UNIVERSITY OF LUSAKA

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INVESTIGATING THE RELATIONSHIP BETWEEN MANDATORY CONTRACTUAL SAVINGS AND STOCK MARKET DEVELOPMENT IN SUB-SAHARAN AFRICAN COUNTRIES

BY

LIFA MAPOSA

PHD6831002

SUPERVISORS:

DR. FRANCIS.M. MUMA

DR.STEPHEN MPEMBELE

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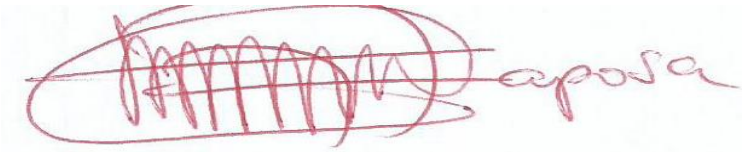
DECLARATION

I Lifa Maposa, hereby declare that the research reported in this dissertation is my own work and is original, except where duly acknowledged. This dissertation has not been submitted anywhere else for qualifications at any other university or learning institution.

Lifa Maposa



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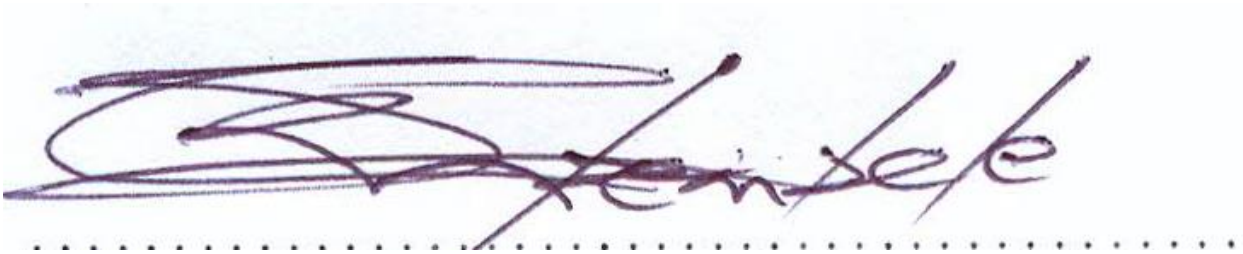
Supervisor: Dr Stephen Mpembele



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ABSTRACT

This study investigates the relationship between mandatory contractual savings and stock market development in Sub-Saharan African (SSA). It also investigates the compatibility of the policies and regulations adopted in SSA countries, with the relationship between mandatory contractual savings and stock market development. Before the exploration of the relationship, an analysis of the characteristics of both mandatory contractual savings and stock markets was done.

The rationale of the study is that establishing the relationship between between mandatory contractual savings and stock market development is expected to guide long-term policies pertaining to economic growth. Sub-Saharan African countries have unique features on savings and capital markets when compared to both developed and emerging economies hence they need policies that can be customized to them.

Using data from 1990 to 2018, time series data on Stock market development proxied by stock market capitalization, value traded and number of listed companies was used against Assets of compulsory pensions (mandatory contractual savings), to establish the relationship between stock market develelopment and mandatory contractual savings through a Panel Vector Autoregressive(VAR) model incorporating the Granger causality analysis.

Findings from this study are that mandatory contractual savings and stock market charactristics are both still 'thin' in most SSA countries except South Africa. Coverage of mandatory contractual savings is only on a small proportion of the economically active total population. Activity on stock markets is very low, led by low listings and limited participation by institutional investors from within and without. Secondly, a positive relationship is found between mandatory contractual savings, stock market capitalization and value traded. This relationship runs from mandatory contractual savings to stock market development meaning that mandatory contractual savings are found to 'cause' stock market development. There are no causal relationships which seem to exist between mandatory contractual savings and number of listed companies.

Recommendations mainly hinged on the poor performance of pension schemes in SSA which remains a major factor discouraging contractual savings, both discretionary and mandatory. Governments are advised to respond to the common shift from formal sector driven economies to informal sector driven economies obtaining in most countries in SSA. It is recommended to re-grow formal sectors or incorporate informal sector to participate in pension schemes.

Key words: Mandatory contractual savings, Stock market development, Stock market capitalization, Value Traded; listed companies, Vector Autoregressive, Granger Causality, Sub-Saharan Africa

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ADF AUGMENTED DICKEY FULLER

AFDB AFRICAN DEVELOPMENT BANK

ASEA AFRICAN STOCK EXCHANGES ASSOCIATION

BPOPF BOTSWANA PUBLIC OFFICERS PENSION FUND

BVRM BOURSE RÉGIONALE DES VALEURS MOBILIÈRES

CIPF CLOTHING INDUSTRY PENSION FUND

CSO CENTRAL STATISTICAL OFFICE

DSP DIRECT SHARE PURCHASES (DSP)

FDI FOREIGN DIRECT INVESTMENT

FPI FOREIGN PORTFOLIO INVESTMENTS

GDP GROSS DOMESTIC PRODUCT

GEPF GOVERNMENT EMPLOYEES PENSION FUND

GIPF GOVERNMENT INSTITUTIONS PENSIONS FUND

ILO INTERNATIONAL LABOUR ORGANISATION

IMF INTERNATIONAL MONETARY FUND

IPEC INSURANCE & PENSIONS COMMISSION

IPRES INSTITUTOIN DE PRÉVOYANCE RETRAITE DU SÉNÉGAL

JSE JOHANNESBURG STOCK EXCHANGE

LAPF LOCAL AUTHORITIES PENSION FUND

LASF LOCAL AUTHORITIES SUPERANNUATION FUND

LCH LIFE CYCLE HYPOTHESIS

MC MARKET CAPITALISATION

MIPF MINING INDUSTRY PENSION FUND

NAPSA NATIONAL PENSION SCHEME AUTHORITY

NASSIT NATIONAL SOCIAL SECURITY AND INSURANCE TRUST

NSSA NATIONAL SOCIAL SECURITY AUTHORITY

NSSF NATIONAL SOCIAL SECURITY FUND

NSST NATIONAL SOCIAL SECURITY TRUST

OECD ORGANISATION OF ECONOMIC COUNTRIES AND DEVELOPMENT

PCA PRINCIPAL COMPONENT ANALYSIS

PIH PERMANENT INCOME HYPOTHESIS

PSPF PUBLIC SECTOR PENSION FUND

PSPF PUBLIC SERVICE PENSIONS FUND

SACU SOUTHERN AFRICAN CURRENCY UNION

SNPF SWAZILAND NATIONAL PROVIDENT FUND

SSA SUB-SAHARAN AFRICA

SSNIT SOCIAL SECURITY AND NATIONAL INSURANCE TRUST

TR TURNOVER RATIO

UN UNITED NATIONS

VAR VECTOR AUTOREGRESSIVE

VT VALUE TRADED

WCFCB WORKERS COMPENSATION FUND CONTROL BOARD

ZSE ZIMBABWE STOCK EXCHANGE

CHAPTER 1

BACKGROUND AND PROBLEM SETTING

1.1 Introduction

The debate on economic growth has spanned over a number of centuries with no conclusive findings on how to steer positive economic growth. Domar (1942), Rostow (1960), Mckinnon & Shaw (1973) are traditional theorists in consensus that for economic growth to take place, financial resources should be mobilized and efficiently allocated over time. Impavido (2013), Musalem (2015) find, for a group of Organization for Economic Cooperation and Development (OECD) countries, a positive relationship between savings growth and economic growth. Other researches which find a positive relationship between savings and economic growth include (Meng, 2011; Catalan, 2013; Mensah and Marbuah, 2013; Greyling and Mwamba, 2014). This research however, does not dwell on economic growth per se but focuses on the analysis of the relationship between mandatory contractual savings and the stock markets (i.e. transmission mechanisms) of these savings. Savings are expected to demand financial products in the stock markets thereby availing finance to companies for investment (Najarzadeh, Reed and Tasan, 2014; Jagadeesh, 2015). On the other hand, markets which are innovative in their product offering should attract savings as investors look for good returns (Tufano, 2011).

The debate on savings and economic growth has, in recent years escalated to a focus of particular savings (i.e. Contractual savings) and economic growth (Impavido, 2010; Meng, 2013; Tressel; 2015). Contractual savings can be defined as savings which are bound by legal contracts such as life assurance, private pensions, public pensions and basic insurance. These are either discretionary or mandatory. Whereas, mandatory contractual savings are a sub-set of contractual savings and are defined as long term savings that are statutorily enforced by law (Meng, 2002, 2010,2015) , non-mandatory contractual savings**,** while being long term savings , are not compulsory i.e. discretionary made. Policies in SSA seem to be currently dependent on unsustainable savings and non-active capital markets thereby leading to policy inaccuracy and sometimes inconsistency. Economic growth has therefore been ‘penalized’ in the process (Levine, 2009).

1.2 Background of study

Contractual savings are regarded as one of the major sources of long term capital suitable for economic development and growth (Impavido, 2001; Meng and Catalan, 2010; Valencia, 2013; Samuel and Worku, 2015). These contractual savings are allocated to various economic sectors via the capital markets especially for long-term investments (Verhoef, Greyling and Mwamba, 2014). Contractual savings however differ in terms of their permanency and volatility. Within contractual savings, some are discretionary while some are mandatory in nature (Loayaza, 2015). The mandatory components of contractual savings are regarded as fairly permanent, less volatile and therefore ideal for sustainable economic development and growth (Turan, 2015).

Capital markets development helps with the efficient allocation of savings across the economy by directing savings to finance the most productive projects (Migrigan and Xu, 2014).However, not all capital markets components are efficient in their ability to transform these savings into investments (Iossifov and Khamis,2009; Tau, 2016)**.** Efficiency of these capital market components vary from one economy to another, and also vary regionally **(**Pfu, 2013**).** For example, Maposa and Muma (2017) find credit markets in developing countries to be less efficient due to directed lending by banks and forced participation into government bond IPOs. These imply that certain countries/regions may have to have a bias in terms of extent of utilisation of these capital market components. The active and efficient components are expected to be preferred.

Regan, (2017) attribute economic growth to a free play between the supply of long term capital such as contractual savings, transmission mechanisms of this capital (Stock markets & bond markets) and other types of savings .In other words, there is need for a frictionless interaction of these if sustainable economic development and growth is to be achieved. In market based financial systems, financial resources are mobilised through various mechanisms (savings schemes) and are channelled into productive sectors through capital markets. With an increase in resource mobilisation (savings), capital markets increase their ability to transmit these savings to various productive sectors through robust financial product innovation (Impavido & Musalem, 2005). The rate of investment (economic growth) is therefore a function of the rate and amount of accumulation of savings at any point in time (Domar, 1946; Worku and Samuel, 2015). A development of Domar's theory by suggests that it is not only mobilisation of significant savings that is required for economic growth but also

a developed capital market need to be in place (Impavido; Tressel;Musalem 2002; Impavido, 2005; Meng 2011).

Empirical literature suggests savings in general as a requirement to economic growth (Impavido and Musalem, 2014; Levine; 2012; Meng, 2015; Loayaza, 2013). This has led to policies focusing on savings mobilisation or capital stock accumulation. However, in some countries this capital has been wasted through inefficient allocation mechanisms and no meaningful development has been achieved for example Tolikas (2018) finds no accompanying economic growth in Turkey despite a tremendous increase in savings and international credit lines to local banks between 1991 and 1998 partly because of the savings being channelled through that country's inefficient credit system. Again, early market based theorists have focused on general savings which include spontaneous (non-contractual savings which are volatile savings). Accordingly, this research is focusing on the non-spontaneous, stable savings (Mandatory Contractual savings).

In recent years, Contractual savings have taken centre stage as a base on which economic development and growth can be premised (lmpavido et al 2005, Tolikas, 2018; Sawagodo and Guerinean, 2015). This economic development and growth is based on the sustainability of contractual savings as compared to Domar's theory (Enache and Milos, 2015) of savings which incorporates spontaneous, volatile savings. While the Domar Theory suggest that once financial resources are in place economic investment naturally follows, recent theorists (Ronen and Zhou, 2013) argue that these savings should further be allocated efficiently via developed capital markets into the various sectors of the economy.

Capital market development positively impacts on economic growth through two dimensions: (i) Mobilising savings from surplus economic agents and (ii) through the selection of high-growth or high yield projects (Midrigan and Xu, 2014; Adu, 2013). The nexus between capital market development and economic growth is found to be stronger in economies with liberalised financial systems than in countries with controlled financial systems (Arizala, 2010; Coulibally, 2008). Impact of capital market development on economic growth is also found to differ depending on the comparable extent of development of credit/bank based systems and market based (stock market) systems (Laeven, 2014). This bias is driven by the allocative efficiency of stock markets when compared credits markets which are usually clouded by directed lending and moral hazards (Serra-Garcia, 2010

).Economic growth is therefore found to be higher in countries with a more developed stock market system and lower in economies with a credit system more developed than stock markets. High income countries reflect a stronger influence of capital market development on economic growth than low income countries. These high income countries with significant impact on economic growth are also characterised by strong regulatory platforms (Osi-Boateng, 2008).Capital markets in African countries are affected by instability of government policies, weak regulation and lack of diverse securities (Gakeri, 2011;Adetiloye, Babajide and Ugwu, 2016).

With consensus that savings development and capital market development are both linked to economic growth, focus has therefore shifted from a '***Savings -Economic growth' and Capital market-Economic*** analysis to a '***Savings - Capital market development'*** analysis (Domar 1942; Impavido 2000; Davis 1995, Davis 2005;Meng 2011) and also because of the lack of consensus about the pre -requisite importance of the medium through which savings are channelled through to achieve the economic investment hence growth. The relationship between contractual savings and general capital market development has attracted a lot of attention largely as a result of policy implications embedded in the relationship. Contractual savings are associated with long term financial resources and hence long term capital injection into the various sectors of an economy leading to economic growth (Impavido 2000 & 2002;Musalem 2000; Impavido, Musalem, Tressel 2005; Todaro 2011). It is a general observation therefore to associate any economic development 'drive', its sustainability and magnitude to the major source of long term savings: Contractual Savings. Findings in Hu (2011) and Meng (2005) establish that capital markets development is correlated to activity and efficiency of contractual savings. In related studies, contractual savings have been found to be positively correlated to development of the stock markets in OECD member countries (Impavido& Musalem 1996, 2011 and Sawadogo et al., 2015). In all the findings, capital market development is regarded as a crucial factor to sustainable mobilisation and / or direction of financial resources to the productive sectors of the economy. Deliberate and sustainable savings should sustainable and positively impact on stock market and general capital market development (Shaw, 1975; Akinlo, 2013).The arguments are that there should be a deliberate policy framework to mobilise and channel savings to capital markets for the benefit of all sectors in an economy.

In more recent studies, the pre-requisite order of existence of contractual savings and capital market development is what has taken centre stage as theorists attempt to find a logical and sustainable path to achieving economic growth (Rasaki, Saffiyah and Hakeem, 2013). A robust long term savings policy should therefore result in stock market activity in terms of daily trading , pricing, new listings and hence the general development of these stock markets suggesting that savings growth leads to stock market development. Capital market reforms and structures are also found to encourage savings where depth and breadth of these markets tend to offer more investment tools and better returns (Walker & Lefort, 2002,Diaz, 2012; Adetiloye et al,2016) suggesting that capital markets sometimes lead to savings growth. There is also documented evidence of a positive correlation between contractual savings assets size and capital market growth: stock markets (Davis & Hu, 2005, El-Wassal, 2013). Research related to contractual savings and their efficiency found out that the level of funding of contractual savings, with particular reference to pension savings, is correlated to the further build-up of discretionary savings in the economy and efficiency of stock markets (Davis & Hu 2005) suggesting a possible influence of pension funds savings (outside total contractual savings) on capital markets.

In existing research, Impavido (2000); Musalem (1999); Tressel (2000); Davis (2000); Hu (2005) and Meng (2011) assert that contractual savings are broadly made up of mandatory and non-mandatory savings. Existing research has focused on causality between this broad category of contractual savings and broad definition of capital market development (Meng, 2011). For purposes of clarity, this set of existing research will be referred to as 'macro studies' since they focus on the broad level of savings and broad level of capital markets. The focus of this research is on mandatory contractual savings and stock market development. For simplicity's sake, this research refers to this emphasis as 'micro studies' since the attention is on specific contractual savings and a specific sub –set of capital markets. Micro studies find contractual savings as broadly defined, unsustainable while the broad categorisation of capital markets is viewed as inapplicable in developing countries where stock markets clearly dominate the capital markets.

'Macro' studies have focused on the causal relationship between contractual savings and stock market development (Davis, 1998; Impavido & Catalan 2000; Meng, 2010). Non-mandatory savings may dwindle or disappear over time since they are very volatile. This

makes these non-mandatory savings unsustainable hence irrelevant in modelling sustainable development. Findings from previous research (De Gregorio, 1996; Davis, 1998; Levine & Zervos, 2000; Levine, 2004; Impavido & Catalan, 2000; Meng, 2010) concur that there is a unidirectional causal link between financial market development and savings. They also agree that financial sector development does lead to economic growth in early stages although this impact diminishes as the economy grows (Patrick, 1966; Levine, Loayza & Beck, 2000; Levine & Zervos, 2001). They however fail to address the following questions:

1. What triggers financial sector development?

2. What aspect of financial sector development plays a key role in triggering growth in an economy?

Existing research fails to take into account the volatility of discretionary savings over time. Policies on development should be based on stable, sustainable input variables (Patrick, 1966). Most African countries have been pre-maturely abandoning policies as they attempt to trigger economic growth (World Bank Report, 2011; Meng, 2012).

Existing research on contractual savings and capital market development, focusing on the causal relationship does not therefore give policy makers an accurate prescription since they look at the very broad level of savings (i.e. including incidental savings/ non-mandatory savings which vary over time) and also looks at the broad capital markets (i.e. including debt markets which are less active compared to stock markets in developing countries). Bond markets have accounted for very insignificant contribution to overall GDP in developing countries (Levine 2000 & 2010). As depicted in Table 1.1, the credit market is very small and undeveloped with Government bonds dominating mainly to finance recurrent expenditure than growth projects (IMF Report, 2010). Private corporate bonds are very insignificant in most SSA countries. Some countries such as Zimbabwe, Zambia and Mozambique were not included in the analysis (on Table 1.1 on next page) due to scarce statistics especially on the bond markets. During the period under review, the missing countries were characterised by hyper-inflationary environments which made it difficult to capture the relevant statistics. The scenario on the table below however shows the general trend on the contribution of debt markets in SSA.

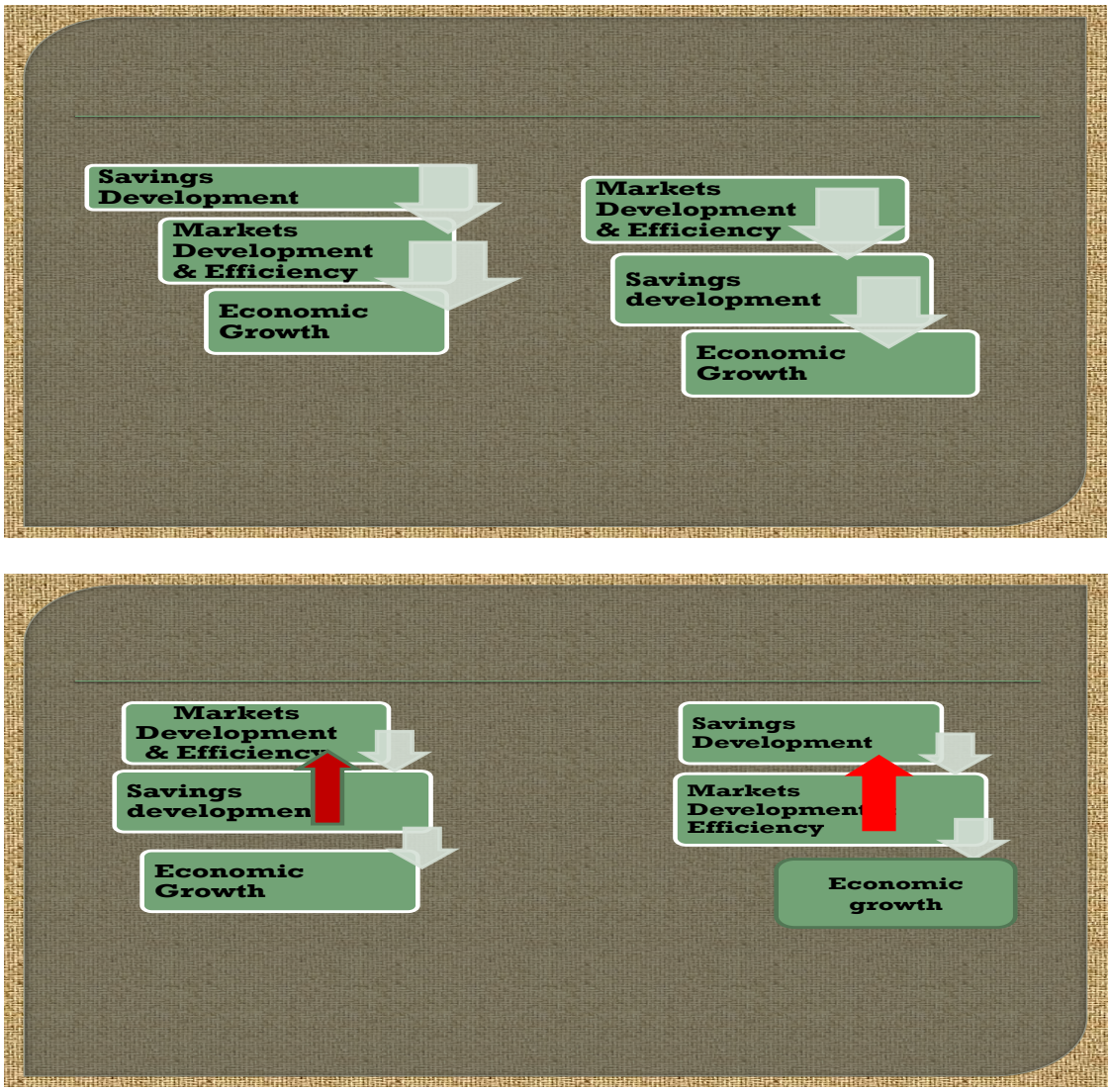
Table 1.1 Comparative performances of Government and corporate bonds in developing countries

Country	Government Securities Mkt Capitalization(%GDP)		Corporate Bonds Mkt Capitalization(%GDP)	
	1990-2000	**2001-2010**	**1990-2000**	**2001-2010**
Angola	0.09	5.17	0.00	0.00
Botswana	12.97	4.88	0.71	2.02
Burundi	7.71	6.46	0.00	0.00
Cameroon	19.71	11.78	0.00	0.10
Central Africa Rep	0.00	14.03	0.00	0.21
Chad	1.49	5.73	0.00	0.05
Congo Rep	26.91	6.73	0.00	0.04
Cote D'lvoire	19.13	12.33	0.01	0.04
Eritrea	57.77	54.62	0.00	0.00
Ethopia	21.78	28.42	0.00	1.71
Gabon	4.49	8.62	0.00	0.52
Gambia	26.48	29.84	0.00	0.00
Guinea -Bissau	17.53	17.27	0.01	**0.08**
Ghana	13.74	28.17	0.04	0.47
Guinea	9.63	8.44	0.00	0.00
Kenya	15.02	20.84	0.03	0.46
Lesotho	4.46	9.25	0.00	0.00
Mali	2.38	2.05	0.02	1.42
Mauritius	22.76	32.29	0.23	0.20
Namibia	16.41	18.21	0.00	1.54
Nigeria	21.61	7.44	0.29	1.11

