PENSION FUND REFORM TOWARDS DEVELOPMENT OF NATIONAL ECONOMY: A SOUTH AFRICAN CASE STUDY

by

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Abstract

South African pension assets have grown astronomically over the past few decades. The implications of this phenomenon on savings, capital markets and growth in the economy are investigated in this study. The research seeks to empirically investigate the effects of pension assets through six research papers that will address this question. Chapter 1 outlines the problem statement, research objectives and significance of the study.

Chapter 2 gives a historical perspective of the South African pension fund sector using secondary data and desk review of existing literature. It shows various legislative frameworks passed by the South African government, spurring reforms in the sector. Providing a descriptive review of the trends of the type and number of funds, total assets under management and legislative reforms provides evidence of the significant developments in the pension fund sector. Analysis of available data shows the contribution of pension funds to the South African economy, the growth trends in funds contribution and the role of the state controlled Public Investment Corporation (PIC). The huge growth of pension funds industry, more particularly the PIC rekindles the debate on how the PIC and its share in the sector can be used for driving growth and employment in the economy.

South Africa has one of the largest pension systems in the world, but low savings continues to constrain growth. Chapter 3 examines the exact nature of the relationship between pension funds and savings remain unsettled in the literature. It is for this reason that this study seeks to interrogate the effects of pension funds on savings using the ARDL methodology. We find evidence suggesting that rising pension assets have a negative impact on the national savings rate. The analysis also shows that for our control variables, unemployment has negatively impacted the savings rate while the level of income affects savings rate positively.

In Chapter 4 we seek to provide empirical evidence to establish the effect of pension fund assets on overall capital market development. It uses proxies for both stock and bond markets and uses the autoregressive distributive lag (ARDL) and the vector error correction model (VECM). The results show a positive relationship between pension savings and stock market development. No long-run relationship was established between pension savings and the bond market development. We find only unidirectional relationship between pension fund savings and stock market development. Evidence shows that policies in the stock market are conducive for its development, with contrary shown in the bond market.

Chapter 5 investigates the relationship between pension assets and economic growth within the context of South Africa in. In spite of the fact that South African pension assets have been adjudged as being amongst some of the best performing and fastest growing in the world in recent decades, there exists a gap in the empirical literature on the role institutional investors

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like pension funds play in the finance-growth nexus. It is against this backdrop that the chapter seeks to investigate the impact of pension funds on economic growth within the context of South Africa. The study therefore employs the Vector Error Correction Model on time series data spanning the period 1966 to 2011. The study found the existence of a causal relationship between pension fund savings and growth however, the study did not find causal association running from capital market development to economic growth but rather found the existence of a reverse causality running from growth to capital market development. The policy implications of the findings is geared towards encouraging savings within the context of the South African labour market with a concomitant effect on investment and growth of the economy. The following Chapter 6 examines the cointegration between pension assets and economic growth in the presence of structural breaks. We find that pension assets have a positive but minimal impact on growth in the presence of structural breaks. The direction of the results is similar for the model with or without structural breaks.

In Chapter 7 we investigate the Public Investment Corporation (PIC) incentives and decisions within a socio-economic, political and multiple level of governance context. Using the Institutional Analysis and Development Framework (IADF) we outline policy recommendations and identify gaps for institutions in the context of financial markets and outline policy recommendations. Studies have dwelt on the role of pension funds in the development of capital markets, however there is paucity of works pertaining to the incentives and operations of institutions that manage pension funds. Literature has focused on pension reform and its linkages to growth, savings and macro-economic variables using econometric analysis. The value addition in this study is the use of a theoretical model in the analysis of pension fund institutions given the multiple governance levels and collective action that characterise the sector. Adopting the IADF in this regard will provide theoretical foundation for the reformation of the PIC to drive national development goals that will reduce poverty and inequality.

The significance of the study lies in making use of different methodologies to understand the relationship between pension assets and growth (Chapter 4). In addition, measuring the transmission of pension assets and growth within capital markets, namely bond markets is significant (Chapter 5). Institutional analysis of pension funds and the entire pension system is a new approach using relevant methodology (Chapter 7). The role financial markets through pension funds play in poverty alleviation relooks policy frameworks and investigates alternative mechanisms necessary for growth outcomes. Greater detail is provided in Section 1.5. of the significance of the study.

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ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criteria
AIPF	Associated Institutions Pension Fund
ARDL	Autoregressive Distributed Lag
BBBEE	Broad-Based Black Economic Empowerment
CC	Compensation Commission
CEPA	Cambridge Economic Policy Associates
CPI	Consumer Price Index
CUSUM	Cumulative Sum
EME	Emerging Market Economy
FDI	Foreign Direct Investment
FFS	Fully Funded Schemes
FPE	Final Prediction Error
FSB	Financial Services Board
GDP	Gross Domestic Product per capita
GEAR	Growth Employment and Redistribution
GEPF	Government Employees Pension Fund
GNDI	Gross National Disposable Income
GOV	Government Consumption
HQ	Hannan-Quinn
IADF	Institutional Analysis and Development Framework
INFL	Inflation
IAA	Innovative Accounting Approach
LR	Likelihood Ratio
LST	Number of listed companies
NBFIs	Non-Banking Financial Institutions
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
PAYG	Pay As You Go
PFA	Pension Fund Assets
PIC	Public Investment Corporation
PIH	Permanent Income Hypothesis
PP	Phillips-Perron
PPP	Public Private Partnership
SARB	South African Reserve Bank

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SASSA	South African Social Security Agency
SIC	Schwarz Information Criterion
SIDA	Swedish International Development Agency
SMME	Small Medium and Micro Enterprise
SOEs	State-Owned Enterprises
Stats SA	Statistics South Africa
STK	Stock market capitalisation
TFR	Total Fertility Rate
TBVC	Transkei, Bophutatswana, Venda, and Ciskei
UIF	Unemployment Insurance Fund
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WDI	World Development Indicators
ZA	Zivot-Andrews

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CHAPTER 1
GENERAL INTRODUCTION

1.1 BACKGROUND

The enactment of various pension fund legislations since 1911 has played a significant role in the development of pension systems in South Africa. The most notable reform was in 1956, when the Pension Funds Act was promulgated, followed by the 1994 Public Investment Corporation Act (Hendricks, 2008). Both Acts established strong institutions and regulatory bodies that have over more than five decades supported the development of the pension system and the capital markets. Until 1994 South Africa's pension system was managed according to race, with both non-contributory schemes and private schemes affected (van den Heever, 2007). Despite the exclusion of the large majority of the population, South Africa has developed capital markets that have post-democracy integrated substantially with global capital markets.

In recent years South Africa's pension assets have shown considerable growth in financial markets and the economy. Scholars have established that economies with higher savings boost domestic investment, finance current account deficits, and stimulate economic stability, with lower reliance on foreign capital translating to economic growth (Apilado, 1972; Anton, Bustillo & Fernandez-Macias, 2014; Loayza, Schmidt-Hebbel, & Servén, 2000; World Bank, 2011). The fundamental question is whether these pension savings increased savings rates and whether they were directed at increasing growth rates. South Africa's savings are an important contributor to overall national growth, and the low level of savings perpetuates the low growth trap (Loayza et al., 2000; Simleit, Keeton, & Botha, 2011). The World Bank (2011) argues that sustaining economic growth requires strengthened savings exceeding 25% to sustain investment-led growth. Furthermore, can it be argued that the current tax relief incentives and national policy reforms to encourage savings have been effective measures for increasing national savings? Currently empirical evidence on the savings-growth nexus is limited to a few studies without a focus on pension funds (Odhiambo, 2009b). This study thus focuses on the pension fund effects on the savings rate and whether these savings have led to an increase in the level of economic growth.

Pension fund assets have played a significant contributory role in the provision of domestic capital in financial market development. The endogenous growth model shows that pension funds have additional benefits that contribute to the development of capital markets, even if they do not lead to an increase in savings (Bailliu, 2000). Pension fund savings are able to improve capital markets through a more efficient allocation of savings. This is argued by Pagano (1993) and confirmed by Walker and Lefort (2002) who maintain that they result in

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more efficient and liquid capital markets contributing to long-term investments that have a positive growth effect. Evidence shows that accumulation of capital from pension funds contributes to the rise of institutional capital and strengthens domestic capital markets, enhancing financial sector development and also giving rise to increased regulatory framework between investors, firms and authorities in the market (Chan-Lau, 2004; Hu, 2012; Meng & Pfau, 2010). The inevitable question becomes what effect have pension funds exhibited on capital markets locally? This study will focus on this particular issue and also seek to understand the transmission mechanism of pension fund assets and their impact on capital market development.

There are currently three pillars of a pension system and governments and private institutions are responsible for the management thereof (Department of Social Development, 2006; National Treasury, 2004a). The first is non-contributory pensions where the elderly do not make a contribution but receive state support. These are accessible at the age of 60 as a form of social security, and it is used primarily to alleviate poverty and redistribute income. It is a means-tested monthly grant measured at R1510 per month. Contributions for the second pillar are mandatory and workers contribute levels determined by the government which will serve as income during retirement (Van den Heever, 2007; Van der Berg, 2002). This pillar exists only for government employees, who are required to make contributions partially matched by the government towards the Government Employees Pension Fund (GEPF). The third pillar also constitutes contributions made by workers who determine the allocation, these can be participants in either the first or the second pillar. It is important to outline that forgoing consumption and the ability for nations to encourage planning for retirement is captured through precautionary and contractual savings**.** Several investment vehicles and products have over time mobilised savings in the financial systems, mobilising and holding worker contributions intended to deepen the level of savings. South Africa has seen a substantial increase in institutional investment as a percentage of GDP rising from 125 percent in 1994 to 186 percent in 2009.It is important to understand how this increase has impacted domestic savings (Sibanda & Holden, 2014)**.** Have these increased pension fund assets translated into an increased domestic savings rate that is a crucial determinant for growth and is seen as a core component driving investment levels upwards? This study will seek to understand how the current size of pension fund assets have translated into increased growth by empirically testing the transmission mechanisms by which pension fund assets have impacted both savings and capital market development. Evidence shows that the causality between pension assets and growth is country-specific (Hu, 2005; Zandberg & Spierdijk, 2010).

It is important to establish the effects of the transition into the post-democratic period and how that affected the pension system. Social security programmes and the regulatory framework

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have shown that different acts and reforms significantly influenced institutional investors (Moleko & Ikhide, 2016). This calls into question how institutions such as regulators, asset managers and consultants, trade unions and even pensioners operate, and whether these actions are responsible (even partially) for the limited or extensive effects of capital flows derived from pension funds. Using the Institutional Analysis and Development Framework (IADF), the political economy and the underlying incentives driving reform will be investigated from an institutional perspective (Gibson, Andersson, Ostrom, & Shivakumar, 2009; Frischmann, 2013). The government's support of the privatisation of the pension system warrants further analysis of the political economy and the circumstances around National Treasury's formation of the Public Investment Corporation (PIC) and the newly formed public sector fund known as the Government Employees Pension Fund (GEPF).

The study applies an Autoregressive Distributed Lag (ARDL) bounds testing approach to measure the cointegration in the study. We also make use of unrestricted Vector Autoregressive (VAR) estimates to examine the effects of pension assets on growth. Using both cointegration estimation and unrestricted VAR we are able to measure the effects of pension assets based on various data collected from the Financial Services Board (FSB), South African Reserve Bank (SARB), Statistics South Africa (Stats SA) and the World Development Indicators (WDI). Lastly, using the IADF we analyse the contribution and conditions surrounding institutions within the pension fund value chain.

1.2 STATEMENT OF THE PROBLEM

The surge in institutional assets and rapid growth of assets is a global phenomenon. The Asia Pacific region has seen an increase of pension assets from $369 billion in 2001 to $1.68 trillion in 2010, at an annual growth rate of 19.1% (Hu, 2012). The same trends are highlighted in developed economies, with Organisation for Economic Cooperation and Development (OECD) countries institutional investor funds exceeding GDP levels of $46.1 trillion, rising to levels of $83.2 trillion in pension fund assets in 2012 (OECD, 2013). South Africa similarly has seen its total assets increasing from $100 billion in 2003 to $236 billion in 2013, translating to the highest global compounded annual growth rate of 14.4% in 2013, though they declined in 2016 to a still high $207 billion (Willis Towers Watson, 2016, Willis Towers Watson, 2014). Pension fund assets as a percentage of GDP is currently at 67%, showing the crucial role savings play in long-term investments (OECD, 2016). Growth in South African assets under management is likely to continue to surge upwards, the increasingly important role of institutional investors in driving global growth is rising substantially and we need to investigate what the implications are on domestic capital markets and growth. Despite such expansion in capital markets, poverty and inequality in the South African context have worsened.

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Developing economies must look at the potential of domestic capital markets to drive growth and potentially shape the economic landscape of emerging market economies.

The WDI (2016) show that South Africa's highest GDP growth rate in the post-democratic era was 5.58% in 2006. The GDP growth rate has been at varying levels, ranging from lows of -2.13% and -2.39% (between 1985-1993) with a high of 4.2% in 1989. This improved by rising to an average of 2.7% (1994-2000), reaching 4.2% (2000), 4.5% (2004) and a peak of 5.58% (2006). It has since fallen back to the low levels recorded in the late '80s and early '90s when South Africa was facing political unrest, trade sanctions and a debt crisis. Growth levels since the 2008 global economic recession failed to increase, with growth struggling to increase above a meagre 3% over the last decade. Growth since the recession remains depressed at 3.03% (2010), 1.52% (2014) and declined to worsening recession levels of 0.5% (2016). It becomes important to ascertain whether pension assets given the exponential growth can be considered a determinant of economic growth.

According to Stats SA's 2017 Poverty Report, there are currently more than 30 million poor people living in South African households (Statistics South Africa, 2017a). This report outlines women are more severely affected with higher levels of household poverty 47.8% versus male prevalence of 31.7%, furthermore children below 17 years and the elderly are most vulnerable to poverty. This is despite the fact that the gross national income per capita has increased over the last two decades from $8,399 to $9,594 per capita. The structure of the South African economy is characterised by a highly developed formal sector with industries such as services, mining, agriculture and manufacturing that are globally competitive and well serviced. The contrasting tier is that of the underdeveloped and underserviced tier where the majority of the people are divided by race. It has a large informal sector between 7% to 12% of the economy, which lacks basic infrastructure and is comparable to other developing countries (Wills, 2009; Saunders & Loots, 2005). Upon the demise of apartheid the country did not experience large-scale asset redistribution or nationalisation but was opened to international trade and capital flows (Rodrik, 2008). The government through social spending and public expenditure implemented comprehensive programmes to eradicate poverty and sought to reduce inequality. National Treasury adopted a counter-cyclical policy approach, and the view of implementing expansionary measures during times of economic slowdowns was taken. Much of the public spending was concentrated on the public sector wage bills and social protection measures, with the recent undertaking of infrastructure building programmes as a drive to increasing the declining public investment as a share of total expenditure.

The growth of the economy is a key determinant in South African government efforts to reduce poverty and unemployment, and in the first decade post-1994, GDP growth has been mediocre at an average of 3%. Rodrik (2008) outlines that this translates to a per capita GDP

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growth rate of 1.2% in the first decade of democracy, similar to most African countries. This is inadequate for reducing inequality in South Africa: instead we have seen a widening gap and it has worsened. According to Dollery (2003), the GDP per capita in real terms is worse than it was in the 1970s and should be cause for grave concern. Economic growth in the second decade was slowed substantially by the economic crisis from which the South African economy is struggling to recover. Export-orientated manufacturing has declined, with imports continually exceeding exports. The failure to expand the largely labour-intensive manufacturing and non-resource tradables sector has contributed to underperformance and disappointing growth of the economy. This means that the low skills-based workers who are the majority of the unemployed have not been absorbed into the manufacturing sector due to its shrinkage. The South African labour force employed in manufacturing and non-tradables has steadily shrunk, and this translates to large numbers of the working age population being excluded from participating in the economy. When discouraged workers are included in the equation the unemployment picture worsens to 36%. The national goal is the employment of 15.8 million people by 2015 and 23.8 million by 2030, which is the cumulative new employment of 10.7 million people that the economy must absorb into new jobs (National Planning Commission, 2011; The Economist, 2014).

It is mostly the youth who are excluded from participating in the economy as more than 50% are unemployed (Statistics SA, 2017b). Unemployment in South Africa is unusually high and worse than that of the emerging market average of 56% of those with jobs, at 40% we are dismal performers. Unemployment rate estimates, at 24.6%, are three times higher than the African average of 8.3% on a par with Swaziland, Mozambique and Namibia (African Development Bank, OECD & UNDP, 2016). The gap between South Africa's richest and poorest has widened. The Gini coefficient reached a high of 0.72 in 2005, but fell to 0.70 (2009), 0.69 (2011) and was at 0.62 in 2013 (UNDP, 2013). South Africa remains the most unequal society in the world. The 2015 target of a Gini coefficient of 0.3 is unlikely to be reached as reported by the Millennium Development Goals country report. Labour income is the major driver of inequality as the large majority of households have no labour income but rely on social transfers or family members to support them. This will test the gains of South Africa's democracy and transition into the next two decades.

It is important to note that the government has increased per capita spending substantially from a low of R1,703 in the 1960s to R7,959 in 2007 (Alm & Embaye, 2011). This translates to more than four times its original value, but without addressing structural constraints and market failures the levels of economic growth will remain sluggish. Important policy frameworks such as the Industrial Policy Action Plans I, II and III, the National Industrial Policy Framework and the New Growth Path outline ambitious strategies for growing key sectors of

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the economy and responding to market failures. These policies seek to improve living conditions and to enhance long-term economic growth and attract investment. Foreign direct investment (FDI) levels remain low at 17% of GDP and significant capital is needed to grow the economy.

The role of financial development in driving economic development and poverty reduction has received much attention in the economics literature (Beck & Levine, 2004; Levine, 1997). The finance growth nexus was confirmed by Levine (1997), confirming that financial development points to economic growth. Some studies have confirmed the causality and the need to test the direction of growth for country-specific effects. Using different methodologies and data types we see different results. One of the preconditions for optimal effect of pension funds on capital markets has been identified as the level of financial sector development (Vittas, 1999). It is important to note that South Africa's banking system and non-banking sector are highly sophisticated and hold significant assets under management. Bijlsma, Van Ewijk, and Haaijen (2014) argue that the role of pensions enables investment of funds into capital markets, enabling long-term investments. Increased pension assets hold the potential to increase aggregate savings. Thus the causality between growth of pension assets and economic growth, as well as the causality of pension assets and some of the empirically tested transmission mechanisms, is what this study seeks to understand. Underdevelopment, low growth and poverty remain consistent with African economies. The question is, given the importance of financial development, how can its importance in the economic development question within an African context be realised? But first we need to understand which mechanisms show empirical causality between pension savings, capital market development and growth. There is no doubt that pension funds exhibit a positive effect for capital market development, but are these effects consistent in both stock and bond markets?

Significant literature has investigated linkages between financial development and growth but few have focused on the role of institutional investors, particularly on pension funds. Studies have used mainly panel studies with few investigating the true effect of pension funds on growth, few have investigated non-banking financial institutions (NBFIs) and institutional investors' effects on growth (Rateiwa & Aziakpono, 2017; Sibanda & Holden, 2014). This broad concept includes mutual and insurance companies and funds, money markets and other investment intermediaries. According to the author's knowledge there is a paucity of studies exploring the link of growth, savings and capital market development with pension funds in South Africa. Work is extensively focused on developed economies, with a large emphasis on Asian and Latin American countries. Furthermore, no work has explored pension systems with particular reference to the political economy and the institutions managing policy, management and governance of pension funds.

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1.3 RESEARCH QUESTIONS

The main research question is: Do pension assets contribute to growth in South Africa? In order to answer the main research question the following sub-objectives are addressed in this study:

1. What is the current state and nature of the South African pension fund industry?
2. Do pension assets boost savings?
3. What has been the impact of pension assets on capital market development?
4. What has been the role of pension assets in the attainment of economic growth?
5. What has been the effect of pension system reform on growth?
6. What is the role of the Public Investment Corporation (PIC) in poverty reduction in the pension fund system?

1.4 RESEARCH OBJECTIVES

The main research objective of this study is to investigate the role of pension funds in South African economic growth. The sub-objectives of this study include:

1. To examine the current state and nature of South African pension fund industry.
2. To determine whether pension assets boost savings.
3. To determine whether pension assets impact capital market development.
4. To measure the growth effects of pension assets.
5. To measure the growth effects of pension fund reform from PAYG to FF.
6. To assess the role of the PIC as an institution and investigate the issues involved in its transformation to its current state.
7. To make policy recommendations based on the results of the study.

1.5 SIGNIFICANCE OF THE STUDY

The study is significant for a variety of reasons, the first being that the research will make use of different methodologies to understand the relationship between pension assets and economic growth at a country-specific level. Using a multivariate VAR framework to measure the impulse responses derived from the vector autoregressions will contribute to the debate around the relationship between the variables. In addition, the use of Yamamoto approach will add to the literature in the pension-growth nexus. Most of the research in this area makes use of panel data (Davis & Hu, 2005, 2008; Hu, 2012; Zandberg & Spierdijk, 2013), with few using

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country-specific measures. Studies are mainly in Latin America or other emerging markets (Holzmann, 1996; Holzmann & Stiglitz, 2001; Poirson, 2007; Schmidt-Hebbel, 1999), with few studies largely in South Africa (Rateiwa & Aziakpono, 2017; Sibanda & Holden, 2014). These studies focused on the aggregate data and used total non-banking financial institutions. Studies have measured the effects of financial development and growth (Odhiambo, 2004, 2009a, 2010), and a few have measured the impact of savings on growth in South Africa (Odhiambo, 2009b) but none have specifically measured the pension effect on both savings and capital market development. The country-specific effects in this study are measured taking into account contextual variables that are important determinants in the pension fund environment. In most panel studies the results tend to be generalised and may not capture the true effects of the variable of interest on pension funds. In fact, most work done has been limited to developing countries and some emerging market economies mainly in Asia and Latin America, and there have been very limited studies in Africa, even South Africa.

The study will also measure the impact of pension assets on capital market development, performing regression analysis on both bond and stock markets. Most studies have examined the effect of institutional investment on capital markets looking at the aggregate effect (Catalan, Impavido, & Musalem, 2000; Impavido & Musalem, 2000; Kim, 2010; Raisa, 2012; Vittas, 1999), thus delineating the two markets is a contribution within the debate. Most studies have focused merely on the equity markets, and it may be that the transmission mechanism to growth could be channelled through the strengthening of the linkages in the bond markets.

No research has been done on the institutions that manage pension assets. This study will also study the institutions, their history and some of the incentives that drove institutional changes. This study will make a comprehensive analysis of the critical stakeholders, understanding their incentives and goals and balancing the interests of different stakeholders in managing pension assets using the IADF. The IADF is used largely for natural resources and municipal contexts, it will be the first application in a financial services context (Gibson et al., 2009; Imperial, 1999; Imperial & Yandle, 2005; Jommi & Paruzzolo, 2007; Ostrom, 2011; Polski & Ostrom, 1999; Smajgl, Leitch, & Lynam, 2009).

Lastly, looking at the role of pension funds in South Africa, do they have a role to play in poverty alleviation? If so, what does this mean for pension development and economic development in the rest of Africa? South Africa offers a unique economic structural make-up with complexities of jobless growth and rising inequality (similar to most African economies) despite increased government expenditure and improved GDP per capita. The issue of how to enhance growth so as to reduce these structural flaws with an emphasis on capital markets using financial development, by the creation of a new asset class within institutional investment called infrastructure, may be investigated in future studies. In an era where poverty

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and inequality levels may destabilise the political gains of a democracy, it becomes imperative to look at alternative mechanisms to drive the national growth agenda, assessing the PIC as an institution, the asset allocation and investment policy framework for outcomes that do not necessarily compromise beneficiaries' main requirement of retained savings for income upon retirement.

1.6 STRUCTURE OF THE DISSERTATION

This dissertation comprises eight chapters, with Chapter 1 providing the background, problem statement and research questions and objectives. Chapter 2 is a study of pension funds, evolution and trends. In order to understand the contextual trends, detailed insights into the pension sector trends will be undertaken. Chapter 3 examines the linkages between pension assets and savings, and Chapter 4 measures the effects of pension assets on capital markets, with specific causality on bonds and stock markets measured. In Chapter 5 the impact of pension assets on growth is addressed. Chapter 6 looks at the impact of a structural break on pension assets and growth. In Chapter 7, qualitative methodology is used to assess the role of the PIC using the IADF. Chapter 8 provides a summary, conclusions and recommendations.

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CHAPTER 2

PENSION FUNDS EVOLUTION, REFORMS AND TRENDS IN SOUTH AFRICA[1]

2.1 INTRODUCTION

Pension funds in South Africa hold sizable bond and equity holdings. In the South African context, the growth of assets under management has increased the liquidity and depth of the local bond and equities markets. Globally, pension funds are critical drivers of the development of the stock or local securities market (Chan-Lau, 2004). It has been shown that stock market development has a positive and significant correlation with growth (Levine & Zervos, 1998; Caporale, Howells & Soliman, 2004; Beck & Levine 2004). The authors show that investment levels, productivity and growth are significantly correlated with stock markets.

Levine (1997) argues that countries with better developed banks and financial systems grow faster than those with weak financial systems. The ability to allocate capital, monitor and provide finance for investments, risk management, mobilisation and pooling of savings are some of the benefits of well-developed financial systems (Levine, 1997, 2004). Pension funds contribute to financial systems through capital markets by impacting savings rates, productivity growth and capital accumulation. Many scholars argue that pension funds also contribute to capital market development: in order to understand the extent to which pension savings induce behaviour on capital markets we must understand the reforms and structure of pension systems. This chapter seeks to analyse current South African trends as there is a paucity of work in the related field in African economies. South African pension funds have been rising substantially in the last decade and stand out as the third fastest growing pension fund markets globally (Towers Watson, 2014). The focus of the chapter will outline the contribution of pension assets to financial markets, the investment patterns and regulatory framework influencing behaviour. The chapter is a descriptive piece with no empirical analysis.

In summary we are able to see the pivotal role of the regulatory framework in the development of pension funds. The overarching legislation continues monitoring and overseeing the sector, whilst regulation of investment allocation and reporting is performed by the legislated role of the Pension Fund Regulatory body and Pension Fund Registrar and Adjudicator.

The South African pension a system has undergone reforms that can be categorised into four phases: Infancy, Institutionalisation, Separation and its continuation, and Corporatisation and

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[1] This chapter has been published as a paper in the International Journal of Economics and Finance Studies, 2017 Volume 9, No 2. It was also published as a Working Paper PI-608 in the Pensions Institute in 2016.

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Amalgamation. Each phase points to changes in the legislation, structure and systemic changes governing pension funds.

Infancy (1911–1958) was the period where institutionalisation and establishment of the pension fund system occurred. Separation (1959–1985) followed with the Pension Act of 1956 leading to a new era of legislation with the appointment of the Registrar of SA pension funds. With the differentiation and growth of the first and third pillar, development of pension funds, stringent oversight gained momentum. Racial separation continued up until 1994, however in the period 1985–1994 strengthened union mobility against the legislative framework showed the strength of workers in the pension system. The increased influence of workers led to a systemic shift with union support of defined benefit funds versus defined contribution funds. Lastly, the corporatisation and amalgamation (1995–2015) of state funds into a new entity called the PIC and changes in investment allocations (Regulation 28) entered South Africa into the privatisation phase of state assets.

The objective of this chapter is to summarise the reforms and trends of South African pension funds. Section 2.2 explores the linkages between pension funds and capital markets, including their welfare effects. Section 2.3 summarises the contribution of pension funds to the development of South African financial markets. Section 2.4 focuses on growth trends and examines some stylised facts. Section 2.5 focuses on the role and magnitude of the state owned Public Investment Corporation in pension assets. Section 2.6 concludes the chapter with some recommendations.

2.2 PENSION FUNDS WELFARE EFFECTS AND CAPITAL MARKET DEVELOPMENT

Pension funds have been recognised to play a contributory role in the development of capital markets (Davis, 2006; Hu 2005; Walker & Lefort, 2002; Davis & Hu 2005; Rezk, Irace & Ricca, 2009). There are various channels through which institutional investors have developed capital markets, but there are necessary preconditions that must be met for pension assets to develop capital markets (Meng & Pfau, 2010). One important precondition is the level of financial development: the higher the level of financial development the more significant the impact of pension funds. The dynamic interaction between pension funds and financial markets is stronger in a well-developed financial market. Financial development determines the level of optimisation that can be derived from pension funds. The indicators for level of development depend upon macroeconomic conditions, market efficiency, transparency, pension fund investment regulations and the legal framework (Vittas, 1999).

Pension assets differ from household assets as they have a long-term outlook. They provide long-term supply of funds to capital markets, especially in the bond markets, leading to financial development (Meng & Pfau, 2010; Davis, 2005). The size of pension assets enables

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them to hold greater proportions of equities and bonds than households (Davis, 2006). Empirical work by Hu (2005) found that increased size of pension assets encourages private bond finance in both the short and long run.

According to Walker and Lefort (2002) pension systems behaviour enable them to contribute to lowering transaction costs, diversifying risk and holding superior ability to process information. These characteristics enable improved allocation of invested funds to financial intermediaries, resulting in better resource allocation. These coincide with factors within the financial markets that lead to enhanced growth (Levine, 1997; Raisa, 2012*)*. Stock markets also enhance growth by providing incentives for long-run investments.

Pension funds contribute to the loan and securities market, improving competitiveness as they compete with the banking sector. It is argued that efficiency is improved as lending rates and spreads are lowered, reducing firm and household costs for accessing capital. The issue of qualitative impact of pension funds that trigger innovation in financial systems has also been identified as a benefit. New instruments, the modernisation of infrastructure and improved regulations occur as a consequence of the development of pension funds, resulting in the overall advancement of the financial sector through greater transparency and market efficiency (Davis, 2006; Davis, 1995). The contribution of pension assets to the lowering of prices in the market is linked to a variety of factors. Pension fund assets reduce dividend yields and increase price-to-book ratios, thereby implying a decrease in the cost of capital (Walker & Lefort, 2002).

Pension assets impact aggregate private savings (Barr, 2000). These savings result in investment, and this increased investment leads to enhanced output. The pension system of a country determines the extent of the enhanced growth. Personal savings may be eroded by how the government finances pension reform, thus decreasing total impact of personal savings. Implicit debt is raised when governments move from Pay As You Go (PAYG) to Fully Funded Schemes (FFS). It is important to look at country-specific debt raised, tax conditions and overall obligations before concluding that savings are automatic. Savings are automatic only when the regulatory framework enforces conditions whereby pension contributions are compulsory (Bailliu & Reisen, 1998; Murphy & Musalem, 2004). They also confirm that forced pension savings will raise overall savings. This emphasises the link between institutional capital and an adaptive legal framework. Furthermore, empirical work shows that privately managed funded schemes increase personal savings, when in a fully funded context versus unfunded system (Bailliu & Reisen, 1998; Bebczuk & Musalem, 2006; Rezk et al., 2009).

Pension assets are not only able to accelerate capital market development, but also improve welfare. The World Bank model for pension funds can be divided into three pillars (Hu, 2005;

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Rhodes & Natali, 2003; Holzmann & Stiglitz, 2001). The first pillar is a distribution pillar financed by taxes that is managed by the public sector as a means to eradicate poverty. The main aim of poverty alleviation and prevention constitutes a significant portion in South Africa's state pension system. The assumption that the working age population was able to save whilst working, or even find work during the years of employment, does not always hold globally, more so in South Africa. Job insecurity, income instability and informal employment make it even harder for workers to save for their old age (Uthoff, 2006). Van den Heever (2007) estimated that 5.4 million people, an estimated 47.8% of the working population, do not participate in contributory schemes although they are employed. This includes a large number of informal workers who are excluded from participating in pension systems. This translates to a greater fiscal burden on the state through reliance on social grants during retirement.

It can be argued South Africa has a strong privatised occupational system regime with private personal schemes (in both the public and private sector), and a wide reaching non-contributory public-financed pension system that is intended for poverty alleviation. The private personal schemes contributing to the second and third pillars of a pension system exhibit a direct effect on the financial system. Rhodes and Natali (2003) emphasise that the pension system adopted is also determined by the social risks and need for social protection. The demand for social protection is reflected in poverty and inequality indicators and the ability of the state to meet the needs of its citizens will be tested by the overarching policy framework and the national budget.

South African financial markets exhibit universal plus occupational schemes and means-tested public pension provision schemes, pointing South Africa to a commodified privatised pension system which also exhibits strong signs of a decommodified pension system whereby tax-financed pension provision takes a predominant role. Uthoff (2006) describes the main role of social pensions as providing the elderly poor with income, and stresses that great demand for social protection exists when a nation has high dependence ratios and low per capita income. South Africa exhibits both constraints, and in this context the welfare effects are enormous as it is the world's most unequal society according to the Gini coefficient. South Africa's social grant system comprises a total of 15.9 million beneficiaries, of whom 2.9 million are old age pensioners (Sassa, 2014a). The national social grants expenditure on Old Age Grants was 40% of total expenditure as reported in the fourth quarter of 2014 at R44 billion of the total R109 billion total expenditure (Sassa, 2014b). The economic sustainability of social protection programmes is dependent on the national fiscus and covered by taxes, it has no linkages to contributions made. This factor determines the financial viability of pension programmes that carry significant costs but are designed to respond to labour market problems. The extent to which a country is able to finance the need for grants may lead to

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reforms in the sector, however high levels of unemployment, an old age population dependent on the state for assistance and the need to mitigate poverty and inequality will continue to be drivers propelling state-funded social protection. The concerning feature for fiscal planning is the impact increasing the current 3 million pensioners will cost the fiscus, receiving an already high 40% allocation of social protection programs allocation. The current pension burden and cash transfer by the state is 3% of GDP, or R128 billion in 2016/17. It appears the state has increased its allocation from R21 billion (2008) to current levels of R53 billion (2016/17). Worsening budget deficits, low growth and fiscal consolidation suggest this trend may change (Moleko, 2017).

In summary pension systems display unique characteristics based on the country-specific labour market nuances, stage of demographic transition, public finances and growth levels. There are different needs in an economy, with the mix between public and private pension schemes positioned to service that. Dependent on the prevailing economic conditions of a country, pension assets are able to improve welfare conditions and positively impact capital market development and growth through reduction of transaction costs, market volatility and the reduced cost of capital for firms. This is also enhanced when increased corporate governance and liquidity are experienced concurrently. Increased specialisation occurs as a spin-off, usually leading to diversified financial instruments (Raisa, 2012).

2.3 THE EVOLUTION OF SOUTH AFRICAN PENSION FUNDS

The South African financial sector has strong banking and non-banking financial institutions. The robustness and financial depth of the banking sector is arguably one of the most sophisticated in the world, with influence on the financial development and growth. Bisignano (1998) observes that the size of the banking sector has shrunk relative to total financial assets. One of the reasons for this shrinkage in the proportion of total assets held by banks is the rise of institutional investors, particularly in the last three decades (Sibanda & Holden, 2014), see Figure 2.1. Institutional investors manage innovative securities, surplus funds and savings. These institutional investors take the form of pension and provident funds, short- and long-term insurance companies, mutual funds and collective investment schemes.

The South African pension fund sector was highly segregated and different systems were in place due to the legacy of apartheid. This meant that the South African government differentiated pension schemes between independent states or homelands and the Republic of South Africa. Each had their own separate pension schemes divided on racial grounds (Hendricks, 2008). The regulatory bodies managing pension schemes also evolved over time,

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with several pieces of legislation affecting the management of pension schemes. These will be discussed in the different phases of reform.

The pension fund sector total assets under management contribute a staggering R2.7 trillion to the South African economy (Financial Services Board, 2012). According to Sibanda and Holden (2014) the level of total assets of institutional investors as a percentage of GDP had reached 186% in 2009 from a level of 125% in 1994. The increasing contributions of institutional assets in the financial sector see it playing a more significant role. It is important to note that South Africa's total pension assets are recognised as one of the largest pension markets in the world. According to the Towers Watson Global Pension Assets Study they are ranked at number 10 in size, and make a small contribution of 0.7% to the total world's pension assets (Towers Watson, 2014). This translated to $236 billion in total assets as at year-end in 2013, bigger than France, Hong Kong and Ireland's pension market share.

Table 2.1: Banking and non-banking sector financial assets

Year	GDP (R millions)	Total Bank Assets (R millions)	Total Bank as % of GDP	Total Assets: Non-Bank[2] (R millions)	Total Non-Bank as % of GDP	Assets Banks: Assets Non-banking
2001	2 008 181	1 050 068	52%	1 715 002	85%	61%
2002	2 081 837	1 102 860	53%	1 739 310	84%	63%
2003	2 143 232	1 381 843	64%	1 919 677	90%	72%
2004	2 240 847	1 498 619	67%	2 272 156	101%	66%
2005	2 359 099	1 677 652	71%	2 768 288	117%	61%
2006	2 491 295	2 075 157	83%	3 415 389	137%	61%
2007	2 624 840	2 546 788	97%	3 867 503	147%	66%
2008	2 708 600	3 166 502	118%	3 797 520	140%	85%
2009	2 666 939	2 962 613	88%	4 254 613	160%	55%
2010	2 748 008	3 121 782	115%	4 815 447	175%	66%
2011	2 836 286	3 405 067	122%	5 142 252	181%	67%
2012	2 899 248	3 648 222	127%	6 011 956	207%	61%
2013	2 963 389	3 836 199	130%	6 921 203	234%	56%
2014	3 008 576	4 175 946	139%	7 626 234	253%	55%
2015	3 063 101	4 827 022	158%	8 180 364	267%	59%

[2] Total Non-Bank assets refers to Non-Banking financial institutions outlined in footnote 5.

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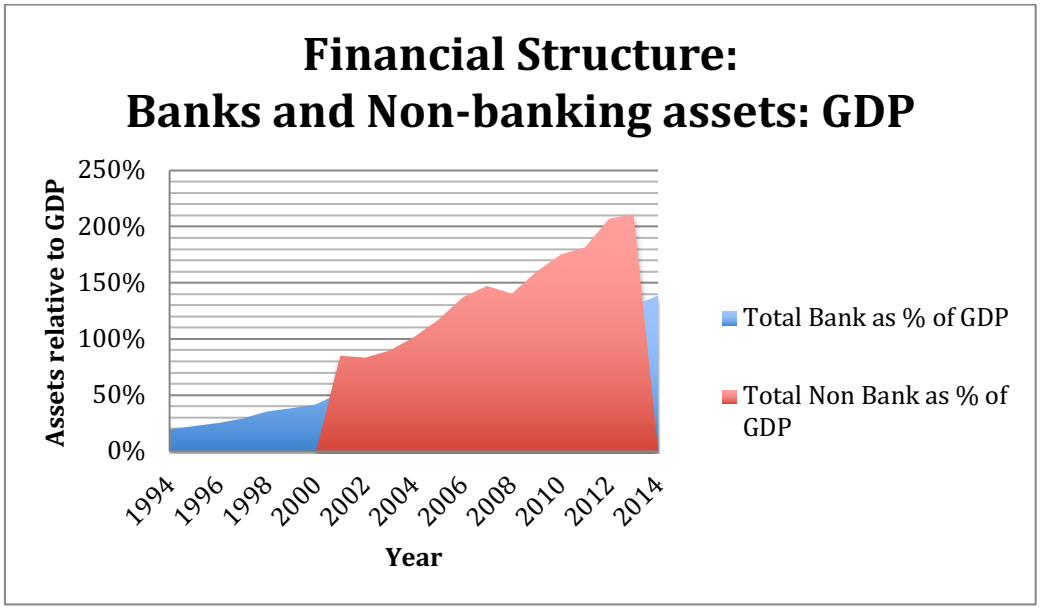
Source: Author's own compilation using data from the South African Reserve Bank, Financial Services Board (2001–2016)[3]

The levels of non-banking versus banking assets from 2001 to date has been higher coupled with the rate at which non-banking assets grow far exceeding bank assets growth. The assets in relation to GDP confirm the trend. Total non-banking assets are considerably larger at R6.92 trillion versus banking total assets of R3.84 trillion in 2013. This points to institutional investors playing a more pivotal role in financial markets.

Figure 2.1: Banking and non-banking assets (as a percentage of GDP)



Source: Author's own compilation using data from the South African Reserve Bank (1994–2014)[4]

2.3.1 Infancy: At the beginning (1911–1958)

According to Van der Berg (2002) South Africa's first pension fund was introduced in the Transvaal Republic in 1882. The institutionalisation of South Africa's pension funds dates back to 1911 when the Public Debt Commissioners Act of 1911 was passed. The Public Debt

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[3] Significant contribution to banking assets is largely from cash and balances with central bank, loans, investments of all types, pledged assets, intangible and non-current assets. Total banking assets in Table 2.1 include securities in the form of derivatives, investment and trading securities and short-term negotiable securities which are on balance sheet activities.

[4] Figure 2.1 shows the trend in financial assets in relation to GDP. Non-banking assets include Institutional investors, unit trusts, the PIC, long- and short-term insurers, public and private pension and provident funds, participating mortgage bond schemes, finance companies and non-monetary public financial corporations.

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Commissioners Act marked the beginning of the presently known PIC. The new Act made provision for holding state assets and using them to finance government budget deficits (Hendricks, 2008). Its functions over the next few decades expanded to the provision of loans to government and state entities such as Rand Water Board and Eskom. It also provided funds to provincial administrations (FSB, 2012). This was a single government entity that was able to manage and control government funds. The pool of government money was a tool for government to also borrow from itself.

Amongst these funds were industrial agreements that were entered into with Industry Councils binding employers to offer competitive benefit packages to its employees (Van der Berg, 2002). A total of 2,771 funds existed with a total membership of 675,404 in 1958. This comprised 11 state-controlled funds, 14 funds established under industrial agreements, 599 privately administered funds, and the majority 2,147 underwritten funds (FSB, 2012).

2.3.2 Separation (1959–1984)

The second phase in the evolution of the pension fund sector was when the Pension Fund Registrar was appointed. The institutional and regulatory framework for the sector experienced further improvements. The first Annual Report (1959) published by the Registrar of South African pension funds states that the existence of such a body was to manage and play an oversight role for pension funds. The passing of the Pension Act of 1956 and establishment of a regulatory institution is deemed to be pioneering. The Registrar states that in that era it was globally one of the most comprehensive and detailed regulatory tools managing pension funds. It set in place the classification of various types of pension funds that are still used to differentiate pension funds in the market. The annual reporting of all fund assets and liabilities, number of funds, members, amounts paid out as annuities and gratuities across privately-administered, state-controlled, foreign and exempt or underwritten funds was established. Official statistics and trends have been recorded from 1959 to date, and it provides fund trends in the South African context.

