve Bank (SARB) and the World Bank Database. Therefore this implies desktop data extraction from the aforementioned sources, as it is an efficient means of data collection and has been carried out by others who conducted similar studies.

The study makes use of ARDL modelling as it enables the use of the Bound testing approach for testing for cointegration (Pesara, Shin & Smith, 2001), can include variables which are not integrated of the same order, and tests for the short-run and long-run relationship between financial development and private investment. Thus, the study does not use a vector error correction model which requires variables being intergrated to be of the same order. Failing to

find cointegrating relationships would imply using a vector autoregression which does not provide the long-run relationship this study is trying to uncover. The study further tests to establish the efficiency of the model using standard diagnostics.

### **3.3 Sampling**

The sample period for the study is from the first quarter of 1977 to the last quarter of 2015, which derives 156 observations. The minimum number of observations for a sample period should be 30 for one to have valid statistical inference. In view of the fact that the data used is not cross-series, the confidence interval will not be used to determine the sample. The data used in the study are from SARB and World Bank Database, which are reputable institutions. The variables that are be used have been used in similar studies.

### **3.4 Data Analysis Methods**

#### ***3.1.1 Methodology***

The data analysis method made use of the following steps:

- i. Analysis of distribution of data;
- ii. Analysis of central tendency and dispersion;
- iii. Testing for stationarity;
- iv. Determine the optimal lag length;
- v. ARDL Bounds testing; and
- vi. Testing for efficiency, constant variance and stability of the model.

The first step was to analyse the distribution, central tendency and dispersion of the data using descriptive statistics in order to find useful patterns for analysis. Thereafter, the data was tested for stationarity to determine if the variables have the same order of integration. The study used three methods to accomplish this goal, namely: Augmented Dickey Fuller (ADF) (Dickey & Fuller, 1981), Phillips Perron (PP) (Phillips & Perron, 1988) unit root tests, as well as the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) (Kwiatkowski, Phillips, Schmidt & Shin, 1992) stationarity test.

The Dickey-Fuller (Dickey & Fuller, 1979) test may be used to test for stationarity when the errors are not serially correlated, but when the errors are serially correlated, then the ADF test

is used instead as it incorporates differences in the lag variables as in the equations 3.1, 3.2 and 3.3 below (Dickey & Fuller, 1981):

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + U_t \quad (3.1)$$

$$\Delta Y_t = \alpha + \delta Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + U_t \quad (3.2)$$

$$\Delta Y_t = \alpha + \gamma T + \delta Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + U_t \quad (3.3)$$

Where  $Y$  is the variable of interest,  $\Delta Y$  is the change in  $Y$ ,  $\beta_i$  is the coefficient of  $\Delta Y_{t-1}$ ,  $i$  is the lag length,  $p$  is the maximum lag length,  $t$  is time subscript,  $\alpha$  is the intercept term,  $\gamma$  is the trend coefficient and  $U$  is the error term.

If the data suffers from serial correlation and heteroskedasticity in the error terms then the Phillips-Perron (PP) (Phillips & Perron, 1988) non parametric test is used:

$$Y_t = \alpha + \gamma T + \phi Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-1} + U_t \quad (3.4)$$

Where  $\phi$  is the parameter for the lagged value of  $Y$ . All variables and parameters are as previously defined.

The estimated unit root statistics  $Z_\phi$  and  $Z_t$  are shown in equations 3.5 and 3.6 below:

$$Z_\phi \approx T(\hat{\phi} - 1) - \frac{1}{2} \left( \hat{\lambda}^2 - s^2 \right) \left( \frac{1}{T^2} \sum_{t=1}^T Y_{t-1}^2 \right)^{-1} \quad (3.5)$$

$$Z_t \approx \frac{s}{\hat{\lambda}} t \hat{\phi} = 1 - \frac{1}{2} \left( \hat{\lambda}^2 - s^2 \right) \left( \frac{\hat{\lambda}^2}{T^2} \sum_{t=1}^T Y_{t-1}^2 \right)^{-1/2} \quad (3.6)$$

Where:  $t_{\hat{\phi}=1} = 1 \approx s^{-1} (\hat{\phi} - 1) \left( \sum_{t=1}^T Y_{t-1}^2 \right)^{1/2}$  and  $s^2 \approx \frac{1}{T} \sum_{t=1}^T U_t'^2$  and  $\hat{\lambda}^2$  are estimators of the short-run and long-run variances of  $U$  respectively.