Source: Author's calculations using World Bank Development Indicators, African Development Bank Statistics and Local Central Bank Statistics

Given the inactiveness of the bond market, the equities market remains a fairly dominating market in terms of activity although it is also operating at very low levels. There is therefore a research gap in the form of the causal relationship between guaranteed savings (mandatory savings) and the 'active capital market' (stock market*)* in developing countries. Establishing this relationship offers an accurate policy 'prescription' than the general relationship established by 'macro studies' over the years. In this new paradigm, savings necessary for economic growth have been re-defined and reference is specifically made to mandatory contractual savings. Mandatory contractual savings are viewed to be more sustainable than general contractual savings (Impavido, 2010; Tressel, 2015)

Fig 1.1: Possible directional causal relationships between mandatory savings and stock market development



Authors' own adaption: Premised on Harrod Domar Model (1948)

'Macro studies' (Catalan, Impavido & Musalem 2000; Davis 1995; Davis 1998; Meng 2010) are challenged from the perspective that their conclusions are premised on broad contractual savings. Earlier arguments in this research are that broad contractual savings include non-mandatory savings which are deemed to be unsustainable. The implications thereto are that the policies which are put in place, premised on 'macro studies' findings, will be of short run nature (up to the point where non-mandatory savings vary from the average) once the volatile variables begin to vary. The other possible worst case scenario is that non-mandatory savings could have been making up the bulk of broad contractual savings, further discrediting the sustainability of not only the findings but also of the policies crafted based on these

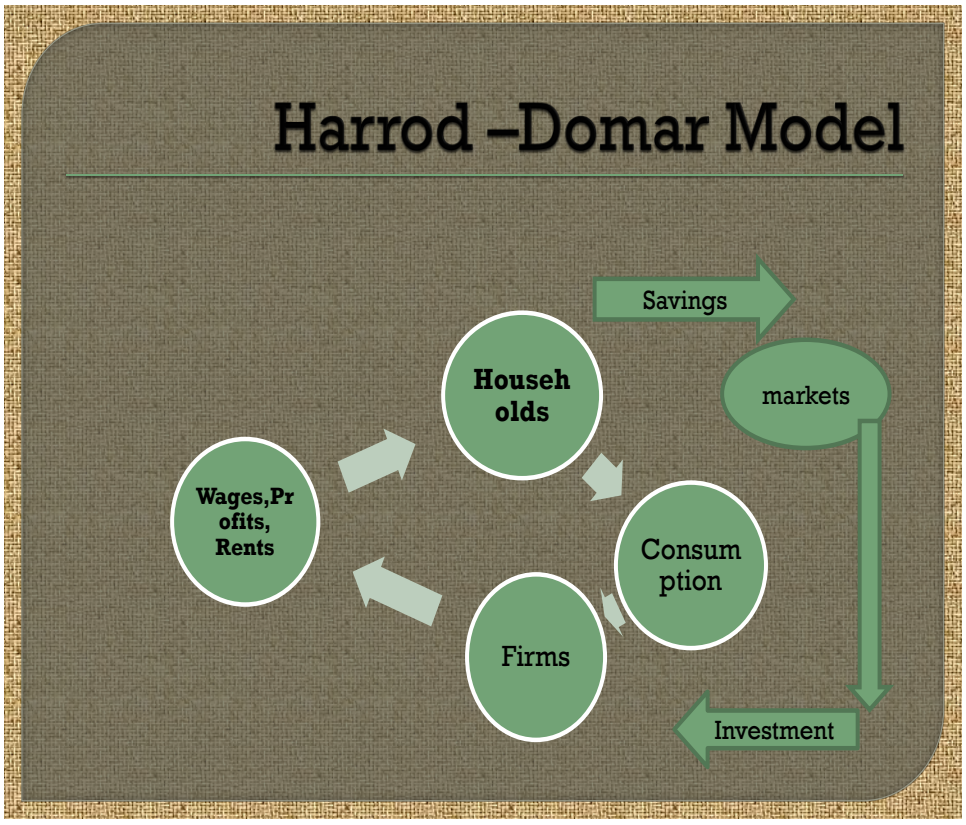
findings.'Micro studies' therefore seek to plug this weakness of macro studies where the focus is also not on developed countries but on the developing world, SSA in this case.

Very few SSA countries have undergone reforms, both financial sector reforms and pension reforms (with the exception of Ghana's pension reforms, Kenya's pension reforms and Zimbabwe's financial sector reforms). This has also been an indication of lack of deliberate policies of stimulating economic growth via savings and/or financial markets development. While reforms in Ghana and Kenya yielded somewhat positive results, reforms in Zimbabwe failed to bring about significant changes (AfDB, 2012). Mwega (1997) attributes success in the Ghana and Kenya cases to their focus on contractual savings (pension funds) while he attributes failure in Zimbabwe to a mistimed focus on credit markets (banking sector).

1.3 Theoretical framework

Conceptually, the research is premised on the market based theories of economic growth of Harrod-Domar Model (Domar, 1942) as depicted in Fig 1.2 below in the figure of cycle of liquid capital resources in an economy.

Fig 1.2: Cycle of liquid capital resources in an economy



Authors own adaptation: Summary of Harrod Domar Model (1942)

In this model the level of economic investment is directly related to the level of savings accumulation. In this conceptualisation, we introduce a transmission mechanism through which savings are transformed into economic growth. The original framework is however manipulated to focus on mandatory contractual savings (representing savings in the original model) and stock markets (representing markets in the original model). It is also argued in this manipulation of the conceptualisation that households never maximise savings hence the optimal savings level suggested by the Life Cycle Theory (Gokhale, Kortlikoff & Warshawsky, 2005) may not be attained at any point in time. If households cannot optimise savings, then optimal stock market development and economic growth may not be attained. This therefore may require policy interventions in order to bring savings to optimal levels. At this optimal level of savings, stock market development and subsequently economic growth are expected to accelerate.

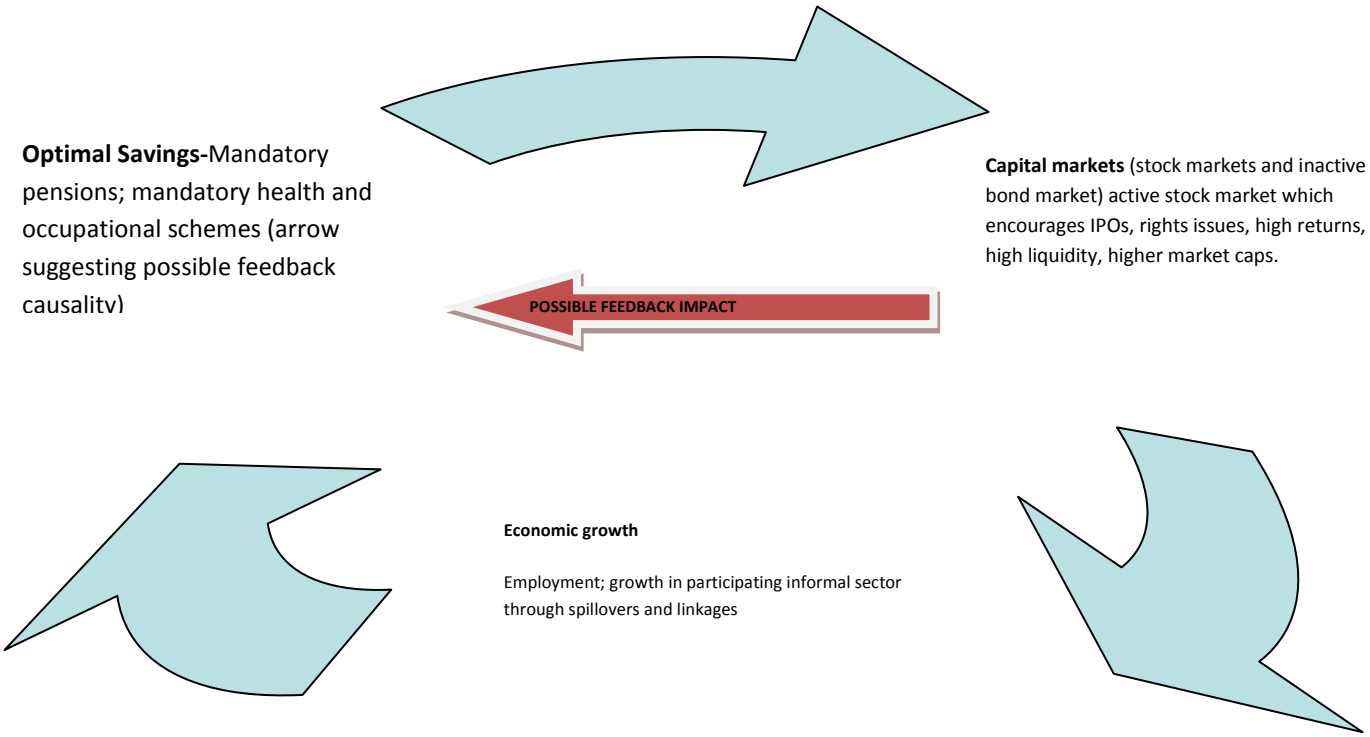
Sub-optimal savings can be avoided in two ways, firstly mandatory savings policies can be put in place to force the households to save therebyby increasing total savings. Secondly, incentives to encourage savings can be put in place although households may not respond these (Gokhale, 2016). The concept of mandatory savings is borrowed from the Keynesian Theory which argues for the direct intervention of the state in financial markets when need arises. For economic growth to be attained at sustainable levels, the levels of savings should also be at the highest possible level and should be efficiently and effectively allocated across the economic sectors *ceteris paribus* (Loayza, Schmidt-Hebbel & Serven, 1999). While the general theoretical flow is suggested to be from savings to capital markets, there is a possible influence of the capital market on savings over time. Capital market development may attract and encourage more savings (Impavido, 2000; Catalan, 2005; Meng, 2011). The question that remains is which of the two variables influences or causes the other.

At broad categorisation of savings and capital markets, empirical evidence by Davis and Pfu, (2010); Musalem and Meng (2011) and Regan (2017) in OECD and some developing countries suggest a causal direction from savings to capital markets. Sample sizes used in these studies are however considered too small to give credible conclusions. Issues to do with sample sizes are however also debatable in econometric analysis. The question that may still remain a puzzle in these studies relates to whether financial product development (depth and breadth of markets) responds to increased savings or it is savings that increase in response to

increased availability of financial products. Some empirical research findings actually suggest that savings tend to increase where there are diverse investment assets (Loayza & Schmidt-Hebbel, 1999).

The Life-Cycle Theory suggests that there is an optimal savings level consisting of mandatory savings and discretionary savings (Gokhale, Kortlikoff & Warshawsky, 2005). In an economy where the savings culture is very low, total savings operate below the optimal level (Jappelli, 2005) and this will reduce the flow of funds to capital markets. It has also been observed that mandatory savings and discretionary savings are substitutes of each other in perfect markets, ceteris paribus (Modigliani & Cao, 2004). Mandatory savings may however negatively impact on discretionary savings (Venti & Wise 1993; Karanarathne & Abeysinghe, 2005) thereby reducing the overall savings below optimal levels. Where mandatory savings reduce discretionary savings, this represents a substitution effect hence total savings will remain unchanged (Cagan, 1965; Green, 1981; King-Mireax, 1982; Thaler & Shefrin, 1988). Left alone, investors may not maximise savings, they may choose to consume more than what they have to (Thaler, 1988).

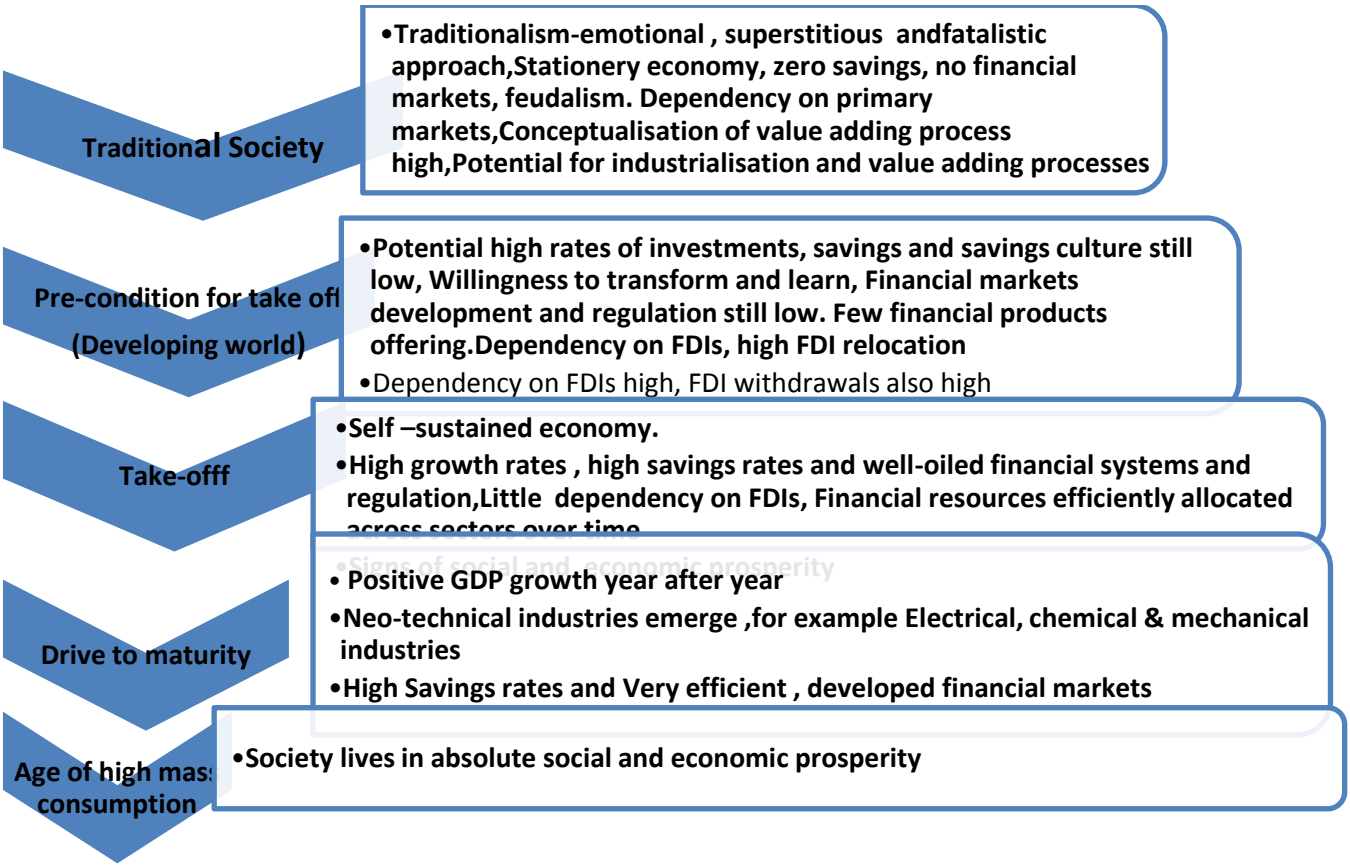
Fig 1.3 Linkages between Savings & Stock markets



Source: Authors' own Conceptualisation: Market based theories of growth, Domar(1942)

Khetsi and Mogale, (2015); Taiwo, Adedayo and Evawere, (2014); Briggs, (2011) assert that growth is a result of the dynamic interactions between savings and the mechanisms (stock markets) which allocate the savings amongst the various sectors of the economy. Economic growth policies should therefore focus on these two variables. In developing countries, there has been, in recent years, a significant growth in the informal sector which has remained virtually unregulated (IMF, 2012 World Bank, 2014). Encouraging this sector to save may take a very long time and this will be at the expense of overall economic growth in the interim. In this regard, one wonders how savings can be siphoned from this and other sectors in a more sustainable manner. The Five stage Growth Theory by Rostow (1960) (depicted in Fig 1.4 on next page) is also a 'cornerstone' on which this research hinges on. Reviews of the Rostow theory by (Khan and Marinaro, 2015) maintain that an economy trancedes through stages suggested by Rostow as evidenced by the existence of economies depicting characteristics of each of those stages. The transition from a traditional society to high mass consumption seems to be a common path for all economies (Rostow, 1960). Sub-Saharan countries are mostly in the Pre-condition for take-off stage which is mainly characterised by high developmental potential stifled, however, by the low and poor savings culture. The question now is, 'how do these developing countries move to the next stage from a financing perspective?

Fig 1.4: Rostow Five stages of growth (Rostow 1960)



Source: Adapted from Rostow (1960)

The emphasis of Rostow's model is the important existence of both savings and financial market development. For an economy to progress from one stage to the other there must be an improvement in both financial markets and level of savings. Developing countries (including SSA) are identified to be in the second stage characterised by low savings, low financial development and regulation. This stage is also characterised by high foreign direct investment (FDI) relocation.

1.4 Statement of the Problem

Ideally, economic growth policies seek to mobilise resources and efficiently allocate them through capital markets into the productive sectors of an economy. This is done through focusing on mobilising savings which are then allocated via various channels (bank credit markets, debt markets and stock markets) into economic sectors and attracting foreign direct investments (FDI) into the high growth sectors. On savings, most policies focus on

contractual savings mobilisation and capital market development with hope of achieving economic growth (Meng, 2011).

In reality, however, in developing countries such as SSA, discretionary savings are generally low compared to the developed world and other emerging markets such as Asia and Latin America (Loyaza, 2015, Deaton, 2013). Capital markets also have a skewed development in SSA when compared to other regions (Downing,Underwood and Xing, 2009;Laeven, 2014;Siyum,2018).In the developed world, both equities and debt markets are fully developed and active whereas in SSA, markets are far much underdeveloped and less regulated when compared to stock markets (Impavido and Musalem, 2005). The general policies adopted in the developed world and other emerging markets where savings and savings culture are high and where all components of capital markets (debt and stock markets) are functional, has failed to steer economic growth in SSA because of lack of the pre-requisite conditions (i.e lack of high savings rates and savings culture and dysfunctional components of capital markets (debt markets) (World Bank, 2012, 2015). FDI inflows are low or erratic (erratic because of political instability and policy inconsistency in SSA) and therefore not reliable for sustainable development (AfDB Report, 2010; IMF Reports, 2008 & 2009).

In this regard, the problem lies in employing policies to focus on general contractual savings and general capital markets which fail to achieve policy targets in SSA since some of these savings are either very low or non-existent and some aspects of the capital markets are either non-existent or extremely inactive.

It is therefore paramount to identify sustainable sources of savings/resources in SSA and find how they are related to the active transmission components of the capital market: to ensure a complete, efficient and effective translation of savings resources into sustainable economic growth. Establishing the relationship between sustainable sources of savings and the active capital markets components will enhance policy relevancy and accuracy thereby achieving sustainable economic growth.

Policy inconsistency and policy inaccuracy are the major drawbacks to development in SSA (Siyum, 2018). It is not clear whether policies should focus on developing capital markets (stock markets in particular) or focus on savings /resource mobilisation. There is a sustainable

policy implication embedded in the relationship between the sustainable financial resources (mandatory savings) and active transmission mechanisms (stock markets).

1.5 Research Objectives

1.5.1General objective

To establish the relationship between mandatory contractual savings and stock market development in SSA.

1.5.2 Specific objectives

The following are the specific objectives of this research:

- Explore the nature and characteristics of stock markets and mandatory contractual savings in SSA.
- Investigate the relationship between the various forms of stock market development and mandatory contractual savings in SSA.
- To determine, using Granger Causal analysis, the causal relationship and its direction between mandatory contractual savings and the three (3) stock market development indicators: Market capitalisation, Value Traded, Number of listed companies.
- To assess impact of exogenous factors, namely regulation, credit markets, FDI, Economic growth and on mandatory contractual savings and stock market development.

1.6 Research Questions

Through this research, the following questions are expected to be answered:

- What are the characteristics of stock markets in SSA and mandatory contractual savings in SSA?
- Is there a relationship between the various measures of stock market development and mandatory contractual savings in SSA?
- Is there any causal relationship (and of what nature?) between mandatory contractual savings and stock market development in SSA countries?
- What other exogenous factors influence the development of mandatory contractual savings and stock market in SSA?

1.7 Hypothesis

$H_{01:}$ There is no relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries.

$H_{11:}$ There is a relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries.

$H_{02:}$ The relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) does not vary across in SSA countries.

$H_{12:}$ The relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) vary across in SSA countries.

$H_{03:}$ There is no causal relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries.

$H_{13:}$ There is causal relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries

H_{04}: The relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) does not vary across in SSA countries.

$H_{14:\ The}$ relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) vary across in SSA countries.

$H_{05:}$ Regulation, FDI, credit markets, economic growth has no impact on mandatory contractual savings and stock market development.

$H_{15:}$ Regulation, FDI, credit markets, economic growth has an impact on mandatory contractual savings and stock market development.

1.8 Significance of Study

This study is the first to interrogate the relationship between mandatory savings and stock market development for SSA. Findings are expected to come up with a different view of dealing with economic development challenges in the region especially from a funding perspective and also the allocation of financial resources perspective.

In the last three to four decades, there has been a general view dismissing the economic validity of mandatory savings globally. Firstly, it is argued that mandatory savings reduces total savings via evasion and secondly that it substitutes discretionary savings. These negative views on mandatory savings are challenged by the findings and the literature analysis provided in this study. Findings in this study suggest that the substitution effect between mandatory savings and discretionary savings should not be generalised. It fails to hold in some countries while in some countries, the extent of substitution is very negligible (Arnberg and Barslund, 2014). In SSA, this view on mandatory savings is dismissed as inapplicable in literature analysis for various reasons mainly involving the culture of savings, the changing population structure and shifts in type of employment from formal to informal(World Bank, 2014;Deaton, 2015) amongst others. This does not only contribute new information to literature, but also creates a new 'mind-set' amongst policy makers in as far as the behaviour of economic agents is concerned in SSA.

Findings reflect that, unlike in developed countries, mandatory contractual savings in SSA do not in anyway 'crowd-out' discretionary savings hence in order to increase total savings; such mandatory savings should be increased. Additionally, new knowledge being created pertains to the behaviour of these savings across income groups: savings behaviour improves as we move from lower income groups to high income groups. This implying that while the savings culture is generally poor in Africa as suggested by Loayaza (2001; 2012; 2016), Davis (2003), Meng (2013; 2014), Demeatredes (2011; 2013) and World Bank (2002; 2006; 2011; 2014), increases in incomes of households improves the level of savings. Findings here show that it may be poverty that reduces the tendency of saving and not that the culture of saving is poor.

Conclusively, the study argues for interventions by regulators in order to increase savings in SSA countries. This puts a stern test to the traditional theories that argue for markets forces to 'rule' when it comes to savings.