The Pension Fund Act was the first of its kind globally. It is for this reason it was said to be somewhat experimental in the first Annual report. Where the Act was found to be impractical the necessary adjustments would be made to the Act as it was implemented (Financial Services Board, 2012). Registration as a pension fund would be conditional upon complying to the Act's definition and meeting the stringent requirements of being financially sound. Once the Office of the Registrar was satisfied that a pension fund met its requirements it was registered, failing which registration was halted whilst arrangements were made to the Office of the Registrar to enhance readiness to its satisfaction. The cancellation of funds for various reasons, including fraudulent activities, would be imposed as part of the Act. Pension funds

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would annually provide audited financial statements outlining their financial condition. These conditions contributed to the strengthened regulatory framework and development of funds into this next era.

The territory set aside for African inhabitants during the apartheid era was known as Transkei, Bophutatswana, Venda, and Ciskei (TBVC) whereby separate autonomous states were created for indigenous South African people. It is not clear whether the Pension Funds Act was applied consistently across South Africa and the TBVC homelands, which were seen as separate administrations and were governed separately with separate development plans. It is likely though that pension reform was not as stringent and the Act was not applied to its full level of requirements, as these were a people deemed inferior by the apartheid government. Non-contributory pensions were racially fragmented prior to convergence to a means-tested level until 1994. Prior to the equalisation of state grants, whites earned more than ten times their African counterparts at R322 versus R31.

The Preservation of Pension Interest Bill was withdrawn by Parliament after facing fierce opposition from trade unions (Van der Berg, 2002). It was promulgated in 1981 by the government and it sought to preserve pension rights of funds upon member withdrawals. This meant that workers upon leaving employment with a specific firm would be unable to access their savings from retirement income. The issue was polarised by legislation inhibiting Africans from accessing unemployment insurance, this payout proved to be an important safety net in times of labour mobility. The Bill also propelled trade unions to start their own provident funds, which were the first non-contributory schemes for Africans (Van den Heever, 2007). Trade unions strongly influenced restructuring of regulations to the benefit of employees. A major shift experienced in the 1980s was the movement from defined contribution funds to defined benefit funds. A shift attributed to the improved benefits faced by employees in defined benefit funds, supported by trade unions (Van der Berg, 2002; Standish & Boting, 2006).

By the end of this period there were 11,929 registered pension funds covering a membership of 5,124,439. Total assets under management had grown to R21.1 billion by 1984.

2.3.3 Continued separation (1985–1994)

Entry into this phase is the passing of the Public Investment Commissioners Act of 1984, which strengthened the regulatory role of the sector. Public Investment Commissioners were appointed to control and play an investment management role over public funds, which were invested only in the bonds and fixed interest market but by the mid 1990s equity such as ordinary and preference shares received an allocation of public funds. The total market value of shares held by funds as at year-end 1984 was only R6.1 million (FSB, 2014). During the period up to the first democratic elections, the PIC maintained a close relationship with the

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apartheid government fulfilling its mandate as a debt provider to government (Hendricks, 2008).

In this period, Self-Administered, Underwritten and Foreign Funds were joined by Official Funds, which were administered by the Department of National Health and Population Development and by the South African Transport Services. In 1991 the establishment by the Department of Finance of the Transnet Pension Fund Act, No. 62 of 1990, exempted these funds from certain provisions of the Pension Funds Act. Other such exempted funds were the Telkom and the Post Office Funds, and legislation was amended enabling this. Foreign funds dwindled towards the end of this era.

An amendment in the allocation of assets was passed: the abolishment of investing 53% of assets in prescribed assets was done away with (FSB, 2015). A new format had to be developed as new categories of assets came into operation in 1989, these changes had to be incorporated in the investment patterns of pension funds. Competitiveness was also introduced in 1994 with the PIC buying stocks on a competitive basis, which was a new development (PIC, 2011).

Government policy and legislation in the next phase would be by influenced reports and investigations commissioned by the Mouton Committee of 1992 and the Katz Commission on Tax Reform of 1995 (Van der Berg, 2002). The terms of reference for the Mouton Committee of Inquiry were to investigate and make recommendations regarding principles that should apply for a retirement provisions system in the Republic. The report made 104 recommendations that would be the foundation for reform in the sector in the next phase (FSB, 2016).

Slow demographic transition in South Africa due mainly to fertility rates that are still fairly high in Africa compared to OECD and other emerging markets. Total Fertility rate (TFR) measured by the Census (2011) is 2.67 but for Africans it is still very high at 2.82 with coloured (2.57), Indians (1.85) and whites (1.70). The census data reveals that TFR has declined for all population groups. However, because of good health conditions life expectancy is increasing. The youth unemployment rate is large and hence the dependency rate is also high. Contributions to the pension funds is hence low. The large majority of the population was not covered for retirement in their old age: only an estimated 5.5 million people's retirement needs were covered, versus 9 million people between the ages of 15-64 who were not members of any retirement fund (Van der Berg, 2002). Various reports on the issue of social security and social protection as a means to combat poverty had been commissioned by the state pre- and post-1994. The crucial linkage between pension funds and poverty is that social policy is crucial for combating poverty on retirement in the form of old age pensions where private

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savings have not been possible. The South African pension fund sector was well developed entering into the post-1994 era, and coverage for the formally employed was noted as highly developed. The impoverished and those without employment were economically excluded and social security policy had to ensure the inclusion of pension benefits for the millions of South Africans whose retirement needs were not covered during this era.

2.3.4 Corporatisation and amalgamation (1995–2015)

Several changes were seen in this next phase of the pension fund sector. Exempt Funds section 2(3)(a) were changed to Underwritten funds. Bargaining Council Funds, previously known as Industrial Agreements, were established. The Government Employees Pension Fund (GEPF, n.d.) was established. An important change was that state-controlled funds were now formally managed by the PIC.

Several other reports commissioned include the Smith Report of 1995, the Lund Committee report of 1996 and the Taylor report of 2002. The latter two were produced in the period leading up to the corporatisation of the biggest fund in South Africa.

The Public Investment Corporation Bill was amended in 2004, and the previously known Public Investment Commissioners were given a legal mandate to act as asset managers. The Public Investment Corporation Act transferred all the state assets to the PIC. The state assets would be derived from the GEPF and other state entities, such as the Unemployment Insurance Fund (UIF). The state remained in control of the fund as it maintained its status as the sole shareholder, through the Minister of Finance to whom the Board of Trustees would be accountable. The PIC manages government funds, but is not accountable to government but to the Minister, an anomaly given the extent of assets under management. Hendricks (2008) argues that the PIC behaves no differently to a private asset management firm and it seeks returns and profits, rather than development or poverty alleviation. The PIC confirms this view with its centenary publication stating that it operates similarly to a typical asset management firm (PIC, 2011).

The Investment Policy of South Africa's GEPF managed by the PIC outlines that the strategic asset allocation must be spread across domestic and foreign equities and bonds. It is this 5 percent allocation of equities and bonds whose investment contributes towards economic and social infrastructure and job creation. The 5 percent allocation to the Isibaya and Pan African Infrastructure Development Fund, which targets social and economic infrastructure, job creation, Broad-Based Black Economic Empowerment (BBBEE) and environmental sustainability, is inadequate given South Africa's economic profile.

Pension funds act as social safety nets in a structurally unbalanced economy. South Africa, similar to Latin American countries, is characterised by high levels of income inequality, low

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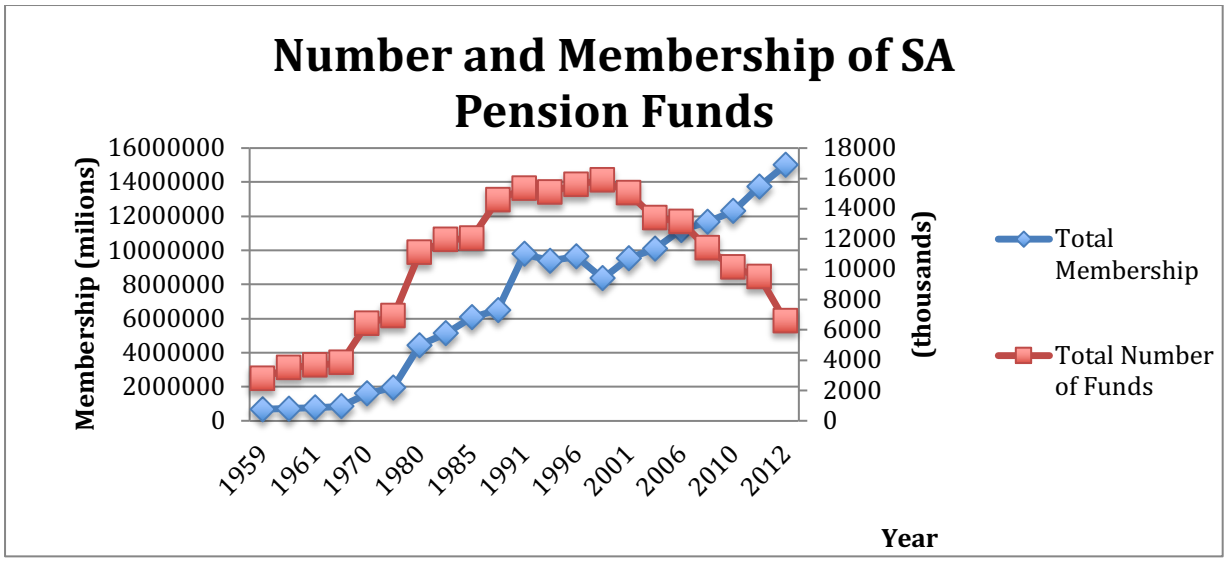
growth and investment levels. Per capita GDP levels are better than most of Africa but inadequate to reduce unemployment and poverty levels. It is important therefore to strengthen both the regulatory framework in the management of the second and third pillar, and the coverage of the non-contributory schemes.

2.4 PENSION FUND INDUSTRY GROWTH TRENDS

The Towers Watson Global Pension Asset Study (2014) is an international pension fund growth study that is published annually and analyses trends in the pension fund sector. It shows that South Africa's compounded annual growth rate of 14% is the highest annual growth over the past decade in the world, followed by Australia (12%), Hong Kong (12%) and the United Kingdom (11%). The world average is 6.5% over the same period, showing that the South African growth far exceeds the market average. This could be attributed partly to the growth in the total number of funds and total membership (see Figure 2.2).

Figure 2.2: Number of registered funds and total membership (1959–2012)



Source: Author's own compilation using data from the Registrar of Pensions (1959-2014)

The total number of members has risen from 675,404 individuals in 1959 to 15 million individuals in 2012 (FSB, 2012). Standish and Boting (2006) argue that the number of active members has not moved substantially. The number of members remained under 10 million members until 2005, and it has only been in the last decade that a steady rise to the current 15 million members occurred. Van der Berg (2002) outlines that up to 69% of the South African labour force would be reliant on state old age social pensions in their old age. More than 75% of South African pensioners rely on the means-tested social grants for income after retirement (Stewart & Yermo, 2008). The coverage of private and state-controlled pensions remains severely limited despite a well-regulated and highly development pension system.

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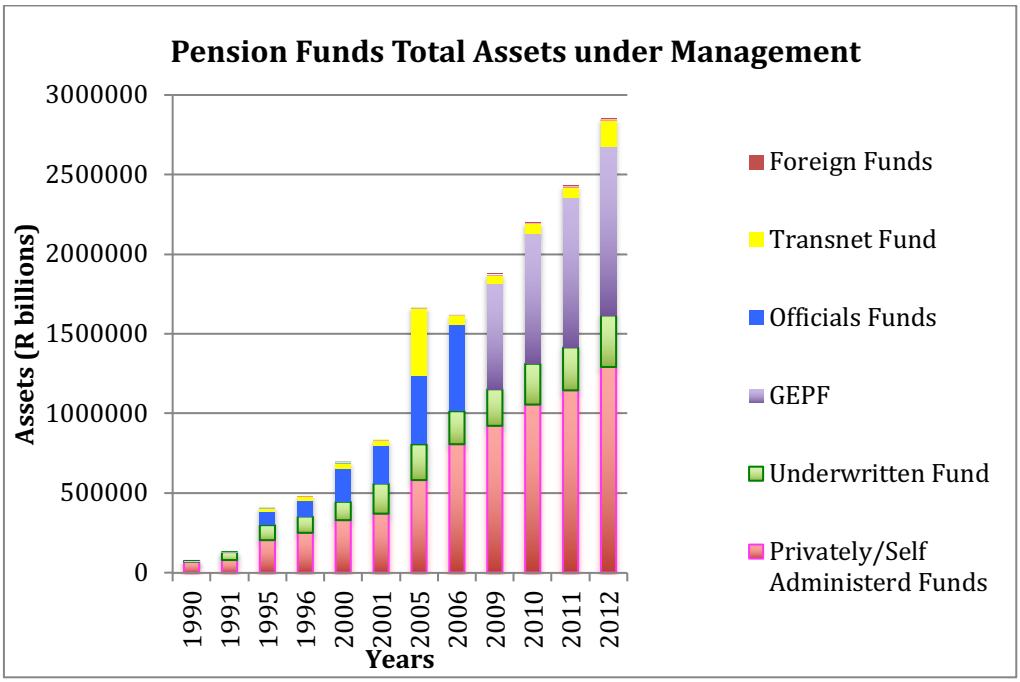
The National Development Plan recorded the labour force at 17.5 million in 2010, with a labour force participation rate of 54% (National Planning Commission, 2013). The majority of South Africans are excluded from formal participation in the labour market and this would explain the numbers of total pension fund members not capturing the majority of South Africans. There is no existing data on the informal labour market and its contribution to the pension fund sector.

A decline in the number of pension funds has also been experienced as shown in Figure 2.2. This however is explained in more detail by the fluctuations in the type of funds registered in the sector. The rankings according to asset size are shown in detail in Figure 2.3. The governance of funds is the responsibility of trustees who oversee regulatory compliance of the fund. According to Stewart and Yermo (2009) more than 80% of South African pension funds have fewer than 100 members, which has raised concerns about the availability of well-trained trustees to govern these funds.

Figures 2.3 shows the total assets under the management of the pension fund sector. The year-on-year growth flourished post-independence and can be attributed to both performance and growth in the contributions from the number of members, as seen in Figure 2.2, The South African pension fund sector is the largest in Africa.

Figure 2.3: Total assets under management



Source: Author's own compilation using data from the Financial Services Board (1990– 2012)[5]

[5] Telkom, Post Office and Industrial Agreements Funds are calculated but not reflected in the graph due to the scale which disables visibility because their contribution to the total is very small. Industrial

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The Total assets under management grew substantially from R157.8 billion in 1991 to R2.7 trillion in two decades (FSB, 2012). The concentration of assets is mainly in privately self-administered, underwritten and GEPF funds. In 2012 privately administered pension funds contributed R1.29 trillion and the GEPF R1.05 trillion, together making up more than 85% of the total assets under management in the financial markets. Although underwritten funds are larger in number, by 2012 they only contributed 11.76% to total pension assets. The trends in the types of funds exhibit the same pattern. Figure 2.2 shows that the total number of funds recorded in 2012 has more than doubled over the 50-year period, from 3,075 funds to 6,581 in 2012. The number of privately administered funds has seen a sharp increase of 372% rising from 662 to 3,128 funds. The post-democratic era of 1994-2005 sees a 66% rise in the number of privately administered funds, translating to 1,393 funds being registered during this period. Underwritten Funds made up more than 75% of the number of registered funds, rising to levels of over 90% in the late 1980s and 1990s, this substantially decreased in the last decade post-2000. The sharp decline in the number of underwritten funds results in a low rise over the period of only 46%. Standish and Boting (2006) attribute the decline of the number of funds to the move towards umbrella funds.

There are several funds not supervised under the Pension Funds Act of 1958, namely Official Funds and the GEPF, and parastatals such as the Post Office Pension, Transnet and Telkom Funds, which are supervised by National Treasury.

Agreements from 1995 became Bargaining Council Funds and a variety of funds were formed in 1995 such as Transnet, Telkom and the Post Office. The GEPF was established in the mid 2000s.

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Table 2.2: Types of funds

Number of Registered Pension Funds	1959	1960	1970	1980	1985	1990	1995	2000	2005	2010	2011	2012	2015
Privately/self-administered funds	662	674	810	788	1,032	1,375	2,094	3,056	3,487	3,340	3,292	3,128	2,946
Underwritten funds/Exempt Funds	2,358	2,768	5,548	10,265	10,953	13,198	12,970	12,509	9,888	6,776	6,204	3,444	2,188
Industrial agreements	16	17	28	35	30	19	16	13					
State-controlled funds/GEPF	14	15	14	11	10	9				1	1	1	1
Official funds						8	5	4	3	3	2	2	2
Transnet							1	1	3	3	3	3	3
Telkom							1	1	1	1	1	1	1
Post Office							1	1	1	1	1	1	1
Bargaining Council									5				
Foreign funds	25	36	35	3	1	1	1	2	2	1	1	1	1
Total	3,075	3,510	6,435	11,102	12,026	14,610	15,089	15,587	13,390	10,123	9,505	6,581	5,143

Source: Author's own compilation, data sourced from FSB (1959-2015)

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Table 2.3 indicates that the largest percentage of total assets has been invested in Insurance policies in the last two decades. During 1992–2005 an average rate of 23% was invested in the asset class, rising to an average 47% in the last five years. This is because all fund types were reported on by the Registrar post-2005, prior investment allocation up to the year 2005 reflects the allocation only of self-administered funds in their Annual Reports. The inclusion of underwritten, foreign and state-controlled funds has strongly influenced the rise in allocation. Investment in shares in companies during the period 1992–2005 averaged 32%, however with the additional fund allocation (inclusion of underwritten, foreign and state-controlled funds) the average drops to 22%. Bills, bonds or securities issued over the 20-year period account for a 9% average and Krugerrands a meagre 5.2% average. There is no significant shift between privately administered funds and all other funds. This is consistent for all remaining asset types. Post 2005 foreign investments are shown reaching a high of 13% allocation of the total investment portfolio of pension funds. Debentures, loans and immovable property cumulatively receive less than 5% of the investment allocation over the period under review. Section 28 Regulation sets out parameters and limitations for investment in each asset type, and the Pension Fund Registrar assesses compliance by funds to this regulation.

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Table 2.3: Investment portfolio of funds (percentage of total pension fund assets)

	1. Immovable property	2. Bills, bonds or securities	3. Debentures	4. Loans	5. Shares in companies *Equities	6. Collective Investment Schemes	7. Unit Trusts	8. Insurance policies	9. Deposits and Krugerrands	10. Foreign Investments	11. Other assets
1992	4.8	14.0	0.7	0.1	26.6	-	0.0	30.8	8.9	-	14.1
1993	4.9	19.2	0.7	0.1	26.5	-	1.1	29.6	8.2	-	9.5
1994	4.8	14.0	0.7	0.4	40.4	-	1.4	26.8	9.3	-	2.2
1995	4.3	12.6	0.7	0.3	47.7	-	1.5	24.6	7.5	-	0.8
1996	2.9	13.8	0.6	0.4	45.5	-	1.8	26.8	6.5	-	1.7
1997	4.1	14.8	0.5	0.5	43.0	-	2.9	26.2	5.4	-	2.6
1998	4.2	14.3	0.2	0.6	37.4	-	4.8	26.1	6.4	-	6.0
1999	3.6	12.0	0.2	0.6	34.3	-	4.8	28.2	7.0	-	8.3
2000	3.6	11.9	0.11	0.7	31.1	-	5.2	31.5	6.7	-	9.2
2001	2.7	11.2	0.0	0.8	31.1	-	5.1	32.6	6.3	-	10.2
2005*	0.6	8.6	0.1	0.1	23.3	5.5		47.6	4.3	7.8	2.1
2006	0.5	8.0	0.5	0.1	22.0	5.2		47.3	4.8	9.9	1.7
2009	0.7	7.4	1.1	0.1	18.0	7.3		48.0	6.2	9.5	1.7
2010	0.7	7.1	1.2	0.1	19.0	7.6		46.4	6.3	10	1.6
2011	0.7	7.5	1.1	0.0	18.8	7.9		45.9	5.1	11.8	1.2
2012	0.7	8.1	0.5		18.0	8.4		44.8	5.0	13.0	1.5
2014	0.62	8.67	0.15		17.96	9.11		41.34	3.19	17.42	1.54
2015	1.18	8.46	0.27		17.62	7.22		40.68	4.30	18.80	1.47

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Source: Author's own compilation, data sourced from FSB (1992–2015)

Notes: 6. Reporting Investment in collective investment schemes started in 2005 and unit trusts were discontinued post-2005. Investment in shares in companies also started in 2005. Investment in collective investment schemes started in 2005 and unit trusts were discontinued post-2005. Reporting shares in companies in this format also started in 2005. It is also important to note that the Financial Services Board reported Investment Portfolio of Self-Administered Funds until 2004, after which reporting reflects all Fund Types.

The Minister of Finance sets regulations of investment into various assets, legislation permitting foreign or offshore allocation were increased by 5% to a maximum of 10% of their assets outside SA with the approval of the Reserve Bank. Regulation 28 was further amended with no more than 25% invested in foreign assets (excluding African investments).

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2.5 THE ROLE OF THE PUBLIC INVESTMENT CORPORATION

The PIC is a wholly state-owned investment management company. It was formed in 1911 and it became a corporate entity when the PIC Act of 2004 was passed in April 2004. The PIC is a financial services provider in terms of the Financial Advisory and Intermediary Services Act, which allows it to invest funds on behalf of its members. Its main objective is to manage clients' investments and ensure returns that exceed benchmarks. The PIC manages the GEPF, UIF, Compensation Fund, Political Office Bearers Fund and the Associated Institutions Pension Fund. It also seeks to ensure client and customer satisfaction. It has secondary objectives of managing risk return attribution levels and practicing effective enterprise risk management. It also seeks to contribute positively to South African development by investing 45% of its mandated funds in the Isibaya fund. This fund comprises equity investments in social and economic infrastructure, environmentally sustainable projects, and investment in priority sectors that will foster growth, BBBEE and job creation. The Board of Directors of the investment company, including seven Non-Executive Directors, are appointed by the Minister of Finance in consultation with Cabinet.

According to the PIC Annual Report (2011) the GEPF historically and to date contributed a minimum of 90% to the funds on behalf of which the PIC invests. According to the GEPF Investment Policy Statement (n.d) there exists a special relationship between the PIC and the GEPF. A mandate has been given to the PIC to act as the funds asset manager over a substantial portion of the fund's assets. Without the contribution of the GEPF, the PIC would likely cease to function in its existing capacity. Where the PIC does not manage the assets of state employees, agreements must be entered into with the mandates drawn from the GEPF for other asset managers. The active members of the GEPF are employees who work in national and provincial governments, including the armed forces and correctional services department.

It is recognised by the GEPF Investment Policy that the sole mandate of the establishment of the PIC is to manage GEPF assets. It is also a public entity and it must comply with the Public Finance Management Act. According to the PIC Act of 2004, the state is the sole shareholder of the PIC and the Minister of Finance is the shareholder representative. This policy change has led to little political interference in the management of the PIC. In fact, the strengthened independence and autonomy of the PIC has led to the harsh critique by Hendricks (2008) of operating a privately run, state-owned entity that does little to drive the urgent developmental agenda of the country.

The growth of assets in the PIC has been significant in the last three decades (see Figure 2.4).

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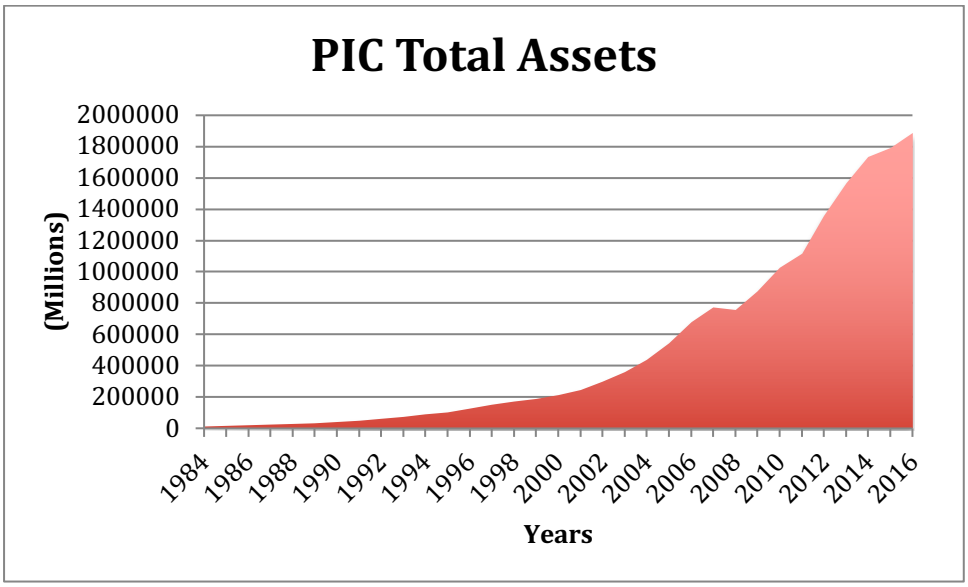
Figure 2.4: PIC total assets growth



Source: South African Reserve Bank (2017)

Over the last decade the PIC has contributed almost half of the total South African pension fund assets. In the year ending 2012, the PIC assets under management exceeded a trillion rand contributing to 49% of the total pension assets in the financial system. The contribution of state employees' pension funds to the financial development of the South African economy is significant. The growth of the assets can be attributed to increased efficiencies of the financial markets and non-institutional investors improving due to the productivity of capital. In its Integrated Annual Report, the PIC reported 13.72% real rate of return in one year, thus it can be argued that strong investment performance has contributed to the growth of assets (Public Investment Corporation, 2015).

Table 2.4: Proportions of GEPF and PIC in Total Financial Market Assets

R million	GEPF Total Assets	PIC Total Assets	All Funds Total Assets	% GEPF	% PIC
2002	293 256	299 923	867 396	34%	35%
2003	307 637	358 711	909 099	34%	39%
2004	377 340	438 525	1 091 807	35%	40%
2005	462 596	545 701	1 283 921	36%	43%
2006	545 600	677 638	1 620 923	34%	42%
2007	673 408	773 540	1 938 569	35%	40%
2008	725 046	754 776	1 973 318	37%	38%
2009	738 281	875 388	1 874 062	39%	47%
2010	817 593	1 025 703	2 198 384	37%	47%
2011	942 832	1 115 052	2 429 843	39%	46%

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2012	1 057 325	1 358 916	2 749 145	38%	49%
2013	1 263 299	1 404 000	3 211 017	39%	44%
2014	1 449 951	1 605 000	3 677 244	39%	44%
2015	1 623 465	1 813 000	4 035 825	40%	45%

Source: Author's own compilation, data from SARB, FSB, PIC (2002–2015)

2.6 CONCLUSION

The study shows that significant changes occurred during the different phases of growth in the sector. From an early stage the development of regulatory framework to manage the non-banking financial sector played a significant role in the financial development of the sector. Government regulation and interventions have ensured that pension funds are well managed and bad practices discouraged in the pension sector through institutions such as the Pension Fund Registrar who plays an oversight role in the sector.

In this section the contextual analysis shows a significant portion of pension assets are used for social protection and distribution to alleviate poverty in the first pillar, these are state funded. High levels of unemployment rates, job insecurity and income levels translate to a small number of workers participating in formal pension systems. Historical inequalities led to a large dependence on state support for social protection in old age. A mandatory second pillar does not exist, and herein lies opportunity for further development of the South African pension system. The closest is state employee contributions, whose pension assets are managed by the state-owned PIC, which is significant on financial markets contributing almost half of all assets. The concentration of total assets is mainly in privately self-administered, underwritten and state employee funds in the third pillar.

The study also identified that the size of the banking sector has shrunk relative to total financial assets, in contrast non-banking assets have flourished with rising levels of institutional investors. They have the potential to impact savings rates and capital market development but empirical analysis must be undertaken to assess these linkages. Further empirical work must be undertaken to measure the extent and intensity of pension systems in improving capital market development, growth and savings rate.

Pension funds are a crucial source of capital that can be used to drive national priorities, however policy recommendations on the regulatory framework and management of institutions will need to be reviewed. There remains huge potential for growth of the South African pension fund sector but there is limited research on the performance of the sector and its impact on growth.

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CHAPTER 3

HAVE PENSION FUNDS BOOSTED NATIONAL SAVINGS IN SOUTH AFRICA?

3.1 INTRODUCTION

Several authors have pointed out the role of savings in the linkages between pension assets and economic growth (Bailliu & Reisen, 1998; Bebczuk & Musalem, 2006; Holzmann, 1996; Rezk et al., 2009). The positive association between savings and growth is couched in their provision of capital for investment or government consumption (Bosworth & Burtless, 2004; Murphy & Musalem, 2004; Prinsloo, 2000; Schmidt-Hebbel, 1999). In the context of growing pension fund assets, it is important to ascertain whether consumption patterns have altered such that postponed consumption has altered aggregate household savings levels. This chapter seeks to establish whether pension assets affect savings and examines the theoretical interactions between the two variables. This is an important question as literature has focused on establishing the channels through which pension assets increase growth: through savings, improved corporate governance, reduced labour market distortions and capital market development (Catalan, 2004; Catalan, Impavido, & Musalem, 2000; Davis & Hu, 2005, 2008; Hu, 2005; Kim, 2010; Meng & Pfau, 2010; Raisa, 2012; Rezk et al., 2009; Schmidt-Hebbel, 1999; Walker & Lefort, 2002; Zandberg & Spierdijk, 2013).

This chapter revisits the relationship between pension assets and savings as this has not been extensively assessed in emerging markets and there is a paucity of work in African economies. The transmission from pension funds to growth can be empirically tested in the savings and capital market development channels. It is for this reason that the study examines the relationship between pension assets and savings. A large number of studies measure the relationship between pension assets and savings, however there are few such studies in sub-Saharan Africa. This is quite understandable given the paucity of well-developed pension fund markets in sub-Saharan Africa. South Africa with its globally competitive pension industry will be a good testing ground on the nexus between pension funds and savings rate.

Personal income plays an important role in the ability of an employee to make contributions to pension plans or savings. The growth or decline of personal income will directly impact their ability to save (Feldstein, 1976; Friedman, 1957). The spending habits of the working population will also impact savings levels, and their ability to contribute towards pensions (Thaler, 1994). Apilado (1972) argues that the problem with contributions to retirement plans is the displacement or substitution effect when employees replace other forms of savings with retirement savings, reducing the overall total savings. On the other hand, Bosworth and Burtless (2004), Rezk et al. (2009) and Samwick (2000) opine that the introduction of mandatory savings increases the level of pension fund assets and has been empirically proven

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to significantly and positively affect savings. Retirement savings may supplement existing savings with prospective retirement income allocated separately by the employees.

Employee contributions to pension schemes have risen in South Africa. The impact has been a significant growth in the number of South African pension funds from 2,771 funds with a total membership of 675,404 in 1958 to 5,150 funds in 2014. This comprised nine state or state-owned enterprise controlled funds, 2,996 privately administered funds, with the majority 2,175 underwritten funds (FSB, 2014). During this period there was a high growth in members, from less than a million in 1959 to 15.9 million in 2014. The growth has been concentrated in the last decade (FSB, 2014). The coverage of private and state-controlled pension funds supports more than 75% of the South African ageing population reliant on retirement assistance from state social grants in their old age (Van der Berg, 2002). Pension assets have grown astronomically, from R657 billion in 1959 to R3.67 trillion in 2014, making South Africa's pension fund system the biggest in Africa and currently the 11th biggest in the world (FSB, 2014; Towers Watson, 2014). The question that must be investigated using our data set is whether this increase in pension assets has resulted in a higher domestic savings rate.

A few studies have focused on the pension system and whether this has translated into higher savings levels. Mixed results show no conclusive outcomes. However, country-specific effects must be factored into any estimation (Bailliu & Reisen, 1998; Bebczuk & Musalem, 2006). The pension systems debate is centred on PAYG versus FFS, with many countries now reforming to FFS due to the premise that it is most beneficial to savings. Chile is a developing economy with an advanced pension system and long-term pension reform. It is a popular case study. Having started in 1981, it is one of the few country studies with a long-run time series exceeding 30 years after pension system reform. Some Chilean studies show positive results (Holzmann, 1996; Rezk et al., 2009; Schmidt-Hebbel, 1999) but others (Bosworth & Burtless, 2004; Samwick, 2000) show different results. In the past two decades several countries including South Africa have undergone pension reform with the main objective of boosting savings. Savings and fiscal incentives included tax reform to boost savings mainly in lower income households, increasing taxing saving accounts and tax-deductible earnings of up to 27% of earnings are applicable (National Treasury, 2013b). In addition, strengthening of pensions portability between jobs and preservation of savings is in place with harmonisation of tax benefits. More than 80% of households in working class contribute to provident funds, thus the funds receive the same tax treatment of contribution and benefits as pension funds are expected to encourage savings. However empirical evidence suggests that there are mixed results and the intensity of reform effect vary quite considerably. This may suggest that increase of pension assets is not necessarily associated with increased savings levels. Increased budget deficits and the negative savings effects on national accounts can deplete the build-up of pension reserves, indicating that pension reform may simply redistribute assets

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but neither increase savings nor have any positive increase on overall economic growth. The pension system selection ex ante may differ from the actual prediction. Policy makers should include investigation of both the household savings behaviour and the corresponding government savings response in an economy ex post. This analysis is a first step to understanding the linkages between pension, savings and growth. We begin by investigating the underlying theories supporting the view that pension savings directly provide impetus to total domestic savings: is this the South African story?

This chapter is organised as follows: A brief overview of savings trends not outlined in the previous chapter in Section 3.2. Theoretical explanations for the relationship between pension assets and savings will be explained in Section 3.3, followed by an empirical literature review of pension funds and savings in Section 3.4. The data, variables and model specification are shown in Section 3.5. The empirical analysis and results are presented in Section 3.6. Section 3.7 presents the conclusion.

3.2 TRENDS IN SOUTH AFRICAN SAVINGS

The importance of savings in an economy has received extensive empirical attention: savings not only finances current account deficits, it also plays a mobilisation role by contributing towards capital formation in an economy. Investment levels are important as they trigger increases in the gross national income, an important variable in measuring the standard of living in a country. Emerging economies with consistently high and rising growth rates have rising investment rates that are coupled with savings rates exceeding 25%. The World Bank (2011) and Prinsloo (2002) maintain that investment levels exceeding 30% are necessary for growth, but domestic savings boost investment levels and reduce the macroeconomic offsets retained from uncertain international flows of capital. This savings thrust coupled with improvement of technology and innovation improves productivity outcomes. Public expenditure levels also impact domestic savings, in combination with the levels of public expenditure, household and corporate savings. In order to curtail slow growth in the South African economy, the low investment and savings rates that are impediments to transformation of the economy need to be increased. Despite the extraordinary increase in pension asset wealth, the savings rate has steadily declined in the last two decades.

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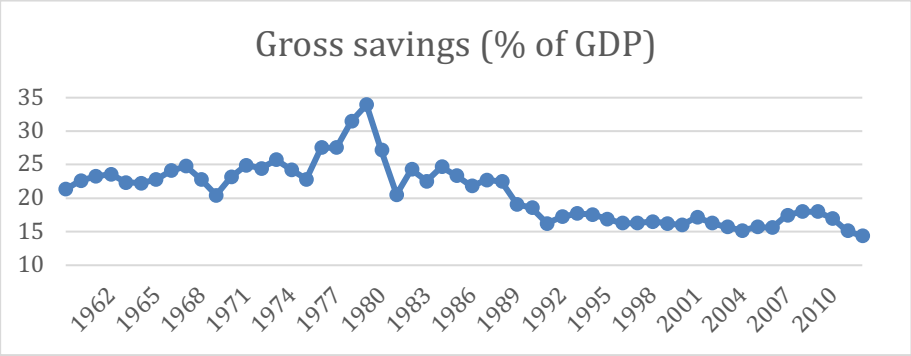
Figure 3.1: Gross savings as a percentage of GDP



Source: World Development Indicators (2014)

The South African Reserve Bank measures gross savings comprising corporate, household and government savings levels. An analysis of the trends of gross savings between 1960 and 2014 show that gross savings has declined from 22% to the current 14% (see Figure 3.1). Total gross savings between 1960s up until the mid 1980s exceeded 25%, and it was only in 1990 that the savings rate dropped below 20%. The gross savings rate as a percentage of GDP dropped substantially with a parallel decline in both household savings and general government savings. The South African Reserve Bank measured household sector savings at 6.9% in 1960, this in 1999 was a low 2.9% of GDP (Prinsloo, 2000). Similarly, general government savings declined to deficits from a positive 6.3% in 1960 to a decade in the 1990s of dissavings, with the peak in 1996 of a level of -3%. The deterioration of the South African savings rate began in the mid 1980s: from a high average of 26.7%, where it surpassed several first world countries, it now has the lowest savings rate even amongst middle income and emerging economies, whose savings rate exceed 20%.

Figure 3.2 shows South Africa compared to other emerging market economies (EMEs). Malaysia, India and South Africa exhibited the same level of savings at 21% in 1980 but the others have all escalated to above 30%. The weakening of the South African savings rate has continued on a downward trend since the 1990s and it does not appear to have recovered. Conversely savings rate in other EMEs has risen to levels over 30% in China, Botswana, India, Malaysia and Indonesia. Moving higher at a slower rate are Chile and Brazil, both starting at relatively low savings rate levels.

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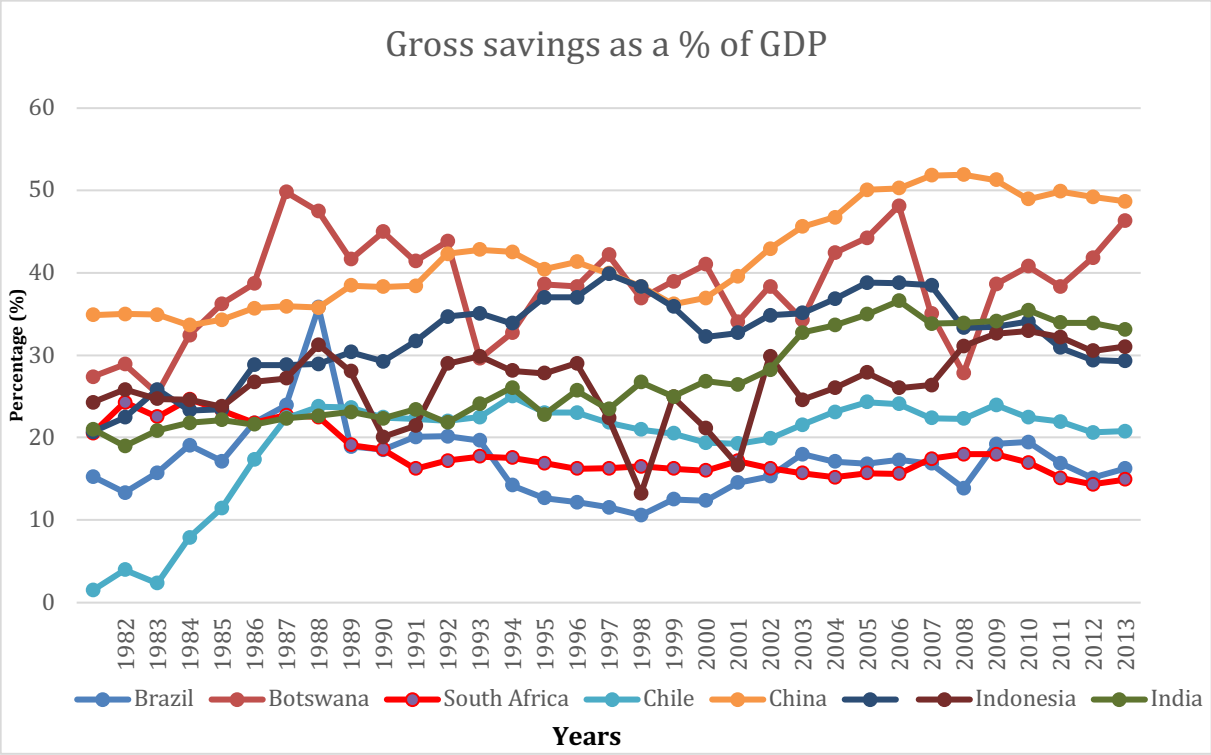
Figure 3.2: Gross savings as a percentage of GDP compared with other EMEs



Source: World Development Indicators (2016)

The World Bank (2011) outlined that structural characteristics which were significant in explaining South Africa's low savings rate included high levels of youth unemployment, public expenditure and productivity contribution. Pension reform in the context of declining national incomes may not yield the desired effect largely due to high levels of unemployment and inequality, as the large majority of low income households are unable to save income after meeting their basic needs. Emerging market economies such as Chile more than doubled household income between 1980–2008, India tripled it, the Chinese increased it by more than 11 times. Rising household incomes supported savings rates and growth targets of 6-7% in these economies. South Africa's household incomes have risen minutely by less than 10% during the same period. Further worsening the savings rate was the government dissavings, but the extent to which financing the transition costs of systemic reform impact on savings has never been measured. This was compounded by significant transfers of government funds to households in the form of social grants. Social grants (old age, disability, war veterans, foster child, care dependency, child support, grant-in-aid, and social relief of distress) in South Africa are estimated at close to 4% of GDP, making it one of the highest in Africa.