In cases where the ADF and PP derive contradictory results, the KPSS (Kwiatkowski *et al.*, 1992) stationarity test can be used. The KPSS statistic uses the OLS regression on a trend and random walk as in equation 3.7 below:

$$Y_t = \lambda T + (r_t + \alpha) + e_t \quad (3.7)$$

Where  $r_t = r_{t-1} + U_t$  is a random walk and  $r_0 = \alpha$  is the intercept. All the other variables are as previously defined.

The KPSS (Lagrange Multiplier (LM)) statistic is formed using the following equation:

$$LM = \frac{\sum_t S(t)^2}{(T^2 f_0)} \quad (3.8)$$

Where LM is the Lagrange Multiplier statistics,  $f_0$  is the estimator of the residual spectrum at frequency zero and  $s(t)$  is the cumulative residual function:

$$s(t) = \sum_{p=1}^t \check{e}_p \quad (3.9)$$

The next step is to determine the optimal lag length of the series, which is accomplished using the Akaike Information Criterion (AIC) (Akaike, 1974), the Schwarz information criterion (SIC) (Schwarz, 1978), and the Hannan-Quinn criterion (HQC) (Hannah & Quinn, 1979) equations:

$$AIC = -2l/T + 2k/T \quad (3.10)$$

$$SIC = -2l/T + (k \log T)/T \quad (3.11)$$

$$HQC = -2l/T + 2\log(\log T)/T \quad (3.12)$$

Where  $T$  is the sample size,  $k$  is the number of parameters and  $l$  is the log likelihood.

The AIC is useful in sample testing and out of sample forecasting but can be inconsistent in selecting the correct lag length. This may result in either under- or over-estimating the correct lag length if the AIC picks up a length lower or higher than the true length. In contrast, the SIC is order-consistent and gives more parsimonious models when the sample size increases immensely as the probability of selecting the right model emerges to unity. The difference

between the AIC and SIC is that the AIC selects the model that will predict the best values and is less concerned with having too many parameters. In contrast, the SIC is designed to select the true values of  $p$  and  $q$  (lag lengths). Like the AIC, the SIC can be used to compare in sample or out of sample forecasting performance of a model. The HQC has the advantage of being objective and automatic, but over fit when the sample size is small (Ayalew, Babu & Rao, 2012).

After determining the optimal lag, the next step of the analysis is to test for cointegration among variables, which is accomplished by using the Johansen (1991) approach. Cointegration is generally defined as a concept which mimics the existence of the long run equilibrium relationship among variables. It gives an indication of convergence to some sort of equilibrium in the long run. However, if all variables are integrated of the order zero, then only the short-run relationship exist.

If it is established that the variables are not of the same order and the order of intergration is less than two, then the Bounds testing procedure may be used.

After determining that none of the variables are I(2), the first step of the ARDL approach requires the specification of the model as shown below:

$$\Delta PI_t = a + \sum_{i=1}^n b_{PI} \Delta PI_{t-i} + \sum_{p=1}^{mj} c_{FDj} \Delta FD_{j,t-p} + \sum_{q=1}^{rk} d_{Xk} \Delta x_{k,t-q} + f_{PI} PI_{t-i} + g_{FDj} FD_{j,t-p} + h_{Xk} x_{t-q} + e_t \quad (3.13)$$

Where  $PI$  is private investment,  $FD_j$  is type  $j$  of financial development,  $x_k$  is the vector of control variable (inflation, gdp and trade openness),  $a$ ,  $b_{PI}$ ,  $c_{FDj}$ ,  $d_{Xk}$ ,  $f_{PI}$ ,  $g_{FDj}$ , and  $h_{Xk}$  are parameters.  $i$ ,  $p$  and  $q$  are lag lengths.  $n$ ,  $m_j$  and  $r_k$  are the number of lagged variables included.  $e_t$  is the error term at time  $t$ .  $\Delta$  is the difference operator.  $j = 1, \dots, 4$ , representing the four types of financial development.

The next step entails testing for serial correlation in equation (3.13). If serial correlation is present, extra lagged variables will be included as measures to remove it. For a dynamic system to be stable the roots obtained must lie inside a unit circle. Thereafter, the Bounds test approach was performed, which entailed testing the null hypothesis that the parameters were

equal to zero. If parameters are equal to zero, it implies no long-run relationship. Ideally the null hypothesis should be rejected for the long-run relationship to exist. Assuming the results in the Bounds test indicates the present of cointegration then the next step will entail estimating the long-run equilibrium between the variables and lastly extracts the long-run and short-run effects.