1.9 Scope of research

This research focuses on Sub-Saharan African countries for the period 1990-2016. Countries with stock markets which are at least 5 years old and have at least 10 listed firms qualified to be part of this study. The focus on this period emanates from the fact that most countries in

SSA had their stock exchanges and variants of pension schemes being established from 1990 onwards although some of the countries already had these prior to that period.

1.10 Related research on Contractual savings and economic variables

Previous researches assessing impact of one economic variable on another have adopted a multi-disciplinary approach. This ranges from causality tests to qualitative assessments based on grounded theory. The development of capital markets is yet to be convincingly explained. Various researchers have only been able to explain the process of capital market development in certain environments and failed in other environments. Calderon-Rossell (1991) came up with model for stock market developmet premised on savings. To date, the model still hold a significant place in literature in as far as explaining the growth of stock markets is concerned. Its short comings are mainly its failure to take into account soft factors such regulation, FPI and complementary factors such as banking sector development (El-Wassal, 2013). Holzmann (1997) in Chile, Schmidt-Hebbel, (1998); Catalan, Impavido and Musalem, (2000) in Non-African OECD countries, Borcsh-Supan and Koke, (2004) for European countries, and Meng and Pfau, (2010) for Caribbean countries.

Yuwei (2012) employed a Panel Error Correction Model (PECM) to investigate relatedness of pension fund assets to economic growth using. The model is able to capture both short-run and long run dynamics of the relationship between the two variables (Banerjee, Hendry & Smith, 1986).Originated by Davidson (1978), this methodology is now the cornerstone in economic research involving panel data (Barrell & Davis, 2004; Hu, 2006). The search for theory is therefore still an on-going process. The PCEM methodology by Yuwei (2012) can also be employed in assessing the impact of mandatory contractual savings on stock market development.

El-Wassal (2013) identifies a number of factors that affect stock market development, that is, supply factors, demand factors, institutional factors and economic policies. Supply factors and demand factors however are the factors which are found to have an influence on stock market development (Rostow, 1962 and Harrod & Domar, 1948). Institutional factors and economic policies are complementing factors, impying that the presence of the pre-requisite factors may not be enough without these complementing factors.

The Toda and Yamamoto (1995) VAR (Vector Auto regressive) approach to assessing the relationship between savings and capital market development is employed in a number of researches. Coporalle, Howells and Soliman (2004) use this approach in testing for causality between savings and economic growth in Argentina, Chile, Korea and Greece; Boukabari & Jin (2010) employ the VAR methodology in investigating the causal relationship between Stock market development and economic growth in EU countries. The VAR model allows for capturing of cross-country effects between the dependent and the explanatory variables.

VAR models are able to capture the interrelatedness of factors with other factors as well as with their past since they involve the use of lagged values of multiple time series. The output of VAR models including Granger causality tests, impulse response functions and variance decompositions are widely used in assessing co-movements for policy implantation.

Meng and Pfau (2010) use the Corrected- Least Squares Dummy Variables (LSDVC) to investigate the impact of pensions on capital market development in financially developed countries such as the United Kingdom, Netherlands and the USA and low financial development countries such as Argentina, Poland, Peru and Colombia. Oke and Onafalujo (2015) use the general Ordinary Least Squares (OLS) model is assessing causality between pension assets and capital market development in Nigeria.

Pfau and Loayaza (2015) also investigated the impact of pension funds on capital market in in Central and Eastern European Countries from 2001 to 2010. The results reflected that there is a relationship between the two variables where pension funds are found to positively influence stock market development. The impact was however found to exist in the short term and non-existent in the long term.

Some researchers have found no relationship between savings and capital market development (Catalan, 2001), some have found a relationship of causal nature running from savings to markets (Deaton, 2000; Loayaza, 2003 and Pfau, 2005). A causal link from capital markets to savings have also been a finding in other economies (Impavido, 2000; Musalem, 2005 and Meng, 2005). While all these previous researches focus on savings in general, in relation to either capital markets or economic growth, there is no evidence to date showing

investigation of the relationship between mandatory contractual savings and stock market development.

1.11 Research Assumptions

The major assumptions of the research include:

- Mandatory savings and voluntary private savings are perfect substitutes *ceteris paribus.* This is a reasonable assumption since public savings are synonymous to taxation, that is, mandatory savings reduce disposable income and thereby reducing the potential for private savings.

- There is a certain level of total optimal savings that can be achieved in an economy (Schumpeter, 1912) and is split into mandatory savings and voluntary/discretionary private savings; however, an economy may operate below this optimal level of total savings because of cultural and economic factors.

- In an economy where public savings (mandatory savings) are minimal, private savings may not necessarily increase to increase total savings to optimal point.

- The most recent above assumption imply that the government may shift total optimal savings to mandatory savings hence guarantee financial resources for growth.

- There is a relationship between contractual savings schemes (size, activity. efficiency) and stock market development.

- Economic growth mainly emanates from mobilisation of long term capital.

- Efficiency of contractual savings can be best measured through funding ratios and timely payouts to beneficiaries while size of these schemes is best measured through total contributions, asset classes and number of securities bought into the scheme.

1.12 Limitations

Availability of data, especially on some mandatory contractual savings in certain countries is not available in major sources such as the World Bank and IMF databank. The research was therefore forced to estimate data for certain periods. There is also heterogeneity amongst countries pertaining to the mandatory savings schemes available, this may imply that other countries are already saving more than their counterparts. Stock markets in some economies

such as Botswana and Mozambique are still at ‘infancy’ level that information from these again is still scarce and may be difficult to analyse.

1.13 Research Outline

Chapter 1 provided a background to study. The problem setting is highlighted as well as research aims and objectives.

Chapter 2 reviews literature pertaining to the variables under study especially their causal relationships. The main focus will be on savings with particular emphasis of the nature of savings in SSA, savings trends, savings instruments, contractual savings and mandatory contractual savings and their relationship with key economic variables such as GDP and capital market development. The fundamental differences between the nature of savings in SSA and those of other regions (Developed nations and other emerging economies) are analysed. The conceptual framework of the research will mark the end of this chapter. Conceptual framework presents the researchers perception of the relationship under study and this will employ mainly schematic diagrams to express the perceived relationships.

Chapter 3 focuses on the conceptual framework. These are the main theoretical underpinnings on which the research is premised. Theories on which the research is premised are discussed thereby fitting the research gap into existing theories. The theories on resource driven economic growth are discussed. Theories on institutions driven economic growth are also reviewed

Chapter 4 explains the methodology employed in this study. Empirical literature pertaining to the methodology used will be reviewed. The limitations of the methodology as well as those of the whole study are discussed with ways of managing the deficiency of the methodology being explained.

Chapter 5 presents the data of the variables under study, analysis of the data through Granger causality approach and finally presents the findings of the analysis and focuses on presentation and discussion of findings. This chapter examines the impact of mandatory contractual savings on stock market development or vice versa implied by the findings in chapter 4.

Finally, Chapter 6 summarizes and concludes the thesis. The meaning of the causal relationships is explained and their implications on policy are discussed. The extent of compatibility between causal relationships and existing policies is analysed. Recommendations pertaining to the required policies or policy reforms are discussed. Finally, the chapter highlights limitations encountered by the study and also identify areas for further research

The establishment of the causal relationship between the sustainable component of savings (mandatory contractual savings) and active components of capital markets (stock markets) is important for SSA. Most policies used in these economies are adopted from the developed countries whose fundamental macro-economic dynamics are different from African countries. This 'blanket' application of policies has therefore failed to yield positive results for SSA. Policies should be based on specific, sustainable variables and not left to chance.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses, firstly, the characteristics of SSA stock markets and mandatory contractual pension schemes in the last 26 years. The discussion focuses on empirical developments in terms of operational, legal and regulatory characteristics of these. Secondly, the chapter focuses on the economic relationships expected between stock markets and mandatory contractual pension schemes. The focus being on which variable is expected to determine the other. Country and regional variations in these relationships and the drivers of such are investigated through a literature analysis.

Sub-Saharan Africa has, over the centuries trailed their developed countries counterparts in terms of development. While the developed countries economies have benefited from their own internally triggered sources of development, Africa in general has failed to do so. It is however clear that the African story revolves around the failure to raise financing to trigger development. In developed countries, financing has been made possible by advanced development of capital markets, both debt and credit markets. Allocative efficiency has also been a significant feature of the developed markets especially efficiency emanating from the stock markets while savings have traditionally been high (OECD, 2010, 2011 & 2014).

It is also undisputed that the development of the markets in advanced economies has been largely triggered by the abundance of financial resources. Given that policies adopted in the advanced economies are to a larger extent mirrored by the developing countries, financial markets in developing countries should be then equally developed if policies where the main driver of this development. Sadly, there has been a wide gap between the two markets. Some schools of thought attribute this to improper 'domestication' of policies adopted from the developed countries (Erb, 2001;Loayaza, 2006).Several economists argue, through their findings (Yartey, 2006; Loayaza, 2003; El-Wassal 2013), that the level of financial resource mobilisation in developed countries is too high to compare with that of developing nations.

Development in Sub-Saharan Africa has, for many decades, been dependent largely on FDI and directed lending through credit markets. However, with growing indigenisation policies,

the role of FDI has been seriously compromised through FDI unfriendly policies. In Zimbabwe foreigners can only own a maximum of 49% of local companies while in South Africa the Black Economic Empowerment policy (BEE) of 2006 is also increasing local ownership of companies. Directed lending has also been subdued as most economies have privatised the heavily dependent parastatals hence minimising economic growth traditionally triggered through directed lending processes (AfDB Report, 2006). Debt markets however remain fairly less developed in most countries in SSA save for South Africa and Nigeria. This has left financing for companies being sustainable dependent on open markets (Stock markets) whose development is dependent not only on availability of savers but the type of savings as well.

2.2 Sub – Saharan Africa stock markets: Evolution, Performance and challenges

2.2.1Overview

SSA has 47 countries out which only 29 have stock exchanges namely Zimbabwe, Ghana, Algeria, Nigeria, Botswana, Angola, Sudan, Malawi, Kenya, Namibia, Mauritius, Swaziland, Tanzania, Cameron, Mozambique, South Africa and Zambia and Ivory Coast, Benin, Siera Leone, Burkina Fasso, Togo, Senegal and Eritrea(ASEA report, 2014). The distribution of these is concentrated in North and Southern Africa. There is a sparse distribution of stock exchanges in central Africa partly because of political instability in that region especially in Congo, Burundi and Rwanda (Adjasi, 2007; ASEA reports, 2014). The mushrooming of stock markets in Africa started in the late 1970s and these stock markets have played a crucial role in offering investors an investment avenue. Most companies have managed to raise capital through IPOs and rights issues through the stock markets. Confidence in local markets has been built mainly from stock markets with listed companies growing phenomenally (Catalan, 2007, Levine & Impavido, 2010; Mlambo, 2006; Adjasi & Biekpe, 2014).

African stock markets have increased since the turn of the early 1990s. Before to 1990, the number of stock markets was negligible with a total of five stock markets in SSA and three in North Africa. These have increased to a total of 29 countries with stock markets in various stages of development (Adjasi, 2014). This however includes very infant exchanges like the Uganda and Mozambique stock exchanges to comparatively developed stock markets such as the Nigeria, Zimbabwe and Johannesburg stock exchanges. Most African stock markets have significantly grown in terms of market capitalization between 1992 and 2002 (Mlambo, 2006;

Adjasi, 2007; Adjasi and Bieke, 2014). Total market capitalization for African markets increased from US$113,423 million to US$ 244,672 million between 1992 and 2002 , increasing further to above US$ 4 trillion in 2016 (Adjasi and Yartey, (2007). In as much as African stock markets have developed rapidly, even the advanced stock markets in SSA are still far from achieving the status of full development. Trading hours are very limited in most stock exchanges in SSA because of the few participants hence low activity.Market capitalisation is also found to be driven by a few counters. Trading is limited to a few palyers because of the limited flow of information largely caused by lack of techlogical advancement to distribute information. Regulatory oversight is still at its infancy, this compounds low activity as potential participants see high levels of risk in such circumstances (Mlambo, 2006).

The levels of Stock market capitalisation, value traded and number of listed companies in SSA still reflect that these markets are still 'thin'. Outsatnding countries include Egypt, Nigeria, South Africa and Zimbabwe with listed companies of 792, 207, 403 and 79 respectively. Zimbabwe has been affected by several de-listings of late, reducing the listed companies to 63 in 2015 down from 83 in 2013 (Zimbabwe Stock Exchange, 2015). The number of listed companies in Sub-Saharan Africa averages 39 compared with 113, while market capitalization as a percentage of GDP is less than 1.4% in some selected countries. There are some notable outliers such South Africa where number of listed companies has been as high as 704. The Johannesburg Securities Exchange is larger than all the other SSA countries combined. Other than the JSE, the ZSE, NSE and the Nairobi Stock Exchange have also been fairly growing and competitive at one point. There is also a huge disparity between some SSA countries and countries in SSA like Malaysia whose market capitalization to GDP is in excess of about 161%. The biggest challenge in SSA is that of low liquidity, as low as as 0.02% in Swaziland compared with about 29% in emerging economies (ASEA report, 2014 and 2015). Low levels of liquidity make it difficult for a market to sustain its own trading systems since volume of assets traded become extremely low thereby discouraging future entrants.

African stock markets have perfomed above average in terms of periodic returns. The Ghana Stock Exchange emerged the best perfomer in the World in 2004 with an annual return of 144% in US dollar terms ahead of huge, reputable markets such as the LIFFE and Wallstreet who postedan average of 30% (Databank Group, 2012). Uganda, Kenya, Egypt, Mauritius

and Nigeria stock exchanges apart from Ghana were also amongst the best performers in the year.

Long term sources of finance in Africa such as banks, corporate bond markets and stock markets are very inefficient in terms of pricing and allocation of resources (Singh, 1999). In Zimbabwe for example, 20% of bank credit is in the form of directed lending at subsidised rates, with 15% of the total banking sector loans classified as non-perfoming (RBZ, 2013).This emphasizes the inefficiency of these credit markets. Burchil (1995), states that stock markets in Africa can be used as a springboard to jump start the development of the economies through improving the allocative efficiency of the existing savings as compared to the banking sector. AfDB (2013) predicts that by 2020, Sub-Saharan Africa stock markets may grow by more than 5 times their current level. These expected developments are however subject to the development of savings in these SSA economies. South African stock exchange (Johannesburg Stock Exchange -JSE) comprises 85% in market value of the total market capitalisation in Sub-Saharan Africa. This means that the JSE is bigger than all the other stock markets in SSA combined, (Economist, 2015). While SSA stock markets are generally small, some of its stock exchanges are bigger than those in the developed world. For example, the South Africa's stock exchange is actually bigger than Italy's stock exchange in terms of market value at Euro 1.2 trillion versus Euro 556billion as at December 2017 (Economist, 2017). Sub-Saharan Africa's stock exchanges are small in both market capitalization and number of shares traded, with some exchanges such as Mozambique and, the Swaziland Stock Exchange only comprising of four and five listed companies respectively.

2.2.2 Regulatory environment and Capital restrictions

At inception, most African stock markets emerged in environments with poor regulatory systems. While regulatory and supervisory mechanisms have improved, they still lag behind those of developed markets with the exception of South Africa (Osi-Boateng, 2015). This has been identified as one of the factors which affect investor confidence hence low activity coupled by low FPI. Countries such as Zimbabwe, Egypt and Nigeria have managed to form independent agencies which monitor activities of stock exchanges especially insider trading which remains a major threat to confidence. According to the Association of Stock Exchanges in Africa (ASEA),Exchange control mechanisms have been put in place by most African countries (Zimbabwe 1997; Zambia 1993 and Kenya 1987) and these have made it

difficult for foreign investors since they may not be able to realise their investment (Mlambo, 2006) . While these restrictions on capital movements could be managed by some investors, the inconsistency of these policies has worsened the situation (Ando, 2010).

2.2.3 Institutional characteristics, Liquidity and investor type

Investors in most African stock exchanges remain characterised by domestic institutional investors mainly pension funds, insurance companies, life assurance companies and asset managers (ASEA, 2016). Individual investors remain subdued mainly as a result of low knowledge about stock markets. Liquidity has remained a challenge since activity is also low. Trading is very thin with the world's worst liquid stock markets being in Africa (Mlambo, 2006). Liquidity builds confidence amongst investors since it signifies the ease of entrance and exit. Ease of investing and divesting reduces the risk embedded in a stock market investment. African stock markets remained undeveloped especially technologically with only South Africa and Egypt having adopted advanced trading technologies that allow online trading (Mlambo, 2006). Zimbabwe only managed to trade online in 2016, albeit still not on full scale (ZSE, 2017).

2.2.4 Regulatory Oversight

Regulation of SSA stock markets and capital markets in general remains weak. While institutions for monitoring activities in these markets have been widely put in place (See, Table 2.1 that follow), the autonomy of such institutions remains questionable (Marandu, 2017).

Table 2.1: Stock Market regulatory institutions in Selected SSA Countries

Exchange		Year established	Regulator
Botswana	Botswana Stock Exchange (BSE)	1989	Non-Bank Financial Regulatory Authority
Ghana	Ghana Stock Exchange (GSE)	1989	Securities and Exchange Commission (SEC) Ghana
Kenya	Nairobi Securities Exchange (NSE)	1954	Capital Markets Authority (CMA) Kenya
Malawi	Malawi Securities Exchange (MSE)	1994	Reserve Bank of Malawi (RBM)
Mauritius	Securities Exchange of Mauritius (SEM)	1989	Financial Services Commission (FSC) Mauritius
Nigeria	Nigerian Stock Exchange (NSE)	1960	Securities and Exchange Commission (SEC) Nigeria
South Africa	Johannesburg Stock Exchange (JSE)	1887	Financial Services Board (FSB)
Uganda	Uganda Securities Exchange (USE)	1997	Capital Markets Authority (CMA) Uganda
Zambia	Lusaka Stock Exchange (LSE)	1994	Securities and Exchange Commission (SEC) Zambia
Zimbabwe	Zimbabwe Stock Exchange (ZSE)	1993	Securities Commission (SeC) of Zimbabwe

Source: ASEA report, 2016

i. Johannesburg Stock Exchange

JSE is has managed to catch up with the worlds most developed markets in terms of reporting. The JSE has emerged top in the World in terms of regulation of securities exchanges for the fourth consecutive year (ASEA, 2013). In last decade, there have been deliberate policies by the JSE to develop sustainability in reporting for listed companies in line with global demands. Despite this progress by the JSE, most stock exchanges in SSA have been lacking in this regards (ASEA, 2013; Deaton, 2015).

ii. The Ghana Stock Exchange

Ghana Stock Exchange is not only the top perfoming bourse in West Africa and SSA in general but has put compliance plans to develop a sustainable reporting framework in line with global demands (AfDB, 2016). The Ghana Stock Exchange has been running training sessions for Finance Directors of listed firms in that country on the requirements of reporting since September 2012 (Ghana Stock Exchange Report, 2017).

iii. The Nigerian Stock Exchange

Like the JSE and GSE, the Nigerian Stock Exchange (NSE) has also put in place mechanisms to ensure that listed companies adopt the recommended reporting framework (NSE Report, 2017). The NSE also joined the Sustainable Stock Exchanges Initiative

(SSE) in 2013 which is a right step in encouraging the adoption of the new reporting framework. To date, the NSE still uses a persuasive approach to its listed companies in a bid to encourage them to be compliant. The exchange also provides training to listed companies on corporate governance issues (NSE Report, 2018).

iv. **The Stock Exchange of Mauritius**

The Stock Exchange of Mauritius (SEM) is regarded as the main investment hub for Africa and is one of the most advanced markets in terms of technology utilisation (ASEA, 2012, 2015). The SEM adopted the Global Reporting Initiative earlier than any other stock exchange in Africa (SEM report, 2016). The SEM is a member of the Impact Investment Exchange Asia (IIX) and was actively involved in setting up the Impact Exchange trading platform where the SEM is responsible to oversee the regulatory aspects of the platform. The IIX is the head exchange in terms of monitoring environmental and social requirements and obligations of companies listing on the platform.

v. **The Zimbabwe Stock Exchange**

The Zimbabwe Stock Exchange (ZSE) implemented the sustainable reporting framework in November 2017 (ZSE report, 2017; ASEA, 2017). The acceptance of the bourse into the club was however subject to the bourse amending its listing requirements to include a requirement to report on ESG practices and performance. To date, the Government in general has shown acceptance and recognition of the need for greater corporate transparency in order to attract FPI. These are the factors that have driven the JSE to a globally recognised exchange (ZSE Report, 2018).

In as much as the ZSE has not announced when it will incorporate the ESG requirementsit has made tremendous progress to attain transparency in governance issues.

2.2.5 Performance of African stock markets

Returns in African stock markets however are fairly higher than other regions as indicated in Table 2.2 on page 31. Volatility of African stock markets averaged 40% compared to 21% in the developed world (Erb, 2004). The volatility has offered investors an opportunity to buy low and sell high since this volatility is very pronounced. For example, the ZSE gained 500% in two weeks in November 2017 when the long serving President Robert Mugabe was ousted

from power (ZSE, 2017). Table 2.2 that follow summarises the performance of selected African stock Exchanges. Five African stock markets namely Zimbabwe Stock exchange (1996), Zambia Stock exchange (1997), Egypt Stock exchange (1990) and Ghana Stock exchange (1993), have been ranked amongst the best performers in the world. In 2013, Dar-es Salam Stock exchange was the best performer at 57%, followed by Ghana Stock exchange (49%), Uganda Stock exchange (47%) and Nairobi and Zimbabwe stock exchange at 43% and 39% respectively. Volumes of trade remain subdued below the 1,000,000-mark for most stock exchanges except the Nairobi , Johannesburg and Nigeria stock xchanges. The number of listed companies has dropped by an average of 18% between 1995 and 2016, an indication of shrinking markets in terms of activity. The returns offered by these African markets has however been very high at an average of 35% annually, which compares very well with developed markets such as the S & P 500 which offers an average return of 26%.

Table 2.2: Performance of sampled Stock Exchanges in Africa 2014

Market/Index	1-Year Return*	YTD** Return*	Weekly Trade Volume(mill)	Turnover (mill)	Market Cap(bn)	Listed companies 2016	Listed Companies 1995	Value Traded(mill)
Malawi Stock Exchange	69.9%	71.0%	$0.4	1.7	26	14	0	11.1
Ghana Stock Exchange	57.9%	49.3%	$4.5	537	184	35	19	0.8
Nairobi Securities Exchange	52.0%	48.6%	$36.9	9.2	55	65	56	2.1
Uganda Securities Exchange	44.3%	42.9%	$0.6	0.2	1.4	16	0	0.0
Zimbabwe Stock Exchange	41.9%	39.8%	$8.3	14	30	65	64	3.9
Nigerian Stock Exchange	46.2%	37.9%	$122.3	13.9	12	189	181	2.3
BVRM	40.1%	34.8%	$4.5	2.5	13.6	28	31	0.3
Lusaka Stock Exchange	34.0%	29.0%	$0.6	1.1	8	11	0	0.1
Dar es Salaam Stock Exchange	30.8%	28.5%	$8.5	5.1	12.8	21	0	0.2
Stock Exchange of Mauritius	25.7%	19.3%	$5.8	7	72	90	28	1.6
JSE	29%	38%	$2300	45	214	391	640	76
Swaziland Stock Exchange	16%	10%	$0.6	0.0	9.3	6	4	0.0
Botswana stock Exchange	8%	15%	$0.4	5.2	24	35	12	0.0
Namibia Stock Exchange	16%	21%	$0.8	1.32	1312	25	10	0.3

Source: Adapted from Invest Africa 2013 report & Authors compilation from ASEA 2014 Report

2.2.6 Attractiveness of SSA stock markets and international integration

Most stock markets in Africa are still characterised by manual settlement and trading systems. Zimbabwe automated its trading system in July 2015 although the full use of the automated system is yet to be achieved (ZSE, 2016). Namibia is integrating its systems with South Africa hence it is currently under transition. Some stock markets in Africa (Dar es Salam, Namibia, Uganda, Ivory Coast) do not trade on a daily basis. These characteristics generally make these unattractive to both advanced local investors and foreign investors.