Gross Savings is defined as gross national income less total consumption, with net transfers. Gross domestic savings is GDP less total consumption, it excludes foreign transfers. Gross domestic savings has consistently exceeded gross savings in SA. Both series have been

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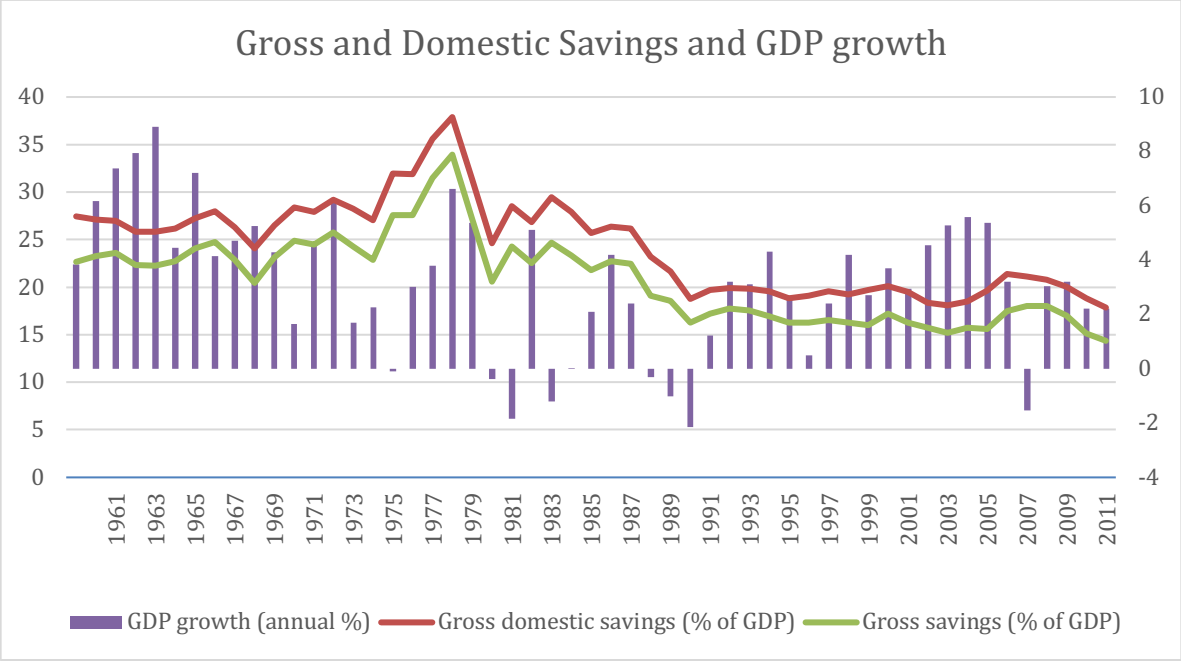
steadily declining and current 2014 levels of gross domestic savings are at 18% versus a lower gross savings rate of 14%.

Figure 3.3: Gross and domestic savings as a percentage of GDP



Source: World Development Indicators (2016)

The Growth Employment and Redistribution (GEAR) macroeconomic strategy framework embarked on by the government in 1996 targeted a savings rate of 23% which was deemed necessary for a GDP growth rate of 4% per annum (Prinsloo, 2000). In addition this would support investment rates of 25% or more, which is necessary for high and fast growth in this emerging economy (World Bank, 2011). Figure 3.3 shows the highest level of GDP growth rate was 5.6% in 2005, and this has steadily declined to lower levels of 1.5-3% growth per annum in the post-recession period.

3.3 THEORETICAL BACKGROUND: PENSIONS AND SAVINGS

Friedman's (1957) permanent income hypothesis (PIH) and Modigliani's (1986) life cycle hypothesis form the basis for the theoretical analysis in this section. The PIH is underpinned by establishing the long-term expectations of an individual's future income affecting his/her consumption and savings patterns. The theory emphasises consumers' expectations of permanent income alter their consumption patterns, more importantly their behaviour towards savings. Several scholars argue that interest rates have an ambiguous effect on savings depending on the opposing effects of the income and substitution effect, the net effect of these determine whether effect is positive or negative (Prinsloo, 2000; Simleit et al., 2011). The expectations of long-term wealth determine the consumption plans of individuals. Other factors

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affecting the permanent income include one's training, personality, ability, economic activity location and the occupation held. An employee whose income fluctuates regularly within the same period (holding all biographical factors such as age, race, occupation and location constant) versus an employee whose income is stable will have different average expectations of their permanent income. In the former the employee's income cannot be used as a good predictor of future earnings, while the latter's more stable income offers an improved idea of what their permanent measure will be, which will alter consumption patterns. The theory outlines that consumers are rational and seek to maximise utility thus smoothing consumption over their lifetime, so fluctuating savings levels are observed at different ages (Bebczuk & Musalem, 2006; Friedman, 1957; Simleit et al., 2011). Higher savings are associated with young working adults, with retired workers as consumers who dissave. One of the tenets of the hypothesis is that consumption is underpinned by diminishing marginal utility over time, thus young adults starting a family consume more than a young working adult (Simleit et al., 2011). This introduces the heterogeneity of households whose propensity to save is not identical (Bailliu & Reisen, 1998). Bebczuk and Musalem (2006) also argue that individuals are not homogenous and are not fully rational and altruistic, therefore pension savings do not always correspond with contributions and benefits. Free-riding may occur as workers merely consume disposable income without saving for old age retirement and rely on state support. These are workers who hold the ability to save but choose consumption, possibly burdening future generations with higher taxes from social security assistance. Governments must therefore implement policy tools that enforce savings and fully-funded pension systems that ensure alignment between one's savings and the benefits derived.

The second theory supporting the direct linkage between pension assets and savings is the life cycle theory. The life cycle model emphasises two phases in one's life: the working years and the retirement phase. The assumption is that one saves when young and working, and dissaving occurs during retirement (Bailliu & Reisen, 1998; Feldstein, 1976; Murphy & Musalem, 2004). The accumulated savings generate sufficient capital from households to improve aggregate savings. In the absence of a working younger population aggregate savings would therefore surely decline.

The framework adopted by Bailliu and Reisen (1998) provides the theoretical foundations for how the accumulation of pension asset increases aggregate saving. Firstly, the economy is divided into those who work (who will eventually retire), and others who are retired (who produced the capital stock in the economy for the younger generation). The younger generation utilise this capital stock productively in the economy to generate output.

The younger generation savings s_t plus consumption a_{1t} is the total wage received during the working years. a_{1t} shows consumption when young.

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$$a_{1t} + s_t = m_t \tag{3.1}$$

The savings of the younger generation produce the capital stock required for the next generation. Interest paid on these savings in the next period t are shown below:

$$a_{2t+1} = (1 + i_{t+1})s_t \tag{3.2}$$

The worker chooses what level to allocate for consumption and savings in the first period. In the second period consumptiona_{2t+1} takes place when retirement occurs. Savings would have borne gains from interest during the period from when savings are held from *t* to period (*t+1*). Both a_{2t+1}, $a_{1t} \geq 0$.

The utility function after first order conditioning derived from Bailliu and Reisen (1998) draws us to the implicit savings function:

$$s_t = s(m_t, i_{t+1}) \tag{3.3}$$

The total savings in a household can be mandatory (s_t^M) or voluntary (s_t^V) thus substitution between the two can occur depending on national policy frameworks, but total household savings s_t remains unchanged.

$$s_t = s_t^M + s_t^V \tag{3.4}$$

K_{t+1} capital stock in time *t*+1 is the sum of aggregate savings in time *t* and *t*+1. The model incorporates a growing population of $P_t = P_0\,(1+n)^t$.

$$K_{t+1} = P_t s(m_t(K_t), r_{t+1}(K_{t+1})) \tag{3.5}$$

Aggregate savings is represented by savings at time $K_t = P_t s(m_t, r_{t+1})$.Thus total capital stock at time K_{t+1} includes returns to capital stock in one's retirement, combined with total wages saved by the entire population.

In addition to this a further motive added by Modigliani (1988) included forgoing current consumption for the future towards retirement through contributions. The theory reflects the allocation of resources and consumption over a lifetime. The rising and declining income levels during one's life span would lead to the increase or decrease of accumulated wealth. The model assumes that income levels do not remain constant, and during retirement, income levels drop and dissaving occurs. At this point the accumulated wealth would be used to finance consumption due to loss of income. This model assumes that growth rates exhibit ability to change savings rates and not per capita income. Modigliani (1980) outlines the vast amounts of literature prior to the 1980s that quoted motivation for savings as primarily wealth transfers to the next generation. However other factors, such as children's needs and retirement planning, were a motivation for savings in several surveys. Another assumption is

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that wealth after retirement declines, and this continues until consumption reduces all accumulated wealth to zero.

Theoretically pension funds lead to savings through contribution to total capital formation as shown in Equation 3.5. The accumulation of pension savings in capital formation during one's lifetime of the entire population is a function of levels of income and wages that are not consumed in that period but are retained for the next period. Contractual savings to pension savings are included in this estimation, whether they are made within a mandatory or voluntary policy framework.

The theoretical reason for the non-effectiveness of pension savings on gross domestic savings is what is referred to as transition costs. A pension regime change from PAYG to FFS only has a positive impact on savings if the cost of doing so does not reduce overall savings (Schmidt-Hebbel, 1999; Samwick, 2000; Zandberg & Spierdijk, 2013; Cuevas, Gonzalez, Lombardo & Lopez-Mármolejo, 2008). This transition cost is referred to as implicit debt and it comprises those retirees whose pension premiums have to be paid out whilst existing worker contributions no longer directly reach retirees but are deposited in a private fund (Schmidt-Hebbel, 1999). Cuevas et al. (2008) attest that the privatisation of pension funds still require ongoing payments be made to current retirees, despite the diversion of contributions to a fund. This indicates financial contributions to existing retirees are due from the public revenue, no longer from current workers. Hendricks (2008) argues the implication of this cost being paid by the current generation is forgone expenditure substituted to finance pension debt. He argues that the government incurred substantial liabilities in order to finance pensioners and the additional burden of higher financial debt in the context of grossly high levels of inequality and low levels of income is unwarranted. Without the demographic prerequisites of a shrinking youth and growing retired population, the reform is argued to perhaps have been untimely, especially in South Africa where life expectancies are declining. Furthermore, the expectations of improved savings are premature if countries incur debt accompanied by high servicing costs, eroding government fiscus at the expense of prioritising national expenditure targeted at improving social welfare. Fiscal measures taken in financing the transition, such as increased taxation, scaling up on borrowing raising national debt, reduced government expenditure or tax incentives promoting retirement savings, will determine that the net gains made to gross savings from pension reform undertaken are not correspondingly eroded.

3.4 EMPIRICAL LITERATURE REVIEW

The pioneering investigations on the effects of pension and savings are provided by the works of Kohl and O'Brien (1998) and Thomas and Spataro (2016), who give an overview extending beyond pension effect on savings and capital market development. These papers also considered labour force participation, household income and consumption and job mobility in

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the extensive surveys of pension fund effects. In this paper the focus is on pension funds and savings. The early works on this topic in the 1970s and 1980s focus only on OECD countries mainly investigating the Social Security Wealth (gross and net) effect on household or personal savings (Feldstein, 1974, 1976). During the same period, more studies focused on the effects of social security wealth with respect to consumption and household income behaviour. In the 1990s culminating with the increased pension savings wealth, studies incorporating the effect of pension wealth on personal savings and households were produced (Lee & Chao, 1988; Geletkin & Logue, 1980; Kune, 1981; Bailliu and Reisen, 1998; Schmidt-Hebbel, 1999; Morande, 1998; Coronado, 1998).

In the last two decades the empirical testing of pension savings and domestic savings has undergone significant research. One of the early papers investigating emerging market pension reform effects on the labour market, investment and growth also measured impact on savings. Schmidt-Hebbel (1999) argued that Chilean pension reform increased both national and private savings. Similarly Samwick (2000) reported that Chile increased the savings level after pension reform. However, out of 150 countries, it was the only study between 1970–1994 to report increased savings. Furthermore, the savings rate of countries with PAYG was lower than those with FFS. This provided evidence that the savings rate was influenced by the pension system adopted.

New evidence introduced by Murphy and Musalem (2004) outlined that the impact of pension savings on national savings depends on whether pension savings are voluntary or mandatory. The econometric analysis included a component of clustering countries where the pension schemes were voluntary or mandatory. Using Ordinary Least Squares (OLS), the 43 countries tested between 1960 and 2002 introduced an important strand of literature. In other studies several authors have affirmed this view with empirical work (Rezk et al., 2009) testing several Latin American countries (Argentina, Chile, Colombia, Mexico, Peru and Uruguay) between 1995-2006 showing mandatory pension fund regimes have a positive impact on aggregate private savings. The relevance of national budgets is introduced into the equation by a study on fifty states in America between 1970–1999 (Bosworth & Burtless, 2004). The primary goal was to estimate the impact of increased pension funding on both national savings and public budgets. The fixed effects model shows that pension savings substitute other forms of private savings and thus have no effect on national savings. Upon the advent of pension reform new bands of literature evolved testing the significance of funded pensions on savings. One of the first research outcomes from Balliu and Reisen (1997) concluded that funded pensions increase aggregate savings. The effect was eight times higher in developing economies. The study had a short sample period between 1982–1993 using only ten countries. Using improved methodologies and 48 countries Bebczuk and Musalem (2006) also focused on the nature of the pension system between PAYG and FFS, expanding on their previous works. They argued

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that there appears to be little evidence that increased pension savings necessarily leads to increased national savings, especially with the policy shifts of pension fund reform. The intensity of an increase in pension savings on national savings varied between 0-20c for every $1 increase of pension savings showing instances where pension savings impacted national savings. The effect was more pronounced with more mature pension systems which showed more significant responses with higher national savings. The sample of 48 countries included 19 OECD countries with 29 developing economies. Many countries having moved to fully-funded schemes needed to ascertain whether moving had influenced the national savings rate.

Some of the reasons for decline or no effect in savings from increased pension wealth or savings is explained significantly by Anton et al. (2014) and Schmidt-Hebbel (1999). The financing of the pension fund transition is assessed by measuring the pension transition deficit as a percentage of GDP and implicit public debt. Cuevas et al. (2008) explored the transition effects of pension liabilities outlining how the newly incurred explicit public debt through transition may even adversely influence the nation's creditworthiness due to the significant fiscal burden incurred. In the South African instance although the work was not empirical the debt incurred is a likely reason for pension fund contributions having no effect on national savings (Hendricks, 2008). The effect of depleted national savings and increased tax reliefs for the wealthy crowd out any positive savings effects. It requires empirical analysis to determine if this is indeed the case.

The results from various studies show that differences arise in the conclusions of the empirical literature. Various studies in the last two decades show the relationship between pension fund assets and savings is ambiguous. None of these studies have investigated the accumulation of pension funds' assets in South Africa and their impact on gross domestic savings. This gap in the literature requires a country-specific study. Secondly, the pension fund reform may show different results for the pre-and post-FFS pension reform systemic change. The results provided by this analysis will offer some explanations for the declining savings rate, in the context of increased pension fund assets.

In summary, the literature is inconclusive as studies show that the direction of causality differs and the country-specific effects must be taken into consideration. An increase in savings is shown by Balliu and Reisen (1997), Schmidt-Hebbel (1999) and Bebczuk and Musalem (2006). A positive relationship is exhibited in studies with mandatory savings as a requirement (Bonasia & Napolitano, 2017; Murphy & Musalem, 2004; Rezk et al., 2009). A second strand of literature shows that pension funds have no effect or even a negative effect due to their substitution effect (Holzmann, 1996; Anton et al., 2014; Bosworth & Burtless, 2004; Samwick, 2000). It is important to establish the empirical linkage in South Africa: Odhiambo (2009b)

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established that the direction of causality runs from growth to savings, and if this is predominant in South Africa pension assets the long-run impact on growth will not be significant. Odhiambo (2004) used the VECM and Johansen cointegration estimation technique and also showed that economic growth leads financial development. However, the study does not test the specific financial sector but is limited to the aggregate levels of financial development. This study will decompose the sectors and focus on pension assets transmission to savings, these are important as it has consequences on growth. The study will restrict its scope to pension assets and improve the effects of pension funds within financial markets. An additional contribution in one of the models is that the relationship is measured over 33 years and it is likely one of the longest annual time series surveys conducted in a developing country.

3.5 DATA AND VARIABLES

3.5.1 The data

The analysis spans a period of 33 years between 1980 and 2013 to measure the impact of pension savings during both the periods of rising and falling savings rates. The dependent variable is gross savings and the independent variables include several determinants of household savings in the model. The model controls for fiscal policy, macroeconomic conditions, labour markets and levels of financial sector development. Data is sourced from the WDI, FSB and OECD economic indicators. Total Pension Assets is derived from the FSB, with the Gross National Disposable Income from OECD, and the remaining indicators are derived from the WDI.

Gross savings is defined as the difference between gross national income and public and private consumption, plus net current transfers. Gross savings comprises household, corporate and general government savings as a percentage of GDP[6]. The natural log of this measure is used as the dependent variable.

Domestic credit to the private sector (percentage of GDP) is used as a proxy for financial sector development. It is measured as a percentage of GDP and the natural logarithm is used. A higher level of financial sector development is associated with the enhanced capability of financial intermediaries to mobilise savings for investments. An increase in private sector domestic credit is expected to increase savings. Data was from the WDI database.

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[6] Household savings is that part of current income after payment of direct taxes that is not consumed or transferred as part of household current consumption. Personal household savings also includes employer and employee contributions to pension and insurance funds, including interest earned on these funds (Prinsloo, 2000).

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Gross National Disposable Income (GNDI) is the sum of the gross disposable income of all resident institutional units in the economy. GNDI is computed as gross national income and transfers receivable by resident units less current transfers payable by resident units. Disposable Income is the amount of money remaining in a household budget after income taxes have been deducted. The natural logarithm of GNDI was used and data was from the OECD statistics database. An increase in disposable income is expected to increase savings.

Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator, the natural logarithm could not be used due to the period of negative real interest rates in the economy. The real interest rate has an ambiguous effect on savings as an increased rate raises the opportunity cost of current consumption (causing savings to increase) yet it simultaneously increases future returns thus it could lead to higher consumption (causing a decline in savings). Data was from the WDI database.

Pension assets are measured using annual aggregate assets of retirement funds in South Africa. This comprises all privately administered funds, underwritten funds, GEPF, Transnet funds, Telkom Pension fund, Post Office Retirement Fund and foreign funds. We expect an increase in pension assets to move in either a positive or negative direction with gross savings. The natural logarithm was used and data was from the FSB.

Unemployment rate is the total number of unemployed people as a percentage of the total number of individuals in the labour force. The natural logarithm was used and the data was from WDI.

General government consumption expenditure is the sum of all government current expenditures for the purchase of goods and services. The natural logarithm is used and we expect that an increase in debt service will have a negative effect on savings and the data was from WDI.

The computation of savings as measured by SARB comprises both private and public savings. The measurement of retained income from postponed consumption comprises private (both households and corporates) savings and public sector savings. South African national accounts according to Prinsloo (2000) show household savings include the income of pension funds and both employee and employer contributions to pension funds. It is important to establish that the measurement of total savings in fact incorporates pension assets.

3.5.2 Model specification

The ARDL bounds testing econometric approach will be used to determine the relationship posited in this study. ARDL allows for analysis regardless of the levels of the stationarity of variables in a model, provided that none of the variables are I(2). Pesaran, Shin and Smith (2001) states that ARDL offers a new approach in testing relationships where the stationarity

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levels of regressors are a combination of purely I(0) or I(1). The results of the stationarity tests in this study show that most of the variables are I(1), with only one variable I(0). Chowdhury (2012) states that ARDL is useful for small sized samples, as the model has the ability to robustly model against autocorrelation and simultaneous equation bias. Another advantageous reason for this estimation technique is its ability to take an adequate level of lags. Pesaran et al. (2001) makes use of Schwarz Bayesian Criterion and the Akaike Information Criterion (AIC) for appropriate lag selection per variable. Ozturk and Acaravci (2011) state that the ARDL procedure enables a model to have a variety of optimal lags which is not possible with other cointegration procedures. The dependent and independent variables are permitted to have different lags for different variables. This benefit is described as enabling the past values to impact the present value (Ajilore & Ikhide, 2013). Lastly, ARDL estimation is able to produce t-statistics that are valid and unbiased in the long run, differentiating it from the other more commonly used co-integration estimation techniques (Odhiambo, 2010). It is argued that the ARDL enables the separation of explanatory and dependent variables, this disables the problem of endogeneity (Ghatak & Siddiki, 2001). Perhaps the most advantageous reason for this estimation technique is that the ability of the framework is not adversely affected by residual correlation further reducing the problem of endogeneity (Sakyi, 2011; Afzal, Farooq, Ahmad, Begum & Quddus, 2010). It is for this reason this model is advantageous as we measure gross savings which includes pension savings, one of the main explanatory variables.

The control variables that will be used for estimating the contribution of pension assets to savings will include *Private Domestic Credit, Disposable Income, Real Interest Rates, Pension Assets, Inflation,* and *Unemployment Rate*. For Model 1 the model to be estimated is specified as follows:

$$Ln(SAV)_t = \alpha_0 + \beta_1(INC)_t + \beta_2 Ln\,(PFA)_t + \beta_3 Ln\,(INT)_t + \beta_4 Ln\,(PSC)_t + \beta_5 Ln\,(INFL)_t\ \varepsilon_t \quad (3.1)$$

For Model 2 the model to be estimated is specified as follows:

$$Ln(SAV)_t = \alpha_0 + \beta_1(INC)_t + \beta_2 Ln\,(PFA)_t + \beta_3 Ln\,(GOV)_t + \beta_4 Ln\,(UNEMPL)_t\ \varepsilon_t \quad (3.2)$$

LnPFA represents the log of total pension assets, which is used to measure pension savings. *LnINC* is the log of disposable income. *LnPSC* represents the log of private sector credit, which is a proxy for the level of financial development. *INT* represents the level of interest rates, which is used to measure monetary policy. *LnINFL* represents the log of inflation as a proxy for uncertainty and macroeconomic stability. *LnGOV* represents the log of government

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expenditure. *LnUNEMP* represents the log of unemployment rate which is used to measure the labour market. Subscript *t* represents the time index and ε_t represents the residuals.

We estimate two models which can be separated into categories making use of the ARDL methodology. The approach used by Loayza et al. (2000) gives insights to the broad approaches that can be taken in measuring the reasons for different savings rates in countries. One of the research focuses is that study of savings across the world are country-specific savings experiences and policy determinants of these, closely followed in this paper. We separate the models into categories by taking into account indicators identified in literature as explaining the behaviour of pension assets impact on savings rates. The summary of determinants outlined by Loayza et al. (2000) is followed in this paper, with varied determinants focused on in various developing economy studies. These determinants are traced from more than seven studies[7] and include income, rates of return, financial depth, fiscal policy, demographics, pension systems, uncertainty, distribution of income and wealth and domestic borrowing constraints. Simleit et al. (2011) provide South African specific determinants that form part of this study in the separate models which further emphasise the use of our control variables.

The models were constructed using existing literature affording the ability to measure the labour market impact, levels of financial development and per capita income or per capita GDP effects (Ajilore & Ikhide, 2013; Bailliu & Reisen, 1998; Odhiambo, 2004). The different models are able to reveal the different interactions of each variable on the savings rate. In Model 1 we are able to see the effect of levels of financial development, monetary policy, uncertainty, pension assets and income on gross savings. Model 2 includes the labour market effect and a proxy for fiscal policy on the same independent variable.

3.6 RESULTS AND EMPIRICAL ANALYSIS

3.6.1 Stationarity test

The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests were employed to determine the order of integration of the variables. It must be noted that with the ARDL the variables can be I(0) or I(1), however they cannot be I(2). The stationarity test helped to eliminate any variables that do not satisfy this condition. Interest rates and government expenditure show that they do not have a unit root at levels at the 5 and 1% significance levels,

[7] Note that for a more detailed discussion of the specific variables and which papers showed significant or insignificant coefficients signs in the empirical findings would require closer analysis in each paper. What the papers have determined are the set of variables in developing countries that influence the savings rate summarised by Loayza et al. (2000).

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so we can reject the null hypothesis that there is a unit root at levels. All the other control variables are I(1) so we are able to proceed with the cointegration analysis.

Table 3.1: Unit root tests

T-stat	ADF Level	PP Level	Order	ADF Differenced	PP Differenced	Order
Gross savings	-1.053933	-0.689357	I(1)	-6.862452*	-7.266662*	I(1)
Income	-1.819868	-1.464601	I(1)	-4.132902*	-4.06806*	I(1)
Private domestic credit	0.354821	0.60097	I(1)	-8.735705*	-9.277317*	I(1)
Government expenditure	-3.880622*	-4.333168*	I[0]	-5.387661*	-5.383192*	I[1]
Inflation	-0.813102	-2.638151	I[1]	-10.65812*	-12.761*	I[1]
Real interest rate	-3.533991**	-3.501382**	I(0)	-8.1283*	-10.18494*	I(1)
Pension Assets	-2.075593	-2.865243	I(1)	-6.64163*	-6.64163*	I(1)
Unemployment rate	-2.116991	-2.278553	I(1)	-3.978624*	-4.002924*	I(1)

. ** and * indicate statistical significance at 5 and 1 percent levels respectively.

3.6.2 Cointegration test

The bound testing procedure is used to determine whether there is a long-run cointegrating relationship between gross savings and the independent variables.

Table 3.2: ARDL bounds test for cointegration

Model	Combination of explanatory variables	F statistic
Model I	F(INC, PFA, INT, PSC, INFL)	F stat 3.314992*** LB 2.08 UB 3.0
Model II	F(INC, PFA, GOV, UNEMPL)	F stat 3.492132** LB 2.56 UB 3.49

Asterisks indicate significance level: 10%***, 5%**, 1%* levels

Table 3.2 shows the results of the ARDL bounds cointegration test. The results show that Model 1 is significant at the 10% level and Model 2 is significant at the 5% level. A very strong cointegrating relationship has been established between gross savings and the explanatory variables. The computed F statistic of 3.31>3.00 and F statistic of 3.49>3.49, the hypothesis of no long-run relationship existing can be rejected at the 10% and 5% level. There is also evidence of a strong relationship between gross savings rate and all the independent variables when fiscal expenditure and labour market related proxy (using unemployment) are considered.

The residual diagnostics for both models show that there is no evidence of heteroscedasticity, as we cannot reject the null hypothesis at the 5% significance level. The same holds for autocorrelation, we cannot reject the null hypothesis that there is no autocorrelation at the 5%

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significance level. The histogram shows that the models are normal and the Cumulative Sum (CUSUM) of squares and CUSUM tests show that the models are stable.

3.6.3 Causality analysis based on error correction and long-run model

The cointegration analysis shows that the short-run relationship between gross savings rate and the variable of interest *PFA* in both the models is negative. However, we find that there exist significant and positive results for *INC* and *UNEMP*. The results of the short-run dynamic coefficients are shown in Table 3.3.

Table 3.3: The short-run estimation

Variable	Regressors	Coefficients	(t-stat)
F (INC, PFA, INT, PSC, INFL)	LNINC	0.620527	1.011181
	LNPFA	-0.381347***	-1.819702
	LNINT	-0.002880	-0.582153
	LNPSC	0.100468	0.418690
	LNINFL	-0.424316*	-3.681201
F(INC, PFA, GOV, UNEMPL)	LNINC	-0.898231**	0.0332
	LNPFA	-0.615022*	-3.731698
	LNGOV	0.139220	0.914133
	LNUNEMP	-0.622461*	-3.403718

*1 % significance level, **5% significance level, *** 10% significance level

The block exogeneity results show that in the short run *INC* causes gross savings. The models exhibit a unidirectional relationship between pension and savings and we do not find evidence of savings causing pension fund assets. *INFL* is also found to have a negative effect on savings in the short run.

Causality is tested using the Wald test for each independent variable. In Model 1 we see that in the short run the Wald test shows that the variable *PFA* causes gross savings. In Model 2 the short-run representation shows that the variables *INC, GOV,* and *UNEMP* have a positive effect on savings in the short run.

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Table 3.4: The long-run estimation

Variable	Regressors	Coefficients	(t-stat)
F (INC, PFA, INT, PSC, INFL)	LNINC	0.350113	1.263414
	LNPFA	-0.486256**	-2.145695
	LNINT	0.006127	0.773622
	LNPSC	0.966994***	1.973882
	LNINFL	0.371143***	2.004030
F(INC, PFA, GOV, UNEMPL)	LNINC	0.389041***	1.848002
	LNPFA	-0.343143***	-1.861146
	LNGOV	0.163443	0.514061
	LNUNEMP	-0.335011**	-2.504080

Note: *1 % significance level, **5% significance level, *** 10% significance level

Table 3.4 shows the results of the long run estimation. The estimated coefficients show that in the long run a 1% increase in income (*INC)* has a positive result. In Model 1 and Model 2 the results show a 0.35% and 0.38% impact on gross savings rate from a rise in income. This is expected, with various other studies showing positive linkages between an increase in income with increased savings levels (Samwick, 2000; Simleit et al., 2011).

When testing the impact of levels of financial development, we find that the variable has a negative relationship though significant at the 10% level. The coefficient for government (*GOV)* consumption has a positive relationship but is not statistically significant. The results are ambiguous as public consumption in other studies shows a negative effect on savings (Loayza et al., 2000). Simleit et al. (2011) argues that the prudent fiscal position of the South African government is inadequate to improve savings levels. The predicted theoretical expectation that higher levels of uncertainty measured by the inflation (*INFL*) variable result in higher savings levels holds true, as we see a 0.37% increase in savings from a 1% increase in uncertainty (Loayza et al., 2000).

The coefficient for the interest rate (*INT)* consumption has a positive relationship but is not statistically significant. Literature shows relationship with interest rates is ambiguous due to various other studies showing mixed results (Samwick, 2000; Simleit et al., 2011). Prinsloo (2000) argues in the event that the substitution effect prevails, interest rates will have a positive effect on savings rate.

Pension assets (*PFA)* is the main variable of interest and it has a negative relationship with gross savings in both models. A 1% increase in pension assets results in a (-0.48%), (-0.34%) decrease in savings in Models 1 and 2 respectively. This is significant at the 5% and 10%

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significance levels. Other studies confirm that pension savings can be a substitute for other forms of saving thus exhibiting no positive effect on total savings (Bosworth and Burtless, 2004; Anton et al., 2014). Holzmann (1996) outlines the negative coefficient of pension assets is likely the impact of fiscal performance and public dissavings. Prinsloo (2000) and Simleit et al. (2011) outline public dissavings were prevalent particularly in the 1990s and 2000s in South Africa. The financing of pension reform through public expenditure and higher taxes may have reversed the effects of an increase in pension assets on savings rate. The required increase in corporate savings has been inadequate to offset both a declining household and government savings.

3.7 CONCLUSION

The evidence suggests that despite rapid accumulation in pension assets, this has not led to a positive impact on savings. An increase in income has a positive effect in savings levels. Policies that will increase household income growth and disposable income levels amongst low-income households will positively impact savings. It is imperative to increase the number of employed in the labour market to reduce the unemployment rate in households, this may show positive results for pension savings.

Policies that will increase the level of household savings and reduce government dissavings should be adopted, in order to boost the savings rate of South Africa. The government having adopted the privatisation of pension funds has not measured the effect of the decline in government savings due to continued deficits incurred from the transition. South Africa's high unemployment rate requires a response that reduces the low levels of household incomes. The government must boost economic growth that is coupled with labour-intensive technologies in order to boost household savings required for the high levels of investment required for higher growth. Dependency on volatile foreign capital inflows remain inadequate for South Africa to boost its investment levels and growth without the required accumulated domestic capital.

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CHAPTER 4
PENSION FUNDS AND DEVELOPMENT OF CAPITAL MARKETS IN SOUTH AFRICA

4.1 INTRODUCTION

This paper examines one of the channels through which pension assets affect economic growth in South Africa. Several studies have established that there are at least four channels through which pension assets increase economic growth: savings, improved corporate governance, reduced labour market distortion, and capital market development (Catalan, 2004; Catalan et al., 2000; Davis & Hu, 2005, 2008; Hu, 2005; Kim, 2010; Meng & Pfau, 2010; Raisa, 2012; Rezk et al., 2009; Schmidt-Hebbel, 1999; Walker & Lefort, 2002; Zandberg & Spierdijk, 2013). Investigating the strength of the relationship between pension funds and capital market development will help to determine the impact of this relationship on economic growth since literature has established the growth-inducing capability of capital markets in developing countries (Barr and Diamond, 2006; Caporale et al., 2004; Enisan & Olufisayo, 2009; Hassan, 2013; Hu, 2012; Moreno & Santos, 2008; Pradhan, Arvin, Bennet, Nair & Hall, 2016; Thumrongvit, Kim & Pyun, 2013; Yartey & Adjasi, 2007).

Studies on the impact of pension assets on capital market development in developing countries have mostly been focused on Asian and Latin American economies.

Pension funds over the last several decades have grown and made a substantial contribution to financial flows in the capital market. In South Africa there are 5,150 retirement funds with an asset value of R3.67 trillion, derived from 15.9 million members and pensioners (FSB, 2014). The size of pension funds in the South African market increased from R157 billion to R2.7 trillion between 1990 and 2012, and the pension assets ratio to GDP in 2016 is 57 percent of GDP (OECD, 2016). Estimates by Davis (2005) and OECD (2016) show that emerging markets average ratios of 12 percent of GDP depending on the maturity and size of the economy. In comparison to most developing countries the South African pension fund market has more similarities with pension assets in developed economies.

4.2 THE ROLE OF PENSION FUND ASSETS IN CAPITAL MARKET DEVELOPMENT

Pension funds are also referred to as institutional capital, in this environment significant contributions from pension funds are accumulated in financial markets. This is coupled with a changing regulatory framework for institutional investors. Walker and Lefort (2002) outline that the size of these investors is unique and requires a specific set of new financial instruments for investing sizeable amounts of wealth. The process requires a parallel development of regulation for this institutional capital, this includes laws, regulations and financial instruments

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that are managed by pension regulatory authorities. The growth in pension funds stem from the increased number of pensioners, who are referred to as clients, now represented on the financial markets by such institutional investors. The scale of investments is usually large, with several pension fund managers appointed by pensioners to act on their behalf through pension funds. This relationship between pension funds and pensioners is governed by rules for investment levels in various asset classes, reporting guidelines, accounting standards and general auditing standards usually overseen by a pension and investment regulatory authority. It is these systems that indirectly lead to a more developed capital market system as both risk management and transparency is promoted. In the literature pension funds have been recognised to play a contributory role in the development of capital markets (Davis, 2006; Hu, 2005; Walker & Lefort, 2002; Davis & Hu, 2005; Rezk et al., 2009). The importance of institutional investors and pension funds is heightened in the context of developing financial markets in a market-based economy.

A country's ability to make large gains from pension funds is dependent on financial market structure. Preconditions must be met for pension assets to have a substantial contribution to the development of capital markets. Meng and Pfau (2010) argue that an important precondition is the level of financial development: the higher the level of financial development, the more significant the impact of pension funds. The indicators for the levels of financial development vary depending upon market efficiency, the level of transparency and pension fund investment regulations, specific macroeconomic conditions, and the existing legal and regulatory framework.

In order to trace the effect of pension fund investment on growth, the chapter provides the channels through which this is possible. The theoretical linkages are outlined in detail below.

Pension assets differ from household assets as they have a long-term outlook. They provide long-term supply of funds to capital markets, leading to financial development (Meng & Pfau, 2010; Davis, 2005). Raddatz and Schmukler (2008) outline the contribution of pensioners in the long term as their contribution of funds through the provision of a stable source of funding (their pension savings) as a source of capital in financial markets. This differentiates pension funds from other institutional investors such as mutual or insurance funds. The difference lies in the behaviour of liabilities, for instance pension investments are usually released upon retirement, thus offering financial markets systems stability from longer investment time horizons which other retail investors do not provide. Kim (2010) points out that pension assets differ from insurance companies due to the illiquid nature of liabilities, in contrast to more liquid insurance and mutual fund investors. Secondly, pension liabilities are usually invested in shares rather than bonds. According to the Towers Global Pension Asset Study (2014 and 2015), the average global asset allocation of the largest pension markets was distributed

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largely between equities and bonds with equities 52 percent and bonds 29 percent (2014) and in the following year (2015) equities dropped substantially to 44 percent and bonds increased slightly at 29 percent. According to the FSB (2014), current South African private pension funds asset allocation is largely skewed towards insurance policies at 44 percent, with equities 18 percent, bonds 8 percent and foreign investments 15 percent. Pension funds in South Africa are also recognised as critical drivers of the development of the stock or local securities market and improve liquidity and depth of local bond and equities market. Stock market development has a positive and significant correlation with growth (Levine & Zervos, 1998; Caporale et al., 2004; Beck & Levine, 2004). The development of the bond market, bond exchange and investments in the sector can be directly linked to the emergence and growth of pension funds (Faure, 2007). Investment levels, productivity and growth are significantly correlated with stock and bond markets.

Raisa (2012) argues that no other investor is able to match the long-term nature and investment scale of pension assets. This requires pension funds to draw on and increase exposure in private and government bonds on the domestic markets, with variants such as inflation-linked or zero coupon bonds.

The size of pension assets enables them to hold greater proportions of equities and bonds than households (Davis, 2006). Empirical work by Hu (2005) found that as pension assets increase in size they encourage private bond finance in both the short and long run. Raddatz and Schmukler (2008) argue that this is the reason why several scholars agree that pension funds increase the depth of markets due to increased demand for investment instruments. Impavido and Musalem (2000) explain that pension assets cause a rise in the demand for shares and bonds. The behaviour of pension funds as holders of these equities or bonds changes the demand of the various market-based instruments. Granville and Mallick (2002) argue that the growth, particularly in pension funds and life insurance products, determines whether or not the savings effect is positive. Secondly, an increase in pension fund investment promotes market liquidity and an increase in trading volumes. As the growth of pension funds occurs, it is coupled with a rebalancing of portfolios which now allocate assets into new bonds and equities (and other instruments). Vittas (1999) terms this the attainment of a critical mass, referring to the increased scale of participation and ownership of pension assets on bond, equities, properties and other securities. This effect of depth from significant increases in assets accumulated across bonds, equities, properties and alternative investments is supported across the literature (Impavido & Musalem, 2000; Vittas, 1999; Walker & Lefort, 2002; Kim, 2010; Meng & Pfau, 2010). Pension funds, as institutional investors over time, require diversification across portfolios, Chan-Lau (2004) refers to the optimal asset allocations which see diversification of a pension fund across different asset classes. Optimal portfolios are founded on the modern portfolio theory encouraging portfolio diversification

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which holds benefits such as protecting against inflation, hedging risk and protecting returns, allowing for investment into equities and bonds in either foreign or domestic capital markets.

It is however possible that pension asset growth may exceed the development of and growth of securities markets, as was the case in Eastern Europe and Latin America (Chan-Lau, 2004). Risk aversion and investment guidelines limiting investments in asset classes and low bond or equity issuance in developing markets result in few listed companies holding assets of the size required by pension investors, leading to significant concentration of assets invested in a few listed entities and government-related bonds. Chan-Lau (2004) lists several emerging markets with sizeable holdings in fixed income securities ranging between 40 to 90 percent of holdings of pension fund portfolios. The high volume of pension funds enables them to achieve substantial exposure to a variety of asset classes beyond bond and equity asset classes. The PIC is South Africa's largest asset manager, representing almost half the total non-banking financial assets (49 percent): this shows how pension funds in South Africa have broadened the depth of capital markets (Moleko & Ikhide, 2016). As at March 2015, PIC allocated 34 percent of its portfolio to bonds, 48.68 percent to equity, money markets and cash received a combined 10 percent and the remaining asset classes allocated the remainder (PIC, 2015). Between 2007 and 2015 the allocation of equity remained steady at 48 percent and local bonds at 35 percent, while there has been a decline of cash and money market from 10.6 percent to 4.46 percent during the period. Offshore bonds and equities allocation have received between 5-6 percent of PIC assets over the period. Both bond and equity market liquidity would appear to be positively influenced by such trades in both primary and secondary markets of trade turnover ratios (Kapingura & Ikhide, 2015).

Pension assets economies of scale enable them to also contribute indirectly to financial development. Pension assets behaviour enables them to contribute to lowering transaction costs and diversifying risk, and holds superior ability to process information (Davis & Steil, 2001; Raisa, 2012; Enache, Milos & Milos, 2015; Walker & Lefort, 2002). There are several reasons for this: the first is that pension funds can be held responsible for enhanced competition on financial markets as they have a higher demand for shares and bonds on local markets. Diversification of portfolios is a necessary strategy for reducing risk, increasing the diversification of financial instruments in financial markets. The scale of transactions for pension funds has spillover effects such as increased innovation that promotes efficiencies and lowers the direct cost of issuing financial instruments, reducing transaction costs. Additional spillover effects include the employment of experts and professional investment managers by pension fund managers, this tends to improve infrastructure and further develops information technology, as pension funds can simultaneously intensify the acquisition of systems and personnel to manage both risk and portfolios.

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Government regulation may curtail the pension fund industry if restrictive regulations with excessive government influence guide investment decisions. These may limit optimal portfolio allocations, reducing returns as they are forced by regulations to invest in various asset classes to the detriment of portfolio performance. Government restrictions on investment are necessary to prevent any single investment receiving more than the maximum listed to limit concentration of risk in a single asset class, leading to reduced portfolio returns.

It is also argued that pension funds receive significant commissions and fees and are thus able to hire skilled professionals who not only manage pension funds, but reduce and diversify risk. Increased specialisation occurs as a spinoff, usually leading to diversified financial instruments and improved systems for valuing and gathering information on current and future investments for best returns (Impavido & Musalem, 2000; Raisa, 2012; Walker & Lefort, 2002; Thom, 2014). Professionals provide innovation in the development of new instruments such as collateralised debt obligations, zero coupon bonds, asset-backed securities, futures, CPI indexed bonds, mortgage-backed securities and derivative instruments. The allocation of funds directly affects trading patterns, and the ability to allocate these assets is what affects capital market development.

Table 4.1 shows the investment asset allocation of South African pension funds reported annually by the FSB, trends are shown from 1981–2015. The last three decades have seen considerable changes in the asset portfolios of privately managed pension funds. According to data from the Financial Services Board Pension Funds Registrar, the biggest allocation of pension assets now sits with insurance policies, almost doubling from the advent of democracy in 1995 at 24.6 percent, 46 percent in 2008, to 40.7 percent in 2015. Unit trusts, now also referred to as collective investment schemes, received a quarter of the allocation from their higher levels of 25 percent in the mid 1980s to 6 percent in 2008 and 7.2 percent in 2015.