### **3.1.2 Data**

The variables that were used in the study are private investment (*PI*), financial development (*FD*), inflation (*IN*), Gross Domestic Product (*Y*) and trade openness (*TP*). *PI* is the gross fixed private capital formation as a percentage of GDP for South Africa. *FD* is measured using efficiency, depth, stability and access. Depth is measured using domestic credit to private sector as a percentage of GDP, stability uses short term to total bond ratio, efficiency uses interest rate spread whereas access uses market capitalization of listed domestic companies as a percentage of GDP, *IN* uses inflation rates for South Africa, *Y* uses growth in gross domestic product and *TP* represents a measure of the sum of imports of goods and services plus exports of goods and services divided by GDP. The variables used in the study have been used in similar studies. All the variables have been converted to natural logarithms with the exception of growth in GDP (*Y*) because it contains too many negative integers. This is not peculiar to this study but it is standard practice, except that the interpretation of the slope differed from the rest of the variables.

### **3.5 Research Reliability and Validity**

The empirical method used can be replicated and thus satisfies the qualities of parsimony, replicability, falsifiability and precision (Bhattacharjee, 2012). Using a scientific method enables researchers to re-test the existing theories and findings objectively and subject them to open debate, modifications or enhancements.

### **3.6 Limitations**

The ARDL model has difficulties in identifying the relationships between the data variables which contain a unit root (Oxera, 2010) as issues of spurious correlation may occur. However, cointegration and modelling the variables in differences may be used to avoid problems

relating to unit roots. If there is a random trend present in the data, the model may estimate the incorrect trend rather than modelling the real dynamics (Oxera, 2010). ARDL model can also only be used provided the variables that are of order less than two.

The methodology described in this chapter was used to analyse the data and extrapolate the results presented in the next chapter.

## 4 RESEARCH DATA FINDINGS, ANALYSIS AND DISCUSSION

### 4.1 Data

The choice of variables in this study is based on available data and data used in other studies (Huang, 2006; Mbulawa, 2015; Misati & Nyamongo, 2011a). The descriptive statistics for the variables of private investment and financial development are presented in Table 4.1 below and all variables are as previously defined.

Private investment (LNPI) has a mean of 2,672 and a low standard deviation of 0,245. The kurtosis is 0,190 indicating a relatively peaked distribution and a positive skewness of 1,089 which indicates a distribution with an asymmetric tail leaning toward more positive values. A positively skewed private investment implies more probable positive than negative returns on investment. Domestic credit to private sector (LNDC) has a mean of 4,618 and a standard deviation of 0,341. The kurtosis is -1,381 indicating a relatively flat distribution and a negative skewness of -0,360 which indicates a distribution with an asymmetric tail leaning toward more negative values. A negatively skewed distribution implies a diminishing in relative size of credit to the private sector. The ratio of financial stability (LNFS), measured as short-term to total bonds, shows a low mean of -1,735 and a high standard deviation of 0,812. The kurtosis is relatively peaked with a negative skewness of 1,292. A negatively skewed distribution implies a deceleration in financial stability. The interest rate spread (LNIR) has a mean of 1,374 and a standard deviation of 0,271. The kurtosis is relatively peaked with a negative skewness of 1,185. A negatively skewed interest rate spread implies lower interest rates for loans than for deposits which may translate into financial institutions that take deposits not being able to fully cover their cost and hamper their efficiency. Market capitalization of listed domestic companies (LNMC) shows a high mean of 4,961 and a standard deviation of 0,428. The distribution of market capitalization of listed domestic companies is relatively flat with an asymmetric tail extending toward more negative values. A negatively skewed distribution market capitalization of listed companies implies a deceleration in financial access.

**Table 4.1: Descriptive Data**

	<i>LNPI</i>	<i>LNIR</i>	<i>LNMC</i>	<i>LNDC</i>	<i>LNFS</i>	<i>LNIN</i>	<i>Y</i>	<i>LNTP</i>
Mean	2,672	1,374	4,961	4,618	-1,735	2,105	2,357	3,964
Standard Error	0,020	0,022	0,034	0,027	0,065	0,051	0,162	0,012
Median	2,578	1,425	5,006	4,733	-1,716	2,241	2,704	3,969
Standard Deviation	0,245	0,271	0,428	0,341	0,812	0,637	2,021	0,150
Sample Variance	0,060	0,073	0,184	0,116	0,660	0,406	4,084	0,022
Kurtosis	0,190	1,697	-0,822	-1,381	3,997	4,228	-0,605	-0,552
Skewness	1,089	-1,185	-0,349	-0,360	-1,292	-1,602	-0,243	-0,344
Range	0,959	1,310	1,618	1,058	5,128	3,784	8,758	0,634
Minimum	2,357	0,536	4,005	4,018	-5,648	-0,827	-2,137	3,655
Maximum	3,317	1,846	5,623	5,076	-0,520	2,958	6,621	4,289
Sum	416,796	214,333	773,916	720,341	- 270,632	328,409	367,619	618,333
Count	156	156	156	156	156	156	156	156