Table 2.4on the next page provides some characteristics of selected stock markets in Africa. These characteristic either attract foreign investors or discourage their presence.

The negative features of most African stock markets are the limited trading time. Most of the stock markets do not trade continuously and this makes it difficult to integrate them into the global systems. Secondly, the number of trading days is few with some markets only opens for two days per week. The automation of the JSE witnessed a doubling of trade volumes in 13 months (JSE, 2014). Most African stock markets are on a manual trading system, which possible is hindering the participation of foreign investors' hence subdued activity which leads to constrained development. Finally, the settlement period is too long at an average of 5 days. In developed economies, settlement is real time making it easy for participants to switch from one investment to the other (Fernandes, 2008 & Agarwal, 1997). This lack of attractiveness implied by the characteristics in Table 2.3 on the next page implies that these stock markets may have to rely on internal savings than Foreign Portfolio investments. This may also be a further implication that local savings need to be developed to a greater extent for stock market development to be achieved.

Table 2.3: Characteristics of sampled African stock markets

Market/ Index	Market regulator	Government law	Clearing &Settlement	Settlement Cycle	International custodian	Trading Sys	Trading days
Malawi Stock Exchange	Yes	Yes	Manual	7	No	Manual	5
Ghana Stock Exchange	Yes	Yes	Manual	5	Yes	Manual	5
Nairobi Securities Exchange	Yes	Yes	Manual	5	Yes	Manual	5
Uganda Securities Exchange	Yes	No	Manual	5	No	Manual	2
Zimbabwe Stock Exchange	Yes	Yes	Manual	7	Yes	Manual*	5
Nigerian Stock Exchange	Yes	Yes	Electronic	3	Yes	Electronic	5
BVRM	Yes	Yes	Manual	5	Yes	Electronic	3
Lusaka Stock Exchange	Yes	Yes	Electronic	5	Yes	Manual	5
Dar es Salaam Stock Exchange	Yes	Yes	Electronic	5	No	Manual	3
Stock Exchange of Mauritius	Yes	Yes	Electronic	3	Yes	Electronic	5
South africa	Yes	Yes	Electronic	3	Yes	Electronic	5
Swaziland	Yes	Yes	Manual	5	Yes	Manual	5
Botswana	Yes	Yes	Manual	5	Yes	Manual	5
Namibia	No	No	Manual	3	No	Electronic	5

Source: adapted from Yartey & Adjasi (2007)

2.2.7 The Comparative role of FPI and local investors on Stock market development

Most stock markets in Africa are characterised by an equal volume of transactions from foreign participation and local participation (ASEA, 2014). However, the behaviour of local investors seems to be a major determinant of foreign participation (Coulibaly, 2004). Stock markets with weak participation by local investors also show weak participation by foreign investors (Deaton, 2008). Swaziland has thin trading volumes, less than 0.5% of GDP and is characterised by small FPI inflows. The situation is prevalent also in Botswana, Lesotho and Mozambique. The average annual value traded is 44% accounted for by foreign investors (ASEA, 2014). FPI considered as 'hot' money which tends to cause volatility on those stock

markets whose activity/ trading volumes largely depend on FPI (Yartey, 2008). The high returns in African stock markets, albeit with high risk, have attracted this 'hot' money (Levine & Zervos, 2005). FPI has therefore been 'hopping' from one African stock exchange to the other, in search of returns. This has resulted in temporal 'jumps' (improvements) in various stock market development indicators with no sustainability of this insight (Acquah-Sam 2013). Local investors are generally considered to be stable and hence more sustainable in causing stock market development compared to FPI.

The Portfolio Balance framework by Walker and Flort (1972) identifies two factors that affect FPI. There are factors that affect the reliability of a country in terms of allowing remittances out of investments made locally. There are also facors that are internal and influence the levels of returns (Fernandez- Arias & Montiel, 1995; Taylor & Sarno, 1997; Taylor & Kim, 2001). In their empirical models, variables that incorporate these factors together with a proxy indicator of emerging market stock performance are used. The dependent variables in the empirical model are foreign portfolio investment inflows (FPI) and foreign institutional investment inflows (FII) in nominal terms. The main explanatory variables include, among others, Domestic stock market performance, Exchange Rate and country export base. Secondary explanatory variables include Reserves to import ratio (proxy for creditworthiness), Morgan Stanley Capital International Emerging Markets Net Index(proxy for regional factors), Excess of Domestic Interest Rate over Foreign Interest Rate determined by 3-month Treasury bill rate minus 3-month LIBOR, domestic output growth, foreign output growth proxied by OECD countries and Exchange Rate Volatility.

Generally, the level of returns in the domestic market influence portfolio inflows. Higher returns attract PI while negative or low returns discourage such. Agarwal (1997), Chakrabarti (2001), and Rai (2004) observed a positive relationship between domestic returns and PI in India. Foreign investors buy into the market when returns are high and increasing and they divest when returns are low and decreasing (Gordon & Gupta, 2003).

Exchange rates have also been seen to be influential in attracting or discouraging FPI. Capital can earn a return through exchange rate volatilities. In countries with a volatile exchange rate (e.g Zimbabwe between 2000 and 2008), contribution of the exchange rate returns outweigh all the other contributors to total portfolio returns (Chakrabarti, 2001; Gordon & Gupta, 2003 and Bhattacharya, 2013).

The creditworthiness of a country as measured by Reserves to import ratio determines the extent to which FPI will flow into and out of a contry. In case of divesting, the ratio determines the extent to which a country can honour such withdrawals of funds by the investors. A higher Reserve to import ratio indicates that a country has enough cover to meet withdrawals at any time. Empirical literature from Davis (2012) shows that periods of higher and increasing Reserves to import ratio are accompanied by significant portfolio inflows in OECD countries. The return on a stock market is indicated or captured in the index of that market. For Emerging markets, periods of increasing indices have also been accompanied by episodes of significant FPI inflows suggesting that foreign investors are attracted by returns of a market (Pfu, 2015). Weakening indices have also been characterized by huge divestments by foreigners.

Sustainable development of stock markets is triggered by local investors whose portfolios remain fairly stable within the markets. The volatility of FPI is one of the causes of reactive policies by local governments in the form of prohibitive exit requirements, taxes and capital flow controls (Bekaert & Harvey, 1995; Applegarth, 2004). Stock markets with significant FPI have also been observed to be highly volatile, with trading volumes and market capitalisation drastically moving between positive and negative territory (Stulz, 1999). The presence of FPI in developing markets stocks markets is double-edged. The activity and liquidity is enhanced while at the same time prices are pushed high, out of reach by many local investors. IPOs also become expensive for those companies that will seek to raise funds in the future as IPO prices are correlated to comparative company prices currently reflecting on the market (Harvey 1995). This may result in a 'downfall' or 'crushing' of stock markets. Table 2.4 on page 33 suggests a weakness in some of the factors captured in this model ,as well, factors such as exchange rates, have perennially been volatile in SSA countries except Botswana and Angola (Applegarth, 2008). Given the nature of the explanatory variables in SSA countries, FPI can only be low in these countries. This leaves local investors as an only sustainable means of stock market development in developing countries.

Another major factor affecting FPI is the business environment and the strength of legal systems in a given country. A vibrant capital market may still fail to attract FPI if these facors are in bad space (Applegarth, 2009). In Nigeria and other Central Africa countries, where business environment has been marred by inconsistent power supply, domestic political instability, and bad infrastructure among others as well as weak and slow judicial

processes FPI significantly slowed down in the last decade. The Nigerian business environment is highly volatile especially in terms of government policies and general domestic peace while most Central Africa countries are characterized by civil wars. These conditions are very unpalatable to foreign investors as witnessed by the significant decline in FPIs (World Bank Report, 2016). Table 2.4 below, shows extent to which selected African countries are good in each aspect of doing business, a high value showing better ability of the country in that perspective (World Bank, 2014). African countries are poor in most business aspects hence explaining the low FPI inflows.

The stage of development of a market also has a bearing in its ability to attract FPI. Stock markets, like any other product follow the infancy, growth, maturity and decline stages of a product (Meng, 2013). Nigeria and many other African countries are still at the late infancy stage which may also be a significant factor in limiting the inflows of FPI. Infant markets are highly volatile and hence risk may also be very high. SSA stock markets are not yet as hugeand mature as their counterparts in industrialized nations and as such, funds have flowed more to the stable markets than SSA.Lack of technology in the modern world of globalization have also not spared the SSA markets in terms of attracting more foreign investment.

Table 2.4: Top Ten Countries in Doing Business in Sub-Saharan Africa 2013-2014

Economy	Ease of Doing Business Rank	Starting a Business	Dealing with Construction Permits	Getting Electricity	Registering Property	Getting Credit	Protecting Investors	Paying Taxes	Trading Across Borders	Enforcing Contracts	Resolving Insolvency
Mauritius	20	2	22	1	7	7	2	1	1	7	2
Rwanda	32	1	14	2	1	1	3	3	31	2	22
South Africa	41	7	1	27	15	5	1	4	7	12	8
Botswana	56	12	11	13	2	11	7	6	23	14	1
Ghana	67	20	37	6	4	5	5	9	8	4	16
Seychelles	80	16	10	25	9	40	9	2	2	13	3
Zambia	83	6	7	29	17	1	12	9	32	20	5
Namibia	98	23	2	4	43	9	12	18	20	10	9
Cape Verde	121	8	28	28	6	14	24	11	4	1	38
Swaziland	123	39	5	34	24	9	21	7	13	41	4

Source: World Bank Doing Business Report (2013-2014)

2.3 African mandatory pension schemes: Evolution, performance and challenges

2.3.1 Overview

The African market has unique characteristics which may make it difficult to apply pension reforms to mobilise savings in the same way these reforms have been applied elsewhere (Loyaza, 2015; ILO, 2016).Firstly, African countries are characterised by young populations mainly as a result of the HIV pandemic and the general low life expectancy in these countries (ILO, 2014; UN, 2007; WHO, 2008). Secondly, the size of formal employment is significantly smaller than that of developed and other emerging economies. Several countries are characterised by state owned companies which are on a downsizing mode. A significant portion of the employed population is in low income industries such as agriculture and other primary sectors (AfDB, 2008; ILO, 2015). The informal sector is the largest employer which makes it difficult to apply the conventional approaches of mobilising savings using pension schemes. Thirdly the regulation and governance of pension schemes is still at its infancy with most of these schemes having lost its credibility due to their failure to deliver the promised benefits (ILO, 2009; World Bank, 2011; ILO, 2015). In Zimbabwe and Zambia, pensioners have been receiving eroded pay-outs which can hardly sustain them. This has been caused by (i) inflationary pressure against fixed DB schemes being offered and (ii) the failure of capital markets to offer high returns on pension funds' investments (Oke, 2015). Fourthly, African markets are characterised by a negative savings culture, worsened by the low incomes and high dependency ratios (Loayaza, 2013).

2.3.2 Scope of Mandatory Contractual pension Savings

Mandatory contractual pension savings are a sub-set of contractual savings which include pension contributions, insurance premiums, life assurance premiums and occupational health and safety contributions (Impavido, 2000; Meng, 2003; Loayaza, 2008). The broad categorisation of savings is made of discretionary savings and mandatory savings (Impavido, 2000). Discretionary savings being those where the saver decides when and how much to save , whether to save or not while mandatory savings are those where the saver is obliged to save part of his income. In the refined context, part of pensions and occupational health and safety contributions are defined under mandatory contractual savings (Davis, 2005). According to Loayaza (2013), these are savings which are compulsory in law.

2.3.2.1 Forms of Pensions Savings.

Mandatory contractual savings take various forms but mainly come in the form of pension savings. In light of the fact that where savers are obliged to save, they should be benefiting from those saving in the long term. Pension savings and security savings are singled out as those savings where, despite being a forced saving, savers still stand to benefit in a sustainable and guaranteed manner (Pfu, 2004). Most governments have hence found it easier to 'force' savings via pensions and security contributions than any other form of saving. There are also social benefits that accrue to the savers under pension arrangements (Palmer, 2006). The pension savings are categorised into pillars where each pillar is defined by mode of contribution and the extent of coverage post retirement (Rudolph, 2009).

Pension pillars have generally being confused in literature. To avoid this existing confusion, it is useful at this stage to define terms as used in this context. The pensions are generally divided pensions into three pillars namely:

1. Public pensions
2. Occupational pensions
3. Personal pensions

Each pillar is made up of other variants of pensions. These three mentined above make the aggregated classes of these pension schemes (Davies, 2003). Pensions are categorised into three namely, government schemes, trade unions schemes, and individual private schemes. This is also an important way to look at pension systems, especially if the aim is to compare pension systems in different countries. The most recent frameworks developed by the World Bank classify pension schemes according to ways of contributing to these schemes. This classification includes:

1. Non-contributory (basic pension)
2. Contributory (forced savings)
3. Contributory (voluntary savings)

The first pillar is a government pillar which serves the purpose of eliminating or avoiding poverty in a country. It is a non-contributory scheme which guarantees the beneficiary a minimum level of income at old age. This still exists in countries such as South Africa, Botswana, Namibia and Ghana (Loayaza, 2003). In countries such as Zimbabwe, Zambia and Ivory Coast (and several others that have suffered economic decay) this pillar has 'died a natural death' (Davis, 2000; Pfu, 2005; Erb, 2009). In as much as it is non-contributory from

the beneficiary's perspective, it represents a forced saving by the government as the government sets aside resources to cover beneficiaries under this scheme. In South Africa, 3% of GDP represents payments to support old age pensions, in Botswana, 1.5% of GDP is allocated annually by government to support the old aged. Economists argue that there is a possible moral hazard that may affect taxpayers (Borsch-Supan, 2001). The moral hazard is enshrined in that the the guarantee of a minimum income post retirement discourages people from creating their own pensions or contribute to a scheme. In South Africa, this problem is manifested by the reluctance by locals to get employed. Instead they register foreigners as their children in order to claim child support. (ILO, 2011). On average, 2 in every 5 South Africans have refused employment and survive on Old age or Child Support (ILO, 2012). Faye (2007) however is of the view that this moral hazard in South Africa emanates from a poorly designed process of testing for qualification of the benefit. Feldstein (1998) argues that pillar 1 encourages low level income workers to neglect their preparation for post retirement as they look up to the non-contributory benefit. He therefore argues for mandatory contributions to Pillar 2 which forces every employee to contribute towards his post retirement income. A combination of the two schemes may be of benefit to low level income employees. The poor screening for qualification to benefit from this scheme accounts for the significantly low savings in developing countries (Pfu, 2006)

The second is a mandatory savings pillar which is only benefited from according to level of contribution (does not cover non-contributors). In the two pillars, benefits can either be flat or may be determined some formular in relation to contributions made. Contribution rates vary from one country to the other with an average of 19% of earnings while high contribution rates of 31% of earnings are found in Senegal (Faye, 2007). Contribution rates in Africa trail the European countries pension contribution rates average of 30%, 29% in Asia and 30 % in Australia (World Bank, 2006).

Pillar 3 is a voluntary savings scheme, optional to those who want to supplement the first two pillars. It has been viewed as an option of the highly paid workers. The third pillar is therefore a discretionary savings tool which, in as much as it becomes a contractual saving, it is not mandatory in nature. A significant growth in Pillar 3 results in a significant growth in aggregate savings in an economy. The adoption of this third pillar is arguably low in most SSA countries. Less than 1% of the formal labour force has this discretionary pillar in

Zimbabwe (IPEC, 2010). In Botswana, South Africa, Ghana and Nigeria, the uptake of this scheme averages 0.5%, 1%, 2% and 1.5% of labour force respectively (ILO, 2012). Pillar 1 is designed to protect the elderly from post retirement or old age-poverty, while the second and third pillar protect retirees and the old aged from relative poverty. Relative poverty is poverty that disables someone from enjoying the luxury that he/she used to enjoy during active employment (a fall in consumption following retirement). The financing of the first pillar is through the fiscus where the public tax is used to finance this on a pay-as-you go basis. While in theory private employers claim to be able to provide beneficiaries with benefits that are unrelated to earnings or contributions, this has proved to be difficult (Vonk, 2001). Pillar 2 has been financed on pay as- you-go basis as well but in recent times, it is increasingly private and prefunded, in part or in whole. The World Bank argues for the abandonment of public, non-funded schemes and adoption of the pre-funded Pillar 2. This is expected to improve performance of these as well as reduce domestic debt as governments are always tempted to borrow from pension funds (Egert, 2012).

Forcing employees to contribute to a pension scheme of pillar 2 type can be done persuasively through promising greater benefits to those who contribute more. This is important because employees will cease to view this pension as a tax but see it as a saving. The third pillar replicates the secondin all forms with the only difference being that of it being voluntary than forced. The vuoluntary aspect also makes it typically private in terms of management. Benefits are paid as a lump sum at retirement and periodic withdrawals thereafter (Miegel, 2001). In Zimbabwe, 60% is paid as a lump sum, and the balance is paid in equal instalments over a period of between 10 and 15 years. This depends on the industry or type of job that the contributor has been exposed to.

It can therefore be generalised to look at all forms of retirement income as a subset of the three World Bank pillars. Pillar 1 being provision of retirement income by the state, company or relatives upon no contribution being made by the beneficiary and not related to any form of eranings.Benefits emanating from a mandated pension scheme by government or employer being pillar 2. Mandated pension pillars have always been avoided by participants through early retirement and being informally employed (Loayaza, 2017). This, according to Loayaza occurs where the benefits at retirement are perceived to be low. Zimbabwe has been affected by such a syndrome between 1999 and 2008. There was a rapid shift from formal

employment to informal employment which now accounts for more than 95% to total employment (CSO, 2016). A number of scholars (Davis, 2004; Meng, 2006; Holzman, 2007 & Loayaza, 2009) refer to 'Pillar 2' for fully funded, privately managed schemes, and all public schemes, contributory are covered in Pillar 1.

2.3.3 Pension reforms in Africa

Pension reforms in Africa vigorously started in the aftermath of the much documented Chilean experience of the late 1970s to early 1980s. Traditional pension systems in Africa were characterised by pay-as –you-go systems. These colonially mooted programs were 'dogged' by increasing obligations against dwindling revenue collections by the central governments. Traditional pension schemes have also been affected by political interference in the last decades. While some African countries have undertaken rigorous pension reforms, many are still in the process (ILO, 2012). The main paths of reforms in Africa have included the following:

a. Increasing the coverage of social nets and pension's coverage to the marginalised populations through introduction of different tiers in the pension systems. In Ghana, Nigeria, Zimbabwe, South Africa, Kenya and Zambia there are three basic tiers i.e the Basic Mandatory tier (Contributory), Voluntary Complementary tier (Contributory) and the Universal Old age tier.
b. Changing the approaches to funding of these social schemes. Generally, most countries have been attempting to transform from non-contributory, pay –as –you-go schemes to contributory schemes. However Lesotho has been one of the countries which have reverse-transformed (Osei-Boateng, 2012).
c. Introduction of regulatory institutions to govern social and pension schemes in line with World Bank recommendations.
d. Poor performance in terms of service delivery is attributed to administrative glitches. In Chile, the reform also focused on administrative overhaul. African pension and social security systems have also reformed in this perspective in an attempt to increase efficiency and reduce leakage of resources.
e. Finally, reforms have been on the levels of contribution by both employers and employees towards the social and pension schemes.

Generally, most social systems in Africa use the Bismarck-type of approach where beneficiaries are required to contribute for them to acquire a pension or coverage right. Some

countries still however maintain the non-contributory pension scheme accessed through vetting and meeting certain minimum requirements especially at a certain minimum old-age. These countries with non-contributory schemes include Botswana, Lesotho, Mauritius, Namibia, Seychelles, Cape Verde, Liberia, South Africa and Swaziland. African countries also have separated schemes for private and public sector employees. By December 2013, almost all countries in SSA had a pension system and social security scheme running, either at infancy or at fairly intermediate stage with Nigeria, Ghana and Kenya being in advanced stages of pension and social security reforms (Kumado & Gockel, 2014). Table 2.6 (in appendices) summarises the current laws and policies governing pension funds in various SSA economies. It also provides an assessment of the pension schemes in these countries especially the weaknesses embedded in the policies and laws of each country. Generally, laws and policies on pension funds are still weak in most countries except South Africa and Ghana, while in other countries such as Angola and Mozambique, they are still at infant stage.

2.3.4 Challenges faced by pension and other social schemes in SSA

Coverage remains a drawback in most pension and social schemes in Africa. African economies are characterised by an average of more than 70% being informally employed citizens (ILO, 2014). Pension and social security systems do not cover the informal sector in most African countries except Ghana (ILO, 2012, 2015). The policy frameworks governing pension schemes have also been considered as weak in most SSA countries as they fail to encourage or enforce wide coverage by pension schemes. In Zimbabwe, the number of employees covered by social and pension schemes are a paltry 25% of the total employed population in 2006, declining to less than 15% in 2017 due increased retrenchments(CSO, 2011 and ILO, 2017). This is expected to have increased given the closure of companies and subsequent retrenchments between 2013 and 2015. In Ghana and Nigeria, where reforms are at a fairly advanced stage, coverage is estimated at 88% and 75% respectively of the total formal labour force (Osei- Boateng, 2012).

Mismanagement has always been a problem in social security systems. Funds have been abused by both internal management and politicians. In Zimbabwe, NSSA (National Social

Security Association) have invested over $USD500m in a failing listed bank and ultimately sold the equity investment at a loss of over $USD200m(Zimbabwe Stock Exchange, 2012).
Low pay-outs (see Table 2.6 below) in high inflation environments have also remained a demotivating factor especially amongst the contributors and beneficiaries. Pay-outs of for example, USD23 and USD30 against a poverty datum line of an average of USD250 in Namibia and Botswana are extremely low and are far below pay-outs in the comparative developed countries such as New Zealand at USD560. The low pay-outs are however not exclusive to Africa as other countries such as Bolivia also pay has very low pay-outs. Most social security systems and pension funds in Africa are Defined Benefit (DC) schemes which are prone to under performance. However, with inflation being on the rise, these DB pay-outs are far below poverty datum lines at the time of receipt, a situation which has encouraged contribution evasion and in some cases massive job exodus (ILO, 2016).