The information provided below reflects that after 1994 reports investment patterns of self-administered funds. Privately administered funds contributed R1.1 trillion, at 47% in 2011 of total R2.4 trillion aggregate asset value of South African pension funds. Post-democracy we see the pension funds allocated almost half of pension assets onto equities, likely due to financial market liberalisation, but as markets stabilised the market allocation has stabilised to 20% (2008) and the total allocation to listed and unlisted equities and other domestic equity index-linked instruments totalling 18.1 percent in 2013. The most significant decline in asset allocation is the reduction of assets to bills and bonds issued by the government through state-owned enterprises, provincial administration or local authorities. The decline is largely due to legislative changes, with the regulatory framework no longer enforcing exposure (through minimum requirements) to government, municipal or state-owned enterprise bonds. The effect

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has been a reduction from 22.4 percent in 1981 to 7.2 percent in 2008, down to 7.8 percent in 2013 of total bills and bonds. The allocation of state-owned enterprises and government administration was accounted for separately and it is now probably included in total bills and bonds. This declined from being almost a quarter of pension asset allocation in the early 1980s at 25 percent to the 7.8 percent combined in the total bills and bonds. Other assets which include derivative instruments and unit trusts up until 1982, remains small at less than 2 percent in the last three decades. It is arguable whether increased assets have increased the number of assets in the case of South Africa. Instead it would appear that overall the allocation has done quite the opposite. These trends are quite surprising and further investigation of the composition of insurance policies is required.

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Table 4.1: Investment by asset class of SA pension funds

	1981	1987	1991	1995	1999	2002	2005	2008	2011	2015
1. Immovable properties	5.8	5.9	4.8	4.3	3.6	1.1	0.6	1.1	0.7	1.2
2. Bills and Bonds	22.4	17.9	9.4	12.6	12.0	10.5	8.6	7.2	7.5	8.5
3. Bills and Bonds issued by government or provincial administration	9.1	3.6	0.5							
4. Bills and Bonds issued by local authorities and administration boards	8.2	7.0	3.6							
5. Bills and Bonds issued by Rand Water Board or Electricity Supply Commission	7.9	0.3	2.6							
6. Bills and Bonds issued by Land and Agricultural Bank and SARB	4.5	0.7	0.5							
7. Loans	6.3	1.4	0.5	0.3	0.6	0.8	0.1	0.1	-	-
8. Debentures	8.7	6.6	10.2	0.7	0.2	0.6	0.1	1.1	1.1	?
9. Deposits and savings accounts	15.6	19.5	24.4							
10. Equities/Shares in companies				47.7	34.3	29.3	23.3	20	18.8	17.6
11. Collective Investment Schemes/Unit Trusts		24.4	33.3	1.5	5.8	6.2	5.5	6.6	7.9	7.2
12. Insurance Policies				24.6	28.2	35.0	47.6	46	45.9	40.7
13. Deposits and Krugerrands	-			7.5	7.0	6.7	4.3	6.3	5.1	4.3
14. Foreign Investments				-	-		7.8	9.9	11.8	18.8
15. Other Assets	17.0	12.7	10.2	0.8	8.3	9.8	2.1	1.7	1.2	0.11

Source: FSB (2014–2015) [8]

[8] FSB's annual reports outline the investment pattern for pension funds for each period. Until 1994 the reports reflected only the self-administered, state-controlled and foreign funds. The annual reports show that from 1994 to date investment patterns remain isolated to self-administered funds. The question arises what constitutes insurance policies: are they also allocated to bonds and shares/equities? Without clarity on this the table can be misinterpreted. The definition is not clear in the annual reports.

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Pension funds trigger innovation in financial systems. New instruments, the modernisation of infrastructure and improved regulations occur as a consequence of the development of pension funds (Davis, 2006). Pension funds contribute to the loan and securities market, improving competitiveness as they compete with the banking sector. It is argued that efficiency and a reduction of transaction costs and market volatility occurs as lending rates, and spreads are lowered, reducing firm and household costs for accessing capital (Davis, 2005). Pension fund assets reduce dividend yields and increase price-to-book ratios, indicating a decline in the cost of capital (Walker & Lefort, 2002). This is also enhanced when concurrently increased corporate governance and liquidity is experienced.

Impavido and Musalem (2000) argue that a benefit of increased pension savings is enhanced competition, efficiency and modernisation of the securities market. This occurs as fund managers increase their participation in the bond and stock markets, which is followed by competitive bidding on bond and stock issues. Stock exchanges are at times restructured and technology is introduced to manage increased trading volumes. As pension funds and their scale increase on the market we see settlement systems and professional specialisation. Capital markets make gains from improved governance as a result of increased pension funds activism; this is heightened as at times they represent minority interests (Raisa, 2012), putting a focus on companies being more transparent, improving company disclosures and boosting the execution of good governance.

Some of the benefits of institutional investors include a reduction of transaction costs and market volatility, coupled with greater transparency and market efficiency (Davis, 1995). A reduction of transaction costs is explained by the effect of pooling large assets in deals, some of which invest in indivisible assets, an example being properties. Davis (2005) argues that due to their scale, pension fund investments are concentrated in assets whose returns are weakly related. As fund managers seek to improve diversification whilst compensating for risk, these asset portfolios also invest in specific assets which show long-term yields. The impact on capital markets is on both the volume and prices of specific instruments. The efficiencies gained are price reduction in asset classes such as corporate bonds, equities and other securitised debt instruments, with a simultaneous decrease in prices of the asset classes as the supply gains from economies of scale are realised in the securities market.

4.3 EMPIRICAL BACKGROUND, EVIDENCE OF LINKAGES BETWEEN PENSION FUND ASSETS AND CAPITAL MARKET DEVELOPMENT

The empirical literature on the contribution of pension fund assets on overall capital markets has been focused largely on developed countries and developing economies in Eastern Europe and Latin America. The strength of the relationship between pension fund assets and

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capital market development differs between countries and the level of financial development is pointed out as the likely cause (Enache et al., 2015).

One of the earliest studies showing a strong correlation between pension fund assets and financial market development used a financial market index. These indicators examined total factor productivity and output linkages and capital stock accumulation levels in Chile (Holzmann, 1996). The results showed that pension funds resulted in deeper and more liquid financial markets. Schmidt-Hebbel (1999) pointed out that very little empirical analysis had investigated the linkages between pension system funding and economic growth through capital market development. This is one of the reasons for more empirical analysis.

In looking at the impact of pension funds on Asian financial markets, Hu (2012) used the panel error correction model for 10 Asian countries over the period 2002–2008. The results showed a positive relationship between pension fund assets and the development of financial and capital markets. The study used variables including the banking sector, bonds and the stock market. In another study of the linkages between pension assets and economic growth using datasets of 59 countries split between OECD and non-OECD, contrasting results were found (Zandberg & Spierdijk, 2013). This indicates that pension funds may lead to financial development through specifically capital market development, but the relationship need not automatically translate to a positive growth impact. Hu (2005) investigated pension reform, growth and financial development in empirical work combining developed (21 OECD) and developing countries (38 EMEs) using Granger causality. He established several advantages that pension funds hold for capital market development, such as information provision, incentive challenges, risk management, the clearing and settlement of payments, share subdivision and assembling, and the transfer of resources in different times and spaces by smoothing consumption through asset accumulation. He found that relationship between pension assets and growth was negative in the short run, but positive in the long run. Contrasting results by Zandberg and Spierdijk (2013) using OLS estimation found no relation between funding of pensions and economic growth. Their paper argued that once capital market returns and demographic developments were controlled for, the causality disappeared.

The fact that capital market development may not always lead to growth does not reduce the positive impact that institutional investors exhibit on the levels of financial development. Using VECM and Granger causality, Sibanda and Holden (2014) found no linkage between institutional investors and gross capital formation. Their results however showed that there was co-integration between institutional investors and financial development in South Africa. The proxies used in this study could be further developed to include both stock and bond markets, which were lacking in their study. It is clear in the empirical literature that pension fund growth is strongly associated with capital market development (Meng & Pfau, 2010; Kim,

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2010; Raisa, 2012; Walker & Lefort, 2002; Poirson, 2007). Walker and Lefort investigated the hypothesis of pension fund reform and its impact on capital market development in mostly emerging market economies. The results show that pension funds reduce the cost of capital, lower prices of securities, increase trading volumes and reduce volatility. However, others argue that volatility is not necessarily reduced (Kim, 2010). The same pattern exists in 15 European Union countries using the OLS and Estimated Generalised Least Squares estimation technique between 1994-2011. The results show that growth of pension funds exhibits positive spillovers on stock market development. The contribution made by Kim (2010) and Meng and Pfau (2010) is the measurement on capital markets including both stock and bond markets in empirical testing. Kim's (2010) examination of 37 mainly developed countries using VAR and Generalised Method of Moments estimates showed that the growth of pension funds does stimulate the economy. A different Least Squares Dummy Variable technique was used by Meng and Pfau (2010) for a longer time period, from 1980–2008, with a combination of developed and emerging countries. This research highlighted that indeed pension funds do impact capital market development but only in countries with high levels of financial development, showing the variation of intensity across countries and outlining necessary fundamental requirements. Factors such as macro and economic conditions, market efficiency, transparency and the regulatory framework of financial markets were the differentiating factors.

Thom (2014) investigated the impact of pension funds on particularly stock markets within South Africa. The results overall show a positive linkage between pension funds and stock market development between 1985–2013 using Johansen Cointegration and VECM to examine the linkages. Trading volumes also showed a positive relationship with increasing levels of pension fund assets. The contrary was experienced with stock market volatility, with increased investment from pension funds reducing volatility.

This chapter investigates further the influence of pension funds on the overall financial market system by including bond market impact in the empirical analysis. The allocation of privately administered funds is across various asset classes, mainly bonds, insurance policies, shares and foreign investments. Meng and Pfau (2010) included both stock and bond market proxies as a measure for capital market development and 32 countries were clustered according to the level of financial development. Using Least Squares Dummy Variable Corrected estimation the regression results show that countries with low levels of financial development exhibited no linkages between pension fund assets and capital market development, while countries with high levels of financial development showed strong linkages between pension fund assets and capital market development. South Africa was included in the sample countries and was classified as a highly financially developed country with the sample period 1994—2008. The

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paper uses panel data methodology that makes it difficult to isolate heterogeneity in the results. In this chapter we shift away from aggregate results and use a data set that is more comprehensive to identify the impact of pension assets on a wider array of proxies in South African capital markets. Inclusion of a proxy that measures capital market development that is not focused on only the stock markets will enable us to understand the transmission effect of pension assets on capital markets.

4.4 DATA AND VARIABLES

4.4.1 Data

The dependent variable is a proxy for capital market development which measures the separate impact of stock and bond markets, due to the structure of the financial system in South Africa. Literature uses stock market capitalisation as a percentage of GDP and the less commonly used bond market capitalisation as a percentage of GDP. Meng and Pfau (2010) exclude public bonds, stating that government's fiscal stance influences public bond issuance. Government bonds are argued to have a significant impact on the secondary market development since these are traded in the secondary market and respond to market returns (Faure, 2007). Therefore private and public bond market capitalisation effects are measured using total assets of direct investments in debt instruments for private bond market and for public debt. Stock market capitalisation as a percentage of GDP is measured from 1975-–2012.

The data used comprises annual data taken from the World Development Indicators (WDI) between 1965–2013. The data for stock market capitalisation is available from 1975–2015 from the World Bank WDI. Total pension fund asset data for the period 1965–2013 is derived from the FSB's Annual Reports, issued annually by the South African Registrar of Pension Funds. The asset level of portfolio investments in debt securities is derived from the IMF datasets from 1965–2013.

Investments in debt securities is defined as cross-border transactions and positions involving debt securities. These investments allow residents in one economy to have a degree of influence or management on financial instruments in another economy. This is a dependent variable used as a proxy for private and public sector bond market capitalisation.

Stock market capitalisation is defined as the market value of shares as a percentage of GDP. This is a dependent variable used as a proxy for stock market capitalisation. The natural logarithm is used with a higher level of financial sector development associated with the enhanced capability of financial intermediaries to mobilise savings to capital for investments.

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We expect higher levels of financial development as measured by private sector domestic credit to increase the impact on market capitalisation.

Inflation rate is measured by the change in the CPI and reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. CPI is also a measure to estimate macroeconomic stability and is an indicator for monetary policy. The natural logarithm is used and expect inflation is expected to have a negative effect on capital market development.

Private sector credit is defined as all domestic credit provided by the financial sector which is a common indicator measuring the levels of financial sector development. The natural logarithm is used with a higher level of financial sector development associated with the enhanced capability of financial intermediaries to mobilise savings to capital for investments. We expect higher levels of financial development as measured by private sector domestic credit to increase the impact on market capitalisation.

Interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator: the natural logarithm could not be used due to the period of negative real interest rates in the economy. The effect of interest rates on particularly the bond market must be controlled for as the change of yields has an impact on the demand for stocks and bonds. We expect that a rise in yields is likely to decrease the demand for stocks, and the expected sign is negative.

Pension fund assets are all privately-administered funds, underwritten funds, GEPF, Transnet funds, Telkom Pension fund, Post Office Retirement Fund and foreign funds. We expect an increase in pension fund assets to have a positive effect on the growth of capital markets, thus a move in a positive direction with capital market development.

The variables selected in this study follow those used by several studies that measure the impact of pension assets on capital market development, especially those measuring the determinants in South Africa for capital markets, both bonds and share markets: bond market capitalisation (Adelegan & Radzewic-Bak, 2009; Thumrongvit et al., 2013; Rocholl & Niggemann, 2010); stock market capitalisation (Rocholl & Niggemann, 2010; Catalan et al., 2000; Kuluratne, 2002; Thom, 2014; Zhou, Zhao, Belinga, & Gahe, 2015); private sector credits (Kuluratne, 2002; Thom, 2014; Zhou et al., 2015), and macroeconomic indicators, interest rates and inflation (Kuluratne, 2002; Pradhan et al., 2016; Raisa, 2012; Thom, 2014 Zhou et al., 2015).

The analysis sought to include the levels of financial liberalisation, in order to measure the ability to trade and invest on stock and bond markets with minimum regulatory limitations. The proxy used in several studies is FDI, outlining the level of the market's openness to international trade. It is expected to have a positive effect on the level of capital market

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development. The results were however unable to show significant cointegration in models including this variable.

4.4.2 Model specification

The ARDL bounds testing econometric approach was used to determine the cointegration of the variables in this study. ARDL allows for analysis regardless of the levels of the stationarity, provided that none of the variables are I(2). Pesaran, Shin and Smith (2001) state that ARDL offers a new approach in testing relationships where regressors' stationarity levels are a combination of purely I(0) or I(1). The results of the stationarity tests in this study show that most of our variables are I(1), with only one variable I(0) at 10 percent level of significance. Chowdhury (2012) states that ARDL is useful for small sized samples, as the model is better than other approaches due to its ability to robustly model against autocorrelation and simultaneous equation bias. Perhaps the most advantageous reason for this estimation technique is the ability to take an adequate number of lags. Pesaran (2001) makes use of Schwarz Bayesian Criterion and the AIC for appropriate lag selection per variable. Ozturk and Acaravci (2011) state that the ARDL procedure enables a model to have a variety of optimal lags which is not possible with other cointegration procedures. The dependent and independent variables are permitted to have different lags for different variables. This benefit is described as enabling past values to impact the present value (Ajilore & Ikhide, 2013). Lastly, ARDL estimation is able to produce t-statistics that are valid and unbiased in the long run, differentiating it from the other more commonly used co-integration estimation techniques (Odhiambo, 2010).

The framework that will be used for estimating the contribution of pension assets to both bond and stock market development will include the control variables *Private Sector Domestic Credit, Inflation, Real Interest Rates* and *Pension Assets.* Different combinations of explanatory variables are used, as shown in the different estimations.

The dependent variables Debt Investments securities is used in Model I, while Model II uses the dependent variable stock market capitalisation. These two models are estimated to measure the overall impact of pension fund assets on capital market development. Variables are in logarithms (LN) except for real interest rates that have negative variables, this is factored in the interpretation of the results. The model specification is formulated as follows:

$$Ln(BOND)_t = \alpha_0 + \beta_1(PSC)_t + \beta_2 Ln\,(INFL)_t + \beta_3 Ln\,(INT)_t + \beta_4 Ln\,(PFA)_t + \varepsilon_t \tag{4.1}$$

$$Ln(STK)_t = \alpha_0 + \beta_1(PSC)_t + \beta_2 Ln\,(INFL)_t + \beta_3 Ln\,(INT)_t + \beta_4 Ln\,(PFA)_t + \varepsilon_t \tag{4.2}$$

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where *LnPFA* represents the log of total pension assets which is used to measure pension savings, *LnINFL* represents the log of inflation which is used to proxy monetary policy, *LnPSC* represents the log of private sector credit, which is a proxy for the level of financial development and structure, *INT* represents the level of interest rates that is used to measure macroeconomic stability, subscript *t* represents the time index and ε_t represents the residuals. We estimate the dependent variable *LnBOND* which represents the level of investment on the bond market in the first model. In the second model we run *LnSTK* which represents the stock market capitalisation as a percentage of GDP. Both *LnBOND* and *LnSTK* act as proxies for capital market development.

The second step in this paper is once the effects of pension funds on our dependent variables have been established, we augment the study by using VECM and variance decomposition. VECM allows us to measure the robustness of our findings, and also allows us to measure feedback effects between the variables. The variance decomposition extends the study by showing the effects of shocks for the variables in the model and further supplements the ARDL results. It outlines the contributions from each variable in the presence of a shock.

4.5 RESULTS AND EMPIRICAL ANALYSIS

4.5.1 Unit root test

The ADF and PP tests were employed to determine the order of integration of the variables. It must be noted that with the ARDL the variables can be I(0) or I(1), however they cannot be I(2). The stationarity test was to help eliminate any variables that do not satisfy this condition. The variables are stationary at I(1) and I(0), we see that LnPSC is I(1), LnINFL and LnPFA are a combination of I(0) and I(1). We can reject the null hypothesis that there is a unit root at levels, at first difference the variables are I(1). Given the fact that the majority of variables are I(1) we are able to proceed with the cointegration method. This result tells us that the variables will allow the estimation to exhibit valid results.

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Table 4.2: Time series unit root test

	LEVELS				FIRST DIFFERENCE			
	ADF	ADF	PP	PP	ADF	ADF	PP	PP
T-statistic	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept
Ln PSC	-0.5391	-2.3357	-0.4819	-2.3357	-5.7634*	-5.6802*	-5.9028*	-5.8099*
Ln INFL	-1.0463	-4.1947**	-1.8914	-4.1156*	-9.9926*	-9.9852*	-10.8131*	-11.7556*
Ln INT	-3.3248**	-3.5455**	-3.3402**	-3.5267***	-7.7142*	-7.6145*	-8.6501*	-9.5178*
Ln PFA	-3.2234**	-0.3429	-2.9756**	-0.3429	-4.05473*	-5.0309*	-4.0964*	-4.9900*

Note: The asterisks (*) denote the level of significance, showing the rejection of the null hypothesis at 10%***, 5%** and 1%*.

4.5.2 Cointegration test

The bounds testing procedure is used to determine whether there is a long-run relationship between capital market development and pension assets and other independent variables. According to the F statistic the null hypothesis of no cointegration can be rejected at the 1 percent significance level for both models. The computed F statistic of each model is shown below: they must lie above the upper critical bound at the 5 percent level in each model if there is a long-run relationship between the independent variables and capital market development in stock or public and private bond markets. The F statistic 4.629>2.56 and 5.156>3.49 both lie above the upper critical bound and show that there is evidence of a long-run relationship in both models.

Table 4.3: ARDL bounds test for cointegration

Computed F Statistic	**Model 1 4.6292**	**Model 2 5.1566**
Critical bound (10%)	LCB 2.2	UCB 3.09
Critical bound (5%)	LCB 2.56	UCB 3.49
Critical bound (2.5%)	LCB 2.88	UCB 3.87
Critical bound (1%)	LCB 3.29	UCB 4.37

Both models exhibit no sign of conflicting residual diagnostic assumptions, there is no serial correlation or heteroscedasticity in measuring the relationship between LnBond, LnSTK and their respective arguments. These results are shown in the appendix. The models are both

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stable using the CUSUM and CUSUM squares test and normal distribution is confirmed, thus fulfilling all residual diagnostic criteria. All tests confirm the appropriateness of the models.

4.5.3 Error correction representation

The Wald test results for the bond market show that pension assets (*LnPFA*) do not cause or influence the bond market in the short run. The probability for the test statistic in the bond market models is 0.57(*LnBOND*) with a t statistic of -0.57, it is not statistically significant. The results in Table 4.4 show in the short run *LnPSC* and *INT* are significant and correctly signed. This means that in the short run *INT*, *LnPSC* are in part responsible for changes in capital market development, however our variable of interest *LnPFA* and *LnINFL* do not cause changes in capital market development.

The Wald test results for the stock market show that pension assets (*LnPFA*) do not cause or influence the stock market in the short run. The probability for the test statistic of 1.08 in the stock market models is 0.28 (*LnSTK*), it is not statistically significant. The results in Table 4.4 reveal that *LnPSC* is statistically significant at t statistic 3.02 and probability of 0.0049 for *LnSTK*. In the short run none of the other variables are significant with the dependant variable of stock market development.

Table 4.4: Short-run cointegrating form

Variable	Regressors	Coefficients	(t-stat)
BOND (1,0,0,2,0)	ΔLNINFL	-0.507926	-1.614738
	ΔINT	-0.066920*	-3.836329
	ΔLNPFA	-0.152640	-0.575270
	ΔLNPSC	1.812432**	2.483843
	ECM(-1)	-0.399213*	-4.683035
STOCK MARKET (1,1,0,0,0)	ΔLNINFL	0.079560	0.497064
	ΔINT	-0.015750	-1.610056
	ΔLNPFA	0.175254	1.081959
	ΔLNPSC	1.300569*	3.025994
	ECM(-1)	-0.908911*	-5.675011

Note: The asterisks (*) denote the level of significance, showing the rejection of the null

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hypothesis at the 10%***, 5%** and 1%* levels of significance. The null hypothesis is that the independent variables cause BOND and STOCK MARKET in the short run.

Having shown in the F-bounds estimation that there exists a long-run relationship between the variables, we are also able to see the level of disequilibrium in the cointegration relationship from the error correction term. They are significant and correctly signed at the 1% level, supporting cointegration between capital market development and all the independent variables.

Having established that there is cointegration we can estimate the VECM. To determine if there is long term causality from the dependent variable to all its variables and their lags, variables must be co-integrated as a necessary condition. Using VECM/Block Exogeneity estimation we are able to test the robustness of our findings and also show the direction of causality. In the instance of *LnSTK* there is pension-led market capitalisation. Table 4.5 below displays the error correction term is significant and in the right direction at -0.94%, with a corresponding t statistic of -2.57. In contrast, for *LnBOND* there is no evidence of pension-led market capitalisation. The causality relationship between capital market development indicators in both stock and bond markets is summarised in Table 4.5.

Table 4.5: Causality results based on VECM

Dependent variable	**Lag**	**Pension-led market capitalisation**		**Market capitalisation-led pension growth**	
		t stat (Standard error)	ECT	t stat (Standard error)	ECT
STOCK	1	[-2.57621]* (0.36543)	-0.941415	[1.16768] (0.12570)	-0.146778
BOND	2	[-1.12414] (0.10769)	-0.121062	[1.66475] (0.01993)	-0.033184

Note: The t-statistic is reported in square brackets [ ]. The asterisks indicate the significance of the variable.

We are able to conclude that there is pension-led market capitalisation using stock market development (market capitalisation as a share of GDP) as a proxy for capital market development.

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4.6 VARIANCE DECOMPOSITION

The VECM that is shown in Section 4.5.3 shows us the results for testing causality, however the relative strength of the cointegration is done by applying shocks to the estimation. In extending the VECM we apply the decomposition error variance to outline contributions from each variable, in the presence of a shock. Table 4.6 below shows us the estimations for all the variables. We show the movement of each sequence, from either a shock from other variables or its own shock. The results for variance decomposition for stock market development show that regarding the capital market of South Africa, market capitalisation has a high impact at 80.51 percent, followed by interest rates responsible for a variation of 7.25 percent. The highest influence on capital markets is itself, followed by interest rates. We can see that the variable of interest pension assets is influenced by 67 percent variation in itself, that an 11 percent variation can be caused by a shock to both interest rates and private sector credits, and that inflation affects 8 percent of the variation of pension assets.

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Table 4.6: Variance decomposition for analysed indices for bond and capital markets

Market Capitalisation/Bond Investments	**MARKET_CAP**	**PSC**	**INFLATION**	**INTEREST**	**PENSION_ASSETS**
Stock	80.51%	6.23%	2.12%	7.25%	3.89%
Bond	84.56%	2.45%	2.61%	8.51%	2.45%
Domestic credit to private sector:					
Stock	12.40%	59.74%	6.08%	4.77%	17.01%
Bond	9.88%	31.49%	39.12%	2.24%	17.27%
Inflation:					
Stock	1.27%	37.97%	53.64%	4.38%	2.74%
Bond	10.67%	11.49%	72.55%	0.69%	4.59%
Interest rate:					
Stock	7.75%	22.34%	42.70%	26.36%	0.86%
Bond	21.25%	4.73%	52.59%	19.33%	2.10%
Pension assets:					
Stock	1.40%	11.79%	8.48%	11.02%	67.31%
Bond	12.92%	19.84%	16.40%	5.63%	45.21%

Note: The percentages are computed over a time horizon of 35 lags.

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Table 4.6 shows the variance decomposition for bond market development compared to stock market development. The results for variance decomposition for bond market development show that investments in the bond market have a higher impact of 84.56 percent on itself, followed by interest rates at 8.51 percent. Pension assets, on the other hand, have a lower 45.21 percent variation on itself, it seems that a shock in pension assets has a far lower impact in bond markets, with a much higher variation of 19.84 percent caused by private sector credit shock, closely followed by a 16.40 percent inflation level shock. What this means is that a shock in private sector credit and inflation has a greater influence in the variation in pension assets, in the context of bond markets. In contrast stock markets pension assets see a greater effect from a shock of interest and private sector credit.

4.7 LONG-RUN ESTIMATION

The variable of interest produces mixed results: in the case of the stock market as a dependent variable we find pension funds exhibit positive results, suggesting a 1 percent increase in *LnPFA* results in a 0.22 increase in stock market development. Thus, both the short run and log run results confirm a pension funds led market capitalisation or stock market growth. This is confirmed as expected by Yartey and Adjasi (2007) when pension savings are identified as an important determinant in stock market development. These results are similar to Thom (2014), Impavido, Musalem and Tressel (2003), Raisa (2012), and Catalan et al. (2000) using a different methodology. In the case of the bond market we find it has insignificant results. One of the reasons for the insignificant effect on *BOND* is that equities have historically received the bulk of institutional investment and have been heavily relied on for sources of finance on financial markets in South Africa (Faure, 2007). Although this has changed in recent years with the development of the bond market, combined with financial market ratings of the SA bond market, the increased participation in the bonds market by institutional investors (both foreign and domestic) has not yet shown significant positive results due to lagged effects. The results show that the best channel for pension assets to affect capital market development is through the influence of stock markets.

The ARDL cointegration results are confirmed by the VECM estimation results, which reveal that in the long run *STK* has a positive relationship with all the independent variables. The speed of adjustment shown by the error correction term is significant. All the variables, including pension fund assets, cause stock market development. In the case of *BOND* as the dependent variable, the results show that the variables do not jointly cause bond market development. *INFL* shows a positive long-run relationship with *BOND* and *STK* market development.

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In the long-run ARDL estimation we find that interest rates are both significant and have a negative effect on overall capital market development. A 1 percent increase in interest rates results in a 1.73 percent and 22.69 percent decline in *STK* and *BOND* respectively. It is confirmed, however, that the higher cost of financing as measured by higher interest rates tends to negatively affect the liquidity in both these markets (Yartey & Adjasi, 2007; Enisan & Olufisayo, 2009; Kapingura & Ikhide, 2015).

Inflation has a negative relationship with *BOND* which confirms that high inflation has a negative effect on capital market development. In the study done by Kapingura and Ikhide (2015), bond liquidity is shown to be negatively affected by inflation and the stock market index. Inflation rates are outlined as a significant determinant in bond market development. Inflation pushes up bond prices causing higher yields leading investors to shorten duration of holding asset.

Table 4.7: Summary of results for long-run ARDL coefficients

Regressors	BOND(1,0,0,2,0)	STOCK MARKET (1,1,0,0,0)
C	-7.906527	1.038484
	(-1.239481)	(0.823926)
	[0.2248]	[0.4161]
LnPSC	5.124414**	0.205866
	(2.357999)	(0.486086)
	[0.0251]	[0.6302]
LnINFL	-0.849726***	0.086491
	(-1.740646)	(0.714947)
	[0.0920]	[0.4798]
INT	-0.226229*	-0.017309*
	(-4.888761)	(-2.108152)
	[0.0000]	[0.0429]
LnPFA	-0.434551	0.222964*
	(-1.239481)	(2.987930)
	[0.2248]	[0.0054]

The parentheses show t statistics (….) and P values […] respectively.

The positive impact of *PSC* is as expected, it is outlined as a precondition in the development of the stock market (Yartey & Adjasi, 2007; Zhou et al., 2015). Our results on the negative relationship between the bond market and private sector credit in the long run did not come as a surprise. Bond market development is found to have a negative effect on private credit

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issued by banks as markets tend to substitute banks in many Sub-Saharan African economies which is contrary to the findings in developed countries (Fanta and Makina, 2016). The increased ability of the South African financial system to mobilise capital and allocate it towards private sector credit enhances its operations. Furthermore, a more developed banking sector offers greater support for equity market development. Infrastructure such as interbank markets offer support services that positively affect the rate of development.

4.8 CONCLUSION

In this chapter the impact of pension fund savings on bond and stock market development was investigated using South African time series data. Stock and bond market development proxies measure the impact using ARDL and VECM estimation techniques for robustness. It can be concluded that pension funds have indeed positively affected the growth of stock market development, but this cannot be confirmed in the case of bond market development from our estimations. It can be confirmed that a higher level of financial sector development causes a higher impact of pension funds on overall equity market development.

Secondly the Block Exogeneity tests within the VECM framework show a unidirectional relationship between pension funds and stock market development.

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CHAPTER 5
PENSION ASSETS AND ECONOMIC GROWTH IN SOUTH AFRICA

5.1 INTRODUCTION

South African pension fund assets have experienced exponential growth over the last half a century and are reported to be amongst the fastest growing pension funds globally. The role of financial sector development in recent times with the rise of capital markets exhibited mainly in pension fund assets must be examined. Pension assets net worth grew from R510 billion in 1959 to R157,790 billion by 1990 and subsequently rose even more rapidly following the post-apartheid economic reforms introduced in the country to an estimated R3.6 trillion in 2014 (FSB, 2015; Towers Watson, 2014). South Africa exhibits a high pension asset to GDP ratio in comparison to other emerging market economies, at 57% versus 12% (OECD, 2016). Scholars have argued that market-based financial systems with a well-developed pension funds market tend to have better improved capital allocation for more productive investments, an improved pool of savings and a better risk management mechanism (Hu, 2012; Levine, 2004).

The transmission mechanism of pension fund assets to economic growth occur mainly through improved capital market development, savings and corporate governance, and a reduction in labour market distortion (Davis & Hu, 2008; Hu, 2012). In chapters 3 and 4, we have empirically examined the strength of the relationship between pension assets and savings and pension assets and capital market development. In our previous chapter, we find there is a positive transmission effect between pension assets and capital market development, and the contrary holds for pension assets and savings in the long run. Our goal is to extend the analysis and determine whether this positive effect on capital markets has led to increased overall economic growth.

The finance-growth nexus debate in South Africa has shown little evidence supporting that financial development causes growth. Odhiambo (2004, 2009a) established a causality running from economic growth to financial development. In a follow-up study, he reinforced this position by concluding that it is rather economic growth that causes financial development in South Africa (Odhiambo, 2010). A number of studies that have assessed the impact of institutional investment on growth have mixed results, with panel data studies failing to capture the country specific differences (Davis, 2006; Davis & Hu, 2008; Hu, 2005; Zandberg & Spierdijk, 2013).

The focus in this chapter is to explore if pension assets exhibit independent impact on growth via capital markets. The underlying question will be whether pension assets lead to an increase in growth outside of their effect through savings. The relationship between finance

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and growth in studies examining the causal relationship sees most variables focused on bank-based versus capital market-based categories. With the use of mainly non-banking financial sector data in this study, we attempt to investigate the direction of causality.

The next section looks at the trends within the South African pension funds and selected economies, followed by a background and outline of the theoretical foundation in Section 5.3. Section 5.4 provides a literature review, followed by the empirical methodology, model specification, estimation and empirical results in Section 5.5. Section 5.6 outlines the conclusion.

5.2 EMERGING MARKET TRENDS IN PENSION FUNDS

Global pension assets over the last four decades have been increasing in value and as a percentage of GDP globally, in emerging markets, developing and developed economies. Total global pension fund assets were estimated at $258 billion in 1972, less than five decades later, we see the value of the world's 19 largest pension markets valued at an estimated $35,316 billion (Apilado, 1972; Towers Watson, 2016). At 80% of the GDP in these 19 economies, pension funds represent a significant level of assets relative to GDP, these trends show pension fund contributions in several economies are growing and are substantial. The growth and development of pension fund markets across the world differs considerably as reflected in the ratio of pension assets as a percentage of GDP. The Funded Pensions Indicator shows that emerging markets have considerably varied levels of pension assets to GDP: India (0.3%), China (0.9%), Brazil (14.7%), Mexico (15.2%), Malaysia (60.6%), and Chile (66.4%) (OECD, 2016). Similarly, in Africa Nigeria (4.3%), Kenya (12.9%), and Lesotho (13.7%) reveal low weights with the highest levels in Namibia (76.9%) and South Africa (57.2%). In interpreting trends across countries, it is important to consider the level of assets, and the size of the economy relative to assets. Emerging market pension contributions are not as high as OECD countries which show the highest proportion of total assets as a percentage of GDP as the Netherlands (183%) and US (121%) accompanied by immensely large assets of $1,378, and $21,779 billion respectively. Figure 5.1 shows a comparative outline for different economies: the UK (111%), Switzerland (118%), Australia (119%), Canada (97%), Japan (66%) are relatively high. The lowest levels shown are in France (6.2%), Germany (12.7%) and Spain (3.3%). The varied outcomes are a function of pension fund systems, demographic trends and levels of financial development (OECD, 2016).

The demographic shifts in Europe of an ageing population combined with lower fertility rates have put pressure on the government and its ability to fund pensioners. This has led to systemic pension system shifts from PAYG to FFS, more so in countries with the lowest levels of funded pension assets.

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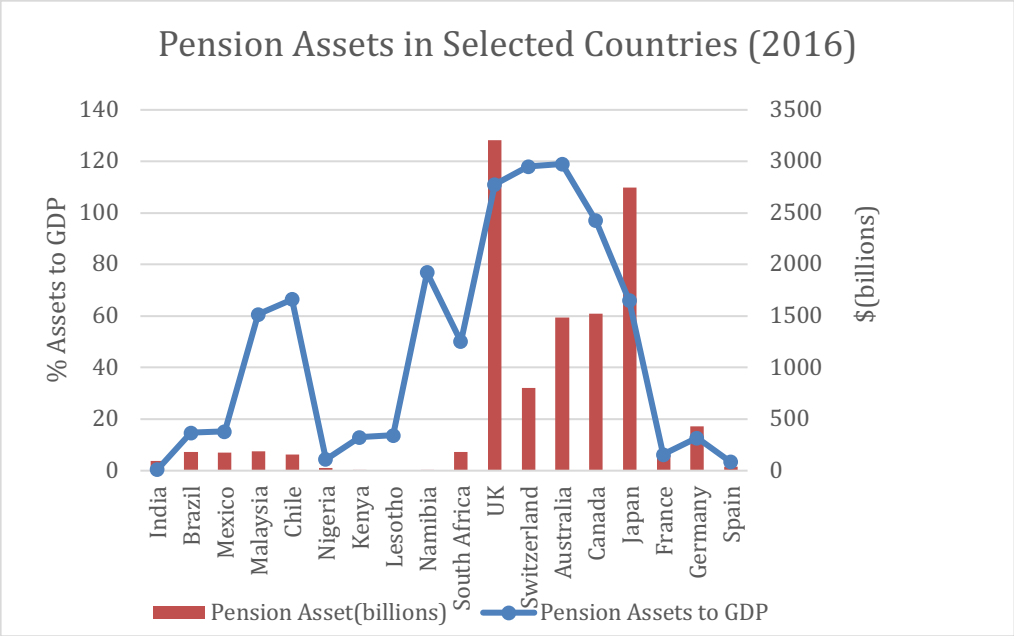
Figure 5.1: Pension assets to GDP in selected countries (OECD)



Source: Author's own work, data from Towers Watson (2016) and OECD Pension Fund Indicator, (2016)

Figure 5.1 shows that some countries have in comparison to OECD countries low levels of pension assets, yet considerably high pension assets to GDP ratios as can be seen with Malaysia, Chile, Namibia and South Africa. This is likely due to the low level of GDP, but also the fast pace of growth in pension assets that exceeds GDP growth rates. The economic impacts of pension assets and institutional investments are likely to have become more significant as shown by the rate of growth in pension fund assets. In the largest pension markets, assets have grown by an average of 6.7% over the last decade, peaking at 8.3 percent over the last five years (Towers Watson, 2016). South Africa's compounded annual growth rates in pension assets was estimated at 14% in 2014 and regarded to be the highest in the world over the ten-year period 2004–2014. Towers Watson (2016) measures that it exceeds all the largest pension fund market growth rates, but in the last two years it has declined, currently to the third highest levels of 11.1% behind Mexico (14.5%) and Chile (11.4%). During the same period other nations have also seen declining growth rates for Australia (12% to 9.2%), UK (10.8% to 6.8%), Brazil (10.8% to 8.1%), US (6.6% to 5.8%) Ireland (6.4% to 4.1%), and Netherlands constant at 7.3%. Growth in assets under management in South Africa can be attributed to strong investment performance: at 2015 financial year end the PIC exhibited 13.72% real returns. Further investigation into this fund shows sustained positive returns over client portfolios in the long term. Another reason for asset growth is the increase in diversification beyond domestic public sector bonds and

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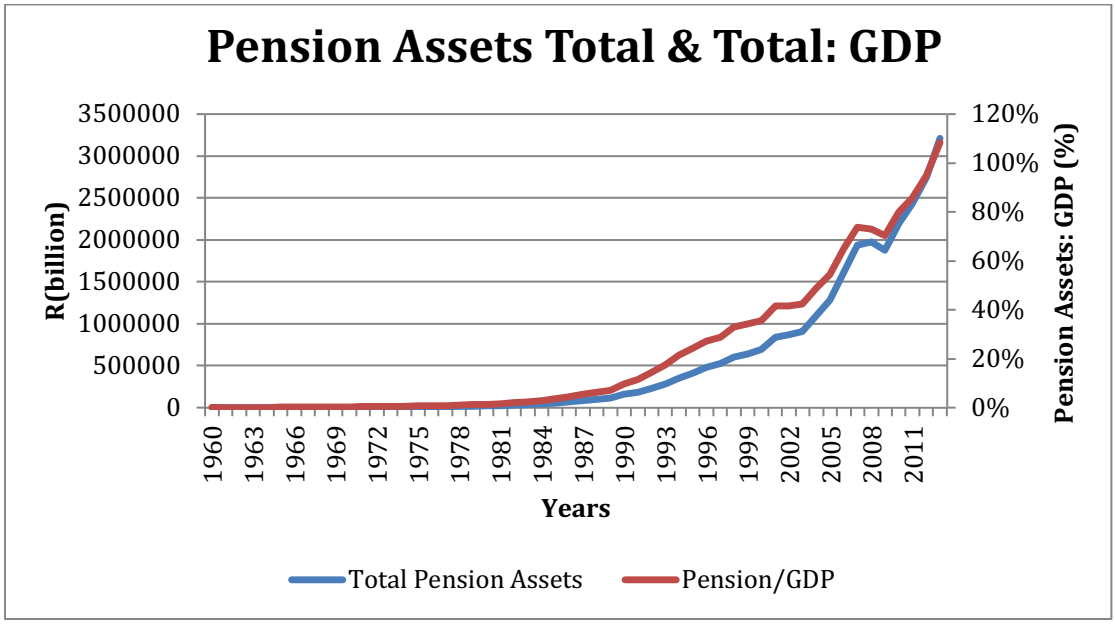
properties to offshore and various local asset classes. The sustained increase in real returns has led to a minimum increased growth of assets under management of 9.32% since 2006.

Over the last three decades institutional investors have been key contributors to capital market development in both developed and emerging markets and South Africa is no exception to this phenomenon. Despite the less than favourable economic conditions South African pension assets are ranked as the 11th biggest in the world at $181 billion (2016), declining from $236 billion in 2014 yet still exceeding those of Chile ($159 billion), Brazil ($180 billion), Mexico ($177 billion), France ($151 billion), India ($94 billion) and Ireland ($128 billion) (Towers Watson, 2014) (see Figure 5.2). Between 2001–2013 total bank assets as a percentage of GDP grew from 52% to 129% versus a far greater growth in non-banking financial assets of 85% to 234% (Moleko & Ikhide, 2016). Almost half the non-bank financial assets[9] are derived from pension funds, amounting to 46% of total pension assets of R6.9 trillion (FSB, 2015; South African Reserve Bank, 2015). The significant growth in pension assets raises the questions of what effect capital flows derived from pension funds have on the South African economy. Secondly what is the role of non-bank financial institutions in the finance-growth nexus debate.

Figure 5.2: Total Pension Assets, and % Pension Assets to GDP



Source: Author's compilation from WDI (Online), FSB Annual Reports (1960–2013)

[9] Non-bank financial institution assets comprise assets consisting of unit trusts, the PIC, long- and short-term insurers, public and private pension funds, participating mortgage bond schemes, finance companies and non-monetary public financial corporations.

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The highest GDP growth rate in the post-democratic era was 5.58% in 2006 (South African Reserve Bank, 2015). South African has not sustained a high level of growth with the average growth rate post 1994 at 3.3%. The declining trend of growth in the decade pre-1994 had an average of 1% due to political unrest, trade sanctions and a debt crisis. The highest levels of growth post the 1994 era were experienced between 2004–2007 with a growth average of 5.1%. The global financial crisis contracted the economy with the post-recession era showing growth levels averaging 2.2%. The background on growth helps examine the post democratic trends on economic output.