The next step is to assess the correlations among the variables. The correlation matrix is presented in Table 4.2 below and shows that DC has a very strong positive correlation of 0,929 with MC. This is to say that as domestic credit to the private sector increases, market capitalization of listed companies also increases. Market capitalization and domestic credit shows a strong negative correlation of 0,757 and 0,788 respectively with private investment. Inflation also appears to have a strong negative correlation of 0,647 with domestic credit. These results imply that as inflation increases, domestic credit is likely to decrease. The same applies to private investment with market capitalization and domestic credit. Financial stability, on the other hand, shows a moderate positive correlation with market capitalization and domestic credit as well as trade openness with financial stability and output growth. Thus, an increase in financial stability is moderately likely to result in an increase in market capitalization and domestic credit. The same can be said for trade openness with financial stability and output growth. The correlation between inflation and that of market capitalization and financial stability is moderate and negative, while that of domestic credit and interest rate spread shows positive and none to extremely weak.

**Table 4.2: Correlation Data**

	<i>LNPI</i>	<i>LNIR</i>	<i>LNMC</i>	<i>LNDC</i>	<i>LNFS</i>	<i>LNIN</i>	<i>Y</i>	<i>LNTP</i>
LNPI	1							
LNIR	-0,057	1						
LNMC	-0,757	-0,098	1					
LNDC	-0,788	0,039	0,929	1				
LNFS	-0,159	0,263	0,495	0,587	1			
LNIN	0,508	-0,238	-0,556	-0,647	-0,474	1		
Y	-0,061	0,160	0,136	0,178	0,119	-0,260	1	
LNTP	0,282	-0,043	0,140	0,166	0,507	-0,126	0,400	1

Having conducted a precursory investigation of the dynamics of the data, the next step is to determine if the variables have the same order of integration, using unit root and stationarity tests.

## 4.2 Autoregression Distributive Lag Model

### 4.2. One Unit Root Test

The Augmented Dickey-Fuller (ADF), the Phillips-Perron (PP) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests were used to ascertain the order of integration that is appropriate for the ARDL modelling technique. The use of more than one unit root test is to ensure robustness of the results. Table 4.3 reports the results of the ADF, PP and KPSS in levels and first difference. The results show that there is a mixture of variables that are integrated of order zero  $I(0)$  as well as those integrated of order one  $I(1)$ . Being stationary simply implies that the variable has zero mean, constant variance and the residuals uncorrelated over time. This warrants the use of ARDL, as the order of one is the highest order of integration that the ARDL recommends.

**Table 4.3: Unit root tests: ADF, PP and KPSS in levels and first difference**

Variable	Model Specification	ADF	PP	KPSS	ADF	PP	KPSS	Order of Integration
		Levels	Levels	Levels	First Difference	First Difference	First Difference	
PI	Intercept	-2.724*	-2.871*	0.925	-4.319**	-4.146**	0.392**	I(0)
	Intercept and Trend	-2.537	-2.023	0.331	-4.504**	-4.251**	0.053**	I(1)
IR	Intercept	-3.307**	-2.285	0.130**	-5.110**	-4.502**	0.051**	I(0)
	Intercept and Trend	-3.307	-2.293	0.127***	-5.093**	-4.481**	0.050**	I(0)
MC	Intercept	-1.500	-1.787	1.359	-4.613**	-4.238**	0.079**	I(1)
	Intercept and Trend	-2.877	-3.168*	0.127***	-4.650**	-4.217**	0.030**	I(0)
DC	Intercept	-1.124	-0.743	1.332	-3.902**	-3.900**	0.060**	I(1)
	Intercept and Trend	-2.051	-1.590	0.246	-3.925**	-3.860**	0.045**	I(1)
IN	Intercept	-1.811	-2.180	1.088	-7.247**	-11.267**	0.101**	I(1)
	Intercept and Trend	-5.561**	-2.889	-0.126**	-7.221**	-11.131**	0.099**	I(0)
Y	Intercept	-3.476**	-3.338**	0.181**	-4.270**	-3.935**	0.044**	I(0)
	Intercept and Trend	-3.681**	-3.295*	0.100*	-4.242**	-3.896**	0.029**	I(0)
TP	Intercept	-1.899	-1.371	0.432**	-3.778**	-4.111**	0.160**	I(0)
	Intercept and Trend	-2.389	-1.686	0.289	-3.939**	-3.991**	0.048**	I(1)
FS	Intercept	-2.830*	-2.457	0.892	-10.290**	-18.162**	0.077**	I(0)
	Intercept and Trend	-3.701**	-3.621**	0.237	-10.292**	-18.981**	0.073**	I(0)

Source: author's compilation and values obtained from Eviews

Notes: (a) for ADF and PP, \* and \*\* means the rejection of the null hypothesis of unit root at 10% and 5% respectively.