Table 2.6: Comparative performance of pensions in developed and developing countries

Country	New Zealand	Mauritius	Namibia	Botswana	Bolivia
Qualifying age	65	60	60	65	65
Population older than Qualifying age	12%	9.2%	6%	5%	4.5%
Population of beneficiaries	446,000	116,000	97,000	85,000	411,000
Monthly Pay-out (USD)	$554-$737	$229-$262	$23	$30	$19
Poverty datum line			$ 220	$271	$198

Source: Compilation from various sources (2017)

Poor investment decisions and restrictive investment avenues have resulted in most schemes, especially DB schemes being underfunded. African investment markets are poorly developed with very few investment assets available to pension schemes. Secondly, investment decisions have been poor because of political interference in the investment of funds. This also contributes to the low pay-outs depicted in Table 2.6 above. In Zimbabwe, pension schemes were formerly required to invest 35% of their portfolios in government instruments (IPEC report, 2007). This is a high withdrawal being invested in low yielding assets. The requirement has since been revised to 10% in 2010 but still high compared to the requirement in first world countries.

Osei- Boateng (2011) cites highly uncoordinated regulatory frameworks in pension schemes in SSA. This mainly comes in two forms; either pension schemes being supervised by more than one regulatory body thereby causing confusion or regulation being inconsistent and

changed over short time periods. Weak enforcement of regulations has seen companies failing to remit their pension and social security contributions for a long period. In Zimbabwe, some companies were 14 months behind in terms of remitting these contributions in 2014 (ILO, 2014) and in 2017, these back-logs have increased to 23 months. This includes the state-owned companies such as the National Railways of Zimbabwe and state universities among others. This has crippled the investment capabilities of pension schemes in an already constrained market. No penalties have been put in place for defaulters to date.

Pension schemes in Africa still lag behind those of the developed world in various aspects including management practices, extent of coverage, statutory requirements, transparency and regulation (Osi-Boateng, 2014). There is a general lack of regulatory coherence and lack of political will to make pensions and social security improve (ILO, 2015). There are however a few countries which have made significant strides such as Ghana, Nigeria and South Africa. Pensions and social security remain a major problem to the fiscus, a situation which affects the overall development of these countries (ILO, 2015; Loayaza, 2016). Stock markets in Africa remain unattractive due to underdevelopment and restrictive divestment regulations (Deaton, 2013). Local Investment activity by local investors remains subdued because of poor savings and savings culture (Loayaza, 2012). Reliance on FPI and FDI has resulted in volatilities in economic development, sometimes negative growth being achieved when these divest to other regions (World Bank, 2014). There is a general need to rely on internally generated investments which are stable hence sustainable.

2.4 Population structure evolution and Pension fund characteristics in SSA

The characteristics of pension funds in SSA have also been largely influenced by the changing population structure in this sub-region (Loayaza, 2013; ILO, 2014; World Bank; 2015). The 'erosion' of the economically active population and a rising dependency ratio brought about by the HIV/AIDS pandemic in most SSA countries has had an impact on pension funds development and general savings structure in these countries (ILO,2014). While developmental policies hinge on certain theories that explain economic development, many of these theories have been found distorted or inapplicable in the SSA context (Coulibally, 2005; Loayaza, 2006). The Life Cycle Hypothesis (LCH) pioneered by Modigliani and Brumberg (1963) suggests that the working class save up for their post

retirement life implying that savings are expected to grow at the middle ages of 35 years to 60 years (Modigliani and Brumberg, 1963 , 1980;Carrol , 1997) , however this has been violated in SSA in two respects. Firstly, the economically active population cannot save as much as they are expected to due to either being out of employment or being over burdened by the high dependecy ratio (ILO, 2014, World Bank, 2016). Secondly, this population has been depleted by health pandemics in the last three decades (ILO, 2012 &2014). Consequently, pension fund scheme assets have been deteriorating in value against an expectation of increasing with an increase in the economically active population.

Population distortions have also occurred in terms of formal and informal employment (ILO, 2010, 2014, 2106; World Bank, 2016). Traditionally, economies in SSA were driven by formal employment and savings could be projected thereon, however, the gaining of independence by most countries in SSA has resulted in divestment by colonial companies leading to retrenchments and secondly mismanagement of the remaining companies has seen most of them closing shop, again leading to increasing unemployment (ILO, 2010; Deaton, 2013). Employment has shifted towards the informal sectors in most SSA countries accounting for more than 60% in middle and low income SSA countries (ILO, 2013).

The argument by the The Permanent Income Hypothesis (PIH) that households smooth their consumption through their lifecycle is distorted in SSA. The conceipts of the PIH suggests that if income peaks between age 40 and 60while expenses in the form of mortgage payments and child rearing peak at younger ages, then we should see significant savings occurring in the ages of 40 years and above (Shea, 2007). However, in most SSA countries, due to low incomes during working life, these obligations on mortgage payments extend up to the late 50s, making it difficult to save for retirement. In Zimbabwe, couples on average own a house at an average age of 48 years, while in Zambia and Mozambique the average home ownership age is 44 years (World Bank, 2013). Secondly, employees with bigger families are expected to spend more in earlier years and lower consumption as age increases. The reasoning about household consumption suggests that many households approaching retirement have inadequate retirement savings (Scholz and Seshadri, 2008), worse so in SSA, given that the dependency ratio on those employed has increased due to the AIDS pandemic and general unemployment.

Economic growth in SSA and other regions is strongly driven by the level of private savings and investment performances (Davis, 2009).However, private savings in SSA declined from 11.4% of disposable income in 1970s to an average of 7.5% in the 1980s. They marginally took a re-bound in the eraly 1990s to average (Elbadawi & Mwega, 2000). The rate of gross domestic investment has also been declining gradually from 21.4% in 1970s to about 17.2% in the 1990s. Both savings and investment in SSA are still far below those of other regions such as the highly performing Asian economies (HPAE), whose savings are leading those of SSA countries by a huge margin of 9.7%. The challenge with savings in SSA is that of not only being low, they are also very unstable at those low rates.

Feldstein, (1977); Feldstein and Bachette, (1991) and Bosworth, (1993) find a high correlation between savings rates and investment rates. Productivity volatilities tend to influence savings and investment.Domestic savings are also the bulk source of financing of projects and capital controls to protect the domestic tax base and the balance of payments discourages FDI hence financing comes from local savings. Lack of access to external finance also makes industry rely on domestic sources (Gordon and Bovenberg, 1994). In SSA, however, there is a huge disparity between the two in the last five decades suggesting that investment has been growing as a result of financing from else than domestic. It leaves it unclear whether its savings that drive investments or investments that drive savings in the case of SSA countries.

Neoclassical models such suggest that an increase in the savings rate induces higher investment growth rates initially but at later stages the investments are the ones that drive savings Solow (1956). In the long term, the rates of growth in GDP are a function of technological progress and the quality and amount of labour available. According to Roemer (1986) and Lucas (1988), permanent economic growth is driven by higher savings and investments. They further argue that savings alone can not drive investment rates but will need to be complemented by technological progress and human capital. Recent studies find that investment rate to be one of the most important determinants of economic growth (Levine, 1992; De Long and Summers, 1993; Easterly and Rebelo, 1993; King and Levine, 1994). There have been arguments pertaining to the relative importance of savings rates and technological progress in driving economic growth. The relative importance of the two in driving economic growth varies from one region or country to another depending Young,

1994). Investment rates create employment opportunities hence increases disposable income for workers. This inturn drives savings upwards all things being equal.

Contracdicting arguments however suggest that at earlier ages, citizens borrow against future income in circumstances where they anticipate increased wages. This invariantly reduces savings in the log run (Tobin, 1967). This coupled by a possible reduction in liquidity and borrowing frictions encourages households to increase consumption thereby discouraging savings again. . The ability of economic growth to increase savings is therefore conditional to the nature of the general populace in terms of their current level of savings and their savings attitude. Only if households are already in the high savings bracket and have a sustained culture of saving will economic growth induce savings. The Permanet Income hypothesis generally argues that unexpected income streams are saved (Harrigan, 1995).

Summing up all these arguments, there seems to be a causal relationship between savings and investment rates which culminate in economic growth. The end of the argument therefore focuses on where the cycle starts, is it savings that cause investment and economic growth or its investment and economic growth that cause savings. The argument further goes to whether there is feedback causality regardless of where the causal influence starts at (Schmidt-Hebbel & Serven, 1996). According to Carroll and Weil (1994), this has potential policy implications. World Bank, (1994), savings rates have traditionally been low in SSA the little improvement in savings seems to be following economic growth. The study by the World Bank concluded that policy makers in SSA should force increases in savings rate instead they should focus on creating an enabling environment that encourages them as well as efficient allocation of these savings in the investment space.

2.5 Economic Role of Mandatory Savings

The implementation of mandatory savings models differs from country to country (Phil, 2000; Davis, 2004; Musalem, 2004) largely because of differing economic characteristics. However, generally, the economic benefits and drawbacks resulting from these mandatory savings schemes show the same characteristics across countries (Yartey, 2007).

There are three avenues through which funded pension funds affect the development of capital markets:

- Changes in savings size and quality of institutional investors as the migration of mandatory pension contributions from a PAYG (pay-as-you-go) to a funded system.

Pension reforms have empirically been proven to positively impact on the total aggregated savings in an economy (case of Chile) and hence changes in the level and depth of financial interactions especially in capital markets (Iglesias- Palau, 2002).

- The mode of migration from PAYG to funded systems is done through issuance of public debt which automatically increases market capitalisation.
- Increasing the number of well resourced institutional investors with independent investment decisions encourages a robust financial system through demand for enhanced regulation by these institutional investors. The operation of the financial system naturally improves as private institutional investors demand not only fair treatment in the market but also improved operating platforms that eventually allows for a smooth price discovery process. Pension funds and other corporate investors tend to lengthen the maturity profile of securities since they mainly fund long term projects. This diversifies the composition of instruments in the financial markets. Efficiency is also improved through enhanced liquidity of capital markets increased participants (Allen & Gale, 2000). Their investments actions are based on return and risk thereby improving the allocation of financial resources.

2.5.1 Impact of mandatory savings on overall aggregate savings

First and foremost, mandatory savings impact on the general savings levels of a country (Acuna 2001). According to López, Murphy & Musalem, (2004) and Kune, (2010) economic stakeholders substitute each unit of an extra forced saving by reducing their voluntary savings by the same magnitude. It therefore implies that mandatory savings crowd out voluntary savings especially where the realisation period of the forced savings and discretionary savings are different (Kotlikoff, 1987, 1990; Mitchell & Zeldes, 1996). The difference in realisation time induces borrowing against pension guarantees which actually is a reduction in economic savings (Scmidt-Hebbel, 2005). This is also compounded by arguments of the Life-Cycle Theory where mandatory savings and voluntary savings are viewed as perfect substitutes (Pistaferri, 2009). This may imply that increasing the other simply shifts resources from one portfolio to the other.

Where the return on mandatory savings is set higher than that of discretionary savings, mandatory savings are expected to increase aggregate savings (Kotlikoff, 1979; Munnell, 1976; Morling & Subbaraman, 1995; Venti & Wise, 1990, 1993). Ando (1963), argue that the

increase in savings will however depend on the interest differential on mandatory savings, discretionary savings and cost of debt since stakeholders may offset the increase in forced savings by simply borrowing if the cost of debt is lower than the interest earned. This is however rare since the introduction of mandatory savings may already be a result of a deficiency in these hence cost of debt will be expected to be already high (Deaton, 2005). World Bank (2004) however insists that whether or not mandatory savings increase aggregate savings, depends more on the design than on the response of stakeholders. Generally, mandatory savings should increase aggregate savings (Jappelli, 2005). In Australia for example, for every dollar of mandatory savings, only 38cents have been offset, implying that 62cents has been the resulting net savings emanating from forced savings models (Modigliani, 2000). This has been observed to be higher in China, America and Central Europe, averaging 71cents. In Singapore, mandatory savings contribute the largest portion in aggregate savings at between 16% and 30% of gross national savings, the highest rate in the world (Asher, 1995). In SSA, statistics show a low to negative discretionary savings (AfDB, 2009) hence any introduction of mandatory savings models have impacted significantly positively on total aggregate savings. Mandatory funded pension systems can contribute to raising national savings rates especially in countries with low levels of financial sector development as households face borrowing constraints (Yermo, 2012). Funded systems also give a major boost to capital markets. They can also help finance productive investment in infrastructure and innovation, both of which are major sources of economic growth.

2.5.2 Relationship between mandatory savings and Economic growth rates

The potential impact of mandatory savings on economic growth depends also on the design of the mandatory savings model with however a general consensus amongst economists that there is a positive impact in the long term (Barr, 2004; Karunarathne, 2005; Gunu, 2006). Higher economic growth rates are also expected to trigger an increase in savings as more people are getting employment and higher wages (Barr, 2004). This, however, is not always the case, GDP growth in South Africa accompanied by improved wages have not resulted in an increase in savings and this is mainly being explained partly by the savings culture of the population (Deaton, 2009). The resulting higher savings emanating from higher GDP and wages are translated into higher investments via both credit and stock markets hence increased output (Davis & Hu, 2004).

Pension reforms in Chile resulted in investments increasing by an average of 33% and GDP increases of between 11% and 16 % between 1981 and 1990.Stock market capitalisation increased by 8% during the same period. A close analysis of the stock market in Chile however reveals that the number of listed companies were also on the increase (by 19%) during the same period (Meng, 2004). Although other studies (Meng, 2000; Acuna, 2003; Ma, 2010;) argue that the improvements in economic growth in Chile were attributed to the general pension improvements than mandatory savings, the coincidence has been too much especially since mandatory savings growth has been accompanied by similar economic growth trends in Brazil and Turkey (Homburg, 2000). While studies in Ireland between 2007 and 2011 indicate a negative impact of mandatory savings on general key economic indicators (including GDP) , this has been attributed to the fact that Ireland is an open economy and hence the net savings from mandatory savings find themselves elsewhere than in the Irish economy(Hick, 2009,Nivakoski, 2012; Stewart, 2013). This is different from other emerging and developing economies such as Chile, Hungary and China (Hu, 2009). Davis (2005) finds no accompanying economic growth as mandatory savings increase in 23 Emerging economies. These findings complement findings of Hu (2003); Christensen (2006); Pfu (2009) and Bradley (2004) who generally argue that an increase in mandatory savings may not account for increases in economic growth since these mandatory savings are a substitute of voluntary savings. Kwenda (2008) however acknowledges the stability of mandatory savings compared to voluntary savings, which makes the former more relevant to long term investments hence higher impact on economic growth than the impact that could be derived from the volatile voluntary savings.

The impact of both forms of savings on economic growth seems to be dependent on several other variables such as capital markets development, government policies on these savings, the stage of development of the savings and levels of entrepreneurship skills in a country (Acuna, 2011).

2.6 Economic drawbacks of mandatory schemes

2.6.1 Contribution evasion

Contribution evasion occurs when workers and employers do not pay required social security and pension contributions. The overall impact of contribution evasion is to reduce even the discretionary savings hence slowing down investments on capital markets. This results in negative development of especially the stock markets (Gillian, 2003). In Chile, defined contribution pension funds designed for lowly paid workforce had an average contribution evasion rate of 45% to 55% in 1990 (Gillian & Bonilla, 1992). The level of evasion is very high in Chile. Almost 40% of active members to social security schemes deliberately fail to pay their contributions (Queisser, 1995)

Evasion has been driven by a number of factors but mainly as a result of the provision of a guaranteed minimum benefit to low income workers. This has significantly reduced their incentive to contribute towards their own benefit. Secondly, irrational workers to accumulate their own retirement income in other assets of their own making or consume the savings now. Thirdly, low income workers as well as small firms as well as firms in financial distress are the main evaders of social security contributions citing low disposable income or financial difficulties respectively. Infact there has been serious collusion between small firms and their employees in assisting each other to evade contributions in Chile. Fourthly, uncertainity over the future benefits has also been a chief cause of evasion in Chile. The introduction of a mandatory scheme has been in some instances, met by a series of workers leaving formal employment for informal sector employment where there are no regulations forcing workers to contribute towards pension (Deaton, 2005).

Evasion is appears to significant among those employees and employers experiencing financial distress (ILO, 2104). In SSA, countries such as Zimbabwe has experienced contribution remittance failure of almost 12 months by employers, both private and public employers mainly as a result of liquidity and other economic challenges faced by the country (ILO, 2014. In Nigeria, Ghana, South Africa and Kenya, contribution evasion has been largely driven by high contribution rates, lack of incentives to comply, lack of technological advancement and perceived low benefits from these pension schemes (Gora & Rutkwoski, 1998; Harris, 1998 and Fox, 1999;). In some cases, employers do not remit but continue deducting contributions from employees. This form of evasion is different from the usual

ones involving connivance between employers and employees and is tatarmaunt to defrauding employees of their own resources.

2.6.2 Retirement Decision

Mandatory defined contribution plans may create a moral hazard on retirement age decisions in several ways. Retiring at early ages has been observed in low income workers in countries such as Chile. ILO (2012) observed that between 1998 and 2009, South African citizens opted to retire early while some preferred not to seek employment at all as they registered for the Old Age Support grant. This was mainly being driven by the need to be considered for government subsidised minimum benefits after utilising their own private pension contributions (Kerr, 2001). Workers in Brazil and China have also employed the same strategies as they seek to qualify for non-contributory, government provided benefits (Antolin, 2011 and Barr, 2006). Early retirement increases obligation payment by pension schemes which reduces its investments in capital markets ultimately causing declines in stock market capitalisation due to selling pressure of stocks, *ceteris paribus* (Deaton, 2006). Workers may also speculate on interest rates offered on contributions and hence may defer or retire early depending on when they expect capital markets to be 'bullish' in terms of interest rates.

2.6.3 Reduced Competitiveness

Competitiveness refers to the extent a country can produce and sell goods or services in international markets at prices that compete with those of other countries. Competitiveness is affected by mandatory pension provision directly via price competitiveness. The general costs of products and services offered by a country tend to be increased mandatory pensions since these (mandatory pensions) are a cost to the companies producing the goods and services. The real total wages increase with provision of mandatory pensions. This makes the products and services being traded more expensive compared to those of counterparts which probably do not offer mandatory pensions. The cost of labour is also independently expected to increase via constrained labour supply, as a result of perceived higher 'taxes'. This may further reduce the inflow of skilled labour, critical in production efficiencies thereby further reducing out from industries causing possible unemployment. Due to reduced sales, wages may also be reduced resulting in pension contributions (these are directly linked to wages)

also declining (Alfaro, 2003 & Li, 2005). Overally, investments into the stock markets may fall resulting in a slowed development of this market.

Competitiveness may be reduced because of the cost-build up brought about by mandatory contractual savings. This adds to employment costs may significantly disincentivise FDI (Alfaro, 2003; Li, 2005; Khaliq, 2007 and Moura, 2013). A positive relationship is found by Meng (2000) and Moura (2007) in China. The rise in FDI inflows in China are partly explained by low mandatory, labour related costs. Davies (2006) also argues that the amount contributed under mandatory pensions is more influential than just the presence or absence of these. Pension policies in the competitor countries for FDI are therefore to be considered more if a country is to remain a competitive destination for FDI. lt is worth acknowledging that multi-national investors make their investment decisions based on an array of factors including the level and type of taxes in host countries being a priority factor. Mandatory pension contributions are generally viewed as a tax (Fortanier, 2007).

In SSA, attraction of FDI has been key to economic growth, income streams for workers and hence savings (World Bank, 2015).Reliance on FDI inflows is more visble in SSA countries than larger more closed European Union (World Bank, 1990; 2004; 2010).Coulibaly (2007) finds a reduced trend in marginal FDI inflows following the insistence on mandatory pensions in Nigeria, Ivory Coast, Zambia and Tanzania between 1990 and 2007. Gillian (2008), however, argues that this reduction in marginal FDI inflows to these countries may be a result of other macro-economic variables such as policy inconsistency, political instability and volatile exchange rates. When introducing pension schemes, policy makers should consider how the scheme is interpreted by the general public. Where pension schemes are viewed as overly interventionist in approach, evasion is likey to be high (Loyaza, 2015). To balance the need to mobilise savings, post retirement income and FDI attraction, governments may consider implementation quasi-mandatory scheme. These are non-compulsory schemes which may find high subscribers due to the effect and influence of trade unions in a country. (ILO, 2017). Such schemes have been successful in Denmark although arguably they are very difficult to maintain since the contributory base is likely to be very volatile sometimes in the short term. A quasi-mandatory scheme, while more difficult to implement, removes the perception of it being a tax burden to both employers and employees such that in the long term, it may be successful (Umeora, 2013).

2.7 Role of mandatory contractual savings in Capital market development

Theory suggests that there is a strong link between savings and capital market development, running from savings to capital market development (Impavido, 2000 & 2008; Meng, 2005; Davis & Hu, 2005 Musalem, 2007). Dobrinsky (2005) finds a positive relationship between savings and financial sector development with the relationship being cyclical in emerging economies. Meng and Pfau (2010) find a higher causal effect of pension savings on markets with already developed capital markets and a lower, insignificant impact of these pension savings in markets with under developed capital markets. Schumpter (1911), in one of the pioneering works, finds a relationship between financial sector development and economic growth via savings growth. Findings in developed markets in the European block reveal that pension savings increases do not have any increase on stock market development since increases in pension savings are accompanied by decreases in other forms of savings. El-Wassal (2010) identifies the existence of institutional investors as a major driver of stock market and other forms of capital market development. Revia (2013), in line with findings of Demigurc-Kunt (2004) finds a positive relationship between institutional quality and stock market development running from institutional quality.

Pension funds (and institutional investors more widely) have been causally linked with financial innovation by suggestions that innovation is a demand driven phenomenon. According to this argument, the large size of pension funds means that they are able to generate substantial demand-side pressure, whilst their nature (given that they are effectively taking up a function of the state and cannot be allowed to fail) means that they are governed by a fundamental contradiction, whereby they seek continual reduction of risk at the same time as an increase in financial returns. Continuous financial innovation is therefore needed to fulfil the demand for new assets with an attractive risk/ return profile for institutional investors (Dermiguc-Kunt, 2015). Whalen (2012) argues that the rise of institutional investors encourages further financial system evolution through providing a market for for securitized loans. By so doing however, pension funds contribute to financial instability, since financial innovations may contribute to spread systemic risk rather than reducing it, as testified by the boom-bust cycle of asset-backed securities. In sum, the promotion of funded pension schemes is indeed closely related to the growth of financial markets and financial innovations. The promotion of funded pension schemes has resulted in the emergence of large and systemically important financial institutions, which may, with their constant

demand for high returns and low risk, contribute to the instability of the financial markets (Trellis, 2014). The change in pension funds asset allocation behaviour and the related issue of the evolving regulation over the years, confirms that pension funds have had and continue to have an ambiguous role as "stabilisers" of the financial sector.