Significant growth in pension funds is likely to occur if economic growth enhances formal employment, which will contribute to allocation of savings towards retirement. Combined with changed consumption patterns and strengthening links to saving in the long run we may see the size of pension funds increasing substantially. Currently almost half of the formal labour force do not contribute towards any retirement savings arrangements (Kaniki & Ntuli, 2011). The remaining 55% who do contribute offer a low 11.3% of salaries, barely adequate for retirement. There is no doubt that this partly explains the more than 75% of the population who are reliant on state assistance for retirement. Greater participation in the formal and informal sector may lead to the rapid growth of pension assets, at this stage no empirical evidence in South Africa shows workers would be encouraged to move into the formal sector due to pension system reform. Statistics South Africa attributes a fifth of total employment or 2,4 million jobs as coming from the informal sector. Characteristics of workers in this sector include inconsistencies in income streams, limited financial literacy levels, and limited, if any, access to pension or provident funds. It is necessary that pension systems in developing economies are designed for both rural and urban communities considering seasonality of income and micro-payments. This should be accelerated to increase participation of workers in retirement savings arrangements or schemes. There exists little emphasis on developing flexible and relevant savings products for retirement for low income households and those informally employed. Informal instruments such as cash savings through stokvels[10], funeral burial schemes, funeral plans and rotating savings are common (Moyo, Musona, Mbhele & Coetzee, 2002). Finmark Trust (2018) maintain that a large proportion of the population make use of informal financial products at 56% in contrast to the unchanging percentage 77% of adults with a bank account.

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[10] A Stokvel is a form of savings or investment where members regularly contribute agreed upon contributions where members then receive lump sum payments, these lump sum are rotated amongst the group members.

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The biggest pension fund, the (GEPF) remains a Defined Benefit (DB) scheme, as are most quasi-public-sector funds. Mandatory contributions ensure that government employees make contributions in this scheme, however if there are greater contributions from both public and private pension funds arose one can expect significant positive impact on growth of assets under management. The potential for increased stock of pension capital remains significant and largely untapped.

5.3 THEORETICAL FRAMEWORK

Pension assets have four growth channels: savings, capital market development, reduced labour market distortions and improved corporate governance (Impavido & Musalem, 2000; Walker & Lefort, 2002; Zandberg & Spierdijk, 2013). Our earlier work in chapter 3 show that the link between pension assets and savings is highly circumscribed in South Africa, so we will not pursue this channel further in this chapter. Pension funds are also confirmed to contribute to higher level of capital market development in chapter 4, addressing the linkages between capital markets and pension funds.

Thomas and Spataro (2014) argue pension funds are linked to labour markets to the extent that they improve job mobility, affect retirement age and directly influence retirement choices. Their work outlines the linkages to pension systems in an environment of pension portability. Pension fund portability is able to encourage employee departure or discourage employee departure due to receipt and accrual of pension benefits. Workers with pensions are associated with lower turnover rates than workers without pension due to compensation premia associated with pension benefits. Pension wealth and accumulation of pension accruals, particularly towards retirement influences worker mobility due to potential loss of pension wealth. It is possible that workers with pension benefits are associated with stability and security from pension benefits reducing their likelihood of movement. Pension scheme designs directly influence the functioning of the labour market. This paper does not explore the labour market development growth channel – our main reason is that many studies focus measurements on pension effects on job mobility, participation in labour markets and employee compensation premia (Thomas & Spataro, 2014). These findings do not contribute to finance-growth nexus, our primary research goal.

Davis (2006) identifies the transmission mechanisms as enhancing growth either indirectly or directly. Improved financial market development, corporate governance, higher savings and reduced labour market distortion are classified as exhibiting indirect effects on growth. The direct effects occur when output and productive investment rises in an endogenous growth framework. Endogenous growth theory embraces the spillover effects of investment, reducing external factors as drivers of economic growth. It can be argued that increasing returns to

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scale are derived from capital investment, directly leading to improved productivity and economic growth.

The endogenous growth theory shows that pension funds have additional benefits that contribute to the development of capital markets, even if they do not lead to an increase in savings. Increased availability of capital to both equity and debt markets improves output endogenously. Outside of savings impact, these assets raise the productive capital formation especially in sectors where capital investment is channelled to sectors exhibiting high levels of productivity (Hu, 2012). This supports existing theory. Davis (2006) argues that pension assets may increase the availability of short- and long-term finance to firms that may increase growth as productive capital rises. This is supported by the argument of pension-specific effects occurring through the transmission mechanism of external finance made available to firms (Bijlsma et al., 2014). The increased capital allocated to investment positively affects total factor productivity (Holzmann, 1996).

Following Davis and Hu (2008) we make use of the Cobb-Douglas production function to establish the channel whereby pension funds may induce growth outside of savings. In the production function, pension funds are linked to capital market development. In the production function, *Y* is the level of output, *P* denotes the level of pension stock, *K* is the level of physical and capital stock and *L* is the level of employment.

$$Y = F(P, K, L) \tag{5.1}$$

Such that where the inputs above are greater than zero, on their own they can give rise to an increase in output. That means it is possible to measure the effect of pension funds through capital stock on the level of output.

$$Y_t = P_t \times (K_t)^{\sigma} \times (L_t)^{1-\sigma} \tag{5.2}$$

This allows us to treat pension funds with the distinct effects of pension assets specifically captured through capital stock, allowing us to measure the effects of pension funds on the level of output. The elasticity of each variable is measured by its subscript σ, t is the time trend, and the residual term denoted as ε. The production function is normalised by L to measure the effects per unit of labour. The result is that the analysis affords us to measure the implications of pension fund assets on output. Using data from table 2.1 we are able to measure the ratio of pension asset to total capital stock as 0.64 (using total bank and non-banking assets).

Pension funds improve resource allocation and overall economic efficiency (Davis, 2006). The strength of impact is highly dependent on the efficiency of financial markets with well-established financial intermediaries strengthening the transmission. Walker and Lefort (2002)

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raise three arguments that link institutional investors to economic growth and development via capital market development. The first reason is that pension funds accumulate large amounts of wealth, which is used for investment. Bijlsma et al. (2014) support this view and state that these funds are invested in capital markets and can make long-term investments possible. Large quantities of institutional investors invoke the development of better regulations for these participants. Hu (2012) argues that institutional investors hold a greater proportion of assets than households, and that the asset holdings in bonds and equities enable pension funds to compensate for risk due to pooling and diversification across assets. Transparency is improved as such clients will be required to disclose and provide reporting in compliance to auditing and accounting standards and the overall effect on capital markets is positive. The second argument by Walker and Lefort (2002) is that pension funds wealth increases the levels of specialisation in financial markets. This is reiterated by Hu (2012) who argues that since pension funds hold closer links to investment banks, they have access to superior skills than households and they can perform better due to higher levels of specialisation and economies of scale. The accumulation of pension funds provides incentives for financial innovation, creating additional demand for financial market instruments encouraging new product development and demand for new products thus improving market efficiency (Raisa, 2012), bringing further support to the supply-leading phenomenon of finance within economic growth. Financial innovation is more specifically described through the development of derivative, securitisation and equities markets, coupled with indexed instruments, corporate bonds, index futures, zero coupon bonds and certificates of deposit (Hu, 2012). New sectors of the economy such as mutual funds and private equity receive pension fund finance. In other asset classes long-term securities are developed to meet the long-term outlook of defined benefit contribution systems. Thirdly, pension funds make long-term investments in order to match the maturities of assets and liabilities (Bijlsma et al., 2014; Hu, 2012; Kim, 2010). The increase of long-term corporate bonds, and securitised debt instruments in the markets are reflections of this trend. The effect is that pension funds directly impact the levels of financial development and availability of capital, thus raising productive capital formation. This heightens the growth effect of pension funds through capital market development.

Pension funds are able to enhance efficiency by improved resource allocation, which results in more productive capital stock (Davis & Hu, 2008). They are also able, due to size, to diversify across assets and better compensate for risk and make gains from lower transaction costs (Hu, 2012; Walker & Lefort, 2002). These scholars argue that the long-term investments required by pension fund managers lowers the liquidity premium. This, combined with the long-term outlook of pension funds, lowers the equity risk premium, all leading to a reduction in the average cost of capital for financial markets. A more efficient allocation of resources enables

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capital market benefits to support the argument of furthering growth through financial development.

Pension funds can have an independent effect on growth outside of capital markets and savings improvements. Pension fund activism may spur growth by having a positive impact on corporate performance. This arises as institutional investors represent pensioners and other minority shareholder interests, who then influence corporations to use the capital more productively boosting growth (Walker & Lefort, 2002; Davis & Hu, 2008). In this context it has been established that even if there is no savings effect, pension funds can still increase growth through this source (Hu, 2012). Protocols such as the UN Principles for Responsible Investment will drive institutional investors in their decision making to incorporate environmental, social and governance-related concerns in their trading activities. Linkages emerge through improved corporate governance, with institutional investors calling for increased accountability and transparency at the firm level. In addition, investments taken are more socially responsible (Barr & Diamond, 2006; Davis & Hu, 2008). The body of literature on this is not extensive and needs further investigation. Improved corporate governance was found in Latin American countries such as Peru, Argentina and Chile to have impacted significantly on market development. Progressive reforms in a country's regulatory and legal framework are largely caused by the activities of institutional investors, who are inclined to adhere to legislation and rules, seeking integrity when conflicts of interest arise (Vittas, 1999).

In situations of dissatisfaction with companies and management, institutional investors hold instrumental power in raising their voice and directing company accountability (Poirson, 2007). This is heightened by an increase in share of company ownership, raising the impact of pension fund shareholder activism. Pension funds are concerned with increased transparency and improved corporate governance in their bid to ensure highest possible returns from investments. This translates to greater emphasis being placed on the need for more independent boards, clear remuneration policies governing executive remuneration and bonuses, take-over measures and decisions that are likely to affect the company returns (Impavido & Musalem, 2000), ensuring that decisions taken are in the best interests of shareholders within a company.

We can thus conclude that the relationship between developments of capital markets is a function of the quality of listed companies, which is closely linked to corporate governance. Catalan (2004) provides linkages of listed companies to corporate governance by outlining that shareholders in listed firms have incentive to increase value. They also aim to improve shareholder value by reducing expropriative management decisions that will diminish shareholder value. The monitoring and oversight occurs through the corporate governance channel in listed companies, when strengthened will increase value for shareholders. The

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transmission of capital market development and the strength of corporate governance is argued to make capital stock more productive (Davis & Hu, 2008). In addition to heightened transparency and shareholder activism, increased institutional investors have a macro-economic impact indirectly on all firms. How good governance and stronger pension regulatory authorities strengthen pension fund management has been the subject of several papers (Hormazabal, 2010; Stewart & Yermo, 2008; Catalan, 2004). The arguments raised for good governance are that the performance of pension funds is improved from risk management and effective investment strategies created partially from the professionalisation of the sector. Catalan (2004) places emphasis on fiduciary duties and argues that corporate governance channel strengthens monitoring and investor protection indirectly. Pension funds are thus, possibly due to their large shareholder status, able to improve corporate governance through the improvement of cost-effective oversight of shareholder interests and a heightened monitoring ability. Pension funds exercise their shareholder rights, in the process affecting non-executive director appointments, monitoring operations and objecting when laws and regulations are not upheld, this bodes well for capital market development (Hormazabal, 2010).

Failures in effective monitoring has raised concerns about the role pension funds. The occurrence of various corporate scandals occurred under the watch of pension funds may suggest that they do not necessarily improve corporate governance. In line with Catalan (2004) we pursue the view that pension fund growth and corporate governance will have positive relations thus strengthening capital market development.

5.4 LITERATURE REVIEW

Davis and Hu (2008) and Hu (2012) admit that little work has been done on examining the specific relationship between economic growth and pensions funds. Existing literature that has investigated the effect of pension funds on growth (Davis & Hu, 2008; Holzmann, 1996; Hu, 2012; Raisa, 2012; Schmidt-Hebbel, 1999, 1995; Zandberg & Spierdijk, 2013) and capital markets (Kim, 2010; Meng & Pfau, 2010; Walker & Lefort, 2002) shows largely positive results. Zandberg and Spierdijk's (2013) results show that there is no relationship between funding of pensions and economic growth. They argue that when capital market returns are removed, the positive effect of pension funding disappears. The pro-growth argument is supported by studies that link pension assets and growth through a strong correlation on capital market development (Davis and Hu, 2008; Hu, 2005, 2012). This is attributed largely to deeper and more liquid markets in both stock and bond markets (Holzmann, 1996; Kim, 2010; Raisa, 2012; Impavido & Musalem, 2000). In addition pension funds have indirect linkages to growth via capital market development through reduction of cost of capital, higher trading volumes,

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financial market development and increased specialisation (Walker & Lefort, 2002; Schmidt-Hebbel, 1995; Holzmann, 1996). In previous studies, Schmidt-Hebbel (1995, 1999) used simulation techniques to show that pension reform resulted in higher investment levels and factor productivity in the Columbian and Chilean context. The strengthening of stock markets through the indirect effects of pension assets however does not reduce market volatility (Kim, 2010). It was also found that institutional investors had the effect of skewing investments to long-term portfolios across the various asset classes (Hu, 2012).

Davis and Hu (2008) showed that there is a positive correlation between funding of pensions and economic growth. The analysis was conducted using a modified Cobb-Douglas production function in 38 OECD and non-OECD countries. The research investigated whether pension reform leads to capital formation through enhanced savings. It also articulated how more efficient capital allocation leads to financial development. The empirical analysis showed that emerging markets see a significantly larger positive effect of pensions assets on growth than OECD countries, and in the case of South Africa, which is one of the countries in the data set, there is a sizeable positive impact measured.

Zandberg and Spierdijk (2013) found no conclusive link between pension assets and growth focusing on the pension system. Their study argued that growth effects are derived mainly from capital returns and demographic changes. Once capital market returns and demographic changes are controlled, the positive effect on growth diminishes and the benefits are limited and appear only in developed economies. Non-OECD countries show no linkages between funding of pensions and economic growth. The authors argue that there is a spurious correlation between economic growth and the amount of pension assets, therefore accounting for the previously observed positive effects. This is proved in a regression that controls for market returns and demographic developments using the inverse old dependency ratio. An OLS estimation is used in a regression estimation of 58 countries (of which half are OECD, the other half emerging or developing) between 2001–2008. The argument of funded pensions stimulating growth is shown and the effect is larger for emerging market economies than for developed economies.

Hu (2005) studied a combination of 59 OECD and emerging economies and found that there is causality between pension assets and growth, however it is not strong. Using Granger causality estimation methods, the study showed that there is a negative relationship between pension assets and growth in the short run, but a positive relationship in the long run. It also makes positive linkages between pension fund assets and financial development. This study is the only study to have looked at both OECD and emerging markets on this scale. Furthermore, it makes a clear distinction between increasing pension fund assets and pension

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fund reform. These are all cross-country studies with only Schmidt-Hebbel (1999) measuring country specific effects in the case of pension fund reform effects in Chile.

Studies on country-specific effects of pension funds on economic growth are scant. In a South African study Sibanda and Holden (2014) measured the long-run relationship between institutional investors and growth using three proxies for growth: financial development, economic development and gross capital formation. The results showed that none of the three variables is driven by pension fund assets, but rather by the banking sector. In the measurement of institutional assets, Sibanda and Holden (2014) include all NBFIs – these include pension assets. A recommendation from the above mentioned study suggests economic development and growth of the banking sector should be prioritised first, before focusing on institutional investment. Rateiwa and Aziakpono (2017) measured the long-run relationship between economic growth and NBFIs in Egypt, Nigeria and South Africa found in the case of South Africa a bidirectional causality between NBFI and growth for the period 1971–2013. Similarly Islam and Osman (2011) measured the country specific effects of NBFIs in Malaysia on economic growth. Their study in addition to pension funds included provident, insurance, unit trust, mortgage and building funds. Using both the bounds testing and error correction approach they found a positive relationship between pension fund assets and economic growth over the period 1974–2004.

Looking at the four growth channels, the bulk of literature is focused on the impact of pension reform moving from PAYG to FFS on savings (Balliu & Reisen, 1997; Bebczuk & Musalem, 2006; Bosworth & Burtless, 2004; Murphy & Musalem, 2004; Samwick, 2000) or capital market development (Walker & Lefort, 2002; Rezk et al., 2009; Enache et al., 2015). Studies have largely focused on developed and Asian developing economies, and to a lesser extent Latin American countries. There is a paucity of research investigating pension assets and growth in the African context (Kipanga, 2012; Sibanda & Holden, 2014).

In this study, we differ from previous studies due firstly to the focus on the growth impact of total pension assets, separating pension funds from mutual funds, insurance companies and collective investment schemes (Rateiwa & Aziakpono, 2017; Sibanda & Holden, 2014; Islam and Osman, 2011).

Secondly this study differs from previous studies because of its emphasis on non-banking financial measures. Other studies on the finance growth nexus in South Africa have shown that economic growth drives financial development proxied by banking measures such as the level of broad money stock (M2) to GDP, liquid liabilities to GDP ratio and Private Sector Credit (PSC) to GDP (Odhiambo, 2004, 2010). In this study we use pension assets as our financial variable and explore channels through which it affects growth.

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Thirdly, there is limited data on pension fund assets in most countries and the series of most empirical studies listed in this section is no longer than 15 years. For instance the Sibanda and Holden's (2014) study spans from 1994 until 2009, as against the 1975-2014 time span of this study. This study should be able to generate more robust results.

Fourthly, this study is able to explore additional channels through which pension funds affect economic growth given its focus on capital markets and corporate governance. The focus on corporate governance enables us to investigate how transmission of corporate governance impacts growth through strengthened capital market development. To test the causality in this argument we need empirical evidence to measure that improved governance does indeed increase growth or improve returns, using number of corporate listings on the stock exchange in the South African context. The causality is important particularly for policy purposes within developing economies, should capital markets through pension funds act as a stimulus for growth in a country with a low savings rate. It would be important to implement capital market policies that will stimulate savings and hence economic growth.

Lastly this study seeks to make use of an innovative methodological approach in examining the direction of causality between pension fund assets, capital markets, governance and economic growth. The use of the Toda-Yamamoto approach in VAR estimation of the Granger causality tests enables us to measure causality irrespective of unit roots or cointegration (Yamada & Toda, 1998).

5.5 EMPIRICAL METHODOLOGY

5.5.1 Model specification

This chapter employs the restricted VAR model. The six-variable VAR model comprises pension fund assets (PFA), stock market capitalisation (STK), pension fund assets interacted with stock market capitalisation (INTPFA), population growth (POP), number of listed companies (LST) and gross domestic product per capita (GDP). The choice of variables enables us to see the specific effects of both the pension fund assets separately and jointly when interacting with capital market development. The variables also show the effect of stock market on the growth of the economy.

The use of the VAR framework allows us to measure the relationship between pension fund assets, capital market development, governance and economic growth. It also allows for the use of multivariate cointegration techniques in unravelling long-run behaviour between our variables of interest. Using variance decomposition and impulse response functions, we are able to estimate the variance of the errors for the variables and examine their sensitivity.

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First we examine the stationarity of the variables in our model using the ADF and PP unit root tests. This is to avoid specification errors in the model. Once integrating order of the variables is confirmed, next step is to choose appropriate lag order of the variable to apply the Johansen testing approach to cointegration. It is necessary to find out lag order because F-statistic is very much sensitive with the lag order. We use the sequential modified Likelihood Ratio test statistic (LR); Final Prediction Error (FPE); Akaike Information Criterion (AIC); Schwarz Information Criterion (SIC) and Hannan-Quinn Information criterion (HQ) to choose appropriate lag order but we prefer to take decision about appropriate lag following AIC. The AIC provides reliable and consistent information about lag order as compared to other criterion.

Our unit root test shows our variables are first-difference stationary. We then estimate our long-run model. We determine that our variable are cointegrated and then use the VECM to determine our short and long run relationships and derive variance decomposition and impulse responses accordingly.

The model to be estimated is specified as follows:

$$V_t = \sum_{i=1}^{k} B_i V_{t-i} + \varepsilon_t \text{ where } V_t = bGDP_t, PFA_t, STK_t, GOV_t\, INV_t, INFL_t\, LST_t\, PFA_t, LAB_t$$

The VAR consists of six variables and the long-run equilibrium is tested between all the variables utilising the Johansen cointegration method. The variables were not all stationary at levels. The multivariate Johansen cointegration technique makes use of the maximum likelihood procedure amongst non-stationary variables. Using either the maximum Eigen value and trace statistics we deduce the rank of the cointegrating matrix. This enables us to determine the existence and number of cointegrating vectors in our model.

The multivariate Granger causality based on VECM allows us to determine whether pension funds and capital markets cause growth. This is measured by Granger causality/Block Exogeneity Wald Test in the VECM estimation, using the error correction terms. The long run causality is found by significance of coefficient of lagged error correction term using t-test statistic. The existence of a significant relationship in first differences of the variables provides evidence on the direction of the short run causality. The joint χ squared statistic for the first difference lagged independent variables is used to test the direction of short run causality between the variables. The null hypothesis in this instance is that there is no causality, where this is rejected the model confirms the presence of uni- and bi-directional causality. We seek to explore all the economic variables though; however, our principal interest is on whether the deepening of pension assets has through capital market development been channelled to expand growth.

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Standard tests were used to select optimal lag length. This study employed the Toda and Yamamoto (1995) approach in order to ensure the robustness of the model. The procedure is an improvement on the Engle and Granger procedure as standard tests in testing the unit root using PP or ADF tests result in low power in mainly small samples. The variables are stationary at both I(0) and I(1), thus differencing procedures are made use of to ensure stationarity of variables. This may have the effect of losing information about the level of variables (Keho, 2007). This test allows more reliable inferences to be made about the causality of variables by reducing transformation bias. This approach is applicable in a VAR estimation in instances of both I(0) and I(1) order of integration and it disregards the cointegration properties required for both unrestricted and restricted VAR. This means that the methodology puts little emphasis on the order of integration of a series and is applicable with cointegration of an arbitrary order. The lag length selection process employed is determined by the variables collected in the *kx1* vector, once the VAR order *k* is ascertained, the technique employs a maximal order of integration (d_{max}+*k)th* order of VAR. The order k is augmented, with extra lag added in the VAR. If the series are I(1) an extra lag is added, if the series are I(0) no additional lag is added to the VAR[11]. The authors of this method state that this method can complement conventional hypothesis testing while maintaining the asymptotic Chi squared distribution of the Wald statistic (Yamada & Toda, 1998), so the method enables the testing of the significance of VAR parameters using maximal order of integration. We do this in the study for more robust analysis which is needed to further enrich the study.

The robustness of the causality is tested by employing an innovative accounting approach (IAA). In order to estimate the adjustment process that takes place after a shock we make use of the variance decomposition and impulse response analysis. This allows to measure the level of error in a variable, as explained by other variables in the model. Sims (1980) developed the technique particularly in the context of a shock, using the tool to outline the effect of one variable on another amongst the variables in this VAR system.

5.5.2 Variable definition and data

The data used comprises annual data taken from the WDI for the period 1975-2014, allowing for sufficient time trend to derive robust results from the estimation. Total pension assets data

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[11] The Toda Yamamoto approach is applicable in a VAR estimation in instances of both I(0) and I(1) order of integration and it disregards the cointegration properties required for both unrestricted and restricted VAR. The usual lag length selection process is employed, the difference is once that is ascertained a *k*, the technique employs a maximal order of integration. The calculation is explained above as dmx + k – this method complements conventional hypothesis testing yet maintains the asymptotic Chi squared distribution of the Wald statistics.

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is derived from the FSB's Annual Report. South African Registrar of Pension Fund issues the report annually.

In this study all variables are annual and have been transformed to natural logarithm (LN).

GDP per capita (GDP) at constant 2005 prices is used as the proxy for economic growth, it constitutes the gross value added by resident producers in an economy, divided by the total population. This measure is the dependent variable in this model. The natural log of per capita GDP becomes the growth rate.

Total pension assets (PFA) are measured using the FSB annual aggregate assets of retirement funds in South Africa to GDP. This comprises all privately-administered funds, underwritten funds, GEPF, Transnet funds, Telkom Pension fund, Post Office Retirement Fund and foreign funds. We expect an increase in pension assets to move in a positive direction with economic growth as previous studies have shown a relationship between financial development and growth (Davis & Hu, 2008; Hu, 2012).

Total pension asset interaction (INTPFA) is measured using aggregate assets of retirement funds in South Africa to GDP multiplied by market capitalisation to GDP. This is a variable that shows the interaction between pension asset and capital market development. It is expected that pension fund assets channelled into the economy through capital markets are likely to increase economic growth.

Stock Market (STK) is a proxy that measures *Market capitalisation (as percentage of GDP) as a ratio to Gross fixed capital formation (GCFC) (as percentage of GDP).* Market capitalisation of listed companies is the market value measured by number of shares times the share price. This is a proxy for capital market development and is also referred to as stock market capitalisation. GFCF formerly gross domestic fixed investment is a measure of gross domestic investment our variable for physical capital accumulate. It is measured as the outlays on additions to assets of the economy and changes to the level of inventories. Stock market is expected to have a positive impact on growth.

Population Growth (POP) is a measure of the annual population growth for the year t-1 to year t. It is a proxy for the labour force, we expect population growth to have a negative effect on long-run growth.

Number of listed companies (LST) is a measure using the number of listed companies in the stock exchange. It is expected that improved corporate governance will encourage listings and thus have a positive impact on growth.

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5.6 MODEL ESTIMATION

5.6.1 Unit root analysis

The time series unit root test was conducted as a first step to ascertain the stationarity of the variables. The results of our ADF and PP tests are shown in Table 5.1.

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Table 5.1: Time series unit root test

	LEVEL				FIRST DIFFERENCE			
	ADF	ADF	PP	PP	ADF	ADF	PP	PP
T-statistic	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept
GDP	-1,647751	-1,818838	-1,611218	-1,733033	-4,325713*	-4,277856*	-4,325713*	-4,277856*
POP	-1,046810	-3.400821***	-1.204058	-4.278325*	-4.310546*	-5,631068*	-2.76643***	-2.712690
INTPFA	-1.220554	-1.879548	-1.802947	-1.879548	-6.968536*	-6.097339*	-7.108909*	-9.458581*
PFA	-1,864829	-0,679895	-1,864829	-0,679895	-6.577022*	-7,028485*	-6,577022*	-7,284150*
LST	-1,347204	-2,122942	-0,842132	-1,458049	-3,297134**	-3,348931***	-3,417658**	3,470159***
STK	-1,627687	-4,486152*	-2,278553	-2,397918	-7,330905*	-7,276678*	-17,96538*	-24,48524*

Note: The asterisks (*) denote the level of significance, showing the rejection of the null hypothesis at 10%***, 5%** and 1%* level of significance

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The results show that using both the ADF and PP methods, the variables are integrated of order *I*(1). The results show we can reject the null hypothesis that there is a unit root in the series, and can conduct the cointegration analysis[12].

5.6.2 Cointegration analysis

In order to select the optimal lag we employ the Hannan-Quinn (HQ), AIC and Final Prediction Error (FPE). The appropriate lag length chosen by the AIC and HQ is 3. The results are shown in Table 5.2.

Table 5.2: Results of lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	69.19	N/A	1.32e-09	-3.42	-3.15	-3.23
1	324.83	414.55	9.50e-15	-15.29	-13.46*	-14.64
2	372.2	61.44*	6.03e-15*	-15.90	-12.51	-14.71*
3	412.63	39.33	7.52e-15	-16.14*	-11.18	-14.39*

Note: The asterisks (*) denote the lag order selected by the criterion.

To test the robustness of the long-run relationship we also applied Johansen and Juselius's (1990) approach to cointegration. The results as reported in Table 5.3 validate that there is a long-run relationship found between the variables. It implies that long-run results are effective and robust. The maximum eigenvalue indicates that there exists at least three, and trace test statistics indicate that there exists at least two, cointegrating equations at the 5% significance level (see Table 5.3). We thus reject the null hypothesis of no cointegration.

[12] It is important to note that it is not necessary for the unit root test to be conducted when using the Toda-Yamamoto VAR estimation approach, as it is also applicable either when the VAR is stationary (around a deterministic trend), integrated of an arbitrary order, or cointegrated of an arbitrary order.

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Table 5.3: Results of cointegration test

Null	λtrace	**5% Critical Value**	**Prob****
r = 0*	143.12	95.75	0.0000
r≤1*	87.31	69.82	0.0011
r≤2*	51.58	47.86	0.0214
r≤3	26.34	29.80	0.1187
Null	λmax	**5% Critical Value**	**Prob****
r = 0*	55.80	40.08	0.0004
r≤1*	35.73	33.88	0.0297
r≤2	25.24	27.58	0.0970
r≤3	16.25	21.13	0.2106

Note: The asterisks (*) denote the rejection of the Johansen cointegration null hypothesis *Ho* at the 5%* level of significance.

The Eigen value and Trace results establish there is a long-run relationship between the variables. Using the optimal lag selected, the long-run equilibrium state for the variable is shown below. The VECM results show that there is a long-run relationship between the variables in the model and in the long run they converge towards a long-run equilibrium state. The error correction term is a measure of the speed of adjustment toward long-run equilibrium. It shows how quickly the level of disequilibrium between growth and its determinants is corrected within one period. The rate of convergence towards equilibrium is shown as negative and significant at the 1% critical value. The error correction term confirms the long-run relationship (cointegration) and the coefficient (-0.1556) indicates the speed of adjustment of short- to long-run equilibrium. The error correction term implies that deviation in the short-run towards long-run equilibrium is corrected by 15.56 in one year, which means that 15% of any disequilibrium between real output and the explanatory variables is corrected within that period.

The existence of a long-run relationship between pension fund assets, capital markets development and economic growth compel us to explore the direction of causality between the variable of the model by applying the VECM Granger causality framework. The direction of causal relationship between PFA and the three variables STK, LST and GDP has important policy implications. The relationship between INTPFA, STK, LST on PFA establishes that causality runs from each to PFA, transmitting it to economic growth. The long-run relationship showing causality is in Table 5.4.

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Table 5.4: VECM estimates

Variables	LR coefficient on GDP				
	PFA	INTPFA	STK	LST	POP
Coefficient	-3.800350	3.743077	-3.645731	0.489142	0.277780
Standard errors	(0.33912)	(0.32777)	(0.31597)	(0.04053)	(0.05862)
t statistic	-11.2064	11.4199	-11.5384	12.0694	4.73904
ECT	-0.155603				

To obtain the effect of the long-run coefficients the long-run coefficients were normalised on GDP. The results are varied, with the signs showing different effects, evidence shows that pension funds on economic growth is positive when channelled through stock markets. The relationship between the labour proxy and growth presented in Table 5.5 is significant. The effect of corporate governance is not significant at the 5 percent level.

Table 5.5: Weak exogeneity test

	Chi square	Probability
GDP	50.874	0.0000
LST	11.59957	0.7091
PFA	40.43549	0.0004
INTPFA	22.35138	0.0989
STK	14.22941	0.5082
POP	25.64464	0.0419

The results of the weak exogeneity test are able to show the endogenous variables in the model. From Table 5.5 we see that *GDP*, *PFA* and *POP* are the only endogenous variables at the 5 percent level of significance with Chi-square values of 50.874, 40.435 and 25.644. At the 10 percent level of significance we include *INTPFA.*

Table 5.6: VAR estimation

	LN_GDP	LN_LST	LN_PENSION	LN_STK_INV	LN_PFASTK_INT	LNPOPGROWTH
LN_GDP(-1)	0.957161	-0.984581	-0.225036	-3.100839	-2.817626	0.090275
	(0.19493)	(0.83760)	(0.67656)	(2.67605)	(2.22766)	(0.58500)
	[4.91022]	[-1.17548]	[-0.33262]	[-1.15874]	[-1.26484]	[0.15432]
LN_GDP(-2)	-0.304056	0.845486	0.046530	2.249675	3.205550	-0.316917
	(0.26210)	(1.12620)	(0.90968)	(3.59809)	(2.99520)	(0.78656)
	[-1.16009]	[0.75074]	[0.05115]	[0.62524]	[1.07023]	[-0.40291]

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LN_GDP(-3)	-0.036881	-0.252208	0.239198	0.552305	-0.732014	0.363306
	(0.16357)	(0.70282)	(0.56770)	(2.24545)	(1.86921)	(0.49087)
	[-0.22548]	[-0.35885]	[0.42135]	[0.24597]	[-0.39162]	[0.74013]
LN_LST(-1)	-0.043255	1.268561	-0.250562	0.640073	0.134313	0.208307
	(0.06190)	(0.26596)	(0.21483)	(0.84972)	(0.70734)	(0.18575)
	[-0.69883]	[4.76972]	[-1.16634]	[0.75328]	[0.18988]	[1.12142]
LN_LST(-2)	0.031831	-0.501781	0.006822	-0.232105	-0.062322	-0.328614
	(0.10022)	(0.43062)	(0.34783)	(1.37578)	(1.14526)	(0.30075)
	[0.31762]	[-1.16526]	[0.01961]	[-0.16871]	[-0.05442]	[-1.09264]
LN_LST(-3)	-0.098950	-0.069953	0.129666	-0.279554	-0.167493	0.207421
	(0.06719)	(0.28872)	(0.23321)	(0.92244)	(0.76788)	(0.20165)
	[-1.47261]	[-0.24228]	[0.55600]	[-0.30306]	[-0.21812]	[1.02861]
LN_PENSION(-1)	-0.039983	0.144259	1.000063	1.288018	2.337397	0.137243
	(0.07708)	(0.33119)	(0.26752)	(1.05813)	(0.88083)	(0.23131)
	[-0.51873]	[0.43557]	[3.73829]	[1.21726]	[2.65362]	[0.59332]
LN_PENSION(-2)	-0.062949	0.139888	0.355162	0.611182	0.773428	0.185714
	(0.13168)	(0.56580)	(0.45702)	(1.80767)	(1.50478)	(0.39517)
	[-0.47806]	[0.24724]	[0.77713]	[0.33810]	[0.51398]	[0.46996]
LN_PENSION(-3)	0.164925	-0.134098	0.562962	-0.477550	0.916076	-0.705609
	(0.09900)	(0.42540)	(0.34361)	(1.35911)	(1.13138)	(0.29711)
	[1.66587]	[-0.31523]	[1.63836]	[-0.35137]	[0.80969]	[-2.37491]
LN_STK_INV(-1)	0.063446	0.099488	0.326551	-0.070457	0.539480	0.151374
	(0.05918)	(0.25429)	(0.20540)	(0.81242)	(0.67630)	(0.17760)
	[1.07209]	[0.39124]	[1.58984]	[-0.08672]	[0.79770]	[0.85233]
LN_STK_INV(-2)	0.087239	0.049183	0.442498	0.013675	0.611198	-0.328490
	(0.06850)	(0.29435)	(0.23776)	(0.94042)	(0.78285)	(0.20558)
	[1.27349]	[0.16709]	[1.86111]	[0.01454]	[0.78073]	[-1.59785]
LN_STK_INV(-3)	-0.009565	0.037477	0.310970	0.400703	0.985694	-0.180674
	(0.05376)	(0.23102)	(0.18660)	(0.73808)	(0.61441)	(0.16135)
	[-0.17790]	[0.16222]	[1.66647]	[0.54290]	[1.60429]	[-1.11977]
LN_PFASTK_INT(-1)	-0.027681	-0.028635	-0.220355	-0.152516	-0.635116	-0.139299
	(0.06827)	(0.29333)	(0.23694)	(0.93717)	(0.78014)	(0.20487)
	[-0.40548]	[-0.09762]	[-0.93001]	[-0.16274]	[-0.81410]	[-0.67994]
LN_PFASTK_INT(-2)	-0.074136	-0.109116	-0.440996	-0.556273	-1.016050	0.289667
	(0.06608)	(0.28392)	(0.22933)	(0.90709)	(0.75510)	(0.19829)
	[-1.12200]	[-0.38432]	[-1.92296]	[-0.61325]	[-1.34559]	[1.46079]
LN_PFASTK_INT(-3)	0.019837	-0.012524	-0.276496	-0.379702	-1.015458	0.213454
	(0.05489)	(0.23585)	(0.19051)	(0.75352)	(0.62726)	(0.16472)
	[0.36140]	[-0.05310]	[-1.45138]	[-0.50391]	[-1.61888]	[1.29584]

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LNPOPGROWTH(-1)	-0.224766	0.110029	0.021598	-0.050564	0.103994	1.727947
	(0.09926)	(0.42649)	(0.34450)	(1.36261)	(1.13429)	(0.29787)
	[-2.26449]	[0.25799]	[0.06269]	[-0.03711]	[0.09168]	[5.80095]
LNPOPGROWTH(-2)	0.310301	-0.067525	-0.195604	-0.984543	-0.939310	-1.042572
	(0.16772)	(0.72068)	(0.58212)	(2.30251)	(1.91671)	(0.50334)
	[1.85009]	[-0.09370]	[-0.33602]	[-0.42760]	[-0.49006]	[-2.07130]
LNPOPGROWTH(-3)	-0.150715	0.103605	0.290795	0.110658	0.265228	0.133243
	(0.09820)	(0.42193)	(0.34081)	(1.34803)	(1.12216)	(0.29469)
	[-1.53485]	[0.24555]	[0.85324]	[0.08209]	[0.23635]	[0.45215]
C	4.353009	5.356621	2.442334	5.052546	12.15419	-2.310138
	(1.08688)	(4.67021)	(3.77232)	(14.9208)	(12.4207)	(3.26178)
	[4.00504]	[1.14698]	[0.64744]	[0.33862]	[0.97854]	[-0.70824]
R-squared	0.979063	0.962763	0.999366	0.799359	0.995437	0.977853
Adj. R-squared	0.958125	0.925527	0.998732	0.598718	0.990874	0.955707
Sum sq. resids	0.005427	0.100206	0.065379	1.022835	0.708785	0.048880
S.E. equation	0.017364	0.074612	0.060267	0.238378	0.198436	0.052111
F-statistic	46.76143	25.85535	1576.128	3.984030	218.1500	44.15358

The VAR model in Table 5.6 establishes that the variables are cointegrated for long-run relationship, and so long-run as well as short-run causality can be investigated. Long-run causality is found by significance of estimate of the lagged error correction term following t-test statistic.

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Table 5.7: Granger causality/exogeneity tests

Multivariate Causality Test			
Null hypothesis	**Decision**	**Chi-sq statistic**	**Probability**
PFA does not Granger Cause GDP	Reject	13.97381	0.0029
GDP does not Granger Cause PFA	Reject	6.290964	0.0983
STK does not Granger Cause GDP	Reject	8.391076	0.0386
GDP does not Granger Cause STK	Accept	1.327827	0.7225
INTPFA does not Granger Cause GDP	Reject	14.18780	0.0027
GDP does not Granger Cause INTPFA	Accept	1.884503	0.5967
POP does not Granger Cause GDP	Accept	6.105562	0.1066
GDP does not Granger Cause POP	Accept	4.731334	0.1926
LST does not Granger Cause GDP	Accept	4.021275	0.2592
GDP does not Granger Cause LST	Accept	0.832190	0.8418
PFA does not Granger Cause STK	Accept	5.011902	0.1709
STK does not Granger Cause PFA	Reject	12.38752	0.0062
PFA does not Granger Cause LST	Accept	3.176761	0.3652
LST does not Granger Cause PFA	Reject	13.93293	0.0030
PFA does not Granger Cause INTPFA	Accept	5.025880	0.1699
INTPFA does not Granger Cause PFA	Reject	14.09742	0.0028

We report the results of the Wald test in Table 5.7. The multivariate causality test suggests that all the variables cause economic growth at the 1% significance level[13].

The results show that *PFA* causes *GDP*, whilst there is evidence of bidirectional causality, with feedback effects from *GDP* to *PFA* shown in these results. Specifically, we observe that *STK* Granger causes *GDP* and *INTPFA* Granger causes *GDP* without evidence of reverse causality. The variables of interest are significant, with evidence that pension funds cause economic growth through capital markets. The interaction term confirms that through capital markets pension assets channel impact, in addition *LST* Granger causes pension funds. The variable shows evidence of causality between pension funds and governance, which could then positively impact growth. *PFA* does not Granger cause *STK*, *LST* and the interaction term *INTPFA*. However, *STK*, *LST* and *INTPFA* Granger cause *PFA*. The results also suggest that capital markets and investment, corporate governance and pension funds play an important role in stimulating economic growth.

[13] The VAR Granger Causality/Block Exogeneity Wald Tests shows that all independent variables cause the dependent variable GDP with a Chi-squared of 314.08, df =18 at 1% significance level.

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Residual diagnostics show no evidence of serial correlation or heteroscedasticity and normal distribution, thus the model fits the data well.

Table 5.8: Error correction model

	Coefficient	Std. Error	t-Statistic	Prob.
ECT	-0.155603	0.054967	-2.830821	0.0120
GDP(-1)	0.280261	0.152175	1.841701	0.0841
GDP(-2)	-0.083056	0.149025	-0.557331	0.5850
GDP(-3)	0.016146	0.153031	0.105509	0.9173
LST(-1)	0.059615	0.055872	1.066993	0.3018
LST(-2)	0.029254	0.058372	0.501158	0.6231
LST(-3)	-0.077495	0.049004	-1.581383	0.1334
PFA(-1)	-0.656395	0.212294	-3.091906	0.0070
PFA(-2)	-0.589266	0.158229	-3.724125	0.0018
PFA(-3)	-0.254312	0.110569	-2.300032	0.0352
INTPFA(-1)	0.448189	0.152593	2.937155	0.0097
INTPFA(-2)	0.275015	0.103255	2.663460	0.0170
INTPFA(-3)	0.191682	0.056340	3.402228	0.0036
STK(-1)	-0.413249	0.159225	-2.595383	0.0195
STK(-2)	-0.234688	0.105739	-2.219514	0.0413
STK(-3)	-0.134761	0.056513	-2.384600	0.0298
POP(-1)	-0.209856	0.093215	-2.251306	0.0388
POP(-2)	0.129837	0.116978	1.109922	0.2834
POP(-3)	0.024114	0.081247	0.296798	0.7704
C	0.086987	0.023733	3.665260	0.0021
R-squared	0.814882			
Adjusted R-squared	0.595055			
F-statistic	3.706924			
Prob(F-statistic)	0.005415			

Our short-run model and the results are reflected in Table 5.8. The results show that *PFA, STK, INTPFA* jointly cause economic growth using the Wald test. In the short run we do not see the same pattern for *LST, POP* which has no evidence of short-run effects.