Notes: (b) for KPSS, \*\* and \*\*\* means failure to reject the null hypothesis of stationarity at 5% and 1% respectively.

#### 4.2.2 Determining Optimal Lag Length

After establishing the order of integration, the next step is to determine the optimal order of lags on first differenced variables. This was obtained from the unrestricted VAR by means of Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SC) and Hannan-Quinn Criterion (HQ). Following the SC and HQ, the information criteria suggests that the optimal number of lags, as reported in Table 4.4, is 5 but a lag of 4 (5-1) was utilized. These two information criteria have been used to minimize problems of over-identification.

**Table 4.4: VAR Lag Order Selection Criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	388.2340	NA	0.000208	-5.639909	-5.290479	-5.497917
1	416.0620	48.48809	0.000139	-6.046393	-5.675123	-5.895526
2	416.1077	0.078973	0.000141	-6.031935	-5.638825	-5.872193
3	416.6100	0.859972	0.000142	-6.024393	-5.609445	-5.855777
4	418.5783	3.340162	0.000140	-6.039065	-5.602277	-5.861574
5	427.5395	15.07114*	0.000124*	-6.159689*	-5.701062*	-5.973324*
6	427.9569	0.695636	0.000125	-6.150862	-5.670395	-5.955622
7	428.0936	0.225773	0.000127	-6.137782	-5.635475	-5.933667
8	428.0947	0.001796	0.000129	-6.122647	-5.598501	-5.909658

Note: \* indicates lag order selected by the criterion

Upon establishing the optimal lag length, an unrestricted error correction model was estimated. As a norm the model underwent some diagnostic tests such as testing whether or not the errors are serially independent. The results confirm that the errors are indeed serially independent. Moreover, the unrestricted error correction model was further tested for stability. That means that any autoregression model needs to be tested to see if it is dynamically stable, by checking if all of the inverse roots of characteristic equations associated with the model are strictly within the unit circle. The results also confirm that the model is dynamically stable.

#### 4.2.3 Bound Test Approach to Cointegration

The cointegration test was conducted to determine the long run relationship among the variables used in the private investment model. The study employed the ARDL Bounds test to test whether there is a long run relationship among variables. The model has an unrestricted trend with no constant. The Bounds test results are reported in Table 4.5 below:

**Table 4.5: Bounds test results**

Level of Significance	Lower bound value	Upper bound values	F-statistic Value	Null Hypotheses
10%	2.03	3.13	4.28255	No cointegration
5%	2.30	3.50		No cointegration
2.5%	2.60	3.84		No cointegration
1%	2.96	4.26		No cointegration

Note:  $K=7$  d.f. the critical values are obtained from Pesara et al. (2001)

The results for the Bounds test reveal that there is a long run relationship among the variables. This is because the F-statistics value (4.28) is greater than all upper Bounds critical values, and thus the null hypothesis of no cointegration is rejected.

#### 4.2.4 Long-run and Short-run ARDL Error Correction Model

Though there is a presence of cointegration, it was necessary to estimate the long-run ARDL in order to calculate the elasticities. Thereafter, the short run ARDL error correction model or restricted ECM was estimated. Thus, the long run ARDL was estimated and the results are presented in Table 4.6 below.