2.7.1 Indirect impact via impact on aggregate Savings

The impact of Mandatory contractual savings on aggregate savings is circumstantial. Ando (2013) finds a positive impact of mandatory contractual savings on aggregate savings in OECD countries. PAYG systems are financed through current contributions. This leads to a disincentive to save privately for retirement (Loayaza, 2015). A mandatory pillar, which is pre-funded, encourages individuals to save for their own for retirement. With respect to the Life-cycle model, mandatory pension savings may result in a decrease in overall savings especially in the absence of credit constraints which may allow household to replace to forced pension by borrowing. If, however, households are credit constrained, savings can be expected to sympathetically increase (Loayaza, 2015; Deaton, 2014; Davis, 2012). The "awareness effect" brought about by the introduction of forced savings increases awareness on the part of households of the need to save for retirement. This increases savings which savings find their way to capital markets thereby triggering activity hence development of capital markets.

Boersch-Supan and Winter (2001) argue that even without a change in aggreagate savings, an introduction of mandatory pension funds increases the allocation efficiency of these savings as these pension funds will invest in assets which the general household will not invest in. The spread of savings into long-term assets is improved a pension fund players increase in an economy. Most developmental projects are of long term nature and will require these long term funds.Introducing mandatory pension funds is expected to affect the distribution of savings amongst different investment assets. Total pension fund assets under management globally are currently at US$ 46 trillion and mostly accounted for by developed and emerging markets. The figures could double if developing countries such as SSA could optimise their mobilisation of contributions (IMF, 2015).

On the contrary, with high mandatory contribution rates in a defined contribution system, employers and employees are tempted to evade contributions (ILO, 2007). Contribution

evasion is usually driven by colluded effort between employers and employees. At infancy, evasion is charaterisedc by the late remmitance of contributions to the schemes. Overtime this develops into hard core non-remittance (Worku, 2014 & 2016). At worst labour supply may be biased towards the informal sector than formal sector (Croix, 2010). The financing of the transion from PAYG to defined funded systems through taxes has a bearing on the levels of supply of labour (Antolin, 2011; Fornero, 2013). The cost to governments arises from the under-funded position of PAYG systems in most African countries. Transition to defined contribution schemes will involve the government financing the under-funding so that beneficiaries are not disadvantaged. The financing of this transition, usually through government taxes is in most cases more damaging than the social security contributions they seek to do away with.

Very few studies have focused on quantifying labour displacements or labour attractions emanating from a reduction or increase in mandatory contribution rates. Faye (2003) attributes the shift to informal employment in Tanzania and Ivory Coast to desperate attempts by entrepreneurs to avoid the rising contributions in these countries. Pages & Stampini, (2009) for Mexico, Bargain & Kwenda, (2009) for Brazil, Mexico and South Africa, El Badaoui, (2008) for South Africa, and Aydin, (2008) for Turkey all finf that there is a positive remuneration gap between formally employed workers and those in the informal sector. Bargain and Kwenda (2009) however, find that the contribution evasion penalty faced by informal workers is higher at low levels of salaries and the benefit increases as informal earnings increase.

Bosch and Maloney (2008), find that movements between formal salaried and informal salaried jobs follow certain trends in Brazil and Mexico. There are high in economic downturns and upturns suggesting that there is involuntary migration into the informal salaried sector. Packard (2007) argues that the characteristics of informal workers are not very different from the unemployed suggesting that workers generally make themselves worse off by migrating to the informal sector in terms of salaries but coud be making themselves better off in terms of avoiding taxes. In Zimbabwe, an estimated 3% of the working population voluntarily left formal employment between 2005 and 2011 as a result of increased mandatory deductions which reduce disposable incomes (Miegel, 2001). There is a general inconclusive debate on this relationship between mandatory pensions and labour supply. The percentage of those leaving formal employment to the informal sectors in

Zimbabwe has risen to more than 75% in 2016 due to retrenchments among other causes (ILO, 2016).

2.7.2 Impact of Mandatory Savings on Credit markets

Credit markets have been driven to a greater extent by contractual savings (Donkor, 2006 and Meng, 2013). The long-term deposits, of especially pension funds, are used to create loans by banks (Besley, 1993). Pension funds and other contractual funds are also the major participants in both corporate and government bond markets especially at IPO level, whether voluntarily or statutorily (Impavido, 2000). Savings create resources that can be loaned to borrowers by banks on one end while they are also used to purchase credit instruments such as bonds, notes and warrants. The combined effect is that of providing liquidity to these credit markets. Mandatory savings will tend to provide an extra benefit to credit markets in the form of guaranteeing the existence of liquidity in credit markets (Alfaro, 2004).

One school of thought suggests that pension funds' investments into the banking sector, via mainly money market deposits, enables bank to get resources for on-lending at least for the short term periods (Besley, 2000; Meng, 2007 and Kerr, 2001). This results in growth of credit markets though in a skewed manner. In South Africa, Nigeria, Ghana, Zambia and Zimbabwe, pension funds account for 65% of short term liquidity in bank-credit markets (AfDB, 2010, Meng, 2014). This sharply contracts with an average of 25% in the EU and Asian markets (IMF, 2010). On long-term credit market activity, pension funds account for more than 50% of government and quasi- government institutions bond purchases in the open market through initial public offers (IPO) in developing countries prompting a conclusion that pension funds have a significant impact on credit markets in SSA (Adelagan, 2009 and Davis, 2011 and Pfu, 2014).

Pension funds have a significant impact on the maturity structure of bank loans as their long term deposits with banks enable these banks to create long term assets. They also influence the allocative efficiency of these credit markets in so many ways including the governance demands by pension funds who have invested heaviliy with banks. While the substitutive effect may result in loan tenor decreasing, the general findins in empirical literature show that loans tenor is increased as pension deposits increase in banks. Levine (1997, Meng, 2013 ; Loyaza, 2015) find that the complementarity effect between banks and stock markets dorminate in emerging economies hence the maturity of loans is found to increase.

Pension funds in Latin America, with the exception of Argentina, Costa Rica and Mexico, have portfolios that are biased towards financial assets issued by banks (World Bank, 2014). On average, these constitute an average of at least 20% of the pension schemes total investments. Pension funds therefore appear to play a complementary role to the banking sector.

The growth of the mortgage bond market in Latin American countries has significantly influenced by pensionPension funds are found to be investing in excess of 25% of their assets in mortgages issued by banks (World Bank, 2015). Mortgage bonds and real estate investment funds are the two main avenues through which pension funds provide housing. The Chilean pension reform changed the fortunes of the banking sector market through investing in mortgage-backed securitised securities since the early1980s resulting in more underwriting capacity of mortgage issuers (Fabozzi, 2001, 2012). Impavido et al. (2001) also underscore that banks and institional investors cannot exist in isolation and where they do, both institutions are found to be under developed for example Argentina, Brazil and Mexico. The enhanced performance in banking sector as a result of pension funds is reflected in the profitability indicators as well as the enhanced maturity of loans. Countries with different sizes of pension assets have been found to have significant differences in terms of bank efficiency suggesting that pension fund assets development is positively correlated to bank performance.

Catalan, Impavido & Musalem (2010) argue that contractual savings development, play more than what they are originally designed for. Other than social protection, mandatory contractual savings enable banks to in operations where it has a comparative advantage than to focus on deposit mobilisation. They have also been linked to improvements in the financial structure of firms since they reduce their leverage through providing equity at IPO stage as well as reducing refinancing risks in cases of need to recapitalise. Through their participation in the bond markets, there has been enhanced long-term development of government bonds market and general increase in the success of public debt instruments.The instability of the financial sector in developing countries has made these effects to be minute while in developed countries these are found to be stronger. The overall effect is that of a reduction in country risk profile through a significant mitigation of both social and financial risks hence improving the ability of an economy to absorb shocks. Interest rates and the general cost of

capital decrease as these wholesale deposits from pension funds increase thereby promoting growth. The effects may however vary from one country to another depending on the level of other supporting factors such as human capital, natural resources and structure of employment contracts.

2.7.3 Impact of Mandatory Contractual Savings on Stock Markets

Mandatory contractual savings, mainly in the form of pension schemes of pillar 2 type, are expected to participate in the stock exchange more actively than any other institutional investor (Meng, 2014). Their participation is expected to have an impact on all the stock market development indicators which include Market Capitalisation, value traded and number of listed companies. This impact is, according to Meng (2010), expected to be more pronounced in economies with high incomes as compared to countries with low incomes. The impact is also expected to vary depending on the levels of regulation of pension funds and development of credits markets. Adjasi and Yartey (2014) find that the rate at which stocks exchange hands in a market is higher in those markets where there are highly cash resourced institutional investors whose buying appetite is always high.

2.7.3.1 Stock market liquidness driven by mandatory contractual pension savings

Pension funds are one of the largest participants on stock markets both on the buying and selling side (Meng, 2013). In the USA, pension funds account for 33% of transactions on the Wall Street (Wall Street report, 2015). Garcia and Sanjuan (2017) find a positive and significant relationship between pension fund assets and liquidity in European countries. The periodic financial resource inflows in the form of contributions enable pension funds to sustainable buy securities on the market. This confirms that the enduring nature of pension funds allows long-term market growth. However, in certain environments, results evidence some differences with prior works. Meng and Pfau (2010) find positive influence on market capitalisation and value traded for developed markets while Sialm, Starks, & Zhang (2015), finds a weak relationship between pension funds assets and market liquidity & activity may being explained by the lower tendency of pension funds to reallocate investments thereby performing lower number of operations (buy–sell) and holding the same stocks longer. Nonetheless, despite this possible lower re-allocation frequency, pension fund re-allocations usually involve large amount of assets, which might produce long-term repercussions in liquidity and activity, given the considerable number of investors and stocks involved over

time (Pfau, 2016) . Results may also vary according to countries studied. Hu (2012) finds that pension funds only influence market capitalisation and traded value in less developed Asian economies, and the turnover is negatively affected in more developed economies.

Liquidity (value traded) is found to be low in countries with infant pension fund systems and progressively getting higher in countries with more robust and well regulated pension systems (Raisa, 2012). Liquidity on the Ghana Stock exchange increased by an average of 11% following the regulation of informal sector to contribute towards pension.

Findings by Holzmann (1997) indicate a positive correlation between the growth of pension fund assets and stock market liquidity in Latin American countries especially Chile. Pension fund investments have been found to increase both activity on the markets through their buying and selling process (Lefort and Walker, 2000). Since the Chilean reform of 1981, the number of trading counters in day more than doubled while the participation by individual investors increased by 27% in two years. Catalan (2006) attributes the increase in individual traders to the increased ease of disposing shares as a result of increased pension fund activity. Findings by Lefort and Walker (2000) as well as Catalan et al (2000) found causality to be running in both directions between stock market development indicators and pension fund investments while Impavido (2009) found causality to be one way fom pension fund investments to stock market development. Their sample sizes and sample periods could have been a contributing factor to the differences.

While these were positive developments on the Chilean market, comparatively with other developed countries, the liquidity of the Chilean stock market was still significantly trailing levels of the comparative countries. Liquidity is below the Demirguc-Kunt and Levine (1999) development threshold level of 15 percent for the 1990s. Catalan (2013), in his review of the Chilean case argues that the rapid growth in pension funds investments in Chile could have failed to increase liquidity because of their once-off transaction models where pension funds buying and selling processes were not a daily process but an annual or bi-annual process.

2.7.3.2 Mandatory Contractual savings as a driver of Market Capitalisation

Pension funds are expected to impact on market capitalisation in three ways. Firstly, through enabling listings growth by participation in IPOs. The long-tern nature of pension fund liabilities make these pension funds a central and key tool for the development of local capital markets compared to other institutional investors. Developmental projects need financing of long term nature. Secondly, through the buying process thereby demand for stock resulting in share price increases (Enache et.al, 2015). Tressel (2015), Osi-Boateng (2014), Kim (2010), Liang and Bing (2010), Niggerman and Rocholl 2010), Pfau and Meng (2010) find a positive impact of pension funds' assets on market capitalisation. Cross-country differences however reflect a higher impact of these in countries with less developed capital markets and less impact in countries with more developed capital markets (Garcia et.al, 2017). In less developed capital markets, there are no other institutional investors except pension funds hence a magnified impact while the influence of other institutional investors in developed capital markets dilutes the impact of pension funds. The impact of pension funds on market capitalisation is also found to be more pronounced in economies where the size of the pension fund assets is higher compared to economies with smaller pension funds (Niggerman et.al, 2010).

Thirdly, indirectly through instilling confidence of other investors (both foreign and local), to invest in the stock market. Loayaza (2015) asserts that foreign investors are comfortable to invest where large domestic investors in the host country are active because it gives them the comfort of (i) safety, (ii) ease to divest and (iii) implied well regulated market. The demand for stocks by these foreign and other domestic investors attracted by the presence of pension funds results in price increases hence growth in market capitalisation.

In Germany and France, where households own very little productive capital via investments or otherwise, stock market capitalisation is very low compared to the United Kingdom, Netherlands and the United States of America. In the later, households own a significant amount of productive capital through investment of savings (Supan, Koke & Winter, 2005). This may suggest that higher savings lead to development in capital markets and also imply that where savings are low, mandatory models of saving should be put in place for capital market development to be realised. To further compound this under-development of stock markets in France and Germany, funds accumulated for pension funds are kept as reserves in

firms' balance sheets for legal and tax purposes instead of being invested in stock markets (Lefort, 2007).

The amplification of local savings through pension funds and other long-term savings institutions (which increase activity and exposure of pension funds) have also been observed to, over and above the direct contribution to Stock market development; indirectly contribute to stock market development through:

1. Increasing confidence of Foreign Portfolio Investments (FPI). Foreign investors gain confidence through gauging the level of participation by local investors on the stock market (Asiedu, 2006, El-Wassal, 2013).
2. Increased activity on the stock exchange triggers regulation scrutiny hence an improved efficiency and transparency which further attracts FPI and other players. The involvement of institutional investors in African exchanges must be monitored closely and encouraged by relevant stakeholders. Institutional investors, through their demand for transparency in pricing and regulation of the field of play; force the regulators to provide an enabling environment for efficient market practices and financial innovation. They also encourage market integrity in both primary and secondary markets, in order to increase governance and achieve trading at minimal cost at the best technology applicable.

   Putting in place institutions characterised by intergrity and democratic accountability, bureaucratic quality are key factors that enhance stock market development in Africa since political risk is greatly reduced leading to increases in Foreign Investment Portfolios(FPI), (Yartley, 2007). According to Bekaert (1995), there is ample evidence that high political risk is related to market segmentation and invariantly low levels of stock market development while Eke and Onafalujo (2015) find a bi-directional causal link between mandatory pension schemes and stock market development in Nigeria. However, Erb (1996) argue that there is a positive correlation between expected returns and the magnitude of political risk. This suggests that some countries with high political risks may experience higher returns than those with low political risk. In both developing and developed countries, the lower the level of political risk, the lower is required returns. Political risk is therefore influences the level of return that investors can get hence it affects the local cost of equity. This has implications on stock market development in the sense that it may reduce the appetite

for IPOs in the domestic markets. This however has been contradicted by empirical evidence in countries such as Botswana, Swaziland and Malawi where despite the presence of good quality institutions of law and order, activity on the stock markets has remained very low (Ndako, 2007 and Boubakari, 2010).

Pension Fundsand other institutional investors therefore offer competition to other intermediaries in the capital market, making the whole market efficient. There is no doubt that an increase in institutional investors will benefit African exchanges in terms of size and (Adjasi & Biekpe, 2006). Following the Chilean pension reform from 1981, the various measures of stock market development responded positively with stock market capitalisation and turnover more than doubling inside two decades (Yermo, 2012). Figure 2.1 (on page 42) suggests, using Chilean data, that increases in pension funds assets results in an increase in stock market size or that there is a positive relationship between stock market growth measured by capitalisation and pension funds growth. Market capitalisation increases sharply because of the buying power of pension funds into stock markets while turnover responds slowly mainly because pension funds buy stocks and hold them for longer periods. This relationship is also found in Hungary, Iceland and Canada following their respective pension reforms (Adjasi, 2005).

Indirect contribution of contractual savings to capital market development come in the form of supply related impacts (Davis, 2005). Funded pension funds and other related contractual savings directly invests in infrastructure and other capital projects as part of their investment assets (Meng, 2004). This creates employment hence further savings downstream which find their way back into the equities markets directly or via pension schemes.

2.7.3.3 Cross-Country and regional differences of mandatory contractual savings impact on capital markets

The relationship between savings (contractual, contractual mandatory and otherwise) and stock market development differs from one economy or region to another mainly because of the following aspects:

1. Differences in regulatory frameworks
2. Pricing inefficiencies
3. Lack of innovativeness in some economies
4. Socio-political variations

Most researches on pensions funds and stock market development is on developed countries for example OECD countries suggesting that the findings may not be generalised for developing countries. The different stages of economic progression between developed and developing countries imply a different economic structure.According to Diamond (1995), funding does not contribute to financial sector development in OECD countries, however this funding is a critical aspect in developing economies. The impact has been seen to be high in Asian countries. Literature to date has failed to come up with comprehensive assessment of pension reforms with the focus of current studies being on Chile. The assessment to date is still on the short term, the long term effects are still unknown.

Financial markets development also hinges on the level and quality of regulation in a country. Generally, regualtors should provide an enabling environment for growth while at the same time vigilant enough to avoid systemic risks (Edward, 2014). Market participants are sensitive to the enforcement of laws of contract in a market, where these are violated, participation is usually very low leading to limited development of that market (Laporta et al. ,1998). Levine (2000) found a positive correlation between quality of legal rights in financial systems and general economic growth. The differing enforcements of contracts from one country by far explain the differing impacts of mandatory contractual savings on capital markets from one country to another (Lefort, 2014). Pension reforms done in several countries generally aim at improving the performance of the pension schemes with the Chilean example an evident example of the extent to which these reforms can turnaround the fortunes of pension funds especially from the perspective of the beneficiaries. This resulted in improved regulation and corporate governance aspects in financial markets in general.This saw capital markets capitalisation growing by 14% by end of 1996 (Meng, 2007) .In Peru, reforms have focused on the role, responsilibity, liability and degree of freedom of the asset managers of pension schemes. This reform culminated in increased volume of transactions of Perusian schemes passing through the stock exchange leading to enhanced market capitalisation, value traded and general participation by other investors. (World Bank, 2006). According to Vittas (1998), even when a country does not have a well developed financial system as long as it can put in place a strong, long-term and reliable government; guarantee safety of pension assets and allow for employment of skilled, a pension reform can always be

done successfully. The variations of the existence of these pre-conditions from one country to another explain the level of success of these pension reforms in different countries. An overhaul of the ecomomic structure ofa country is implied in pension reforms, making it a hard target to put in place the pre-conditions. Change of governments especially in terms of political parties may also make it difficult to put in place the pre-conditions as e new government may not want to be associated with policies of the old government.

Pension reforms may not realise its full benefits if the economy is highly volatile in performance. This is regardless of whether it's a mandatory scheme or voluntary scheme being run in a contry. In Chile for example, government had to also deal with debt as well as stabilise the other macro economic fundaments asuch as inflation, interest rates and money supply. While these are also pre-conditions for pension reform, pension reform itself can be used to achieve some of the pre conditions. In Chile, pension funds bought into government securities issued to by government to repay old debt (Hughes, 2014; World Bank, 2015). Argentina introduced pension reforms in the middle of an economic crisis and as a result, very no benefits came out of it. In Zimbabwe, despite the presence of mandatory contractual savings, their impact on capital markets is yet to be realised post 1994 due to the economic meltdown being experienced (World Bank, 2014). Pension funds have been found reluctant to invest on stock exchanges or government bonds due to hyper-inflationary conditions and instead opting for direct real estate investments (ZSE report, 2015)

Some markets make it difficult to come up with a meaningful investment portfolio because of the seriously contrained capital market in terms of number of securities as well as restrictions on the investments that can be made. Making use of pension funds to develop the capital market increases the risk that the subscribers will have to shoulder. Becker and Paltseva (2001) argue the introduction of pension reforms in most SSA countries was pre-mature as these countries had too thin capital markets to allow any reasonable portfolio to be constructed. Indirectly, this suggests that there is a minimum level of economic progression that allows the introduction of pension reforms to be smooth.Below which the country may become even more unstable. Such co-ordinated growth in pension funds and the economy in general is what Vittas (1999, 2010), suggests should be questioned and tested before the implementation of reforms.

López, Murphy and Musalem (2004) found a higher contribution by manadatory pension funds to bond market development in Asian countries with stable political environments.

Catalan and Impavido (2000, 2009 & 2012) found that pension funds and other institutional investors contribute significantly to the development stock markets especially in terms of market capitalisation than any other economic agent. In other markets, the relationships do not seem to exist. Foe example, Impavido (2007), fails to find any correlation between between contractual savings and selected indicators of stock market development. The relationship is found to be significant and positive in developing countries as well as in developed countries whose financial systems rely more on banks. Some recent studies (Impavido, 2010; Meng, 2013 and Catalan, 2014) have also found a direct positive link between the growth of pension funds and stock market capitalisation in OECD countries. Davis (2002) finds positive correlation between pension funds investments in stocks and the level trading liquidity in 16 OECD countries. Davis and Hu (2004) also find a direct positive link between pension assets and the growth of output per worker (a variant measure of economic growth).

Pension funds appetite to invest in bond instruments and equity instruments is also influenced by the level of transparency by the institutions regulating the trading systems of such and also the transparency in the pricing process in the markets (Levine, Ross and Zervos, 2013). This is explained further by Meng (2015) that the pressure exerted on pension funds by employees through the board of trustees and also pressure from the supervisory bodies and pressure groups force pension funds to invest only in assets that can be fairly and transparently priced in the market. The presence of hyper-inflationary situations make pricing of assets complex and in such situations, pension funds have been observed to opt for direct investments in the real estate sector. Capital markets such as stock markets and bond markets have hence remained under developed in such situations (ASEA, 2015). In Zimbabwe, post dollarization, the pricing of equities have remained unclear with the existence of multi-currency situations and the re-emergence of the local currency in 2015. This has seen pension funds opting out of the stock markets and invested in land development (ZSE, 2016). The acute liquidity situation has also made it difficult to fairly price financial assets (CZI, 2017). The investment allocation of pension funds globally tend to be biased towards listed equity investments (Meng, 2001; Davis, 2004 and Yermo, 2010). This is for a number of reasons including the ease with which fund managers can report to pension funds (Levine & Zervos, 1998 and

McCauley & Remolona, 2000). Listed investments are basically easy to follow and value by clients and information is abundantly available (Adjasi, 2007).

Pension funds are managed by seasoned professionals who value the level of information disclosure. Retail or individual investors usually do not demand increased levels of disclosure by listed companies. The growth of pension funds and their participation in the market therefore force companies to increase the amount of information issued to the public. This does not only improve investor decisions but also improves the price discovery processes leading to improved trading and market capitalisation. (Yermo, 2014). Institutional investors are generally informed than the genral ordinary investor. This is largely because of the level of expertise in institutional investors than individual investors. As a result problems associated with conflicts of interest, principal –agent relationships and general corporate governance issues are easily identified by institutional investors as compared to the ordinary individual investor. Insititutional investors therefore directly or indirectly instill intergrity in the financial markets (World Bank, 2015; Ando, 2016). The presence of such vary significantly from one country to another resulting in different levels of participation by institutional investors hence different impacts on capital market development.There is a high correlation between the existence of clear and fair investor rules and the level of ownership of assets and diversification of such by institutional investors (Osi-Boateng, 2014).