5.6.3 Estimation and results (long-run)

GDP is normalised in the model to obtain elasticity of the long-run coefficients in the model and these results are reported in Table 5.4 in Section 5.6.2. The long-run estimates suggest that a 1% increase in PFA is associated with a 3.80% increase in GDP. The results also show that a 1% increase in STK is accompanied by a 3.64% appreciation in GDP, confirming a positive relationship associated between capital market development and economic growth. These results suggest that capital markets have a positive association with output, and the result corroborates the earlier findings in Chapter 4. We can infer that PFA impact on output is channelled through capital markets.

The VAR model results show that the model as reflected in Table 5.7 explains 97% of the variation in economic growth. The long-run coefficients are not significant and show negative

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signs except when pension funds are interacted with STK. There is a bi-directional causality between the variable of interest *PFA* and economic growth. The overall Granger causality results in Table 5.7 show a positive impact of *STK* on growth, this is exhibited again when measuring the causality between the interaction term and growth. There is evidence pointing towards the conclusion of pension assets transmitting growth effects through capital markets. The results of the Granger causality tests show that *LST*, *STK* and *INTPFA* cause PFA but not the reverse.

5.6.4 Variance decomposition

The Granger causality tests are insufficient as they show the degree of feedback of one variable to another, and it is so difficult to determine the relative strength of causality tests beyond the sample period. We applied IAA which includes both the Variance Decomposition Method (VDM) and Impulse Response Function (IRF) to test the feedback and relative effectiveness of causality approaches.

The VDM is applied to test the response of the dependent variable due to occurring shocks in the variables in the model including itself. A shock to the variable of interest, GDP, will directly affect itself and will be transmitted to all of the other variables in the system through the dynamic structure of the VAR model.

Table 5.9 shows that the predominant source of variation in GDP forecast errors is own shocks, which account for between 81 to 100 percent of the forecast errors over the time frame. Innovations in PFA, STK, LST and INTPFA are also important. It is noteworthy that innovations to STK gradually rise at the beginning of the time period and climb to close to 10 percent.

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Table 5.9: Variance decomposition of short-run error variance

Variance Decomposition of GDP	SE	GDP	PFA	INTPFA	STK	POP	LST
1	0.023242	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.042208	95.30123	0.579683	3.178976	0.690151	0.097158	0.152800
3	0.055120	93.48704	0.411823	4.029336	1.522688	0.091533	0.457579
4	0.067053	91.12036	1.018627	2.775910	3.793113	0.136163	1.155832
5	0.079980	88.97857	1.147186	1.978888	5.789577	0.275214	1.830567
6	0.093547	86.50961	1.376524	1.730932	7.606405	0.387230	2.389300
7	0.106294	84.57829	1.571696	1.542796	8.774222	0.382630	3.150371
8	0.118459	83.28385	1.706804	1.378410	9.248173	0.322996	4.059764
9	0.129761	82.44742	1.725234	1.323490	9.279353	0.269209	4.955291
10	0.140070	81.68071	1.718869	1.331994	9.259828	0.239301	5.769295
Variance decomposition of PFA	**SE**	**GDP**	**PFA**	**INTPFA**	**STK**	**POP**	**LST**
1	0.059339	3.826211	96.17379	0.000000	0.000000	0.000000	0.000000
2	0.090066	2.046050	83.63611	6.154481	6.077269	0.000905	2.085183
3	0.118087	1.562608	76.28923	4.791586	11.65503	1.044345	4.657196
4	0.147072	1.716594	76.57720	3.093357	10.34277	3.324132	4.945953
5	0.170412	2.490639	75.45721	2.392511	8.155957	6.222244	5.281435
6	0.190261	3.332247	73.12895	2.160503	6.769257	8.857040	5.752001
7	0.207641	3.409936	72.44184	1.924465	6.076522	10.37478	5.772463
8	0.223553	3.223876	72.55290	1.813140	6.015353	10.87844	5.516294
9	0.237495	3.168726	72.53589	1.824907	6.231548	10.92035	5.318583
10	0.249485	3.271012	72.46060	1.761121	6.433780	10.79050	5.282994

The second panel shows that between 96.17 and 72.5 percent of the forecast errors in PFA is its own shock. Innovations in POP, STK LST and GDP are also important sources of forecast error variance in PFA.

5.6.5 Impulse response

The impulse response function describes how much of the predicted error variance for any variable is accounted for by innovative shocks throughout each independent variable in a system over various time horizons. Of particular interest in this study are the dynamic responses of GDP and PFA to innovations in STK, LST and INTPFA. The IR also demonstrates the persistence of the response to each of the shocks over a time frame. Figure 5.3 shows the result of a one standard deviation shock to each variable in the model. A one-time SD shock to GDP results in a mild positive movement which flattens out towards the end

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of the period. We observe that with a one-time SD shock to LST, STK and INTPFA both rise marginally before they start to fall from the third period. We also observe that a shock to the Pension variable consistently fell throughout the period, further confirming our earlier results.

For the LNPENSION variable in the panel, a one-time SD shock causes the variable to rise steeply throughout the period of the innovation. STK initially rises steeply before a decline in the 4th period, after which it rises gradually throughout the time frame of the innovation. LST initially falls and began to pick up in the 3rd period, rising gradually thereafter for the remaining period of the innovation. The other results are reported in Figures 5.3 below.

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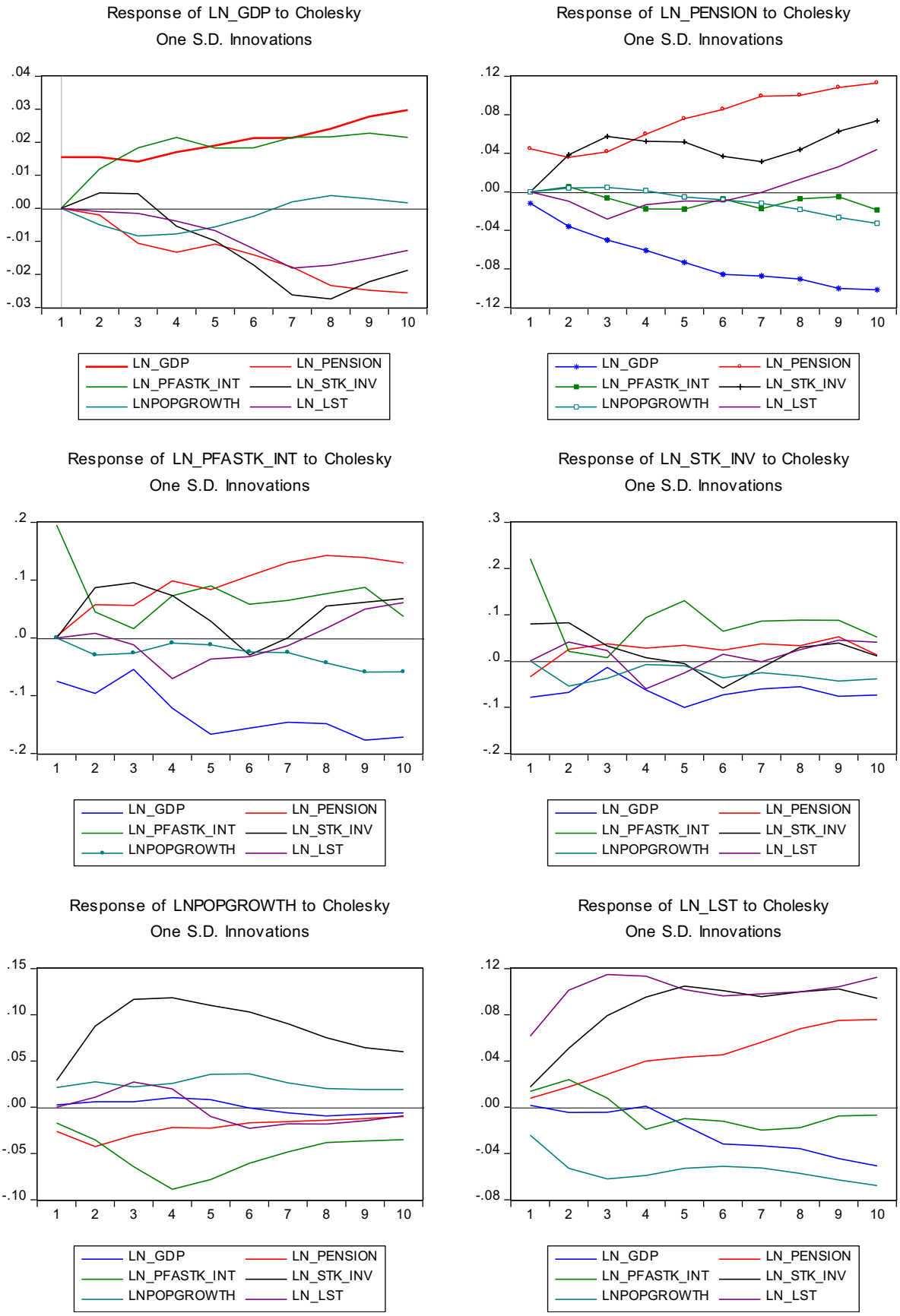
Figure 5.3: Impulse response function



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5.7 CONCLUSION

This chapter used a variety of statistical techniques to examine the long-run relationship between pension savings and economic growth. Using the VECM approach the model generated variance decomposition and impulse responses to further explain the interactions between the variables. The study with the modified Wald Test/Granger causality found the existence of a causal relationship between pension fund assets, capital markets and economic growth although causality runs from growth to the other variables.

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CHAPTER 6
THE CASE OF PENSION FUNDS EVOLUTION AND REFORMS IN SOUTH AFRICA: SHIFT FROM PAYG TO FF

6.1 INTRODUCTION: WHY REFORMS?

Pension policy reform is a worldwide trend with several countries undertaking major and minor adjustments substituting and replacing the PAYG system with the FFS. The World Bank is a key proponent in restructuring and offering reform technical inputs to several economies undergoing pension reform. Countries undergoing pension reform from PAYG to FFS outline the objectives of diversifying risk whilst maintaining economic growth and social protection. Holzmann (1999) outlines four crucial drivers for reform determined by the World Bank for financial viability both in the short and long term. Demographic trends show that high old age dependency ratios affect long-term fiscal viability, whilst short-term debt obligations to pension schemes in some countries create fiscal problems. Pension policy may affect growth if it is found to have a savings effect, this is heightened when strong linkages between labour markets and benefits are found. The third driver towards pension reform is to ensure all workers receive benefits related to earnings, protecting them from low rates of return and potential misuse which erodes workers' benefits.

Pension fund reform requires long-term fiscal views due to the considerable impact, transition burden and complexities associated with it. The conventional means of addressing PAYG shortfalls are inadequate for the long-term sustainability required for pension funds (Holzmann, 1997, 1999). The main concerns outlined by the World Bank driving nations towards reform are short-term concerns where pensions crowd out government revenue or cause high government debt, impacting long-term growth prospects. Secondly, the long-run fiscal viability is put under pressure due to the old age dependency ratios prevalent in most developed countries. This is not necessarily the case in developing economies, as is the South African situation. In addition, the negative economic effects on savings rates and unclear linkages between contributions and benefits distort labour market outcomes, which must be resolved (Holzmann, 1999).

Barr (2000) disagrees that a change in pension scheme need be the only solution to resolve long-term financial viability. Parametric measures such as raising the retirement age and reduction of benefits to pensioners are insufficient means alone for addressing the shortfalls of the existing PAYG system. Alternative measures to prevent fiscal imbalances are a necessity as the reduction of public expenditure proposed may not always be feasible given the social and developmental needs, particularly in developing countries. He argues that it is possible to increase the savings rate, implement policies that will increase the number of

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workers, or improve output such that the average nominal wage rises. Other solutions include reducing public expenditure or paying off future debt in advance, a function dependent largely on fiscal discipline. These recommendations will all contribute to the increase in total contributions so that there are adequate reserves to pay pensioners. Vittas (1999) agrees that parametric measures do not have such a long-term impact on savings and capital accumulation as would pension system reform.

This paper seeks to highlight the impact of the shift from PAYG to FFS and the issues resulting from the structural shift. It is important to ascertain whether the reform had positive effects on the levels of growth. This paper seeks to capture the impact of the structural break and make a comparison with the pre- and post-reform scenarios.

6.2 PENSION REFORM IN SOUTH AFRICA: THE SWITCH FROM PAYG TO FFS

The newly formed democratic government of 1994 produced several social security reform discussion papers and reports contributing to policy changes and legislative amendments in the sector. Over the last two decades there were no less than nine such outputs and commissions: the Mouton Commission (1992), Katz Commission (1995), Smith Committee (1995), Lund Report (1996), National Retirement Consultative Forum (1997), Report of the Committee of Inquiry into a Comprehensive System of Social Security of South Africa (2002), Taylor Report (2002), National Treasury Discussion Paper on Retirement Reform (2004) and the National Treasury Social Security and Retirement Reform (2007) (Nevondwe, 2010; National Treasury, 2004a; van der Berg, 2002; Standish & Boting, 2006). These reforms focused on improving conditions of access and preservation regardless of race. Recommendations also improved the tools and mechanisms to improve the execution of the provision of social security, resulting in the formation of institutions such as the South African Social Security Agency (SASSA). The Mouton and Katz Commissions, and National Treasury (2004a), focused on strengthening member protection and benefits.

The Commission's recommendations included revisions of the tax structure to improve and encourage savings for retirement. Although such reforms are argued to increase savings, a criticism is that they have enhanced tax benefits for a minority. South Africa has adopted a tax relief structure argued by Van den Heever (2007) and Nevondwe (2010) to be disproportionately beneficial to high-income earners. For instance only pension fund contributors are beneficiaries of favourable tax treatment, as opposed to provident fund holders where a large proportion are union members (Nevondwe, 2010). Retirement annuity funds receive restricted benefits, showing selective treatment of tax benefits. Despite the reform measures taken, the tools have been inadequate to sufficiently improve access to retirement provision for the large majority of those who are in the informal labour market or

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those employed at irregular intervals. The majority of the South African participation rates remains dismally low, leaving more than three-quarters of the elderly reliant solely on state assistance for income during retirement.

Pension reform is effected through a variety of processes, these are mainly legislative and regulatory changes, tax changes, contribution levels, liabilities and debt management levels. Moleko and Ikhide (2016) categorised South Africa's pension evolution into four stages: infancy (1911–1958), a period of separation (1959–1984), continued separation (1984–1994), and corporatisation and amalgamation (1995–2015). Harmonisation of tax treatment in order to simplify taxable benefits and to encourage savings incentives were designed. National Treasury (2013b) introduced harmonisation of tax treatment of pension funds, provident and retirement annuities. Tax free savings of up to 27% of individual earnings to encouraging long term retirement savings and to discourage early withdrawals these are taxable on a sliding scale between 18 – 24%. Upon retirement up to a third can be retrieved in lump sum payment with the remaining portion annuitized. The intention was to ensure equity and more progressive tax system that reduces benefits concentrated in mainly high-income earners. This chapter takes a specific focus on the switch from PAYG to FFS and thus it is necessary to understand the preconditions necessary, the likely gains and the South African context. There are three predominant pension reform methods referred to in literature, commonly known as systemic, parametric measures or notional defined contribution (Holzmann, 1999; Vittas, 1999; Schmidt-Hebbel, 1995, 1999; Poirson, 2007; Walker & Lefort, 2002; Hauner, 2008). These measures can be implemented as reforms within the specific type of pension system. According to Rhodes and Natali (2003) reform paths within occupational plus purer occupational pensions schemes constitute non-parametric changes that converge benefits and improve labour market conditions. This tends to increase labour supply reducing the problem of financial instability and intra-generational inequity. Pure universal models suffer financial viability problems, especially where the labour market is not producing new jobs. This is not the context of the South African dilemma.

6.2.1 Preconditions for reform

A strong regulatory environment and effective institutions are requirements for any pension reform to have an impact on capital market development. Secondly there are economic system preconditions for a country to make optimal gains from pension reforms: they are termed feasibility and impact preconditions (Vittas, 1999; Meng & Pfau, 2010, Walker & Lefort, 2002). A nation's macroeconomic stability determines whether inflationary effects erode gains made. A sound regulatory framework must consist of institutions that regulate and monitor the development and application of laws in the local securities markets. Financial sector institutions such as banks and insurance companies will accelerate gains made from pension

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reform, but they must be efficient. The development of new instruments, issuing licences for the operation of pension funds and monitoring compliance requires a strong agency and driver. Without these pre-conditions of macro-economic stability, sound insurance companies and banks, and effective regulation and supervision, the dynamic interaction between pension funds and capital markets will be limited reducing any gains that a systemic change from PAYG to FFS ought to produce.

A pension regime change only has a positive impact on savings if the cost of doing so does not reduce overall savings. This transition cost is borne when one undergoes a shift from PAYG to FFS. It is referred to as implicit debt and it comprises those retirees who must still be paid future and current pensions whilst existing worker contributions no longer directly reach retirees but are deposited in a private fund. Cuevas et al. (2008) say that the privatisation of pension funds still requires on-going payments to current retirees. This cost can be paid by the current generation or it can be spread across multiple generations. The decision taken on how to finance the transition will determine the net gains made from savings (Schmidt-Hebbel, 1999; Samwick, 2000; Zandberg & Spierdijk, 2013; Cuevas et al., 2008). Should the current retirees have their benefits reduced? Or should taxes of current workers be increased to finance the implicit debt? Another alternative would be to issue government debt, and this raises the question of how the debt is financed in the long run, through an increase in taxes or reduced consumption?

Implementing these options may cause savings to fall, denying the economy the intended benefits of reform. It is argued by Murphy and Musalem (2004) that if current retirees bear the costs, savings would increase because they have a high propensity to consume. Another argument is that the wealth transfer under the two systems is allocated to either high or low income earners who hold differing propensities to save. In an FFS, wealth is transferred to high income earners who have a higher propensity to save, and thus savings increase. When implementing pension reform, to induce individuals to save there are usually complementary tax rebates or exemptions. This holds true particularly in voluntary pension programmes and these exemptions mean that such preferential tax treatment reduces government tax revenue, reducing government saving (Murphy & Musalem, 2004). The simple linkage of one's pensions contributions and benefits may cause savings to arise in the context of reform. Awareness programmes that raise the importance of savings may improve individuals' behaviour to save.

In the event of financial viability the World Bank states that country responses have focused on moving from PAYG to FFS, and in the short term reducing benefit (Holzmann, 1999). Reforms in several countries have been undertaken because of weaknesses in the PAYG system. Some were supported with technical assistance by the World Bank to effect transitions

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from PAYG to FFS (Zandberg & Spierdijk, 2013; Bailliu & Reisen, 1998; Holzman, 1997, 1999; Holzman & Stiglitz, 2001).

Another argument that is commonly used to propose for pension system reform is the need to strengthen linkages of individual contributions to benefits (Holzmann, 1999; Uthoff, 2006; Holzmann & Stiglitz, 2001). The weak linkages between the two result in the working population equating contributions as an addition form of labour tax.

According to Holzmann (1999) budget deficits are a common feature in countries using the PAYG system, usually short-term budget management is a concern. The inability to treat these transfers as savings (which have the potential to drive investment) lead to dead weight losses and reduce output and growth. Evidence on whether reform leads to savings is mixed and therefore inconclusive, but the stimulation of additional benefits in the overall financial system leads to development (Raisa, 2012; Zandberg and Spierdijk, 2013).

6.2.2 Gains of reform

In the literature, systemic reform benefits are equivalent to those gained from an increase in pension assets. They include increased savings, capital market development and improved governance. Additional improvements in the case of reform to financial markets include improved competitiveness with institutional investors, development of new instruments, modernisation of infrastructure and a stronger regulatory framework, corporate governance and even market integrity. The intensity of the gains of reform are higher in markets with already high levels of financial development (Meng & Pfau, 2010).

Schmidt-Hebbel (1999) measured the effects of pension reform in five areas: the labour market, investments, factor productivity, growth and savings. It is an example of the multiple effects of pension assets on the economy, showing that growth and savings are but two of these areas. In this study, using empirical evidence we try to establish whether there is conclusive evidence linking reforms and growth.

It is important to point out that countries are at different stages of the demographic transition and although developing countries are at the incipient and moderate stages where the youth is growing, fertility rates are high and the number of elderly people are low relative to the working population. Some countries are reaching consolidation and exhibiting signs of lower fertility rates and an increasing elderly population towards full demographic transition (Uthoff, 2006). This is the case in some Latin American countries such as Brazil, Peru, Venezuela and Colombia, though not to the same extent in European countries already reaching the advanced stages of demographic transition. Rhodes and Natali (2003) argue that financial viability is further worsened by pension schemes that are reaching maturity. When the ratio between the elderly (the beneficiaries) and the working population (contributors) is rising, it is

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likely to put further pressure on the fiscus. Contributions in PAYG schemes are made by the employed, and in scenarios where nations experience high unemployment rates, the pressure on contribution levels by the working population is further exacerbated. This is two-pronged, as both the future number of dependants who will require social protection from the state will increase, and the number of contributors in a PAYG system who contribute to existing beneficiaries decreases. Barr's (2000) simplified pension system model is an equation comprising the number of pensioners multiplied by the nominal pensions and this is equivalent to the contribution rate of the existing number of workers multiplied by the wage bill. Barr modified the model by factoring in a reduction in wages. To balance the equation it would require either an increased contribution rate or an increase in the number of workers contributing in order to meet the pension payouts for existing pension holders. Reduced productivity, and heightened dependency ratios and wage levels holds significant risk for continued sustainability where the number of employed is unlikely to rise and contribution levels of the employed are declining (Rhodes & Natali, 2003).

Van den Heever (2007) argues that the heavy reliance on the state is further worsened by the fact that a significant portion of the employed South African population does not save for retirement. The life cycle theory only assumes dissavings in old age or retirement phase, yet in practice the situation is vastly different (Uthoff, 2006). An estimated 5.4 million informal workers are non-contributors and an estimated 47.8% of the working population neither plan nor save for retirement. Uthoff (2006) presents reasons for non-savings after taking into account prevailing labour market conditions such as job insecurity, income instability and part-time work. Single-headed households led by women in the absence of men cause women to playing dual roles, putting greater strain on them and further restraining them from holding stable jobs. These are important considerations when looking at pension system reform options.

6.2.3 South Africa's context

Literature on South African pension reform is severely limited. The focus on pension reform literature largely covers the non-contributory first pillar (Van den Heever, 2007; van der Berg, 2002; Nevondwe, 2010; Hendricks, 2008). The main purpose of pension systems is to encourage the population to smooth consumption over their lives, thus saving income now to provide for the old aged in their retirement. Where they are unable to save, the state would finance the poor with income through non-contributory schemes (Holzmann, 1999; Rhodes & Natali, 2003; Uthoff, 2006; Van den Heever, 2007; Van der Berg; 2002). There are structural economic, labour and political characteristics in a country that give rise to specific risks and challenges. Pension reform seeks to reduce the demographic, political and macro-economic risks that reduce the ability to provide income for the old aged in their retirement (Holzmann,

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1999). The structural characteristics of a country are important in identification of these risks. Issues of inequality and low growth levels lower the ability to absorb a usually growing working age population into the labour markets. These are predominantly characteristics of African and Latin American countries, affecting the contribution levels of workers and the number of workers who are fully employed. This will determine the design of pension schemes and the extent to which the state bears the burden of reducing poverty. The most common risk in developed and industrialised economies is rising life expectancies presenting the dilemma of an increasingly ageing population. These, matched with lower fertility replacement rates, equate to higher old age dependency ratios. Germany, Italy and France show dependency ratios higher than 40%, which means that the number of elderly people in ratio to the working population is rising significantly (Holzmann, 1999; Rhodes & Natali, 2003; Stiglitz & Holzmann, 2001). The total value of contributions will not be able to meet the rising and current benefits required to pay the nominal pensions of existing pensioners. This simply means in the medium to long term there will simply not be enough people in the working age population (15-64) to pay the required contributions to sustain the retirement income of pensioners. There are indications that this will lead to an increase in taxes or debt to finance pension expenditure, putting significant pressure on country budgets. The debate on the long-term fiscal viability becomes relevant at this point, however in South Africa this has little relevance.

Pension reform takes place in the context of an existing pension system or scheme, and the nature of reform can take various forms. A commodified regime is where there is a strong push towards privatisation and a decommodified pension system is largely tax financed, underpinned by the country's specific political economy. Rhodes and Natali (2003) outline that it is the prevalence of the state versus the private sector in the provision of pension schemes that determines the route to reform. The question arises of who bears the greater responsibility of providing pension benefits and the prevalence of public versus private schemes where multiple pension schemes exist. Private schemes provide benefits through occupational arrangements (second or third pillar) and public schemes or universal systems (first pillar). A mix between the systems arrives at the universal plus occupational scheme (multiple pillar). Barr (2000) proposes an alternative to pillars: these are developed according to country priorities and referred to as tiers. The difference between tiers and pillars is that tiers place far greater emphasis on objectives of a country versus prescribing a shift before aligning any reform to measures. He maintains that the second tier need not be privately managed, against the World Bank view, and proposes that public-managed schemes may face reduced risks.

Political risk is one of the factors driving the privatisation of pension funds, as it removes potential political interference in the use of pension funds as the state will be prohibited from borrowing the funds. In PAYG schemes high degrees of political risk exist with the use of the

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funds and the level of retirement income paid to pensioners which is subject to change during times of fiscal imbalance. The regulation of pension fund portfolio managers and investment management companies also poses significant risks, as the institutional capacity of state regulators determines the ability and efficacy to monitor and police the sector in relation to regulatory framework. Barr (2000) argues that private pension schemes face additional risks beyond those that are common to both publicly and privately managed schemes. All schemes face political risks, demographic and macro-economic shocks. However private schemes cannot guarantee a rate of return due to annuities market risk, investment risk that is linked to the stock markets and management risk inherited through the fault of incompetent or fraudulent fund managers. In addition, Van den Heever (2007) outlines the cost structure of privately-managed policies in South Africa that range between 26.7% and 43.2%. He maintains that as calculated in a previous actuarial report, the findings show that there is secrecy, lack of transparency, and lack of competition concerning administration costs. The fee structure is an additional reduction of benefits in a privately managed scheme across countries. These are important considering the beneficiaries whose net income will be reduced by administration fees charged in the industry.

Compliance to pension laws and regulations is left largely to a Pension Fund Regulator, a state-owned enterprise left to police the entire sector. In South Africa the FSB currently oversees, regulates and monitors 6,581 funds, previously there were between 11,000 and 15,000 funds in the last three decades (FSB, 2012). The necessity of a complex set of skills and capabilities must be highlighted as the protection of 15 million pensioner contributions require legislative compliance by every fund. It is a colossal task. It is also noted that the Pension Fund Registrar excludes public pensions such as the GEPF, Transnet and Telkom, which constitute more than half the value of total SA pension assets, from its direct regulation. Without independent institutions and regulations that curb misuse of public funds, political risk remains a problem. The different systems will both still require strong regulatory and institutional mechanisms in their execution.

6.2.4 Outcomes of the reforms

The era of changing the funding modality lay within the last phase of corporatisation wherein the Public Investment Corporation Act of 2004 was enacted. For the historical pension reform development, it was necessary that pension laws and regulations be amended. The Department of Finance now referred to as National Treasury' reported in its Annual Reports (1998 and 1999) that the GEPF was formed after the amalgamation of several funds. A single homogenous fund with standard benefits, retirement provisions and requirement and management was formed post 1994. As at 1998 the GEPF had 1.1 million contributing members. There is little documented evidence on the purpose, nature and specific areas of

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reform conducted during the corporatisation period by National Treasury. Hendricks (2008) and National Treasury (1998, 1999) outline minimal debt-related results likely to be attributed to pension reform with little provided on the purpose, nature and specific areas of reform conducted during this time. The lack of policy guidance on the transition and formation of several new institutions makes it difficult to measure whether the intended economic consequences of the reforms have been fulfilled.

Hendricks (2008) argues that the elimination of political risk was the driving factor behind pension reform, stating that beyond the protection of apartheid era public servants pensions, the downside has been the cost of debt maintenance and opportunity costs of forgoing meeting the social needs that the people of South Africa are in dire need of. The reform propelled by a demographic transition at advanced stages does not hold for South Africa, in fact National Treasury (2004a) agrees that there is no problem of an ageing South African population as there is in most developed economies. Therefore the PAYG to FFS shift propelled by the government can be attributed largely to the argument of political risk and savings effect and a reduction of labour distortions leading to economic growth. This is vociferously opposed by Hendricks (2008) in lieu of the additional investment risk from the stock and bonds market, annuity risk and pension fund management risk that pensioners face under such a scheme.

Vittas (1999) says that long-term economic growth exceeding benefits from labour market distortions are possible only with systemic change. That means a move from PAYG to FFS is most likely to lead to capital market development. Enhanced savings and financial market development are not generated by Notional Defined Contributions (NDCs) or parametric type of pension reform.

During pension reform there is a transition period where social security contributions no longer directly offset existing pension payments. They are deposited in a fund: in the case of South Africa this is the GEPF, which is managed by the PIC. The ongoing pension payments to existing pensioners must continue and it is here that public debt is usually raised if the fiscal position is not in surplus. Financing the transition requires selling state assets, incurring liabilities, reducing government expenditure or raising taxes.

According to National Treasury the GEPF reforms resulted in improved levels of unfunded liability levels, which were reduced quite significantly on a yearly basis. The percentage levels of the funded liability increased from 72 percent in the previous year(1998), to 96.5 percent in 1999. The value placed on the unfunded liability was reduced to R5.26 billion. There is scant mention of the cost of the reform and how it was financed. The Annual Report (1999) stated that more than a fifth of the fiscus at 21.4 percent went towards debt repayment in 1998. This

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cost is due to domestic debt, of which 98 percent was incurred after 1994 or agreed to during the negotiated Convention for a Democratic South Africa talks. This debt is domestic debt both inherited and acquired, and the holders of 40 percent of the domestic debt were the Public Investment Commissioners, which held the assets of the GEPF.

In South Africa evidence points to issuing of government debt, which is argued by Hendricks (2008) to have had a neutralising and even negative impact on the improvement of aggregate savings. Cuevas et al. (2008) explain broadly that a pension system change affects the debt structure of a country. The pensions owed to pensioners are known as implicit debt and when privatisation occurs this debt becomes explicit debt, changing the composition of liabilities with financial debt replacing the implicit debt which has a direct impact on country credit risk. It is no longer hidden and must be repaid. Empirical results (Cuevas et al., 2008) show that financial debt increases the perception of riskiness as the nature of liabilities is amended. Pensioners are afforded equal status on their claims as creditors, equal to bondholders, a far higher status than those offered to PAYG participants who hold a lesser claim than any creditor with government. It has been argued by many that this part of the transition may erode all benefits of reform, with financing costs are too high. Holzmann (1997) argues in favour of the benefits derived from reducing the implicit debt from unfunded pension liabilities, but outlines that it requires a complex redesigning of fiscal flows and management. Higher old-age dependency ratios and pension system maturity are contributing factors to the higher implicit debt levels that developed countries hold in contrast to developing economies (Schmidt-Hebbel, 1999). The shift in South Africa's pension system from PAYG to FFS has seen significant amounts of debt incurred by the national government. Hendricks (2008) argues that the astronomical growth in debt from R68 billion to a staggering R990 billion between 1989 and 2008 was largely due to government borrowing money from itself to secure pension funds of civil servants. No empirical work on investigating pension fund reform has been done to date. Overall a systemic change can cause increased savings, capital market development and improved governance.

6.3 EMPIRICAL LITERATURE MEASURING SWITCH FROM PAYG TO FFS

Analysing the measurement of the impact of reform, literature has shown emphasis on Latin American countries (Chile and Columbia) with only single measurement on Russia and India (Holzmann, 1999; Vittas, 1999; Schmidt-Hebbel, 1995, 1999; Poirson, 2007; Walker & Lefort, 2002; Hauner, 2008; Uthoff, 2006). Empirical studies on sub-Saharan Africa are severely limited. There is a focus on Chile due to the historical significance and reform measures taken in 1981. Its reform included the replacement of PAYG to FFS, partly motivated by an ageing population. It remains a popular case study in the literature for reducing political risk, improving

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fiscal sustainability and reducing labour market distortions (Acuna & Iglesias, 2001; Holzmann, 1996, 1997; Schmidt-Hebbel, 1999; Shelton, 2012; Vial & Melguizo, 2008).

An increase in pension assets in an FFS is argued to have a positive effect on growth. Savings is one of the channels through which pension fund accumulation exhibits growth effects. This accumulation of capital leads to improved resource allocation and investment, which in turn leads to capital market development. This in turn has positive consequences for productivity and output. Empirical studies have largely focused on the impact of funded pensions on savings (Balliu & Reisen, 1997; Bebczuk & Musalem, 2006; Bosworth & Burtless 2004; Murphy & Musalem, 2004; Rezk et al., 2009; Schmidt-Hebbel, 1999; Holzmann, 1997; Samwick, 2000) and more recently on capital market development (Walker & Lefort, 2002; Enache et al., 2015). Other positive pension reform effects include fiscal viability, reduced labour market distortions, tax distribution effects and reduced political risks. These fiscal benefits and impacts on taxes and public debt or fiscal viability though not measured are usually expressed in models or graphically forecast (Holzmann, 1996; Poirson, 2007; Hauner, 2008; Schmidt-Hebbel, 1995; Uthoff, 2006).

One of the first studies measuring pension reform effects focused on its effect on Colombia's macroeconomic and fiscal economy. Schmidt-Hebbel (1995) used simulation techniques to forecast the economic gains of reform and costs of financing deficits incurred from PAYG. There were other parametric reforms such as increasing contribution rates, introduction of the first pillar of voluntary schemes, and regulatory reforms in the sector. The simulation varied and eight scenarios were forecast for Columbia. The main differences in each varied between a) the levels of pension system coverage, b) the nature of pension reform determined by levels of retirement ages and contribution rates, c) the economic state varied between low and high growth, wages and interest rates, and d) the speed of reform and movement to private funds. Each level of reform showed different results, positive output increase and higher savings. Using similar simulation methods based on equilibrium growth models, Chilean pension reform and its impact is measured, and shows positive effects on growth, output and productivity in the labour markets (Schmidt-Hebbel, 1999). Between 12% and 41% of the output or growth in GDP can be attributed to pension reform. Holzmann (1997) reaches the same conclusion: that total factor productivity was significantly improved post pension reform. Stylised facts trends show that in several countries labour force participation of the elderly has reduced. Schmidt-Hebbel (1999) found that PAYG effect reduces informal labour market participation, simply meaning that employment becomes more formalised.

Several papers compare the effects of pension reform in pre and post reform era (Hauner, 2008; Poirson, 2007; Schmidt-Hebbel, 1995, 1999). The studies assess the financial implications using variables such as levels of market capitalisation or levels of pension assets.

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The micro and macroeconomic effects focus on variables such as GDP levels, consumption levels, investment, and productivity. The focus is not only on the effect that reform exhibits on savings and growth, but also on other variables. Using a Dynamic Stochastic General Equilibrium model Hauner (2008) estimated the macroeconomic impact of three financing scenarios on GDP, Government Debt Ratio, Current Account, Investment, Consumption and Foreign Assets Ratio. Funding reform is debt, tax or expenditure financed in a nation, exhibiting different outcomes. The models suggest that borrowing and higher taxation should be avoided, and whichever method is applied lower government consumption is advised. Pension fund reform in emerging markets showed positive impacts on capital markets such as improved financial depth, enhanced pension assets as a percentage of GDP, and a rise in total pension fund assets (Hu, 2012). Poirson (2007) used forecasting techniques used to show the impact of pension reform on market capitalisation and debt levels in India and Russia. The level of assets under management in relation to market capitalisation is plotted in a trend graph. This raises the question of whether a model can be developed to determine how much pension assets develop market capitalisation.

Enache et al. (2015) used a single equation Error Correction Model shows that increasing private pensions has a positive effect on the development of capital markets. The effect is stronger in the short term than in the long term, with the vast definitions of capital market development the paper selects market capitalisation of listed companies as a percentage of GDP as a proxy. This is certainly a limitation in the study, as there are various layers to its definition. Factors such as improved legal framework and financial structure, depth, liquidity, innovation, new instruments, specialisation, improved governance, and lower price volatility are but a few of the argued benefits of pension reform on capital markets. In such a measure of capital market development, the true impact may not be captured adequately. Walker and Lefort (2002) approached the empirical analysis by measuring the impact of pension reform on cost of capital, volatility and reduced transaction costs in 33 countries. The pension reform effect was measured on the cost of capital, impact of reduced transaction costs and volatility. The results show that pension funds reduce the cost of capital and lower security price volatility, they also show that markets exhibit higher traded volumes. Perhaps one of the gaps in literature is the construction of a measure for capital market development, so as to measure the true impact of pension fund reform.

Literature has focused largely on the impact on aggregate savings and national savings, and the results are inconclusive. It is well known that increased savings is a principal reason driving pension reform. The results show higher private savings in developing countries (Schmidt-Hebbel, 1999). In Chile, up to 31% rise in savings can be attributed to pension reform. There is a mixed bag of results in the literature of whether savings are increased when a nation

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moves from partly funded or PAYG to an FFS. Several studies show that pension reform as defined by moving from PAYG to an FFS leads to an increase in aggregate savings (Balliu & Reisen, 1997; Bebczuk & Musalem, 2006; Rezk et al., 2009; Schmidt-Hebbel, 1999; Holzmann, 1996). Murphy and Musalem (2004) agree it is only in a mandatory pension scheme system that reform exhibits a positive impact on savings. Samwick (2000) proved that indeed savings rates are higher in countries with FFS, however the transition has not necessarily led to a higher savings rate. Two other studies show that pension savings could potentially replace private savings and even decrease savings (Bosworth & Burtless, 2004; Murphy & Musalem, 2004). If in fact pension savings act as a substitute to private savings this means reform has no effect on savings (Bosworth & Burtless, 2004; Samwick, 2000). It is only in Chile that a shift has led to an increase in national savings, but this is disputed depending on the author and technique used. Holzmann (1996) finds that Chilean savings are not positively affected by pension reform. Therefore, shifting the flow of funds from the fiscal to financial system does not guarantee a positive increase in aggregate savings.

6.4 EMPIRICAL METHODOLOGY AND MODEL SPECIFICATION

The paper employs the restricted VAR model and the eight variable VAR model comprises pension fund assets (PFA) and pension fund assets with structural break (PFA99), stock market capitalisation (STK), population growth (POP), number of listed companies (LST), total pension asset interaction (INTPFA), (DEBT) which is a measure of national debts owed and per capita GDP (GDP).

This paper differs as we do not use the ordinary unit root tests that have that enabled us to establish the presence of a unit root without misspecification bias and size distortions. Using the Zivot-Andrews (ZA) unit root test we account for the presence of one or two structural breaks.

The use of a VAR framework allows us to measure the relationship between pension fund assets (with and without structural break), capital market development, national debt, governance, population and economic growth. It also allows for the multivariate cointegration techniques in modelling long-run behaviour. Using variance decomposition and impulse response functions, we can estimate the variance of the errors for the variables and examine their sensitivity.

The model to be estimated is specified as follows

$V_t = \sum_{i=1}^{k} B_i V_{t-i} + \varepsilon_t$ where

$$V_t = bGDP_t, PFA_t, STK_t, POP_t\ INTPFA_t\ LST_t\ PFA99_t\ DEBTLST_t$$

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The VAR consists of eight variables and the long-run equilibrium is tested between all the variables utilising the Johansen cointegration method. The variables were not all stationary at levels, enabling us to move directly to estimating VAR. The multivariate Johansen cointegration technique makes use of the maximum likelihood procedure amongst non-stationary variables (Johansen, 1992). Using the maximum Eigen and Trace statistics we estimate the rank of the cointegrating matrix. These statistics are able to show whether there is a cointegration vector between per capita GDP and the other variables.

The next stage in the estimation enables us to empirically test whether there is reverse causation? The multivariate Granger causality based on VECM allows us to estimate causation between the variables. This is measured by Granger causality/Block Exogeneity Wald Test in the VECM estimation using the error correction terms. The null hypothesis in this instance is that there is no causality, where this is rejected the model confirms the presence of causality. It is argued that this method is preferred to the VAR due to its ability to reveal temporary causality as it uses the coefficient of lagged error correction term and those of the explanatory differenced variables (Agbetsiafa, 2004). We seek to explore all the economic variables in the presence of a structural break, however our interest is whether the deepening of pension assets has through capital market development been channelled to expand growth with and without reform.

6.4.1 Variable definition and data

The data used comprises annual data taken from the World Development Indicators (WDI) between 1975-2014. Total pension assets data is derived from the FSB's Annual Report. The South African Registrar of Pension Fund issues the report annually, there are 41 data points in the time series from 1975–-2014 to allow sufficient time trend for capturing the relevant data.

In this study all variables are annual and have been transformed to natural logarithm (LN).

GDP per capita (GDP) at constant 2005 prices is used as the proxy for economic growth, it constitutes the gross value added by resident producers in an economy, divided by the total population. The natural log of per capita GDP becomes the growth rate.

Total pension assets to GDP (PFA) are measured using the FSB annual aggregate assets of retirement funds in South Africa to GDP. This comprises all privately-administered funds, underwritten funds, GEPF, Transnet funds, Telkom Pension fund, Post Office Retirement Fund and foreign funds. We expect an increase in pension assets to move in a positive direction with economic growth as previous studies have shown a relationship between financial development and growth.

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Total pension asset interaction (INTPFA) is measured using aggregate assets of retirement funds in South Africa to GDP multiplied by market capitalisation to GDP. This is a variable that shows the interaction between pension asset and capital market development. It is expected that pension fund assets channelled into the economy through capital markets are likely to increase economic growth.

Stock Market (STK) is a proxy that measures *Market capitalisation (as percentage of GDP) as a ratio to Gross fixed capital formation (GCFC) (as percentage of GDP).* Market capitalisation of listed companies is the market value measured by number of shares times the share price. This is a proxy for capital market development and is also referred to as stock market capitalisation. GFCF formerly gross domestic fixed investment is a measure of gross domestic investment our variable for physical capital accumulate. It is measured as the outlays on additions to assets of the economy and changes to the level of inventories. Stock market is expected to have a positive impact on growth.