**Table 4.6: Unrestricted Error Correction Model**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047551	0.093755	0.507180	0.6130
D(LNPI(-1))	0.557563	0.085381	6.530262	0.0000
D(LNPI(-2))	0.005418	0.100725	0.053788	0.9572
D(LNPI(-3))	0.013730	0.100090	0.137180	0.8911
D(LNPI(-4))	-0.171766	0.083248	-2.063307	0.0413
D(LNIR)	-0.015605	0.021545	-0.724284	0.4703
D(LNMC)	-0.042416	0.021295	-1.991821	0.0487
D(LNDC)	0.187531	0.078992	2.374043	0.0192
D(LNFS)	-0.001316	0.003379	-0.389584	0.6976
D(LNIN)	2.08E-05	0.004614	0.004516	0.9964
D(Y)	-0.007095	0.002086	-3.401829	0.0009
D(LNTP)	0.182861	0.073898	2.474526	0.0148
LNPI(-1)	-0.027481	0.013488	-2.037390	0.0439
LNIR(-1)	-0.000559	0.004911	-0.113730	0.9096
LNMC(-1)	0.021920	0.007701	2.846234	0.0052
LNDC(-1)	-0.031914	0.014941	-2.136018	0.0348
LNFS(-1)	-0.002603	0.003178	-0.818980	0.4145
LNIN(-1)	-0.002943	0.002606	-1.129415	0.2611
Y(-1)	0.001572	0.000766	2.053489	0.0423
LNTP(-1)	0.014828	0.013887	1.067742	0.2879
R-squared	0.745577	Mean dependent var	-0.003850	
Adjusted R-squared	0.703904	S.D. dependent var	0.021521	
S.E. of regression	0.011711	Akaike info criterion	-5.921557	
Sum squared resid	0.015909	Schwarz criterion	-5.493226	
Log likelihood	422.6659	Hannan-Quinn criter.	-5.747494	
F-statistic	17.89125	Durbin-Watson stat	1.710037	
Prob(F-statistic)	0.000000			

From the estimation of the Unrestricted Error Correction Model (UECM), the long-run elasticities are the coefficient of one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of one lagged dependent variable. For example, the long-run inequality, elasticities are:

$$\frac{LNPI}{LNIR} = -\left(\frac{-0.027481}{-0.000559}\right) = -49.16$$

In the long-run, a one unit increase in the interest rate spread leads to a decrease of 49.16 units in private investment. This suggests that there is a negative relationship between private investment and financial development in the context of efficiency, as measured by interest rate spread. This result is in accordance with Misati and Nyamongo (2011b) who found a negative relationship between interest rate spread and private investment when they examined the link between financial development and private investment in SSA. Economic theory expects a negative relationship between private investment and interest rate spread, as the higher the spread the less credit will be available to the private sector.

$$\frac{LNPI}{LNMC} = -\left(\frac{-0.027481}{0.021920}\right) = 1.25$$

In the long-run, a one unit increase in market capitalization leads to an increase of 1.25 units in private investment. This suggests that there is a positive relationship between private investment and financial development in the context of access as measured by market capitalization. This result is in accordance with Ofori-Abebrese, Amporfu and Adu (2016) who found market capitalization in Ghana increased private investment in the long-run.

$$\frac{LNPI}{LNDC} = -\left(\frac{-0.027481}{-0.031914}\right) = -0.86$$

In the long-run, a one unit increase in domestic credit leads to a decrease of 0.86 units in private investment. This suggests that there is a negative relationship between private investment and financial development in the context of depth as measured by domestic credit. When modelling the long-run determinants of private investment in Senegal, Ouattara (2004) also found private investment to be negatively affected by credit to the private sector in the long-run. Other studies (Ajide & Lawanson, 2012; Wiafe, Barnor & Quaidoo, 2015) found domestic credit to the private sector as a key determinant of private investment in the long-run. Economic theory expects domestic credit to positively affect private investment which, in turn, leads to economic growth.

$$\frac{LNPI}{LNIN} = -\left(\frac{-0.027481}{-0.002943}\right) = -9.34$$

In the long-run, a one unit increase in inflation rate leads to a decrease of 6.17 units in private investment. This suggests that there is a negative relationship between private investment and inflation. This confirms the argument that inflation erodes investments. Similarly, Nainggolan (2015) found inflation to have a negative but significant effect on private investment in the long-run. Other studies (Ajide, 2013; Frimpong & Marbuah, 2010; Naa-Idar, Ayentimi & Frimpong, 2012; Wiafe *et al.*, 2015) found inflation to significantly affect private investment in the long-run.

$$\frac{LNPI}{LNFS} = -\left(\frac{-0.027481}{-0.002603}\right) = -10.56$$

In the long-run, a one unit increase in financial stability leads to a decrease of 10.56 units in private investment. This suggests that there is a negative relationship between private investment and financial stability. This results contradict those of (Cristian, 2012) who found that financial instability negatively affects private investment.

$$\frac{LNPI}{LNTP} = -\left(\frac{-0.027481}{0.014828}\right) = 1.85$$

In the long-run, a one unit increase in trade openness leads to an increase of 1.85 units in private investment. This suggests that there is a positive relationship between private investment and trade openness. This result is consistent with (Kingori, 2015) for Kenya who found that trade openness as the main determinant of private investment in the long-run. Similarly other studies (Ajide, 2013; Frimpong & Marbuah, 2010; Naa-Idar *et al.*, 2012) also found trade openness to significantly influence private investment in the long-run.