Findings by Iglesias and Palacios (2000, 2010) are that pension funds impact on capital market development is heterogenous from one country to another as result of differing macro economic fundamentals, regulations and structure of employment. Short run relationships indicate that well developed financial systems enjoy greater benefits from increase of pension fund assets. Countries will poorly developed financial systems however fail to transmit the shocks on pension funds assets into other sectors due to the slow circulation of these pension assets within the economy. These findings suggest that the countries with under developed financial markets are not innovative enough to utilise opportunities offered by pension funds or the securities that pension funds can invest in are too few hence capital mobility within the economy is slow (Coulibaly, 2008). Iglesias and Palacios (2000) and Vittas (2003) argue that the lack of impact of pension funds on financial systems in developing countries is largely as a result of the abuse of pension funds resources by governments. The government forces borrowing from pension funds firstly through the prescribed assets requirement and secondly

through direct instructions to transfer funds to the government. In Zimbabwe, the largest public pension scheme, the National Social Security Authority (NSSA), has lost more than USD$155 million in a period of five years to various politically motivated transactions (IPEC, 2014). Another view by Vittas (2000) is that for pension funds in developing countries have not yet reached the minimum threshold size to warranty meaningful impact on financial markets. He further argue that regulations on pension funds are also stifling their capability to impact on financial markets since they are still restricted to invest in certain aseet classes. Risky investment securities in low income countries hinder the appetite of pension schemes to invest in capital markets. Most of the risk is however politically motivated suggesting that it is the government that should provide an enabling environment. Raddatz and Schmukler (2008) however suggest an opposing view to pension fund growth and its impact on financial markets. He argues that unless there are other institutional investors active in a market, the growth of pension funds may with their buy-and-hold strategies, may decrease the overall trading volume of securities.

Contractual savings are expected to be more influential in infant capital markets where their trading injects liquidity to households' and firms through providing a ready market for stocks and other financial assets (Catalan, 2004). Empirical studies in The United Kingdom, Spain and Germany reflect a positive correlation between the size of contractual savings and its development and levels of stock market development , both in terms of market capitalization and value traded.Evidence from developing countries also support findings in the developed world for example in Chile, Ghana and Japan, the growth in the contractual savings sector was accompanied by positive growth in terms of market capitalization and value traded. This may be suggesting some form of causality between contractual savings and the various measures of capital market development. Any form of causality especially from savings to capital market development may also imply that it would be beneficial to develop contractual savings ahead of capital markets so as to offer demand on securities as the capital markets develop in future.

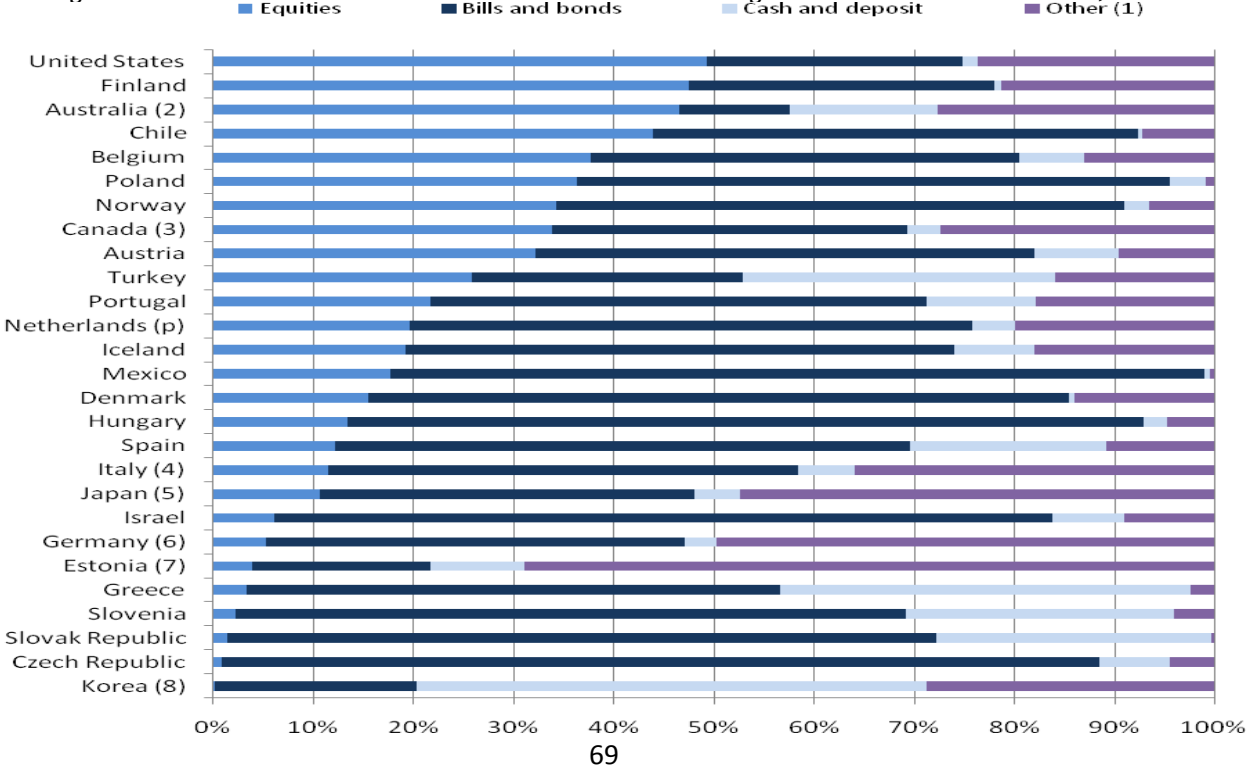
The level of innovativeness that exists in a market in terms of product offering determines not only the level of savings attracted to that market but also the extent to which such savings can impact on the development of the same market (Moura, 2012; Bakane, 2014). Markets with a reasonable high level of savings may not enjoy the impact of such savings on capital

market development if the products offered in the markets are not good enough to attract the savings. Such savings remain in conventional current accounts where they earn a very low return (Willis Towers Watson report, 2018). This implies that, two countries A and B may not enjoy the same level of capital market development if the level of innovation in their capital markets is different. Pension fund investment is equally attracted by such high quality products for return generation and hedging purposes.

2.8 Investment portfolios of Pension Funds and stock market development indicators

Pension fund portfolios take various forms across regions. However, their investments mainly include property, corporate and government bonds, equities and cash (Musalem, 2002 & 2104). In most countries globally, equities form the largest component of pension funds' portfolios except for Korea and Greece (see Figure 2.1 below). Greece and Korea suffered financial instability during the periods 1999 to 2008 hence showing a trend inconsistent with the rest of the world. The bond market also forms a significant destination of pension fund investments and the second after equities in most countries and leads equities in most countries in central Europe. Figure 2.2 also show that bonds and bills are the second largest asset component of pension fund portfolios. This is, mainly, as a result of the compulsory requirement for pension funds to invest in government bonds and bills in most economies.

Figure 2.1: Pension fund asset allocation for selected investment categories in selected OECD countries, 2010



Source:OECD working papers on Finance, Insurance & Private Pensions: World Bank (2012)

Pension assets make up a significant contribution to the total sources of investments in stock markets. An average of 30% of stock market investments are pension assets in North Africa, 25% in South America, 85% in the USA and 112% in the European block (Yartey, 2007). In Sub-Saharan Africa, a significant amount of pension assets find their way into the stock markets when compared to other asset classes, however stock market investment allocations trail government bond allocations. This mainly as a result of these stock markets being the most developed markets which make valuation of pension assets easier (Pfu, 2008). An average of 30% of Zimbabwean pension asset are invested in equities (Chikuni, 2012), 25% in Zambia (Mazorodze, 2011) and 33% in South Africa. Pension assets still make a small proportion of GDP in African countries (except South Africa) mainly because of low formal employment rates compared to the developed world. Table 2.7 below show the level of pension fund assets as a percentage of GDP for selected countries.Nigeria pension assets are a meagre 7.7% of GDP compared to an average of 60% in the United Kingdom and 74% in USA.

Table 2.7 Level of pension fund assets in selected developing & developed countries (2007-2012)

Countries	Pension asset % of GDP	Pension asset % of Market capitalization	Pension asset % growth rate 2007-2012
Nigeria	7.7	25.25	129
South Africa	82	41.20	15.4
Chile	60	51.7	45.6
Netherland	160.2	184.2	11.4
Brazil	14	27.6	22.1
Hong Kong	34.3	9.4	40.1
United States	74.5	90.3	10.4

Source: World Bank Report 2013

This bias towards equity investments by mostly pension funds has impacted positively on the main stock market development indicators namely market capitalisation, value traded and turnover ratio (Davis, 2006). Firstly, the demand push of prices on equities resulting from investment activities of contractual savings has increased the market capitalisation of stock markets (Pfu, 2000; Meng, 2010; Catalan, 2006). (Impavido, 2000; Musalem, 2002; Meng & Pfu, 2005 and Adjasi & Biekpe, 2008) all find a causal relationship between contractual

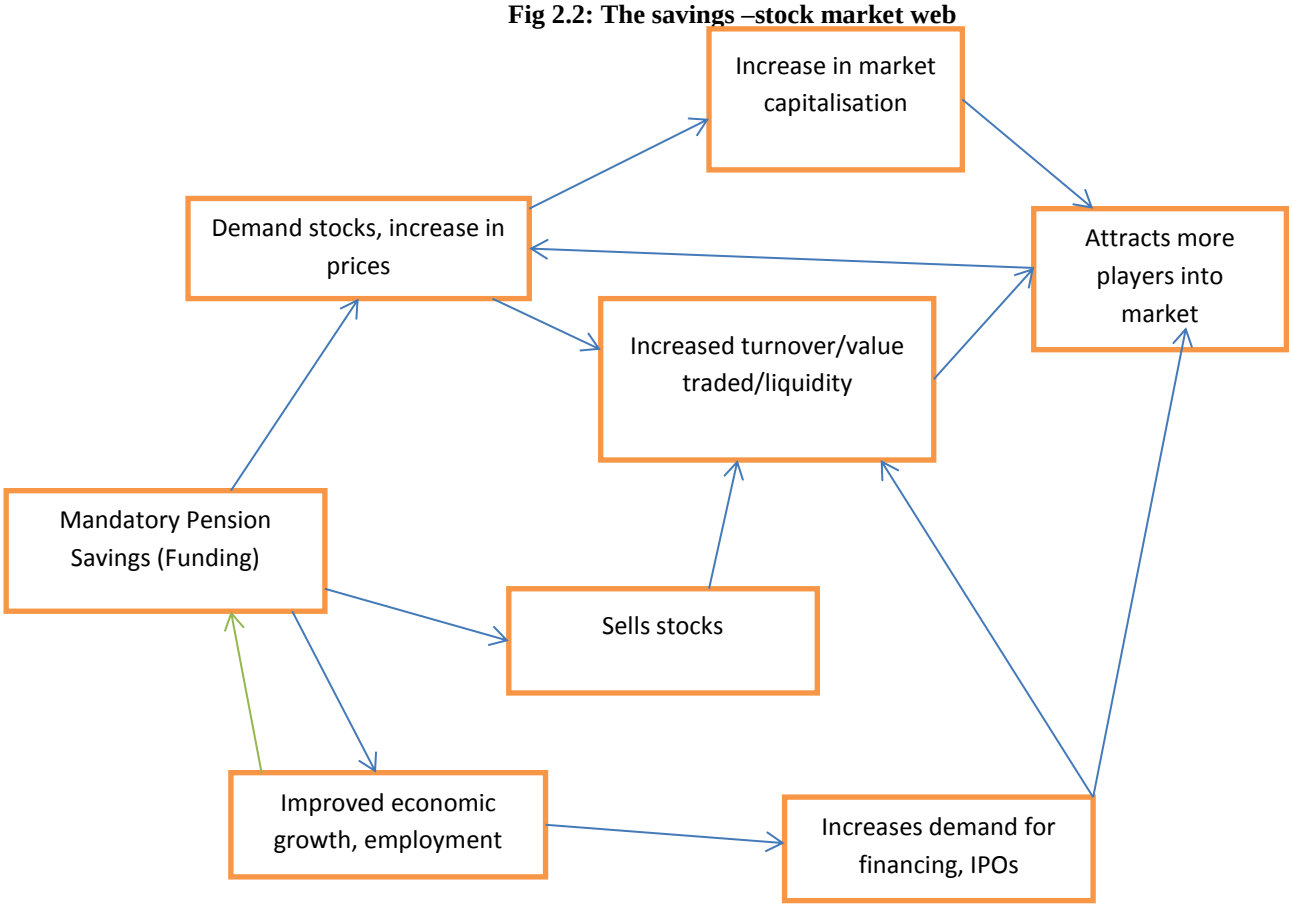
savings and stock market capitalisation in both developed and emerging and developing countries.

Secondly, the activity by pension funds on stock markets attracts FPI (Perroti, 2006). This is due to the confidence foreign player's bestore on a market where major local institutions like pension funds are active (Jappelli, 2005). Following the 1981 pension reform in Chile, and the subsequent development in stock markets in that country, FPI inflows increased tremendously in the subsequent years (Moura, 2010). An 8% increase the first four years and a further increase of 21% in the later decade is strongly associated with the confidence built around the activity of institutional investors on the Chilean exchange (Hick, 2009). Fernandes (2008) and Agarwal (1997) find a positive relationship between FPI and activity of long term institutional investors as represented by pension funds.

Thirdly, the increased activity resulting from participation of pension schemes and other institutional contractual savers makes it easy to buy and sell assets. This has enhanced the tradability of the equities hence becoming more liquid (Argawal, 1997).

The increases in general savings are hypothesised to have an intricate impact on market performance directly and indirectly. This is diagrammatically represented in the Fig 2.2 that follow, which shows the hypothesised 'savings-stock market web'. With an increase in mandatory savings through pension funds and an expected accompanying increase in stock market investments by these pension funds - increased demand for equities results in increased market capitalisation, increased liquidity (buying and selling activity) which attracts more investors' hence general market development.

Fig 2.2: The savings –stock market web



Source: Authors' own adaptation: Hypothesised framework (2017)

2.9 Savings culture in developing countries

Central to development in Africa is the argument that there is need for savings mobilisation through capital markets and capital market development. It remains unclear how these savings will come about especially given a poor, inconsistent savings habit in most African countries. Africa saves less than 13% of GDP on average (Loayaza, 2012). This is low compared to an average of 45% in developed countries in Europe, 40% in Asia and 43% in America and a rising saving culture in China which boosts of an average 56% of GDP in savings in 2014. This is a significant development compared to their 14% of GDP in 2004. The Chinese growth in savings has been accompanied by a significant average GDP growth of 15% annually from 2004 to 2014 consecutive years. It is arguably clear that the phenomenal growth in GDP in China is not a coincidence but a direct result of savings

growth (Armstrong, 2014). The low savings phenomena in Africa are multidimensional resulting from several sources. In Zambia, private savings have declined from an average of 40% of GDP in 1975 to below 3% of GDP in 1994 (Maimbo & Mavrotas, 2003). High poverty levels are identified as the main drivers of low savings especially in SSA (Kalusopa, Dicks & Osei-Boateng, 2012).

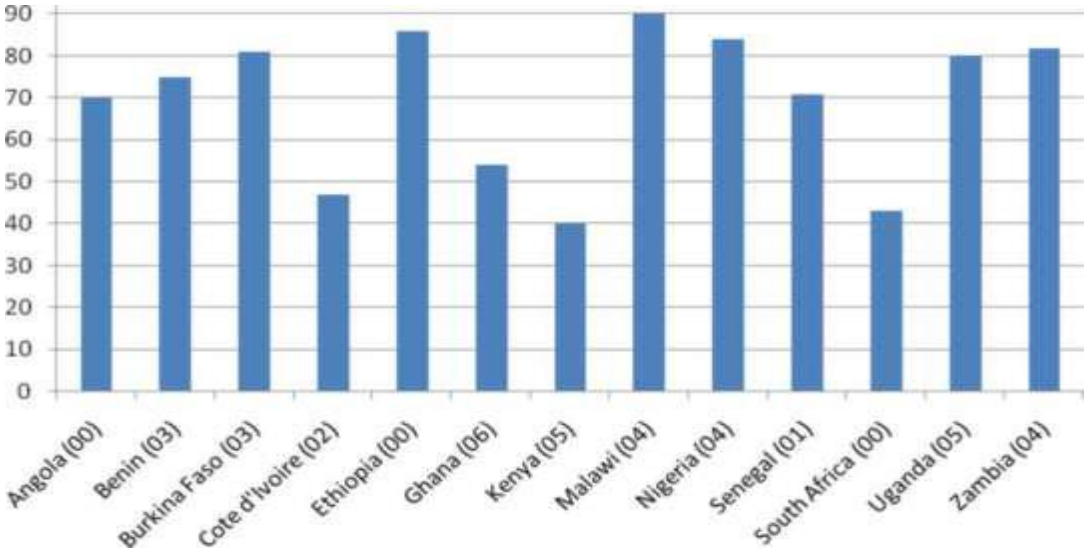
Savings remain central in the development of financial markets from a demand perspective. An increase in savings increases the demand of securities hence encounraging economic agents to come up with more of these products. Financial deepening can therefore only be achieved if there is sustained demand for financial products. Savings trends in SSA have been on the low side averaging 18.1% of GDP in 2008. Between 1991 and 2008 , 94% of SSA countries had a negative savings-investment gap between excluding Angola, Botswana, Gabon, Namibia, and Nigeria who are generally rich in terms of minerals such oil and diamonds (Word Bank, 2013). In light of the poor savings, foreign investment becomes the major source of investments in these countries however the political situations in most of the countries discourages foreign investment due to violence and policy inconsisteny (Adelegan, 2008).

The other norm in developing countries is that of the crowding out effect of private investment by the public sector. The high propencity to borrow by the public sectors, sometimes through instruments that force the savers to subscribe, tends to starve the private sector of resources to undertake their own investments. The low productivity on public sector projects compared to private sector investments leads to a shrinkage of the capital over time. Instead of generating positive savings through wages and pension contributions, the public sector investments usually crumble in a short space of time hence stifling savings growth (Loayaza, 2013).

According to Davis (2000, 2010), there are policy options that can be taken up increase savings especially in the developing world. Firstly, governments need to revisit their fiscal policy tools and correct the negative current account balances. The use of savings incentives have been under utilized in SSA while the results of these can be astonishing. Savings incentives mostly come in the form of interest rate policies that attract savings. While interest rate increases can attract savings into the formal banking sector, such increases in interest rates may still fail to attract savings if the public does not have confidence on the banking

sector (Meng, 2014). The policies and tools to be adopted by SSA countries should therefore complement each other otherwise they may go to waste (Adelegan, 2008). According to Demirguc-Kunt (2008), access to financial services is central to a sustainable mobilization of savings into the formal channels. In the absence of access to financial services, especially the saving instruments, any income to households is quickly consumed. While persuing economic growth can also promote savings, there is always an argument on how economic growth can be achieved without resources to finance it. Impavido (2011) argue that in such a dilemma, external financing can then be sought to trigger economic growth hence savings in the long term but once savings have been mobilized to reasonable levels, external financed can then be abandoned through repayment of external loans or divesting of MNCs.

Fig 2.3: Poverty levels in Africa: Percentage of total population surviving on below $2 per day



Source: Kalusopa, Dicks and Ose-Boateng (2012)

The culture of savings is poor in Africa (Aryeetey, 2007). The factors that explain this poor saving culture range from the traditional family set up where families support each other over time (Bakane, 2012). Survival in the future is dependent on good family relations than what an individual saves (Filmer, 2014). Upon death, the family of the deceased is guaranteed of good upkeep from the relatives in the traditional society (Bakane, 2008). Secondly, savings institutions and instruments are poorly developed in most African countries (Bremang, 2010). Interest rates are very low on savings with saving costs very high (Elbadawi, 2001). The

outreach of the savings institutions is poor with an average of 33% of the population remaining unbanked by end of 2009 (Loayaza, 2012). The unavailability of savings instruments and lack of outreach by institutions is argued to be as a result of lack of savings (Joseph, 2011). This argument is equivalent to the 'egg- chicken' debate which is central in this research. Yartey (2007) asserts that culture is major driver of low savings in SSA as opposed to poverty arguments put across by other scholars. In South Africa, savings remain very low despite a rather improved employment rate and poverty levels (Adjasi, 2008). In Botswana, population is low and employment is moderate but savings are higher than in South Africa although they are also lower than the SSA average. Despite improvements in living standards and the general employment in Ghana between 1990 and 2007, savings remained generally unchanged. This contradicts with developments in countries such as Poland where between 1997 and 2008, savings increased marginally in an environment where disposable income was falling (Elbadawi, 2010). In Zimbabwe, after the introduction of stable currencies in 2009, savings remained generally unchanged suggesting that culture could be a major determinant in savings (Loayaza, 2014).

Thirdly, earnings and wages are generally low in Africa compared to developed countries (Loayaza, 2006). In those countries with fairly above average earnings, the cost of living is observed to be equally high suggesting that saving will be difficult (Schmidt-Hebbel 2004). Fig 2.3 (page 74) suggests that more than 40% (an average of 50%) of population in SSA survives on below USD 2 per day, making saving impossible. This partly explains the low savings rates in SSA countries depicted in Table 2.8 (Appendice 1). Savings over the two decades remained low at average of 18% and 16% for 1991 and 2012 respectively. This probably accounts for the low investment rates which also remained fairly unchanged at 27% and 22% over the same period.

Instability of the financial services sector has to a larger extent discouraged savings. In Zimbabwe, more than forty banking and savings institutions were placed under curatorship and subsequently closed between 2004 and 2009 (RBZ, 2010). The same process of bank closures had earlier been experienced in Zambia (1994 to 1997), Nigeria and Ghana (2000 - 2006). This has dampened savings to alarming levels of below 3% of GDP in 2013(Joseph, 2011). In other countries (Botswana, Ghana and Cote Dilvore in particular), while banking

institutions failure is not necessarily common, the savings products and interest rates on savings are extremely low to incentivise savings (Bremang, 2010).

Rising inflation associated with most developing countries including those in Africa has discouraged levels of savings (Heer, 2006; Cheng, 2014). Inflation has always been a problem in Africa with each country experiencing serious inflationary pressures at least once in every five years (AfDB, 2008 & 2015). The fear of realising an eroded financial resource has thus kept savings at very low levels.

Using Life Cycle Hypothesis(LCH), savings in Africa are low because of a depleted middle aged population which is the age group expected to save more (Ando, 1963; Robert, 1998 ;Modigliani, 2000;Deaton, 2005;). The HIV pandemic, emigration and rising unemployment has negatively impacted on the middle age group's capacity to save (ILO, 2013). The LCH application to the African context is supported by the Permanent Income Hypothesis (PIH) which also explains the low level of individual savings resulting mainly from a growing dependency ratio of the active population (McMorrow, 1999 and Titu, 2012). The general incomes of individuals in Africa are far lower than the anticipated permanent income mainly because of the distortions in the labour market. Labour is lowly compensated in SSA which is one of the causes of skills flight to the developed world (Loichinger, 2013). With unemployment increasing, birth rate remaining high while the aged are not getting adequate support from pensions, the burden has increased significantly on those in active employment hence they cannot save as much as they would or their incomes are far less than they anticipate (Loichinger, 2014).In Africa, savings have therefore not only remained low but have been significantly declining over the past three decades (AfDB, 2013).