Population Growth (POP) is a measure of the annual population growth for the year t-1 to year t. It is a proxy for the labour force, we expect population growth to have a negative effect on long-run growth.

Debt to GDP (DEBT) is a measure of the ratio between national debts owed and the GDP. We expect a higher ratio to have a negative effect on long-run growth, as public fiscus is increasingly used to service debt at the expense of government consumption.

Number of listed companies (LST) is a measure using the number of listed companies in the stock exchange. It is expected that improved corporate governance will encourage listings, and thus have positive impact on growth.

6.4.2 Modified unit root test for structural break

The PP, Kwiatkowski-Phillips-Schmidt-Shin, and ADF methods are useful in determining the stationarity of variables. If the variable identified does not exhibit a random walk, or exhibits a structural change in the series, this has implications on the data in terms of level, change in the slope's trend or even having a combined effect on both the level and trend of the slope of data (Ranganathan, 2010.). Using the ordinary unit root tests the tendency to accept the null hypothesis on non-stationarity is heightened due to misspecification bias and size distortions. The ZA and modified ADF (also known as the breakpoint) unit root tests were designed to account for the presence of these structural breaks. Harris and Sollis (2003) outline that when structural breaks occur the likelihood of falsely rejecting the null hypothesis of non-stationarity is increased. The power of the unit root test is lowered.

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The literature review shows that pension fund system underwent a permanent shift during the period under review and this suggests the normal stationarity unit root test must be adjusted. The breakpoint unit root tests and the ZA approaches consider breaks in the trend, intercept or both. We will test using the ZA unit root test for both the intercept test and the intercept and trend model instead of the conventional unit root tests that will lead to biased results. Perron considered the breaking using the additive or innovative outlier model, and the preferred approach which is more straightforward is the innovative outlier model which we select as it adjusts for gradual changes in the trend function (Harris & Sollis, 2003).

The ZA method sequentially runs regressions for the break dates (Harvie & Pahlavani, 2006). The model constructed shows that the structural break series hypothesis is such that:

$$H_{0:}\, y_t = \mu + y_{t-1+}\, e_t$$

$$H_{1:}\, \mu + \widehat{\theta DU_t(T_b)}$$

Both the change in trend and intercept are incorporated. The timing of the structural break is known at *TB* where the model endogenises a single break in the series yt. A dummy variable DU_t captures the shift in intercept, and dummy variable DT_t captures shift in trend. The null hypothesis is that the data is non-stationary. The alternative hypothesis is that the series is I(0) with one structural break.

6.5 EMPIRICAL RESULTS

6.5.1 Stationarity using Zivot Andrews test

The time series unit root test is conducted using the ZA test and the modified ADF as reported in Tables 6.1. The break point in the time series is estimated as endogenously determined. The results of the t tests using the ZA unit root tests are stationary with the model of intercept and trend change, or both. The null hypothesis of is each variable has a unit root with a structural break in the trend. The ZA test shows we can reject the null hypothesis for all variables at the 5 percent significance level in the intercept model. The only changes with the trend model we see this is not significant for *STK* and *DEBT*, except when both trend and intercept are considered at the 5 percent significance level. The results are confirmed with the third model (both intercept and trend), where we see all variables are significant at the 5 percent level in the presence of a structural break in the trend.

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Table 6.1: Zivot Andrews unit root test

Variable		TB	t_α	TB	t_α	Corresponding
Description	Symbol	(Intercept)		(Trend)		break time
Per capita GDP	*GDP*	2004	-2.89	1998	-3.78	Global financial crisis, 2004?
Population growth	*POP*	2001	-7.25	1994	-3.22	Democracy
Pension assets interaction	*INTPFA*	1985	-3.59	1994	-4.76	Sanctions
Pension assets	*PFA*	1999	-1.91	1996	-5.60	Financial crisis and PAYG to FFS shift
Listed companies	*LST*	1986	-5.61	1991	-3.77	Sanctions
Market capitalisation	*STK*	1997	-5.89	1988	-5.15	Sanctions and democracy
Debt to GDP ratio	*DEBT*	2002	-4.11	1994	-3.12	Democracy and systemic shift

*These variables are non-stationary at the 5% significance level

The empirical results show that the null hypothesis of non-stationarity is rejected, and the alternative hypothesis holds for all the variables under investigation thus far. The results show that the corresponding structural breaks cover the democratisation period, global sanctions and the financial crisis. The structural break for pension assets coincided with the pension fund systemic shift when National Treasury reduced unfunded liabilities of pension assets in 1999, leading up to the formation of the PIC. In addition, *STK* and *DEBT* can be linked to the advent of democracy and the integration of the South African economy with the global economy as sanctions were lifted leading to linkages of capital markets and investments with global markets.

6.5.2 Cointegration analysis

In order to select the optimal lag we employ the HQ, AIC and FPE. The appropriate lag length is 1 with AIC, LR, SC, HQ and FPE $p = 2$.

Table 6.2: Results of lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
1	309.06	NA	1.79e-16*	-13.61	-10.79	-12.63
2	436.11*	141.17*	8.66e-18*	-17.12*	-11.49*	-15.15*

Note: The asterisks (*) denote the lag order selected by the criterion

Next, to determine whether or not cointegration is present we run the Johansen approach to estimate the number of cointegrating relationship among the variables. The maximum

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eigenvalue test statistics indicate that there exists at least seven cointegrating equations at the 5% significance level. Whilst the Max-eigen value test indicates five cointegrating equations. We can thus reject the null hypothesis of no cointegration.

Table 6.3: Results of cointegration test

Null	λtrace	**5% Critical Value**	**Prob****
r = 0*	465.12	159.530	0.0000
r≤1*	306.78	125.615	0.0000
r≤2*	205.85	95.754	0.0000
r≤3*	118.24	69.819	0.0000
r≤4*	74.41	47.856	0.0000
r≤5*	36.42	29.797	0.0075
r≤6*	15.83	15.495	0.0444
Null	λmax	**5% Critical Value**	**Prob****
r = 0*	158.35	52.362	0.0000
r≤1*	100.93	46.231	0.0000
r≤2*	87.51	40.078	0.0000
r≤3*	43.93	33.877	0.0023
r≤4*	37.99	27.584	0.0016
r≤5	20.58	21.131	0.0596

Having established cointegrating relations allows us to estimate the VECM. Using the optimal lag selected the long-run equilibrium state for the variable is shown below. The VECM results show that there is a long-run relationship between the variables in the model and in the long run they move toward long-run equilibrium state. Table 6.3 shows the error correction term, it measures the speed of adjustment toward long-run equilibrium, showing how quickly the level of disequilibrium between growth and its determinants is corrected within one period. The rate of convergence towards equilibrium is shown as negative and significant at 5 percent critical value. The error correction term at -0.055 confirms cointegration and the coefficient indicates the speed of adjustment of short- to long-term equilibrium, which means that 5,5 percent of any disequilibrium between real output and the explanatory variables is corrected within that period.

The error coefficient of the cointegrating vector must be negative and significant for causality to be established (Wickens, 1996). Three of the models exhibit acceptance of these restrictions, and in the first model, which is our model of interest with respect to the

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endogenous variables causing output in the long run. The VECM is useful to determine short-term dynamics between variables, but is restricted in interpreting long-run relationships.

Table 6.4: VECM estimates

Variables	LR coefficient on GDP						
	PFA	INTPFA	STK	LST	POP	PFA99	DEBT
Coefficient	-0.683	0.591	-0.505	-1.361	-2.7406	-0.1475	0.711
t statistic	-8.366	8.47	-5.794	-23.14	-28.69	-36.86	13.48
ECT	-0.056						

After having established cointegration we test causality based on the modified Wald test/Granger causality to establish the direction of causality. The results are reported in Table 6.5 report on whether pension fund assets, capital market development, governance, debt, population can jointly result in causality for the different models. Secondly as reported in Table 6.6 we estimate and report the results of granger causality. The multivariate causality test suggests that *DEBT* and *PFA,* cause economic growth at the 5% significant level in the presence of a structural break[14]. In the event of a structural break we still see a positive effect of pension assets on output, as in the course of when no structural break has occurred as shown in the previous chapter. *INTPFA,* and *PFA99* cause economic growth at a weaker 10% significant level. There are no feedback effects from *INTPFA*, *PFA* and *PFA99* to *GDP.* Bidirectional causality with feedback effects show us that *GDP* causes *DEBT* and vice versa. The results show us that *PFA99* caused *DEBT*, this has important policy implications. The variables of interest are significant, with evidence that pension funds cause economic growth through capital markets. Overall in the background of a structural break, the results also suggesting capital investment plays an important role in stimulating economic growth.

Table 6.5: Weak exogeneity test

	Chi square	Probability
GDP	32.03576	0.00
LST	20.53564	0.1141
PFA	31.45930	0.0048
INTPFA	38.91863	0.0004
STK	59.58678	0.0000
POP	279.0626	0.0000

[14] The VAR Granger Causality/Block Exogeneity Wald Tests showing all dependent variables cause the dependent variable GDP has a chi-squared of 314.08, df =18 at 1% significance level.

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PFA99	29.39105	0.0092
DEBT	24.89709	0.0356

The results of the weak exogeneity test are able to show the endogenous variables in the model. Table 6.5 we see that *GDP*, *DEBT*, *PFA99, PFA, INTPFA, POP, STK* are endogenous variables at the 5 percent level of significance.

Table 6.6: VAR Causality

Multivariate Causality Test			
Null hypothesis	**Decision**	**Chi-sq statistic**	**Probability**
PFA does not Granger Cause GDP	Reject	6.974960	0.0306
GDP does not Granger Cause PFA	Accept	2.549838	0.2795
PFA99 does not Granger Cause GDP	Reject	5.877523	0.0529
GDP does not Granger Cause PFA99	Accept	0.560931	0.7554
INTPFA does not Granger Cause GDP	Reject	5.642750	0.0595
GDP does not Granger Cause INTPFA	Accept	4.328918	0.1148
POP does not Granger Cause GDP	Accept	3.967922	0.1375
GDP does not Granger Cause POP	Reject	8.769979	0.0125
LST does not Granger Cause GDP	Accept	4.059572	0.1314
GDP does not Granger Cause LST	Accept	0.048255	0.9762
STK does not Granger Cause GDP	Accept	2.798713	0.2468
GDP does not Granger Cause STK	Accept	1.318482	0.5172
PFA does not Granger Cause STK	Accept	1.875992	0.3914
STK does not Granger Cause PFA	Accept	2.819379	0.2442
PFA does not Granger Cause LST	Accept	0.282539	0.8683
LST does not Granger Cause PFA	Reject	6.313234	0.0426
PFA does not Granger Cause INTPFA	Reject	9.188752	0.0101
INTPFA does not Granger Cause PFA	Accept	3.101862	0.2121

6.5.3 Results

According to the findings of the long-run estimates showing the effect of pension assets in South Africa for the period 1975-2014, the study finds evidence that pension assets have a positive effect on economic growth in the long run. The ECM long-run estimates show that a 1% increase in *PFA* causes a 0.68% rise in *GDP*, this is more strongly exhibited by a 1% increase in *PFA99* which results in a 0.14% increase in *GDP*, significant at the 1% level. We also find that a 1% increase in *DEBT* reduces *GDP* by 0.71%. What is also examined in this

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study is whether the increased debt was due to *PFA99*, and it is found when employing the Granger causality/Wald tests that pension funds in the presence of a structural break have caused *DEBT*. This is not found in *PFA* and *INTPFA*, thus leaning towards the argument that implicit debt is incurred when pension systems are adjusted.

This study also finds a weak relationship between *STK* and *POP* and economic growth, suggesting that the effects of labour and capital market development in the long run on economic output are weakly related. The pass-through effects when measuring the Granger causality show that the *INTPFA* causes *GDP*. Similarly, *PFA* also causes *STK* through the interaction term, which further contributes to the argument that capital markets are the channel through which pension assets contribute to growth. Thus, similarly to the previous chapter, we can see that *LST*, *INTPFA*, *STK* cause PFA99 and LST causes PFA without feedback effects.

6.6 CONCLUSION AND POLICY IMPLICATIONS

This estimation is important is it measures the transmission effect of pension assets in the presence of a structural break. Although the results do not show whether before there was a structural break economic growth improved, we measure in the absence of a structural break the impacts in previous chapters. The key message in this study is that the results show the long- and short-run relationship between economic growth and pension fund assets in the context of a pension systemic shift, with specific capital market fundamentals captured in the model. There have been no earlier studies measuring the empirical outcomes of pension reforms in South Africa.

The long-run relationship between debt and pension fund assets confirms the arguments of Hendricks (2008) which confirm that pension reform has in turn led to increased debt levels. Empirical evidence shows that the privatisation process and the financing of liabilities due to reform have led national government to increased debt incurred. This debt has a negative impact on economic growth and does not augur well for economic output.

The study also finds that pension assets consistently have a positive growth effect on economic growth, transmitted through capital markets pre- and post-reforms.

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CHAPTER 7
PUBLIC INVESTMENT CORPORATION AND POVERTY REDUCTION IN SOUTH AFRICA: AN APPLICATION OF THE IADF

7.1 INTRODUCTION

Scholars have outlined in great detail the role of pension funds in economic growth (Davis, 2006; Rezk et al., 2009; Walker & Lefort, 2002). The financial system has been empirically shown to drive growth through its ability to mobilise savings through financial intermediaries (Levine, 1997). South African financial markets have a highly sophisticated banking sector and notably one of the largest pension funds globally with pension assets valued at $236 million and contributing 0.7% to global pension assets (Towers Watson, 2014). According to the SARB (2015) the contribution of NBFI assets in relation to GDP in contrast to banking has risen significantly over the last two decades, increasing substantially from 85% to 234% versus a more moderate growth from 52% to 129% between 2001–2013. This growth in NBFI assets could mark a paradigm shift for the financial system. South African pension assets[15] have grown significantly from R184 billion to a sizeable R4,035 billion between 1994 and 2015. A large portion of this contribution stems directly from the GEPF managed by the PIC. The PIC manages R1,081 billion assets and 90% of which are government or state employee assets injected into the financial system (SARB, 2015). Although the channels between pension funds and poverty and inequality remain unclear, institutional reform through policies and strategic asset allocation could help alleviate poverty.

According to Stats SA (2017a) the number of people living below the national poverty line of R577 is 30.4 million which translates to more than half of the population. Significant numbers of the population are reliant on social grant support. More than half of the 36.3% (broad definition) unemployed South Africans are youths who lie between the ages of 15-24. South Africa's new democratic government inherited low living standards, high levels of inequality and poverty from the apartheid government. Despite several policy programmes, expenditure boosting growth and government-directed expenditure in infrastructure in the two decades post democracy, growth remains hardly adequate to absorb the large numbers of unemployed and reduce inequality. Growing countercyclical fiscal policy has instead caused soaring debt levels, and increased budget deficits as government debt as a percentage of GDP continues to rise at 32.4% in 2011/12 (Presidency of the Republic of South Africa, 2012). This translates

[15] Pension assets comprise total assets under management of privately/self-administered funds, underwritten funds, GEPF, official funds, Telkom, Post Office and Transnet Fund, foreign funds, and Bargaining Council Funds.

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into staggeringly high interest servicing levels that are not sustainable. Pension funds in South Africa ought to be more prominent in terms of meeting national economic priorities. The dual problem of poverty and unemployment amid affluence should receive focus by institutions such as National Treasury and the PIC. This may occur through the financial sector channel or by public sector intervention. In the previous chapters the analysis has shown that the financial sector channel may be slow in translating to growth, by seeing the results in savings (Chapter 3), capital market development (Chapter 4) and the overall progression into growth (Chapter 5). In Chapter 4 we remarked that the inability to mobilise savings for investments in the bond market may have resulted in their limited impact on capital markets. Thus, capital market development in the context of high levels of poverty, inequality and unemployment remains limited in its impact on growth in the absence of clear linkages to mechanisms and effective financial instruments that will directly and indirectly impact poverty reduction.

The analysis in this chapter seeks to ascertain whether the current design of pension system can be transformed to meet South Africa's poverty and inequality challenges. Is there a different approach to using pension funds to improve the living conditions of majority of South Africans Can a reformed institutional and regulatory framework in the context of the PIC be used as an instrument of poverty reduction? Can the PIC be repositioned to ensure the management of assets that can enhance national development outcomes linked to growth, unemployment and inequality? It is increasingly clear that to answer these questions policy makers need to understand the systemic design of institutions within the financial sector. This chapter will not answer all these questions but rather conduct a systemic assessment of the PIC as an institution. To do this, the study will first analyse South Africa's biggest asset manager, the PIC, its incentives and what drive its activities using the IADF.

The dominant theme around pension fund research in South Africa and globally is focused on empirical investigations measuring the linkages between pension funds capital markets and other macro-economic economic factors (Kaniki & Ntuli, 2011; Sibanda & Holden, 2014; Vittas, 1999; Walker & Lefort, 2002; Zandberg & Spierdijk, 2013). There is also a focus on social security, with evidence shown that increasing amounts of cash transfers have improved millions of lives in rural areas (van den Heever, 2007; Van der Berg, 2002). The non-contributory first pillar has emerged with strong emphasis on social protection and investing in extremely poor and vulnerable households to alleviate poverty. More will be discussed in the literature review section (Section 7.4).

There is scant literature on the optimal institutional model and the necessary pension reforms for redesigning pension institutions to strengthen linkages to national development goals, whilst achieving both positive and long-term returns for pension funds. Hendricks' (2008) criticism of the PIC and its challenges outlines the excessive amounts of debt incurred by

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South African government attributed to the privatisation of institutional assets. He outlines the systemic change as a key failure of pension system reform. The institution is further criticised as failing to use its dominant position in the market to drive a national development agenda despite the dire socio-economic problems faced by South Africa, pointing to the need for a more in-depth investigation of the structure of incentives driving the PIC. A systemic assessment must be conducted to understand the uniqueness of the institution, and the importance of this study is that it provides a theoretical foundation for the institutional analysis of PIC.

7.2 BACKGROUND – A BRIEF HISTORICAL ACCOUNT OF THE PIC

The South African pension fund sector was highly segregated before the mid 1990s and different systems were in place due to the legacy of apartheid. The South African government managed its own pension schemes with parallel structures for Bantustans, each had their own separate pension schemes divided on racial grounds for both contributory and non-contributory pensions (Hendricks, 2008; Van den Heever, 2007). The regulatory bodies managing pension schemes evolved over time, with several pieces of legislation affecting the management of pension schemes (Moleko & Ikhide, 2016). Parallel to the segregated pension fund sector, the robustness and financial depth of the banking sector was developing, arguably to become one of the most sophisticated in the world.

In its infancy South Africa's first pension fund was introduced in the Transvaal in 1882 (Van der Berg, 2002). This led to the formation of the PIC when the Public Debt Commissioners Act of 1911 was passed. The merger of four separate colonies into the formation of the Union of South Africa pre-empted the Act in 1910. The function of the new Act was to hold state assets and use them to finance government budget deficits (Van der Berg, 2002). This remained its main function over the next few decades but expanded to provide funds to the provincial administration, increasing to the provision of loans to government and state entities such as the Rand Water Board and Eskom (FSB, 2012). The PIC was a single government entity that was able to manage and control government funds. The pool of government money was a tool for government to also borrow from itself.

The establishment of a regulator took place after the passing of the Pension Act of 1956. The Registrar of South African Pension Funds was formed in 1959 and its overarching mandate was to manage and play an oversight role for pension funds. The Pension Act of 1956 set in place the various types of pension funds that are still used to classify and differentiate pension funds in the market, including privately-administered funds, state-controlled funds, foreign funds and exempt or underwritten funds. Another piece of legislation, the Public Investment Commissioners Act of 1984, strengthened the regulatory role of the sector. Public Investment

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Commissioners were appointed to control and play an investment management role over public funds. The bond and fixed interest market remained standard but by the mid 1990s equities such as ordinary and preference shares received higher asset allocation. The total market value of shares held by funds as at year-end 1984 was miniscule at only R6.1 million (FSB, 2014). The increased investment of public assets in the fixed interest and equities market played a pivotal role in financial development. During the period up to the democratic elections, the public investment commission still had a close relationship with the apartheid government fulfilling its mandate as a debt provider to government. During this period assets under management also provided a platform for the government to borrow money from (Hendricks, 2008). The FSB (1994) Annual Report shows that the estimated R352 billion in assets was allocated to various asset classes, with the distribution of prescribed allocation to local authorities (R808 million), development boards (R12 million), Rand Water Board (R69 million), Eskom (R2.2 billion), Land and Agricultural Bank (R582 million), Local authorities loans (R3 million)[16]. In addition, it appears that pension funds were a potential source of finance for government deficits with bills, bonds and securities guaranteed by the government of SA or provincial administration of R16.5 billion (10 percent) in 1994 and R18.1 billion (13.8 percent) of total assets[17]. Towards the dawn of democracy there were significant changes in the relationship between pension funds and debt provision to government or its state entities. What was the norm prior to the formation of the PIC changed. Prescribed asset allocation to state-owned enterprises and provincial authorities were lifted pre-1994 thus the PIC was never obligated to use savings for national development. In 1990 legislation was passed abolishing the mandatory investment of 53 percent of assets in prescribed assets (FSB, 1990). The motives and intent of the changed institutional mandate will be revisited in this chapter using the institutional analysis framework.

After democracy in 1994 several changes were seen in the pension fund sector. Amongst the changes the Minister of Finance oversaw the establishment of the GEPF, which was an amalgamation of eleven homeland and government employee pension funds into a single pension fund for all government employees. A decade later, in 2004, the Public Investment Commissioners Act Bill was repealed and terminated, and all assets, rights and obligations were transferred to a new juristic person known as the PIC. The new entity was given a legal mandate to act as asset managers through the Public Investment Corporation Act of 2004.

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[16] The bulk was invested in other asset classes, the focus in this instance is on prescribed allocation to state entities.

[17] Between 1991–1995 the percentage of total assets invested in bills, bonds and securities remained high at 16.2% (1991), 14 (1992), 19.2% (1993), 14 (1994), 12.6% (1995). These were largely loans in the form of bills and bonds to government or provincial administrations.

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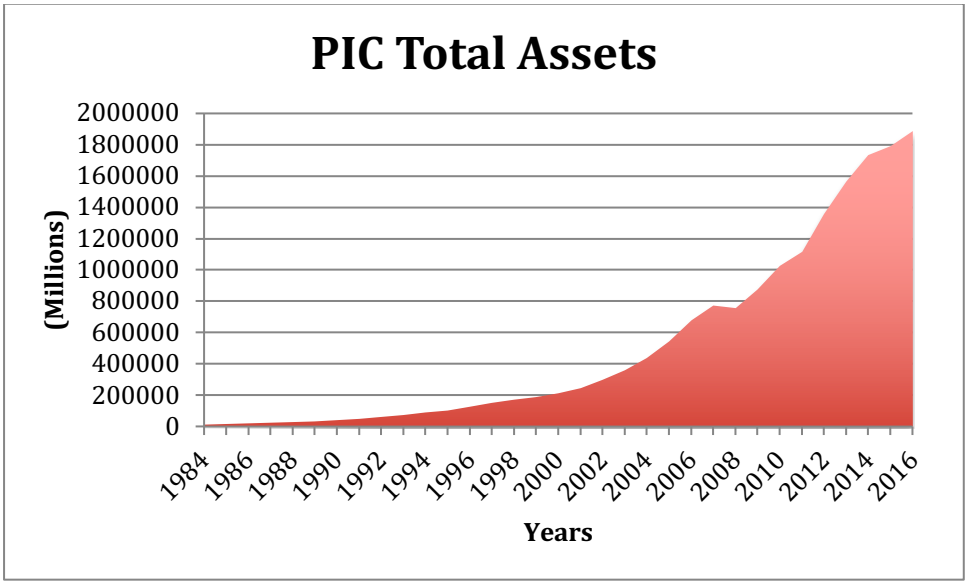
The state assets would be derived from the GEPF and other state entities, such as the UIF. The state remained in control of the fund as it attained its status as the sole shareholder, through the Minister of Finance to whom the Board of Trustees would be accountable. The PIC manages government funds, but it is accountable to government through the Ministry of Finance. Hendricks (2008) argues that the PIC behaves no differently from a private asset management firm and it seeks returns and profits, rather than development or poverty alleviation. Evidence from Chapters 5 and 6 shows that pension funds through capital market development has growth-enhancing outcomes.

The growth of assets in the PIC has been significant in the last three decades (see Figure 7.1).

Figure 7.1: PIC total assets growth



Source: South African Reserve Bank (2017)

Over the last decade we have seen the PIC manage close to 45 percent of the total South African pension fund assets. In the year ending 2012, the PIC assets under management exceeded a trillion rand which is about 49 percent of total pension assets. The contribution of state employees' pension funds to the financial development of the South African economy is significant. As shown in Table 7.1 it is consistently above a third in total pension fund assets in the last 15 years.

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Table 7.1: Proportions of GEPF and PIC in total financial market assets

R million	GEPF Total Assets	PIC Total Assets	All Funds Total Assets	% GEPF	% PIC
2002	293 256	299 923	867 396	34%	35%
2003	307 637	358 711	909 099	34%	39%
2004	377 340	438 525	1 091 807	35%	40%
2005	462 596	545 701	1 283 921	36%	43%
2006	545 600	677 638	1 620 923	34%	42%
2007	673 408	773 540	1 938 569	35%	40%
2008	725 046	754 776	1 973 318	37%	38%
2009	738 281	875 388	1 874 062	39%	47%
2010	817 593	1 025 703	2 198 384	37%	47%
2011	942 832	1 115 052	2 429 843	39%	46%
2012	1 057 325	1 358 916	2 749 145	38%	49%
2013	1 263 299	1 404 000	3 211 017	39%	44%
2014	1 449 951	1 605 000	3 677 244	39%	44%
2015	1 623 465	1 813 000	4 035 825	40%	45%

Source: Author's own compilation, data from SARB, FSB, PIC (2002–2015)

The investment policy of South Africa's GEPF managed by the PIC outlines that the strategic asset allocation must be spread across domestic and foreign equities and bonds. The PIC total asset allocation for listed domestic investment asset classes includes listed equities (44.88 percent), bonds (33.14 percent) and money markets (6.38 percent) for all clients. Based on the mandate some clients include structured investment products, offshore global, and rest of Africa investments. Unlisted investments are allocated between private equity (1.03 percent), real estate (5.69 percent), impact investing (2.12 percent), offshore investments global listed bonds (1.05 percent), global listed equities (4.73 percent) and rest of Africa (0.98 percent). The GEPF investment mandate is spread out across all the above assets under management in accordance with Regulation 28. Previous prescribed asset allocation of investment contributing towards economic and social infrastructure and job creation is no longer mandatory. The equivalent is now possible through an allocation of up to 15 percent which can be invested in alternative investments (either private equity and or hedge funds), but other assets which are deemed to have economic development impact may fall within this category. The Isibaya and Pan African Infrastructure Development Fund targets social and economic infrastructure, job creation, BBBEE and environmental sustainability, and these fall within this segment of assets with a limit of up to 5 percent for African investments. The current asset class composition displays total asset allocation towards Isibaya of 1.40 percent, listed

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African investments (0.62 percent) and unlisted African investments (0.36 percent) (PIC, 2017).

The pension fund sector total assets under management contribute a staggering R4 trillion to the South African economy (FSB, 2015). According to Sibanda and Holden (2014) total assets of institutional investors as a percentage of GDP reached 186 percent in 2009 from a level of 125 percent in 1994. Moleko and Ikhide (2016) observe that the size of the banking sector has shrunk relative to total financial assets. One of the reasons for this shrinkage in proportion to total assets held by banks is the rise of institutional investors, particularly in the last three decades. One of these institutional investors is the PIC, the largest in the sector at 45 percent of all total pension assets (see Table 7.1).

7.3 THE CURRENT ROLE OF THE PUBLIC INVESTMENT CORPORATION IN THE FINANCIAL SECTOR

The PIC is a wholly state-owned investment Management Company. It is a financial services provider in terms of the Financial Advisory and Intermediary Services Act, which allows it to invest funds on behalf of its members. The PIC manages the GEPF, UIF, Compensation Commissioners, Political Office Bearers Fund and the Associated Institutions Pension Fund. The Board of Directors of the investment company are appointed by the Minister of Finance in consultation with cabinet, seven of the Directors are Non-Executive Directors.

According to the PIC Annual Reports, the GEPF historically and to date has contributed a minimum of 90% to the funds on behalf of which the PIC invests. According to the GEPF Investment Policy Statement (n.d.) there exists a special relationship between the PIC and the GEPF. A mandate has been given to the PIC to act as the funds asset manager over a substantial portion of the fund's assets. Without the contribution of the GEPF, the PIC would likely cease to function in its present capacity. Where the PIC does not manage the assets of state employees, agreements must be entered into with mandates drawn from the GEPF for other asset managers. The active members of the GEPF are employees who work in national and provincial governments, including the armed forces and correctional services.

It is recognised by the GEPF Investment Policy that the sole mandate of the establishment of the PIC is to manage GEPF assets. The establishment of the PIC in 2004 sees it operating as a financial services provider, registered with the FSB. It is a public entity and must comply with the Public Finance Management Act. According to the PIC Act of 2004, the state is the sole shareholder of the PIC and the Minister of Finance is the shareholder representative. This policy change has led to little political interference in the management of the PIC. In fact the strengthened independence and autonomy of the PIC has led to the harsh critique by scholars

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of operating a privately-run, state-owned entity that does little to drive the urgent developmental agenda of the country (Hendricks, 2008).

7.4 LITERATURE REVIEW

7.4.1 Pension funds and poverty reduction

It is important that we develop clear linkages between financial development and poverty reduction and pension funds and their specific contribution. At the forefront of the finance growth nexus is the argument that finance contribution leads to improved resource allocation by financial intermediaries. What we see less of in the discourse is the argument of Goldsmith (1969) who outlined that the linkages of finance to real economic infrastructure would determine its growth impact. Sufficient literature point to the failure or far weaker linkages between the two (Jalilian & Kirkpatrick, 2002). The discourse focuses on financial market access to the poor and how improving credit, insurance and financial products can enhance economic growth and reduce poverty as market failures are limited. In other words, strengthening financial sector structure linkages to real economic infrastructure would improve connections between financial sector development and growth. The extent to which finance affects growth is largely determined by how distribution of income, assets and access to opportunities of the poor is improved. Runsinarith (2011a and 2011b) confirm the importance of physical capital in improving labour productivity within the neo-classical growth theory. Infrastructure represents physical capital as a factor of production, thus investment in physical infrastructure has growth-leading effects.

South Africa has been at the forefront of the development of pension programmes within this space and such efforts have been proven to improve the overall well-being of older people. SASSA distributed social grants to 17.2 million beneficiaries, 20 percent of which (3.3 million) were old age non-contributory pension grants (SASSA, 2017). The direct impact of social protection has been increased income amongst poor households, improved distribution of income and reduced poverty headcount gap (Barrientos, 2003; Van der Berg, 2006). Increased expenditure is directly linked to social grants and the share of spending of the poorest 40 percent of the population was found to rise to 50.1 percent. This rise was three times larger during the same period for richer households in South Africa during the mid 2000s. The benefits of a well-developed first pillar has been proven to reduce the poverty gap, in addition to reducing the financial vulnerability of older persons and households. In a comparative study between Brazil and South Africa, households receiving the rural household pension were compared to those without one and the incidence of those lying below the poverty line was higher. Household income rose due to the benefits of pensions shared amongst entire households, as old people seldom live alone in South African households. In

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poorer households the reach of pension income can be up to half of the entire household income (Barrientos, 2003). The second and third pillar also holds potential for poverty reduction through establishing the relationship between private pension fund contributions and linkages to infrastructure development. Does this bode well for poverty reduction?

The first school of thought argues that financial sector development through infrastructure investments can have positive effect on growth (Easterly & Rebelo, 1993 cited in Runsinarith, 2011b; Canning, 1998; Calderon & Servon, 2004; Runsinarith, 2008). The second school of thought argues that there should be greater investment in social infrastructure such as education and health which have greater linkages to poverty reduction (Ogun, 2010). In the third school of thought the effect of infrastructure investment on growth is negligible or of no effect.

The financial sector channel has public and private sector flows, these being contributory and non-contributory pensions, with pension fund reform in non-contributory pensions playing an important role. Within capital markets there is a potential link with infrastructure development using pension funds which needs further investigation.

The argument that infrastructure investment positively leads to poverty reduction is not always supported. There is a school of thought which argues that if infrastructure has weak governance enabling the distortion of public investment choices, it is likely to have poor linkages to reduction of poverty (Ali & Pernia, 2003). The lack of maintenance on infrastructure and type of infrastructure investment also varies the contribution of infrastructure to poverty reduction, such that the linkages were lower than expected. An important condition is the location of infrastructure investments: these must be in areas where the poor reside, this means that economic infrastructure such as roads, railways, electricity, water and sanitation services should be located in either rural areas or urban nodes where a high concentration of the poor reside (Ali & Pernia, 2003). Physical infrastructure and its influence on poverty reduction in the rural areas is argued to increase agricultural productivity and wage income, improving overall economic growth. The market effect also results in positive economic gains, with positive effects on total employment, an indirect effect. The intensity of the effect is country specific, but rural infrastructure investments lead to high impacts on farming and non-farming activities. This increased productivity improves the well-being of the population by increasing both income and consumption levels.

Various authors cite the importance of governance and the management of institutions, with the strengthening of such institutions the overall effect of infrastructure on poverty is more pronounced (Ogun, 2010; Ali & Pernia, 2003). Thus the institutional arrangements surrounding infrastructure investments have great influence on the outcomes.

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7.4.2 IADF theoretical background and literature review

The objective of the IADF is to better understand the incentives and outcomes of actors in a variety of settings where decisions are taken collectively. The framework focuses institutional design in an institutional setting, policy realm, or even a company where decisions are taken collectively. The study of a problem without understanding the underlying incentives driving the stakeholders' decision-making within that sector will inhibit the discussion of how to improve the design of policy and or other tools to improve outcomes (Gibson et al., 2009; Ostrom, 2011).

The IADF raises the importance of understanding administrative and institutional challenges in the context of sectors where collaborative decisions are taken. Decisions taken by institutions within sectors occur in environments of pre-existing institutional arrangements; in the context of this there is a proposal to broaden participation. Now the issue of governance in a sector comes under scrutiny due to ineffectiveness, problems or negative sentiment surrounding various aspects in the sector. It can also be used to analyse the effectiveness of policy, policy reform and policy design (Ostrom, 2011; Polski & Ostrom, 1999) in an effort to improve the design process in policy making and to also avoid policy failures. In the context of pension funds and use for national development, IADF is useful in identifying the context, the outcomes that the intended objectives display and what gap exists between what is expected and what is proposed in policy. Understanding interactions within the sector will further inform how such policy outcomes have occurred. Using the IADF the analysis of policy and design is simplified.

What is the objective of IADF? It seeks to present a practical and systemic method of doing analysis in settings at three levels: operational, policy making and constitutional. At these levels the IADF simplifies complicated social scenarios into easy arrangements, whilst simultaneously enabling the investigation for processes that are interdependent where variables in an institutional setting depend on more than one other variable. IADF provides the necessary tools for studying incentives in these parameters. It takes into account the complexity of a multiplicity of activities and situations from an institutionally-oriented policy perspective (Polski & Ostrom, 1999). There are various sectors where decisions are taken jointly, not as single units either in the community or by government. Imperial (1999) argues that such behaviour is prevalent in various sectors: examples of sectors where IADF has been used are where land and natural resources are predominantly managed or common resource pools (Polski & Ostrom, 1999). Eco-based management systems and agencies that implement this management approach have been analysed using this framework. For instance, in the management of water quality it is accepted that factors other than point of source discharges affect it, land use is an important variable with respect to run-off. This brings to the fore the

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issue of cause and effect, or rather the interrelated nature of problems. In resolving these problems, a system of solutions that are not disjointed but unified should be implemented. Where this approach is not taken, problems emanate from taking solutions from a narrow self-interested approach resulting in common problems such as the non-effective use of resources, government spheres showing inconsistent policies, and duplication and fragmentation of responsibilities and authority. Other examples where the IADF can be applied includes development aid assessment (Gibson et al., 2009), eco-system based management (Imperial, 1999), forest governance (Andersson, 2006), natural resource governance (Clement, 2014), the Australian outback (Smajgl et al., 2009), biotech and pharmaceutical companies (Jommi & Paruzzolo, 2007) and fisheries (Imperial & Yandle, 2005).

Development aid is an example where harsh criticism spurned the use of the framework when practitioners, policy makers, scholars queried if aid fulfilled its objectives (Gibson et al., 2009). The case study of the Swedish International Development Agency (SIDA) is done with an institutional view taken on development aid. The agency is chosen as a case study due to its role as leading innovation within the sector. A better understanding of the causes that result in ineffective aid outcomes will aid in improving outcomes. These causes are referred to in the IADF as incentives.

Pension funds for development and the pension fund reform process and their implications for South African national development discourse is the area of examination within this chapter. The policy environment and stakeholders within the sector provide the relevant context for the analysis. The context is pension funds used for national development. Once a context is applied, IADF then makes use of four tools or mechanisms to perform institutional analysis (Ostrom, 2011): (i) determining the action arena, (ii) outlining the perceived incentives, (iii) determining the patterns of interaction, and (iv) measuring outcomes. Using IADF affords us the opportunity to understand the underlying problems faced with collective action decision making, and how a particular intervention within an environment alters the problem. Evaluations of the outcomes and interactions then occurs using IADF tools. Incentives are able to inhibit all development, growth and other outcomes across the political, economic and social sphere within a sector. IADF is able to identify incentives within the system, created by the system and between actors of a sector that limit gains that a policy or tool was intended to bring about. Policy processes and a sector's own systems may produce perverse incentives which occur when generally harmful decisions are taken by an institution or individual at the expense of others.

In this study we seek to explore from the institutional perspective of pension fund reform the PIC and pension funds being used for furthering development, specifically identifying the key variables that influenced pension reform in the financial markets. A better understanding of

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the causes that result in ineffective pension reform outcomes will aid in improving future policy design. There is limited work on financial sector policy reforms and institutional analysis in the literature. Even sparser is literature on African-related institutional analysis in the financial sector. This chapter will investigate and present outcomes with the intention of improving future policy design. Using IADF this chapter will add to the literature by contributing to the institutional framework in financial sector development and more specifically within pension fund reform.

7.4.3 IADF empirical literature review

The IADF has been utilised in institutional analysis across various settings. Andersson (2006) utilised the framework in assessing forestry sector governance across 32 municipalities in Bolivia. The context within which the framework was used was to test how institutional arrangements in less developed economies shape outcomes where policy making occurs in a decentralised manner through municipalities. These institutional arrangements affect the use of environmental assets, and the study was able to experiment through various scenarios the likelihood of success in governance outcomes. The exploration of forest governance using this approach required identification of the action, the actors and the context of biophysical environment through which these actions were affected by the actors. Using data gained through samples from the 32 municipalities, a binary logit regression analysis was utilised to test whether the level of learning impacts the ability of institutions to effectively deliver services. The output shows association between learning type and the ratings of municipalities, illustrating that the perceptions of government are linked to different learning types.

Clement (2010) conducted an analysis of Vietnamese afforestation policies to analyse policy shortcomings in the sector. The contribution of this study is the inclusion of an assessment of higher institutional and government levels in liaison with local communities or what is commonly referred to as grassroots communities. This shows the use at multiple levels of governance, and the framework is utilised to advance additional output that common literature does not provide. The paper is also able to provide policy recommendations and design thereof by using the IADF. It was found in the study that the nationwide five-million-hectare reforestation programme has had little impact on environmental protection and improving the livelihoods of citizens as envisaged. Recommendations are made on the policy-making processes and discourse to be held by different institutions.

The role of public administration is highlighted in a study on the factors impacting localisation by pharmaceutical and biotech companies in Italy (Jommi & Paruzzolo, 2007). Using IADF the authors outline that the action of public administrators in regulation of the sector, and policies

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that manage incentives and levels of resources isolated for research directly impact levels of localisation. These factors were investigated with other indirect influences also in the control of public administration through policies. The study analysed the factors behind the loss of industrialisation and disinvestment from this sector using questionnaires and surveys in face-to-face interviews with firms from the Association of Biotech Companies and the Italian Pharmaceutical Agency. Several policy recommendations arise from the study that may inform future interactions between sector players in the Italian R&D biotech and pharmaceutical industry.

Lastly, in the fisheries industry policy shortfalls are examined by methods that examine institutional performance and design (Imperial & Yandle, 2005). It is argued that IADF however exceeds these shortcomings. The paper begins by outlining clearly the various kinds of institutional arrangements within the fishing sector, namely community, market or bureaucracy based. The study reveals the relevance of the framework within other contexts and its advantages that are beneficial to analysis of the management institutions in this sector. Examining the contextual setting or action arena, transaction costs are analysed at three levels: information, coordination and strategic costs. Assessment of institutional performance is conducted by qualitative assessments of efficiency, equity, accountability and policy outcomes. The literature review shows that most empirical studies have focused on municipalities, private companies in manufacturing and pharmaceuticals and a large number within the natural resource managing institutions and communities. No studies have shown the application of the framework for analysis of institutions within the financial sector. In conclusion, this study will focus on policy design and institutional analysis in the pension fund sector, focusing on the financial markets in South Africa.

7.4.4 Research methodology and framework

The research methodology for assessing the PIC will be the IADF, a methodology developed by Ostrom (2011) that provides researchers, policymakers and scholars with tools to solve complex goals and incentives of multi-layered stakeholders. Ostrom (2011) describes the framework as enabling her to identify reforms taken within the police services sector in a state in the United States. It has been reproduced in various other fields and sectors as outlined in Section 7.4.2. The framework is able to outline structural factors that enable increased cooperation, and the framework makes use of various theoretical tools to reach its conclusions. These include game theory, institutional analysis, principal-agent approaches, common pool resources theory and public goods.

Using IADF we can assess the perverse institutional incentives within any system, and in the case of this study the pension reform system, its policy processes and day-to-day interactions.

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The SIDA case study is a useful comparative study whereby the method undertook to assess the incentives within the sector of development assistance. These incentives are important as they affect the manner in which the institution takes action, the execution of strategy, the nature of pension reform, and its policies (Gibson et al., 2009). This study will identify collective action situations whereby perverse incentives may hamper the intended outcome and its success. The objectives of the PIC's investment policy are outlined as long term to ensure that members are provided with their benefits as promised, taking into account inflationary increases. Furthermore, the contribution rates of the employer will remain stable with responsible investment guidelines adhered to (GEPF, n.d.).