$$\frac{LNPI}{Y} = -\left(\frac{-0.027481}{0.001572}\right) = 17.48$$

In the long-run, a one unit increase in growth in output leads to an increase of 17.48% in private investment. This suggests that there is a positive relationship between private investment and growth in output. This result is in consistent with Nainggolan (2015) who found that GDP has a positive and significant effect on private investment in the long-run. Other studies (Konor, Sarkodie & Addai, 2016; Naa-Idar *et al.*, 2012) have found GDP to significantly affect private investment in the long-run.

Table 4.7 presents the estimated coefficients for the short-run model. The results show that the interest rate spread, market capitalization and growth in output are negatively related to private investment. Nainggolan (2015) found a positive and significant effect of GDP to private investment in the short-run, contrary to the results obtained in this study. A study by Naa-Idar *et al.* (2012) found GDP to significantly determine private investment in the short-run, while Nwite (2014) found interest rate spread significant in determining economic development in view of the link between economic development and private investment. On the contrary, the variables domestic credit, financial stability, inflation rate and trade openness are positively related to private investment in South Africa. Inflation and trade openness were found to explain private investment in the short-run (Frimpong & Marbuah, 2010; Kingori, 2015). Konor *et al.* (2016) also found inflation to explain private investment in the short-run while Nainggolan (2015) found a significant and negative link between private investment and inflation in the short run. Other studies (Ajide, 2013; Naa-Idar *et al.*, 2012) found inflation and trade openness to be significant determinants of private investment in the short-run.

The variables market capitalization, domestic credit, growth in output and trade openness are statistically significant both in the short- and long-run while interest rate spread is only significant in the short-run. These findings suggest that these variables explain the changes in private investment. The error correction term is negative and statistically significant, indicating a speed of adjustment towards equilibrium of about three percent each quarter. The results further show that about 69 percent in the dependent variable is caused by the regressors. The F-statistic shows that the model is significant overall and the Durbin-Watson *d* value (1.7) reveals that there is no problem of serial correlation in the model.

**Table 4.7: Restricted Error Correction Model**

Dependent Variable: D(LNPI)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002878	0.001232	-2.336590	0.0211
D(LNPI(-1))	0.705879	0.084659	8.337889	0.0000
D(LNPI(-2))	0.013859	0.107231	0.129243	0.8974
D(LNPI(-3))	0.029727	0.106918	0.278033	0.7815
D(LNPI(-4))	-0.132434	0.085323	-1.552153	0.1232
D(LNIR)	-0.022303	0.020398	-1.093432	0.2763
D(LNMC)	-0.050461	0.021585	-2.337755	0.0210
D(LNDC)	0.252757	0.073463	3.440627	0.0008
D(LNFS)	0.002014	0.003209	0.627730	0.5313
D(LNIN)	0.002803	0.004577	0.612458	0.5414
D(Y)	-0.005127	0.001917	-2.674327	0.0085
D(LNTP)	0.200617	0.066716	3.007039	0.0032
RESID01(-1)	-0.037438	0.013442	-2.785117	0.0062
R-squared	0.689985	Mean dependent var	-0.003850	
Adjusted R-squared	0.659739	S.D. dependent var	0.021521	
S.E. of regression	0.012554	Akaike info criterion	-5.826874	
Sum squared resid	0.019385	Schwarz criterion	-5.548459	
Log likelihood	409.2275	Hannan-Quinn criter.	-5.713733	
F-statistic	22.81287	Durbin-Watson stat	1.680980	
Prob(F-statistic)	0.000000			

#### 4.2.5 Model Efficiency Test

In order to ensure that the empirical model is correctly specified, various tests were conducted, which are discussed below.

Table 4.8 reports the results of the first diagnostic test of autocorrelation. The null hypothesis ( $H_0$ ) claims that there is no autocorrelation while the alternative hypothesis ( $H_1$ ) claims the opposite. The decision rule states that the null hypothesis ( $H_0$ ) should be rejected if the p-value of observed R-squared is less than the 0.05 level of significance. Hence, there is no presence of serial correlation in the estimated model, since the p-value of the observed R-squared is 0.2597 which is greater than the 0.05 level of significance.

**Table 4.8: Breusch-Pagan-Godfrey Serial Correlation LM Test**

F-statistic	1.224715	Prob. F(2,122)	0.2974
Obs*R-squared	2.696452	Prob. Chi-Square(2)	0.2597

The second diagnostic test is for heteroscedasticity where the null hypothesis ( $H_0$ ) claims that residuals are homoscedasticity and the alternative hypothesis claims that the residuals are heteroscedastic and thus the variance is not constant. The rejection rule states that the null hypothesis should be rejected if the probability value of observation R-squared is less than the

0.05 level of significance. Since the probability of Chi-Square of 0.5057 is greater than 0.05, the test fails to reject the null hypothesis of constancy of variance among the residuals in the model, and thus are deemed to be homoscedastic.

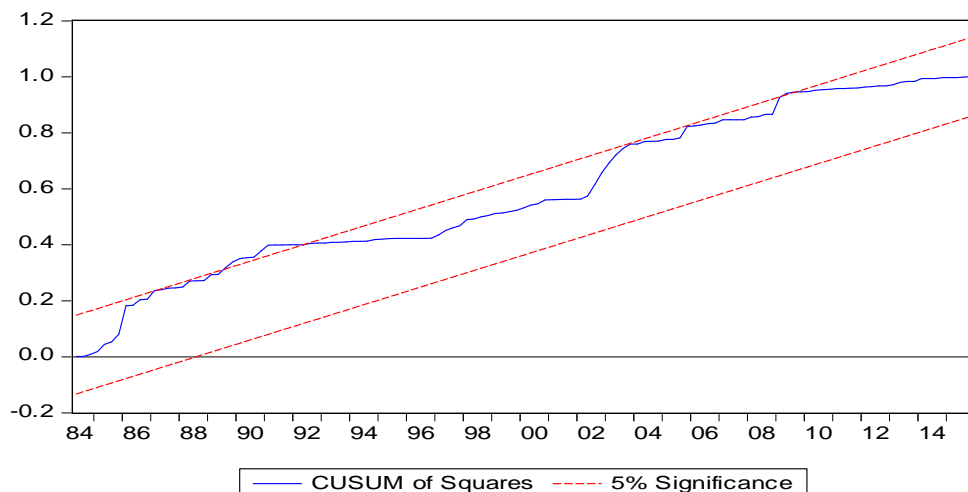
**Table 4.9: Heteroskedasticity Test: ARCH**

F-statistic	0.437790	Prob. F(1,132)	0.5093
Obs*R-squared	0.442954	Prob. Chi-Square(1)	0.5057

#### 4.2.6 Stability Test

The use of the stability test is to test whether or not the model exhibited some structural changes over the study period and that it can be used for reliable predictions. In this regard, the study employs CUSUMS of squares to test for stability on the long-run ARDL error correct model. The CUSUMS of squares does not indicate any structural breaks in the regression coefficients. This is evident from Figure 4.1, a figure statistically well within the five percent critical Bounds. This confirms that all coefficients in the model are stable. Therefore, one can confidently conclude that the relationship between financial development and private investment in South Africa is of long-run in nature.

**Figure 4. 1: CUSUM Squares**



## 5 RESEARCH CONCLUSIONS

This study analysed how financial development (measured by depth, stability, efficiency and access) impacted private investment in South Africa between quarter one of 1977 to quarter four of 2015. The study also analysed which measures of the financial development are most significant in the short- and long-run. The ARDL model was used in assessing the short-run and long-run effect of financial development on private investment. The study further tested to establish the efficiency of the model using standard diagnostics which confirmed the overall significance of the model.

The results of the Bounds test reveal that there is a long-run relationship among the variables. In the long-run ARDL estimation, the study found a positive relationship between private investment and market capitalization, trade openness and growth in output. Contrary to this, a negative relationship was established between private investment and interest rate spread, domestic credit, financial stability and inflation. The unexpected results for domestic credit might have been due to domestic credit not being used in sustaining growth initiatives. The short-run estimation indicated interest rate spread, market capitalization and growth in output as negatively related to private investment, while domestic credit, financial stability, inflation and trade openness as positively related to private investment in South Africa. The statistically significant variables found to explain changes in private investment for South Africa in both the short- and long-run are market capitalization, domestic credit, growth in output and trade openness. Interest rate spread was found only significant in the short-run. Although financial stability, inflation and interest rate spread are necessary, they were not found significant in this study. An improvement in the country's financial stability, the maintenance of a stable inflationary rate and the constricting of the interest rate spread is recommended.

## **6 RECOMMENDATIONS FOR FUTURE RESEARCH**

Future research needs to analyse further the impact of financial development on private investment, focusing on how private investment responds to financial development shocks as well as whether the significant factors differ before and after South Africa's financial liberalization in March 1995.

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