The first step therefore deals with identifying the day-to-day situations that affect all citizens. Step two is a look at the policy processes in a nation and the interaction of stakeholders and the structure of incentives within a given context or "action arena". In this stage the attributes of community participants and the rules in use are outlined, such as those that deal with the additional social, political and economic factors. The third step assesses the systems within which pension funds are managed, which is a complex web of relationships that are able to result in perverse incentives. The fourth perversion can occur within the PIC institution itself, and stakeholders directly linked to the PIC.

The methodology draws on polycentric decision-making whereby different actors that are independent of each other take decisions. This framework uses a multidisciplinary approach at various levels of analysis. The outline of the framework is shown in Figure 7.2 and describes the interaction used by the theory in decision-making.

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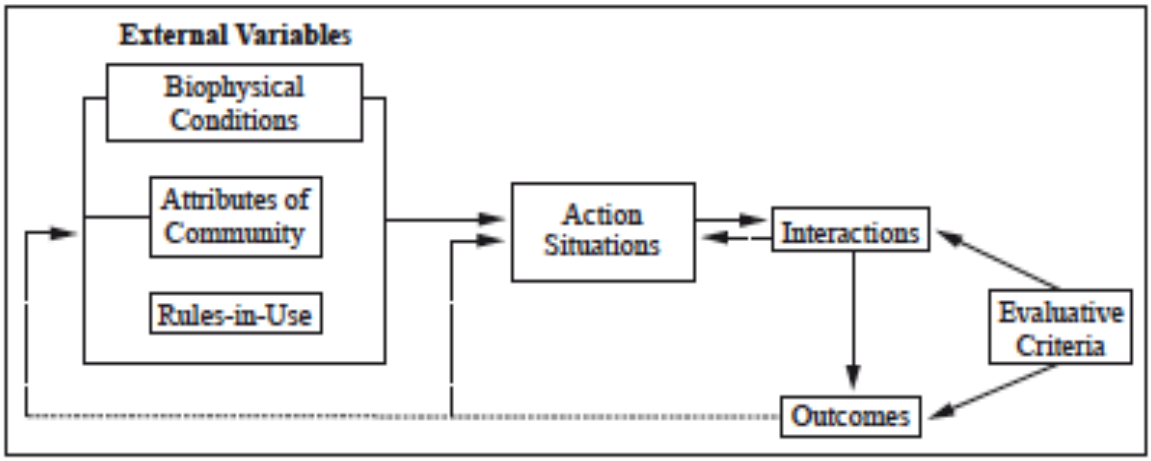
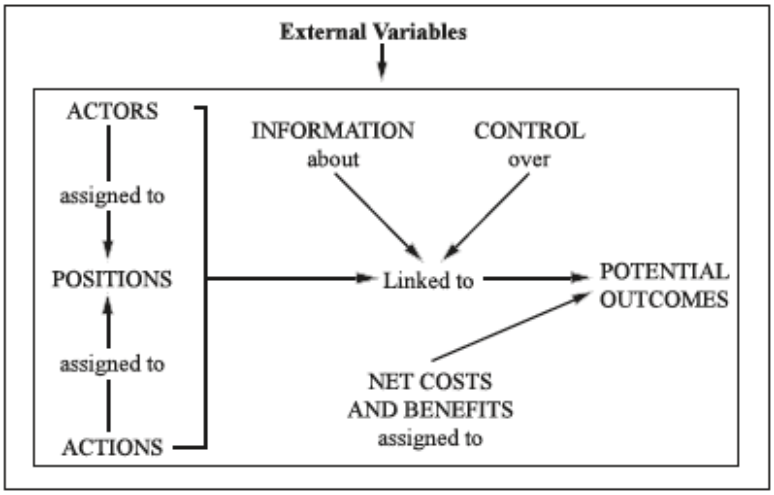
Figure 7.2: Framework for institutional analysis



Source: Ostrom (2011: 10)

Figure 7.3: Action Situations Structure



Source: Ostrom (2011: 10)

Each action as displayed in Figure 7.3 has several characteristics that determine the decision taken, and each individual, stakeholder, beneficiary and institution affected is assessed in this regard. Factors such as the actor's characteristics, information available at the decision-making point, what power is held by the actor, and costs and benefits linked to actions. These amongst several others determine decisions, and are designed in a game type experiment where these elements are examined to understand behaviours and outcomes in different situations. This area is not the scope of my research, however IADF will help to answer questions around the establishment of PIC, its environment and community attributes. The framework also provides a process to give understanding of the action situations, the costs and benefits and associated outcomes in institutions.

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7.5 THE CASE OF THE PUBLIC INVESTMENT CORPORATION IN SOUTH AFRICA

7.5.1 The action area

The PIC was established in 1911 when the Public Debt Commissioners Act was passed and its role was to finance government budget deficits, to hold state assets, and to provide loan finance to government and state-owned entities whose primary function was infrastructure provision: this enabled the government to borrow from it. The institution was affected by the passing of the 1956 Pension Act that set out regulatory tools for the management of pension funds. Pension fund administration during the apartheid era was racially divided when the majority of Africans were forced to reside in homeland administrations. The civil servant pension funds followed suit and were under separate homeland administration, ten such funds existed in the Bantustans. Trade unions during this period of separation of 1959–1994 established provident funds that were the first non-contributory schemes for Africans. This separation continued until 1994. Amendments leading up to the Public Investment Commissioners Act of 1984 saw the new role of investment management mandate upon the entity. It was only between 1995–2015 that the corporatisation and amalgamation of the PIC was seen. Firstly, the GEPF amalgamated state employee funds in the former Bantustans and the former Republic of South Africa. This fund's investment policy outlines that it is a public entity and it articulates that the sole mandate of the PIC's establishment is to manage the GEPF assets.

The PIC is also a public entity, although it is run and operated as a private enterprise, the PIC Act of 2004 requires that it complies with the Public Finance Management Act of 2004. The state is the sole shareholder and the Minister of Finance its shareholder representative. Investment managers are allocated assets through asset consultants or directly by the PIC. The FSB, the PIC Act of 2004, the Pension Act of 1956 and the Financial Advisory and Intermediary Services Act regulate the process of asset and investment management.

The main *actors* in the current PIC are the main fund contributors, which are pension funds namely GEPF, UIF, Compensation Commission (CC), Associated Institutions Pension Fund (AIPF) and Political Office Bearers Fund (POBF). The Ministry of Finance, asset managers and asset consultants, Government Regulators, the FSB, interest groups and trade Unions, PIC Board and staff and the recipients who are also asset owners act on behalf of the pensioners. The contribution to the PIC has been relatively consistent since its establishment with the GEPF in 2004, contributing 94 percent of assets to the latest 2015 levels of 88.8 percent, UIF (6.2 percent), CC (1.8 percent), AIPF (0.8 percent) and others (1.4 percent). This contribution amounts to R1.81 trillion in assets under management with a net profit of R330 million (PIC, 2015).

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The *action situation* can be defined as the period from when the PIC Act of 2004 was pronounced and legislated until 2018. This confines the study to the post- democratic dispensation era where the transformation of Public Investment Commissioners and the newly formed PIC was established.

7.5.2 Influences on the action area

The usefulness of the IADF is that the factors influencing interactions in the action area can be identified. The framework is usually applied in instances of economic governance that entails biophysical characteristics that are important within natural resource management. Although this does not hold for pension fund management, the prevailing socio-economic and institutional conditions of the pension fund sector and South Africa's economic condition remain relevant.

Active pension fund members grew to 16 million members with over 5,000 registered pension funds. The GEPF contribution is a substantial 1.2 million individual members. The number of South Africa's members remained under 10 million until 2005, with the increase of an additional 5 million in the last decade (FSB, 2015).

The systemic shift from PAYG to FFS led to the corporatisation of the PIC. The Department of Finance is the custodian of pension reform, however little evidence is provided on the purpose, nature and specific areas of reform conducted during this time (Department of Finance, 1998, 1999). Scholars have outlined that reform is effected through legislative and regulatory amendments, tax legislation changes, contribution levels, fiscal reform liabilities and debt management levels. These are but a few of the channels through which pension reform is affected. In the 1980s and mid 1990s South Africa effected other major systemic reforms in the public pension system. The Department of Finance's Annual Reports (1998 and 1999) reported that the GEPF was formed after the amalgamation of several funds. A single homogenous fund with standard benefits, retirement provisions, requirements and management was formed post 1994. The level of internal debt due to the pension system transition is one of the signs pointing towards this systemic change. The level of total debt rose from $68 billion in 1989 to a staggering $990 billion in 2008 with the largest portion attributed to domestic debt owed to public servants through the pension fund system reform.

The GEPF supplies most funds to the PIC. Since the establishment of the PIC, the GEPF has contributed up to 90% of the asset allocation. The *nature of the goods* is the management of pension funds. The provision of inflation-hedged pensions to pensioners upon retirement is the most important *community attribute* of the PIC. The main objective of a pension fund is to provide pensions to pensioners. An important rule in the action area affecting the community attributes is the nature of the agreement contained in the GEPF's investment policy that

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highlights the long-term nature of the relationship envisaged through the establishment of the PIC.

7.5.3 Community attributes

Attributes of the community are defined as cultural factors that influence administration and rules within a setting. It is further defined as norms of behaviour and preferences (Imperial & Yandle, 2005). The prevailing or dominant ownership patterns within pension funds were those of a segregated nature; racially, services rendered for black African public or private servants differed from those of Whites pre-1994. After the democratic transition due to amalgamation of state pension funds, a large number of public servants who served under the apartheid government would now be dependent for their pensions on the new democratic government's bureaucracy to disburse member payments. It must also be recognised that the prevailing political arrangements also affect the attributes of a community through legislation and reform initiatives. Upon the establishment of the PIC Act the Ministry of Finance solely played the role of trustee for the GEPF Board of Trustees. The GEPF and PIC *set of rules* were determined solely by the Ministry of Finance as there was no governance structure between the formation of the corporate PIC and GEPF. At the time of the PIC's corporatisation the government was pursuing a neo-liberal growth path for the country's economy.

7.5.4 Institutional context and rules in use

The formal rules require the PIC to manage its portfolio of assets in alignment with Regulation 28. Understandably, the actual interaction between the PIC and the five other funds it manages has not formed part of the scope, the emphasis will be solely on the GEPF. In 2005, the Minister of Finance appointed the GEPF trustees to ensure that a proper mandate with the PIC was established. The important factor to consider within the institutional context after the PIC was corporatised and established was that they were now separate from the functioning of government. Employees of the PIC were not government employees, and their remuneration levels differed.

The *rules in use* of the behaviour of the actors within PIC and GEPF require further investigation. The GEPF investment strategy is implemented by the PIC, and quarterly feedback is given to the GEPF's investment committee on PIC performance. The GEPF determines its own benchmarks which it monitors and assesses regularly. There are means to hold the PIC accountable by the GEPF through performance returns, but there appears to be little engagement between the GEPF Board of Trustees and the PIC Board of Directors

The enforcement of alternative investments by regulators on asset managers is not supported by the industry at large, as industry believes these investments should be at their discretion. Developmental investments need to offer acceptable returns and these must match other

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asset classes, as trustees that do not ensure that projects invested have acceptable long-term returns would be in breach of their fiduciary duties. The formal rules require that the PIC manage the Isibaya Fund on behalf of the GEPF for purposes of national development. The Isibaya and Pan African Infrastructure Development Fund target social and economic infrastructure, job creation, BBBEE and environmental sustainability, these fall within this segment of assets with a limit of up to 5% for African investments.

These imperatives are guided by the GEPF Environment Social and Governance Responsible Investment Policy and Guidelines. The current allocation of R15.1 billion has been invested in infrastructure development via State-Owned Enterprises (SOEs) and a further R10.7 billion has been invested in Small, Medium and Micro Enterprise (SMME) development, targeting sectors promoting job creation and development of social and economic infrastructure (PIC, 2015). This is less than 2 percent of the total assets under management of R1.83 trillion at 1.6 percent asset allocation. It is these developmental investments that link pension funds to poverty reduction. The overall impact of PIC assets has been 99,637 jobs facilitated, of which 89,106 are permanent jobs from its portfolio (PIC, 2017). In a country facing 27.6 percent unemployment or 5.98 million unemployed people this is unlikely to make the required dent on poverty reduction.

Inderst and Stewart (2014) highlight that the current source of infrastructure finance across countries is largely from public funding through the national fiscus (70%), with the private sector providing 20 percent, while 10 percent is from multilateral and bilateral agencies. The national fiscus allocation is managed by the public sector through the role of SOEs. Multilateral and bilateral agencies play a far smaller role in South Africa, lower than the average 10 percent allocation of infrastructure it shrinks to 0.5% allocation from aid agencies. A significant share of infrastructure budget allocations occur to SOEs such as Eskom, South African Airways, Prasa and Transnet (Anyanwu, Mafusire, Brixiova, & Mubila, 2010; Inderst & Stewart, 2014).

According to the African Development Bank Africa's estimated infrastructure gap suffered a shortfall of $93 billion per annum between 2009–2010 (Anyanwu et al., 2010). South Africa's infrastructure gap is estimated at R1.5 trillion, with the government financing R834–R947 billion towards infrastructure over the last five year period (Ismail, Pillay, Mabuza & Xolo, 2014; Gordhan, 2017). The infrastructure investment shortages are in roads, power, water, telecoms, rail, airports and ports. Supply of long-term financing for the infrastructure finance gap of R700 billion from institutional investors has come under the spotlight, as pension funds, insurance firms and sovereign wealth funds are identified as sources of capital. South Africa's institutional investment capital as an emerging market investor has significant potential to allocate both social security funds and institutional investments in far greater measures. Pension funds in other parts of the globe are a major source of capital, financing infrastructure

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due to the long-term inflation-linked product over long-term views. Beeferman (2008) argues that Australian pension funds have allocated 5 percent of assets to infrastructure investments, the Canadian pension plans invest up to 15 percent of assets on infrastructure investments. In the United States many retirement funds association with infrastructure has increased to 5 percent with the Washington State Investment Board, California Public Employees Retirement System and Maine Public Employees Retirement System. The current 1.40 percent asset allocation to the Isibaya fund falls short of these targeted infrastructure investments in first world economies. Developing economies have also invested much higher proportions of finance for infrastructure investment from pension funds. Allocations of 5.34 percent (Chile), 11.1 percent (Peru), 21 percent (Brazil), and 1.7 percent (Colombia) are measured from Latin American countries pension fund participation (Alonso, Bjeletic, Herrera, Hormazabal, Ordonez, Romero & Tuesta, 2010).

South Africa unlike other African countries has highly developed capital markets with a strong privatised occupational system regime and private personal schemes (in both the public and private sector). The pension fund market is one of the biggest globally and ranked 10th contributing 0.7 percent to total world pension assets under management (Towers Watson, 2014). Current pension fund legislation through Regulation 28 outline asset allocation and govern asset allocation limits across domestic and foreign bonds and equities. The PIC has however contributed significantly to increased depth and liquidity of capital markets, with a sizeable proportion of assets at 13 percent of market capitalisation and 24 percent of the bond market (Delaney, 2016).

It is possible that the reliance on capital markets may be inadequate in South Africa due to Regulation 28. It sets out an investment limit of asset classes: asset allocation into alternative or other investments (these incorporate infrastructure assets) are permissible to a maximum of 15 percent of the fund's portfolio. Whilst measuring the funds allocated towards responsible investment, which include targeted infrastructure investments, the study finds between 0.7-1.40 percent of the total investment allocation (PIC, 2017; Viviers, Bosch, Smit & Buijs, 2009).

7.5.5 Evaluating outcomes using the IADF

Collective action situations are numerous within this framework, it is these collective action situations that breed perverse incentives that the establishment of bodies and organisations at a regional or national level will mitigate. There exist little documentation and record of the other funds that contribute to the PIC, however historically the GEPF accounts for between 88-94% of the PIC's total assets under management. This 90% is attained from a mandatory requirement for all government employees to make 13-16% contribution of their pensionable remuneration towards retirement. The PIC has recorded profits of up to R330 million and from

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a wealth generation perspective they fare highly with respect to efficiency. The market impact of the PIC's listed and unlisted investment has developed capital markets (as outlined in Chapter 4), improving efficiencies from a productivity perspective. Using IADF there are different perspectives to measure the strengths and weaknesses of institutional arrangements, efficiency is but one. Equity, accountability and adaptability also play important roles (Imperial, 1999; Ostrom, 2011). An outcome may be efficient, but still fare low on equity or adaptability. When those who derive greater benefits from an action are made to pay for it, fiscal equivalence is said to take place. A lower ability to pay in this context would not exclude one potentially benefiting from pension fund investment activities. In fact in the context of equity, activities in this context require resource allocation occur where those least able to pay derive greater benefits. Redistribution would occur through investment allocation towards assets that enable the lower income quintiles to derive benefits. Based on the action area the outcomes attached to the actions result in poor impact with regard to socio-economic development impact. The Pan African Infrastructure Fund aimed at raising capital for infrastructure has been dormant with a miniscule 0.62 percent asset allocation to listed assets, and 0.36 percent to unlisted assets, it fares less than a percentage allocation. The GEPF's Responsible Investment Policy statement highlights its importance but the emphasis currently placed on such investment is minimal. Isibaya's fund infrastructure and enterprise development initiatives fare a meagre 1.4 percent of the asset allocation. Secondly, using the set of rules within institutional arrangements we find that although the legislation framework enables the investment in alternative or other investments (up to 15 percent) of the asset allocation, there may be implicit rules that influence interactions and influence asset allocations within the industry. Factors to consider are the transaction costs, made up of information, coordination and strategic costs required to increase asset allocation to alternative investments (Imperial, 1999). The end results may show positive returns and favourable profits with regard to institutional performance of the PIC, showing good outcomes on efficiency and accountability, however faring poorly on equity and adaptability. Collectively asset managers use criteria and performance measurements that focus on profits and not equity or adaptability. This is required by their clients who measure their performance against asset class benchmarks. The modification of governance, decisions and goals when measured against adaptability within the South African socio-economic context may show that institutional performance is far weaker.

The costs associated with the increased allocation to poverty-reducing assets may be inhibited due to factors such as the management of complex actor interests in infrastructure investments and the costs of information errors in this context. An example is when construction risk is high or when revenues of infrastructure project are dependent on toll fees

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which at times do not materialise. Where information asymmetries arise, management may deem it too costly and thus avoid the work required in reducing such information asymmetries. Furthermore, due to the number of actors in establishing infrastructure agreements, the coordination costs of negotiating, enforcing and monitoring these may compromise willingness to increase the asset allocation to infrastructure investment. A possible remedy to increase asset allocation would be to use policy to reduce these transaction costs.

The mechanics of the pension system also produce incentives, it is a complex web of relationships between several actors. For instance, the PIC and asset managers can co-exist in the current environment of incentives that do not encourage transformation towards redistribution and equity. This behaviour is maintained as it is seen to have a detrimental impact on the mandate of client priorities. One of the priorities is investment in a portfolio that ensures the risk profile and sustainable returns of clients are met whilst concurrently reducing overexposure to current local market volatility and international exposure. This means the asset allocation and total portfolio of the PIC in unlisted investments that drive economic growth and infrastructure support are not prioritised.

7.5.6 Implications for governance and poverty alleviation

It seems that the structure of pension systems in South Africa does not support poverty alleviation, given the endemic poverty and inability of the economy to absorb the high numbers of unemployed. Investments made into alternative investment allocation hold the greatest ability to drive economic development, reduce poverty and increase employment opportunities for both skilled and unskilled labour. Efficiency priorities are emphasised to the detriment of equity and redistribution, with the overarching goal of profit maximisation targeted. South African financial markets and financial institutions have responded differently to its international counterparts with respect to asset allocations. The PIC currently invests no more than 1.6% of its assets into this asset class, as noted by Isibaya and Africa Equity allocations (PIC, 2015). Stewart and Yermo (2009) concur that an opportunity exists for pension funds to make asset allocations and commit to infrastructure-related bonds and long-term debt investment mechanisms. The current pension fund regulations limited allocation of alternative investments to 5%, this has since increased to 15%. In their quest for diversification and new sources of returns Australian, Latin American and American pension funds have invested between 5% of total assets in infrastructure, with Canadians investing up to 15% of total public pension assets (Alonso et al., 2010; Beeferman, 2008; Inderst, 2009). More developed countries with an enabling pension fund legislation environment, accompanied by legal framework supporting Public Private Partnerships (PPPs), have directly contributed to providing pension funds appetite for infrastructure investments. These countries do not face the dire levels of inequality, poverty and living standards of South Africa.

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Inderst (2009) confirms that infrastructure investments hold benefits different from other asset classes as they are protected from market volatility and interest rate risks. Investments can be made in direct infrastructure projects or indirectly through capital markets listed debt or equity (Inderst & Stewart, 2014). Beeferman (2008) confirms and further argues that infrastructure funds through debt instruments enable protection against inflation and volatility and provide diversification. These favourable outcomes require coordination and initiation for state expenditure and public investment to encourage with private sector participation and investment. The sole responsibility of infrastructure development in the world lies with the public sector and state organs. Infrastructure services are provided by the state as public goods that exhibit positive externalities, with the only tool enabling private sector involvement being the vehicle of PPPs (Sabry, 2015). Project implementation in infrastructure projects must be co-ordinated and initiated by the government through PPPs. Infrastructural services designed using special purpose vehicles enable building, operating, design, planning, management and construction that can be outsourced to private sector (Sabry, 2015; Jamali, 2004). Contractual agreements are entered into through procurement and allocation of responsibilities assigned through structured arrangements involving special purpose vehicles. The states' ability to coordinate successfully is premised on the regulatory environment, which is then implemented through institutions of the state that allocate contracts and oversee the implementation and management of projects. It is government that invokes private sector participation and allocates risks and responsibilities through public agencies, underpinned by sound regulatory framework (Jamali, 2004). Alonso et al. (2010) outline mutual benefits for both private and public when collaboration in infrastructure planning and financing occur. Several stages include planning bidding, execution and management and private capital involvement can be increased by enabling legislation and the necessary management of in the infrastructure design process. These lead to either a crowding in effect whereby private sector participation improves the provision of public infrastructure by increasing the productivity of private capital stock. The alternative is the crowding out effect where investment is reduced due to higher perceived country risk. Various studies point out that there exist a political and project risk between public and private sector due to potential lack of long term political commitment and regulatory instability (Inderst, 2014; Alonso et al., 2010; Beeferman, 2008). In addition, fragmentation between various tiers of government, regulatory instability and short termism of investors could be potential barriers to investment. Inderst & Stewart (2014) posit transparency and accountability reduce mismanagement and corruption associated with such contracts. It is further outlined that enhancing management and technical capacity is also required when facilitating pricing and procurement in arranging infrastructure financing (Inderst, 2009).

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The recent loss of R99 billion across PIC-managed funds in December 2016 when the Finance Minister was changed is evidence of the high levels of investment risk from the current high levels of exposure to equity, bonds and money market (IOL News, 2016). Infrastructure projects such as toll roads, power distribution and transmission facilities, mobile networks and bridges can receive long-term operating cash flows when properly structured. The long-term liability matching is an additional benefit that provides pension funds with long-term cash flows. Yet these benefits are not sufficient to drive greater levels of assets allocation from equities and bonds, foreign and domestic. To change the behaviour of pension fund managers and the PIC towards using greater proportions of the budgets for infrastructure, the issue of incentives need to be addressed.

7.6 CONCLUSION

It is possible that by switching to its current institutional arrangements, the South African economy is bearing a high level of opportunity cost towards the national development agenda having shifted pension systems. Significant capital is available from the PIC but access is limited by legislation possibly curtailing its use for infrastructure interventions that will also act as enablers to driving economic growth. Secondly, the willingness required by institutional investors to meet maximum asset allocation of investments in other assets is grossly inadequate given linkages that could boost economic development reducing the dire socio-economic conditions of poverty, spatial inequalities and economic exclusion of the large majority of the population. To address these challenges policy tools and interventions, tailored to specifically aid the different actors in this action area, are required. One of the constraints leading to the current asset allocation of investments is the discretion that pension funds are afforded by both the PIC and the GEPF into what could be termed the infrastructure asset class. Public investment for infrastructure is largely financed from National Treasury, whose budget is depleting with a shrinking tax base and a slowing down of global growth.

African governments have the unique opportunity of utilising pension fund investment to encourage infrastructure development that will spur economic growth. But this must be accompanied by enabling pension fund regulation, strong contract law and methods for recourse coupled with a strong regulatory capacity in the infrastructure related sector. CEPA (2015) list these factors as upstream constraints and they outline a summary of improvements that address financial and political risk by using appropriate instruments. Regulatory framework and general governance concerns over agencies that collect payments for infrastructure services and quality of governance must also be improved. The accumulation of public finances and pension funds can ensure an inclusive growth path that sees the

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development of the financial system through allocation of capital to meet social services in underdeveloped regions. Thus empirical work in developing countries shows that policy interventions must be on a country by country level as the policy environment for pension fund participation is not homogenous. Ismail et. al (2014) and Alonso et. Al (2010) recommends strengthening the technical support showing value for money in PPP models. Secondly, developing clear framework that enables transparent participation in project process (from design, execution, financing and planning phases). Lastly, improving legal frameworks and consistencies amongst different tiers of government. The South African study found that PPPs usually experience cost overruns and the inaccurate material estimates, late contract awarding and shortage of skilled labour contribute to construction risks (Ismail et. al, 2014). The development of technical expertise amongst agencies involved in infrastructure financing will enhance the appetite for potential investors and reduce drivers of cost overruns.

Currently pension funds play an inadequate role in poverty alleviation. Policy interventions to transform the PIC to play a greater development role can address these weaknesses. Investment in infrastructure should develop economic nodes whilst addressing socio-economic needs. This requires greater emphasis on project planning, building institutional capabilities, good governance and confidence to collaborate in PPPs and the packaging of viable projects. Resources to improve human capacity and improve the regulatory environment will advance the governmental objectives of provision of social infrastructure while simultaneously providing risk-mitigated returns. This is not an automatic consequence but requires legal and statutory reform, and collaboration with institutional investors in identifying and mitigating hindrances to these goals. Using IADF the incentives preventing the PIC and its asset managers from doing the right thing have been identified, and perhaps it is the season for the restructuring of incentives in order to produce different institutional results. These incentives include profit maximisation with managed risk levels offering acceptable returns to its clients. The PIC is a profit-making institution, as are most asset managers reporting R330 million profit in the last financial year (Public Investment Corporation, 2015). This incentive is affirmed by the nature of fees received and collected within asset management. The apparent private control of public funds is confirmed by both the PIC and the GEPF in their annual reports. Pension privatisation has brought along massive fees into asset and investment management firms post 1994. The PIC and its selected asset managers hold the power to invest these funds into bonds, equities, properties and alternative investments. Considering the levels of inequality, underdevelopment and lack of infrastructure are well documented in the National Development Plan, National Infrastructure Plan and National Growth Path, it is imperative that the institutional home for mitigating some of these systemic ills is not just a public goods problem for the public sector to resolve in an alienated

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fashion. The resolution for collaborative actions for favourable outcomes requires co-ordination. With whom does the responsibility of initiation and co-ordination lie with the execution of Public Private Partnerships (PPPs)? The sole responsibility of infrastructure development in the world lies with the public sector and state organs. There is a general perception that insufficient technical capacity for project planning, development and packaging exists in government with whom the private sector must partner. The ability to package projects determines their attractiveness to private investors. The lack of keen interest remains a barrier to investment and is a short term view (CEPA, 2015; Inderst & Stewart, 2014).

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CHAPTER 8
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

The main research objective of this study was to investigate the role of pension funds on South African economic growth. The study investigated the linkages between pension funds and growth with a focus on determining the channels through which such growth would be achieved. In order to establish the connection between pension assets and growth it was necessary to ascertain firstly whether pension assets had a linkage with savings. Secondly, using empirical methods the study investigated whether pension assets had a significant effect on capital markets. This could be either through bond or stock markets in capital markets. Once this was determined using ARDL methodology, the effects of pension assets on growth would be traceable and measured to see the effect of pension assets on growth in the economy. The study was conducted using data from the Financial Services Board and World Development Indicators. Using VECM and VAR methodology the study explored the effects of pension assets on growth. The inclusion of structural breaks due to pension fund reform was incorporated in the model, both these empirical studies enabled the study to measure the cointegration between pension assets and economic growth within and outside the presence of structural breaks. Lastly, the study explored the role of pension funds in reducing poverty as an instrument of equity and redistribution. Institutional analysis of the PIC was undertaken using the IADF, and the PIC as a dominant pension fund manager in the South African context was assessed. Its activities and institutional arrangements could potentially influence national development outcomes. This section investigated the results and ascertained the necessary policy implications for institutional design of pension fund management in an emerging economy context.

8.2 KEY FINDINGS

Results from various studies point to inconclusive outcomes of whether pension fund assets cause savings, this study finds that despite the increase of pension fund assets it has not resulted in an increase in savings. The evidence shows, however, that with increased income, savings levels rise. We find a negative empirical linkage in South Africa thus confirming the work of Anton et al. (2014), Bosworth and Burtless (2004) and Samwick (2000). The results show that despite the rise of pension assets this has not had a positive effect on savings levels.

In determining whether pension fund assets have effects on capital market development, we find that indeed there exist feedback effects. Similar explanatory variables are used in the two

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models (equity and bond) estimated. Results show that pension fund assets cause stock market development, this however is not the case for bond market development. Bond markets offer pension funds the unique ability to match investors to long-term payoffs and cash injections that match the long-term maturity required by pension funds. Results from the variance decomposition show that a shock in private sector credit in the bond market has a higher variation of 19.84 percent than the 16.40 percent exhibited in stock markets. The results indicate that private sector credit is more important in the bond markets versus stock market and in line with Christensen's (2004) findings: if commercial banks increase their holding of debt this may be positive for bond markets.

The empirical results overall show that pension fund assets cause economic growth with feedback effects. In addition, the estimation also shows that stock markets do positively influence GDP. The channel of this growth is capital markets. The study with the modified Wald Test/Granger causality found the existence of a causal relationship between pension fund assets, capital markets and economic growth although causality runs from growth to the other. Most findings in South Africa using banking sector variables argue that financial development does not Granger cause economic growth. Evidence shows that pension fund assets Granger cause stock market capitalisation, leading to growth effects by using non-bank financial sector data, having established that stock markets, listings and bonds Granger cause economic growth. However, we could not establish a unidirectional relationship between pension fund assets and these capital market variables, with largely feedback effects.

The study also shows that other sources through which pension funds potentially contribute to growth are labour markets and corporate governance. The role of corporate governance has not previously been investigated quantitatively. This study measures its effect on economic growth using the number of listed firms on the stock exchange. Our study also showed that the transition from PAYG to FFS did not invoke changes to our results on the role of the relationship between PFA and capital markets development and their impact on economic growth. As against results from elsewhere, we did not find support for the argument that the change from PAYG to FFS resulted in more rapid economic growth although we were able to identify definite structural breaks in our model. Finally, the IADF analysis of the PIC showed that pension fund management must go beyond the mere fulfilment of efficiency to equity considerations if the PIC must align with national priorities of poverty reduction. This, we suggested, must be done through the use of appropriate incentives.

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8.3 POLICY IMPLICATIONS

Evidence shows that despite the highly developed banking sector and capital markets, households have not channelled their income to savings. It may be that household income levels are insufficient and low, thus households with low incomes focus on survival rather than saving. Policies that would increase household savings would include increasing the proportion of those receiving incomes. Reducing the high unemployment rates would also increase the quantum of individuals actively participating in the labour market, as those additional incomes could flow into savings. Income levels are a linkage to boosting savings, thus it would be important to prioritise labour-intensive economic growth, as this will increase the quantum of contributions to pension funds and boost savings.

Our study finds that pension fund assets contribute to improved stock markets and less to bond markets. This suggests that policy makers must investigate the channels of how pension funds could lead to a higher impact in bond markets. This is important as the necessary instruments and mechanisms may require reforms that increase such instruments to improve the transmission of pension funds in debt markets. It is possible that this may entail rethinking the use of domestic debt finance through pension funds' assets. Alternative financing instruments for the economy may emerge with pension funds through corporate listed and unlisted bonds providing domestic finance through capital markets for the improvement of economic growth.

The possibility of using pension funds to further develop bond markets towards increasing economic growth requires greater emphasis. In our analysis we have seen how both developed and developing countries are using infrastructure debt instruments to advance national development goals. It is possible that this may also further strengthen the linkages between pension funds and economic growth. The importance of institutional investment in shaping capital markets in recent decades has surpassed traditional banking assets. Against this backdrop, is it possible to increase the correlation between capital markets development to economic growth whilst also improving national welfare and furthering economic development? The issuance of debt securities that inextricably link to infrastructure and not government debt securities only may provide emerging markets with opportunities to develop new instruments and bonds in capital markets that are a catalyst for growth. The use of debt to improve welfare outcomes using pension funds should be investigated with greater weight. We have seen using institutional analysis that achieving economic efficiency does not necessarily result in redistributional equity and fiscal equivalence. Public policies within South Africa's socio-economic context cannot single out rates of return and ensure the greatest net benefit without consideration of redistribution, even in capital markets. Although it may be associated with various risks, inefficiencies and loss of returns the regulatory oversight of the

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bond market to a large extent determines the success of such development efforts. Stock markets on the other hand see direct benefits from pension fund assets, due to their strong linkages to pension fund assets. The government should review and produce policies and a regulatory framework that address such weaknesses prevalent in capital markets, particularly addressing the barriers to establishing infrastructure as an asset class.

The central question is answered and it is shown with the results that pension fund assets do have a positive effect on economic growth. What is of concern is the extent to which this effect may be increased and even widened to influence poverty. The significance of this study is that most studies have demonstrated causality from finance to growth using mainly banking sector variables. In this study we have demonstrated causality from finance to growth with a highlight on non-banking financial institutions whose assets are isolated. We even go further to link pension fund assets to corporate governance in capital markets, enabling us to measure both the direct and indirect effects allowing better conclusions than earlier studies.

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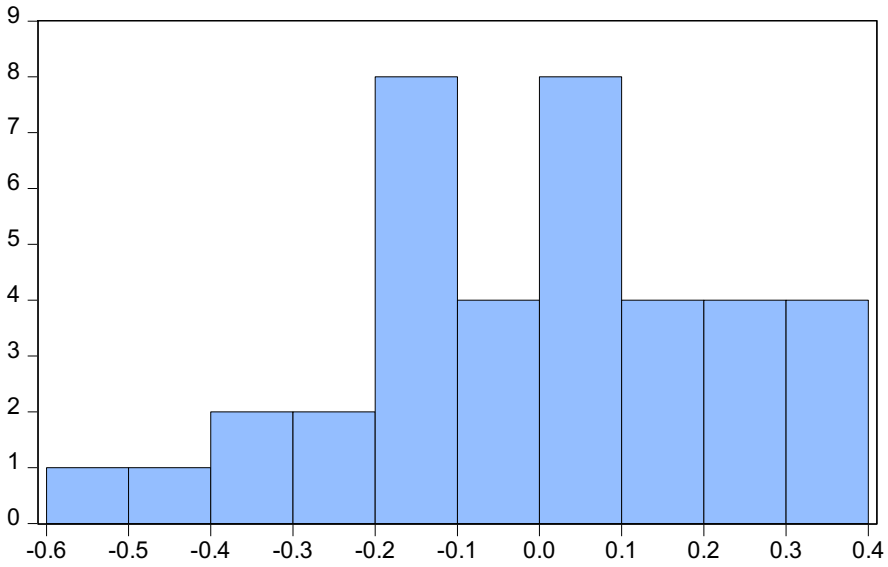
APPENDIX:

1. Chapter 4 Residual Diagnostic criteria

MODEL 1 RESULTS

1. NORMALITY



Series: Residuals
Sample 1977 2014
Observations 38

Mean	-1.23e-16
Median	0.021764
Maximum	0.386025
Minimum	-0.538110
Std. Dev.	0.221053
Skewness	-0.192692
Kurtosis	2.620645
Jarque-Bera	0.463016
Probability	0.793336

2. HETEROSCEDASTICITY

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.122124	Prob. F(7,30)	0.3755
Obs*R-squared	7.884985	Prob. Chi-Square(7)	0.3428
Scaled explained SS	3.982300	Prob. Chi-Square(7)	0.7818

3. SERIAL CORRELATION

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.283096	Prob. F(2,28)	0.7556
Obs*R-squared	0.753174	Prob. Chi-Square(2)	0.6862

4. STABILITY

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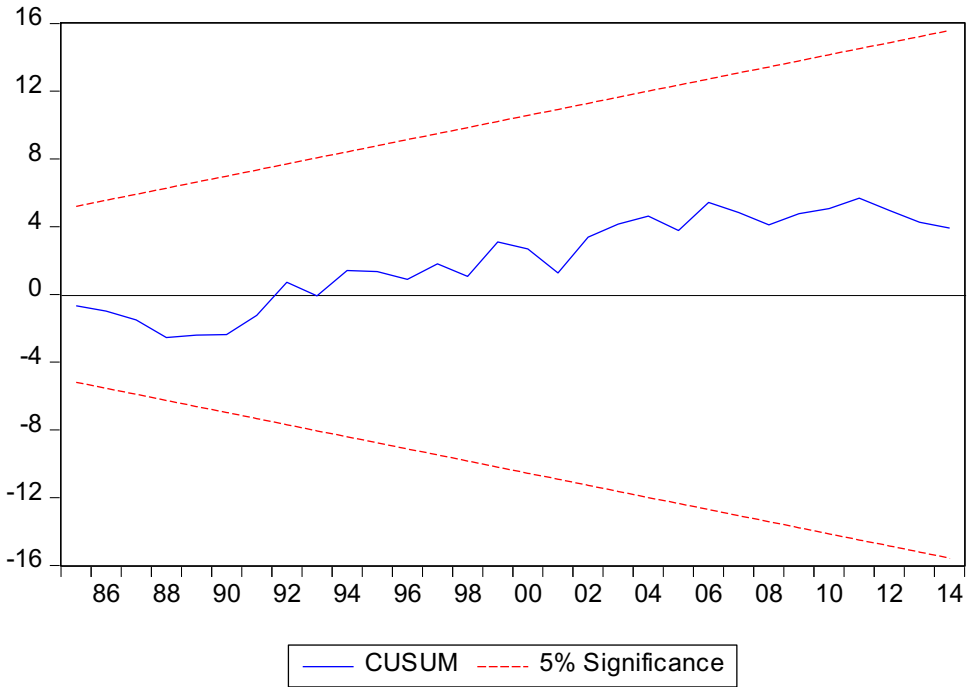
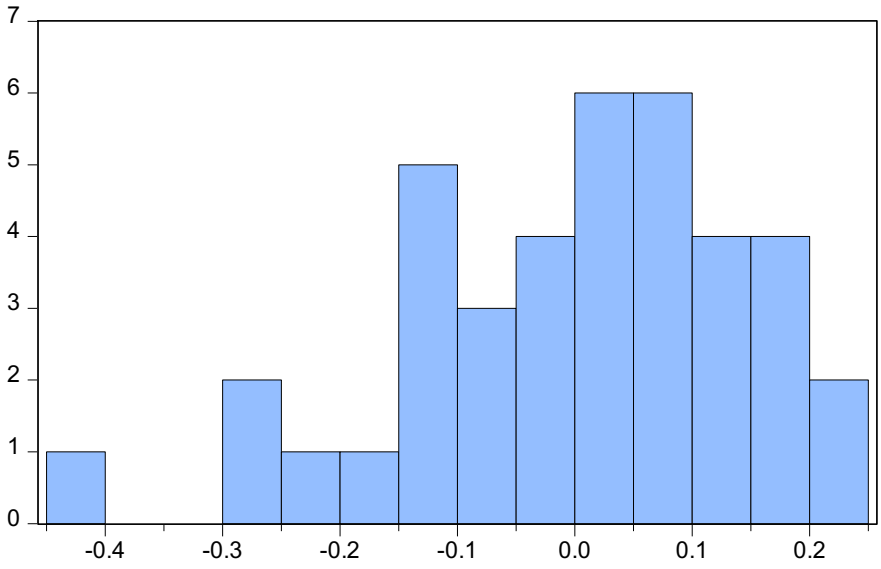


MODEL 2 RESULTS

1. NORMALITY



Series: Residuals
Sample 1976 2014
Observations 39

Mean	-6.86e-16
Median	0.017679
Maximum	0.208505
Minimum	-0.426295
Std. Dev.	0.145874
Skewness	-0.763732
Kurtosis	3.343890
Jarque-Bera	3.983537
Probability	0.136454

2. HETEROSCEDASTICITY

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.341953 Prob. F(6,32)	0.9093
Obs*R-squared	2.349870 Prob. Chi-Square(6)	0.8849
Scaled explained SS	1.854052 Prob. Chi-Square(6)	0.9326

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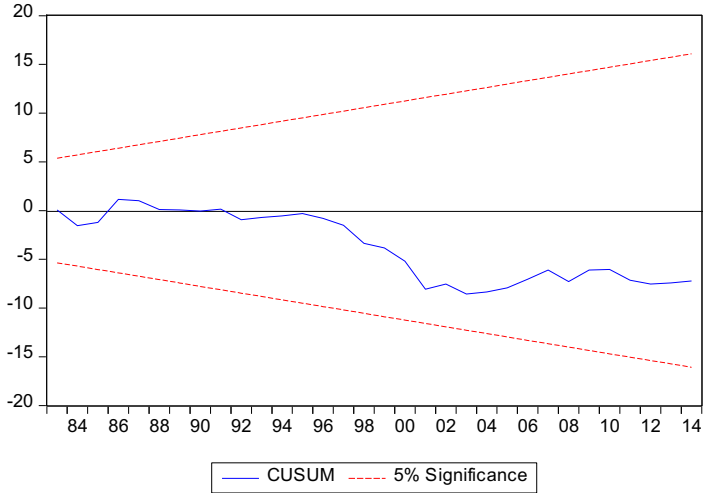
3. SERIAL CORRELATION

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.699268 Prob. F(2,30)	0.1999
Obs*R-squared	3.968524 Prob. Chi-Square(2)	0.1375

4. STABILITY