2.10 Chapter Summary

Literature has shown that savings in SSA are generally low when compared with the developed economies and other developing markets such as Asia. Mandatory savings schemes are also not significantly subscribed to due to declining formal employment and rising informal employment in most countries in SSA except for South Africa, Botswana and Namibia. Pension fund reforms and regulation have not been seriously looked into by most governments in SSA compared to other markets. The current performance of pension funds is weak with beneficiaries getting pay-outs below the poverty datum line. Contribution evasion is very high in SSA owing to the negative impact of mandatory contributions to labour supply and net disposable income. Pension funds however remain the highest participant and major driver of stock markets in SSA. Stock markets in most SSA countries are also very 'thin' in terms of levels of participation and are operationally weak. Debt markets are mainly dominated government activities hence not conducive for private companies financing.

CHAPTER 3

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.1 Introduction

Using the major theoretical and empirical findings on contractual savings, financial markets and economic growth, Chapter 3 of this research thesis focuses on presenting the theoretical and conceptual framework followed. Possible models that depict effects of stock market development on saving and investment, or vice versa are evaluated in the context of causality. The intermediaries through which savings are channelled to the user sectors include banks, insurance companies, and pension funds with banks representing the credit market while the rest represent the investment market. The fulcrum of the argument in this thesis is that stock markets are better transmiters of resources to the user sectors than the credit market. Moreso in SSA, which is characterised by directed lending practices. Capital accumulation and allocation is a fundamental determinant in economic growth hence efficiency is required to be there if economic growth is to be maximised (Garcia and Liu, 1999). Financial intermediaries differ in several ways including transaction costs, risk screening and sharing as well as speed of transacting (Fischer, 2003).

Well-oiled Stock markets is expected to increase savings through attracting savers to buy securities and efficiently allocate financial capital to the most deserving sectors of the economy from a risk-return perspective hence leading to an increase in the rate of economic growth. Portfolio diversification is enhanced through the stock market as it offers a variety of instruments that attract the surplus units (Caporale, Howells and Soliman, 2004).

This chapter is organized to explain theoretically, how the financial system with particular reference to stock market development, is correlated to contractual mandatory savings hence economic growth. Section two outlines and analyses the theoretical link between savings, stock market development and economic growth using the various theories to date.

This chapter puts across the theoretical underpinnings of the research through a focus on the relevant theories on which this study is premised. It also puts forth a guide that is followed by this research through providing the background theories that support the investigation and justification for research problem that was discussed in Chapter 1. The theories are then later

used in this chapter to formulate a conceptual framework that depicts the assumed relationship between the variables under study. The rationale is to show that the problem being investigated is founded and informed from previous research and not informed by personal judgements. A link between theoretical framework and the suggested quantitative research design is also emphasised in this chapter.

3.2 Theories embracing relationship between savings and Capital market development

Theory on savings and capital markets development remains inconclusive. Earlier studies by Calderon- Rossel (1991) pioneered research on what could be possible drivers of capital market development, stock markets in particular. The main thrust of this research is mainly 'pivoted' on this Calderon- Rossel model. Other supporting theories and models are however also discussed in this section. Later studies (Davis, 2000 & 2005; Meng, 2005; Gokhale, Kortlikoff & Washarwsky, 2005; Yartey & Adjasi, 2007 and El-Wassal, 2013) focused on the relationship between stock markets and several other variables such as economic growth, savings and credit markets. Domar (1942), Rostow (1960), Gurley (1973), and McKinnon (1973) are the underpinning theories on all these later studies. While mandatory savings have received attention (Asher, 1995; Bateman, 2000; Davis, 2005; Meng, 2005; Statman, 2013), theory on their role on stock market development remains very sketchy. Research on mandatory contractual savings and stock market development has been inconclusive in developed countries (Catalan & Impavido (2005); Levine, 2010; Meng & Pfu, 2012).

Examination of stock market development and savings relationship can be looked at from three perspectives. Firstly in terms of how it affects the return on saving, secondly in terms of how it affects the riskiness of the saving and thirdly in terms of how of investors respond to changes in return and risk (Bonser-Neal and Dewenter, 1999). It is a general economic expectation that stock market development hjas to enhance the rate of return on saving firstly through the diversification effect which reduces risk and increase expected rate of return. And secondly, through failure to hold preferred portfolios by investors due to capital controls. The liberalised system to investments implied by stock markets is that allows optimisation of resource allocation. The following section discusses theories that reflect a relationship between stock market development and savings.

In all the theories pertaining the relationship between savings and capital market development, the following are the cornerstones of the relationship:

3.2.1 Calderon –Rossel Model of Stock Market development

The Cadelron-Rossell Model on Stock Market Development is one the theories employed to explain the fulcrum of this study.This partial equilibrium model developed by Calderon-Rossell in 1991 explains stock market development as driven by savings and invsetment. This is the most utilised model in studies of stock market development to date (Yartey, 2008; Levine, 2013; Meng, 2015). The model is premised on behavioural finance (i.e savings being a result of household behaviours) and structural approach to stock market development. The main determinants of of stock market development are identified as economic growth and stock market liquidity. Economic growth results in resourced households and firms through wages and profits respectively hence their ability to demand stocks. Market capitalization is defined as follows:

$Y = PV$…… (3.1)

Where:

Y is market capitalization in local currency;

P is the number of listed companies in the stock market; and

V is the local currency average price of listed companies.

The model can be presented formally as follows:

$Y = PV = Y(G, T)$……(3.2)

$V = V(G, P), P = P(T, V)$……... (3.3)

G represents per capita GNP in local currency and variable T represent the turnover ratio. The variables V, P, and M are all endogenous leading to the equations that are presented above. Equation 3.3 captures the impact of economic growth and stock market liquidity on stock market development. The combined effects of the two affects both stock prices ie market capitalisation and number of listed companies. The Calderon-Rossell Model is modified in this study so as to into consideration the role of financial deepening in the analysis of changes

in stock market performance. There are several other macroeconomic factors such as real income, savings and savings rate, financial intermediary development and regulation that are equally fundamental in determining the growth of stock market development (Garcia and Liu ,1999). When these considerations are infused with the Calderon-Rossell model, the result is a model adopted for analysis in this study.

3.2.1.2 Operationalisation of the Calderon – Rossel model in this study

In any given economy, the stock market is the most utilised reliable barometer of capital market activity and general economic perfomance. Stock market performance is used as the proxy for measuring the performance of capital market. In this model, Stock market performance indicators are Market Capitalisation, Value Traded and number of listed companies. In this study, the original Calderon-Rossell Model is reviewed to capture the dependence of stock market development on its past as well such that:

SMD = f (FPI, GDP, REG, MAND.SAV, DOM.CRED)……. (3.4)

Where :

SMD = Stock Market Development

GDP = Gross Domestic Product Growth

FPI = Foreign Portfolio Inflows

MAND.SAV = Mandatory Contractual Savings

DOM.CRED = Domestic Credit

REG= Regulation Quality

For the purpose of analysis in this research, equation 3.4 is re-modeled as follows:

$SMD_t = \beta 0 + \beta_1 GDP_{t-p} + \beta_2 FPI_{t-p} + \beta_3 MAND.SAV_{t-p} + \beta_4 DOM.CRED_{t-p} + \beta_5 REG_{t-p} + \beta_6 SMD_{t-p} + \mu$…… …… (3.5)

Equation (3.5) measures the relationship that exists between Stock Market Development and other independent variables including itself. There are apriori expectations that exist in terms of the negativeness or positiveness of the coefficients which are all expected to be greater

than zero implying a positive relationship between SMD and the several explanatory variables.

The above model expects an increase in stock market development as the savings accumulation increase. Economies with higher and stable savings should therefore be accompanied by higher and stable growth in stock market indicators compared to those with low savings.

3.2.2 Markowitz Portfolio Selection Model

The Markowitz portfolio selection model was pioneered by Dobbins, Witt and Fielding (1994). It was later modified by Bodie, Kane and Marcus (2002), following the re-modelling of it by Gronski in 2001. In its latest form, the model takes into account the influence of stock market development on saving mobilization via the rate of return and the risk of saving. The cocern of an investor is to design an optimal portfolio which balances the risk-return trade-off. The Markowitz theory (1952, 1959). Following this theory enhances the chances that an investors will achieve the highest possible return at a certain level of risk or possible minimize their risk for a given rate of return. Holding several assets which are not correlated spreads the risk of the total portfolio. The Markowitz model suggests three possible impacts of stock markets on savings: positive effect, a negative effect or an uncertain effect.

3.2.2.1 The Positive Incentive Effect

Stock market development impacts positively on savings due to the high returns that are offered by these stock markets. This compensates investors adequately for the postponement of consumption.The high returns; albeit with high risk form an adequate pool of portfolios to meet the basic needs of risky, rationale investors. The incentive effect assumes that it is the stock market which drives savings and not vice versa. The question which still remains unanswered is how the stock markets get to be developed (Stilgtz, 2015). The transparency in the price discovery and pricing sytems in stock markets is alos identified as yet another positive incentive that attracts savers into the stock market than any other market (Levine amd Loayaza, 2014). Levine (1991) considers the liberalization and the “easy to understand expansion” of stock markets as a major attraction of individuals to stock markets. Stocks markets are better to understand as their behaviour is determined demand and supply forces only.

3.2.2.2 The Negative Wealth Effect

Stock market development is not without negative effects. From a theoretical perspective, savings invested in the stock market may lose value or the investor stands to lose his invested wealth should the stock market trade in a bearish manner. Most investors derive their savings hence investments from wages. However this income is highly uncertain as employment can be lost and regained so many times within a given period. Income from labour is very uncertain when compared to income from tangible assets. Investors will invest in the stock markets to an extent that is determined by the relationship between the two components of incomes in their total income (Gapinsky, 1993). Stock market development may possible lead to a decrease in savings since investors now have a guaranteed income which is within their determination in the form of saleable stocks. As liquidity improves or as the ease of selling stocks increases, investors will save less since they can create liquidity in case of urgent need for cash in future. High rates of return from stock markets suggests that investors find themselves with more wealth hence very little reasons to save more.

3.2.2.3 The Uncertain Effect

The relationship between risk and savings rate is not as straight forward as theory suggests. Rothschild and Stiglitz (1971). At certain times, the positive correlatin between risk and savings is dependent on the behaviour of the degree of risk aversion. Investors generally choose the alternative with a lower risk regardless of the return profiles of the alternatives. (Bodie et al., 2002). According to Bonser-Neal and Dewenter (1999) risk depends critically on the rate of acceleration of relative risk aversion.This makes the impact of stock market development on savings a bit unclear or unpredictable as also found by Bencivenga and Smith (1991) and Devereux and Smith (1994), who argue that its not always that the high returns and the risk from stock markets will increase savings.

3.2.3 Prior Savings theory

The Prior Saving Theory is in accordance to the general consensus in economic theory and the general empirical findings in several economies. Savings are found to be a pre-requisite to any investment activity in the sense of financing process. According to this theory, there is need for deliberate action guided by sustainable policies to grow savings if investments in stock markets are to take place. Davis (2012) views a stock market as a retailer selling

products to the buyer (savings). For the retailer to keep on stocking the product and other variants of products in future (an equivalent to development), there must be demand coming through savings. In effect, the Prior savings theory argues that, at initial stages, savings should exist for investment to take place but at later stages, the investments rates and quality also start driving savings. The financial system starts influencing savings via efficiency in allocating capital, identifying projects for investment as well as making available a pool of potential buyers and sellers at a glance (creating an environment of easy entry and easy exit). This is sync with the underpinning conceptualisation of this research: the idea of causality between contractual savings and stock market development. In the absence of stock markets, savings will potentially go to waste through unjustified consumption by the households and firms.

3.2.4 Intermediation Theory

Financial intermediation involves matching lenders with excess funds (savings) with borrowers who need the money and this is done by a third party agent such as a bank. The intermediation is premised on resource allocation assuming the existence of perfect and without any operational frictions. This is inline with neoclassical models where transaction costs are assumed to be low as well as information being available to everyone at minimal cost. The basis of complete perfect markets which this theory is based on comes from the basic assumptions of the neoclassical model that include lack of competitive advantages and little or no transaction costs in getting information as it is freely available to all participants in the market. These assumptions are however not realized in the real world due to various market imperfections such as asymmetric information which increases transaction costs and result in other having a competitive edge over others. Financial Intermediaries therefore exist to remove these imperfections and they do it in many ways. Intermediaries remove transaction costs by sharing or diversifying the evaluation of assets fixed costs, something individuals find difficult to do. This means that business is diversified by financial intermediaries such as banks and with that costs are able to be reduced through economies of scale. Asymmetric information is removed through intermediaries as they act as delegated monitors for the lenders through collecting information on the borrower and also doing a number of screenings (for banks they look at credit worthiness of borrowers). Financial intermediaries also signal an informed position by investing in the assets they have particular

knowledge of as they do extensive research about the market that some individuals can not readily and actively do. Intermediaries like banks also provide commitments to long term relationships with customers and thereby creating a relationship with the customer, removing the problem of adverse selection and moral hazard (Gwilym, 2008). The intermediation theory however only recognizes the importance of financial intermediaries in the economy for the role of removing transaction costs and asymmetric information.

3.2.5 Permanent-Income Hypothesis (PIH)

The PIH was pioneered by Keynes and Friedman in 1957. The theory attempts to separate income two components; that is permanent income and transitory income. The two components impact on savings differently since their occeurence differs over time. Permanent income remains fairly unchanged over long period of time. Its permanency makes consumption out of it to be stable as households are assured of it (Muradoglu and Taskin, 1996). Samuelson and Nordhaus (1995) define permanent income as the net after removing windfall income and other temporary incomes. Transitory income is there the windfall income and other temporary income that households find themselves with. Households generally take advantage of transitory income to generate wealth hence consume very little of it.Where transitory income is more often, the rate of savings or amount of savings is therefore expected to be high (Rousseas, 1972). Permanent income is also defined as income from wealth or assets, skills embedded in an individual or income related to the geographic location of the economy. Modigliani (1986) explains: "…we can reach one conclusion fundamental for an understanding of individual savings behaviour, namely that the size of saving over a short period of time, like a year will be swayed by the extent to which current income departs from average life resources." The PIH conceipt has several implications to savings behaviour. Firstly, households will only save from temporary income and not permanent income because permanent income is already planned for hence is gradually consumed in whole.

The linear relationship can be expressed as:

$S_t = \alpha_0 + \alpha_1 YP_t + \alpha 2 YT_t$ …….... (3.6)

Where:

S_t = gross domestic saving in year t

α_1 = constant marginal propensity to save

YP_t = permanent income and

YT_t = transitory income in year t.

From equation (3.6) at α_1, the individual consumes only permanent income hence the marginal propensity to save on this transitory income is equal to one (MPSt = 1). As long as α_1 is positive and high, savings will increase as none of the transitory income will be consumed to supplement permanent income assuming that α_2 is also positive and increasing (Rousseas, 1972). For savings to increase there must be a very small inequality in incomes across households otherwise if the inequality is high, what one group saves could be leass than what the low income group consumes hence overall savings will go down. Where permanent income is low, transitory income would be used to supplement for consumption in basic needs for survival (Friedman, 1957). This is the same situation that SSA countries find themselves in. Permanent Incomes are low to afford basic needs. This makes households consume even the transitory incomes as they seek to supplement the low permanent incomes. The level of saving will depend on the ratio between permanent income and transitory income (Mikesell and Zinser, 2001).

The PIH has been supported by several scholars Kelley and Williamson (1968), Gupta (1970) Campbell (1987), Carroll and Summers, (1991) and Viard (1993). There are however some arguments against the PIH. Developing countries have shown some divergence from the PIH, household savings in developing countries tend to increase as permanent income increase (Bhalla, 1980), Musgrove,1980 and Betancart, 1971).

3.2.6 Life-Cycle Hypothesis

The life-cycle theory of savings behaviour was pioneered by Modigliani and Brumberg (1954). It was later revisited by Ando and Modigliani in 1963. In its general formulation, savings are determined by the stage of the household individual in the life cycle. The LCH argues that during periods of active employment or income generation 9generally conciding with youthful years), households will tend to save for the future as they anticipate low earnings post retirement or at old age. . These key underlying assumptions of the theory are:

(i) There exist opportunities, in which income is constant until retirement
(ii) Tastes or preferences are constant over life

The fundamental motivation to save here is for retirement through piling cash or acquiring assets. At very youth stages incomes are naturally low as earnings are still at their infancy hence savings are also very low. At middle ages, where incomes have improved with increases in salries due to enhanced experience and also supplementary incomes from accumulated assets increase, savings are expected to be increasing and higher (Deaton, 2013). Income is expected to rise during the the life-cycle and is maximum at retirement. During the life cycle, households can shift consumption to suit the levels of income at that such that in times of high earnings versus anticipated consumption, households will save more during times of low earnings.

Generally savings will increases with income until retirement after which savings are expected to decline. Retirement is therefore the main saving motive.

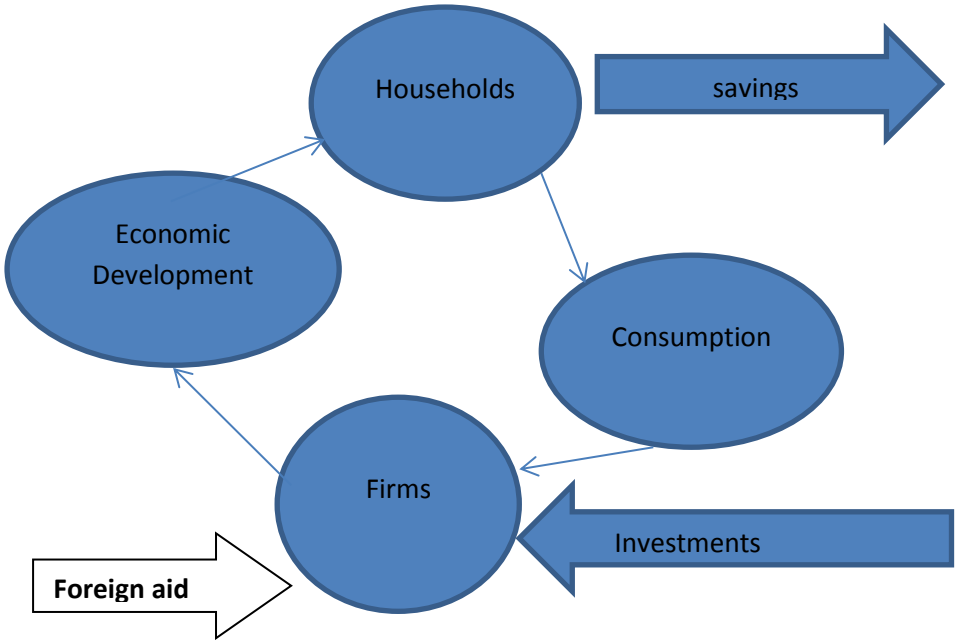
The LCH implies that the higher the old age dependency ratio, the lower will be total household savings, as old aged people consume but do not generate any income. Total savings therefore depend on the savings ratio of working households as compared to the consumption levels of retired households. In SSA countries, the population structure has been distorted by the AIDS pandemic which has wiped off the middle aged group that is expected to be saving (ILO, 2016). The old aged now have dependents instead of them being dependents. The rate at which the liitle savings are being run down has therefore more than tripled thus savings has dwindled significantly. The employment structure which is biased towards unemployment has also implied that there is very little being saved. Overally,

savings implied by the LCH do not materialise in SSA countries and if unchecked or if authorities do not intervene these may reach rock bottom in no time.

3.3 Conceptual Framework of Stock Market-Mandatory savings relationship

The conceptualisation of the causal relationship between savings and stock market development is premised on the Harrod-Domar model (1942) of economic development. Savings and capital markets are part of a broad economic cycle where each of them is a result of another process while at the same time being an input to the next process. Financial theories however concur that savings are supposed to be invested / allocated to various projects and this allocation is done by financial markets. This Harrod-Domar model is diagrammatically represented in Fig 3.1A, below. In the Domar model, savings are transformed into investments into firms to achieve production of goods and services. In the absence of savings, Domar (1942) argues that foreign aid becomes the source of investment capital. Foreign aid is however unsustainable and considered not ideal for long –term economic growth. Production of goods and services combined with employment result in economic growth which translates into wages to households and profits to firms.

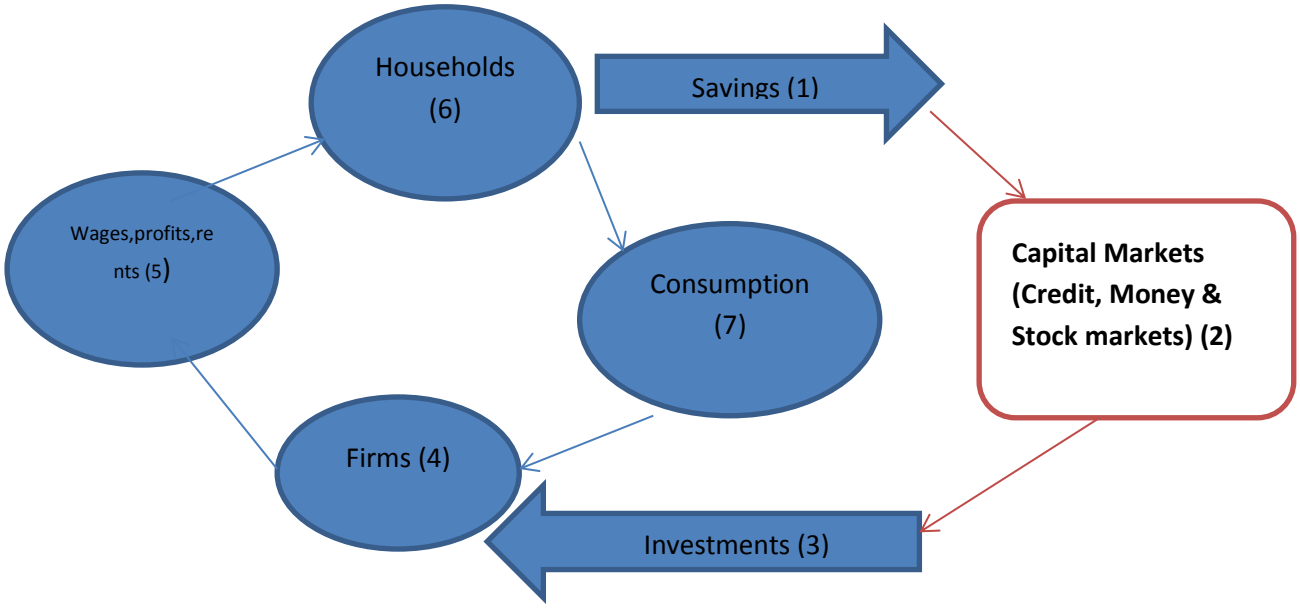
Fig 3.1A: Flow of savings from households to firms: Harrod-Domar Conceptualisation



Source: author's adaptation of Harrod-Domar 1942 model

The model above (**Fig 3.1A**), fails to capture what is considered to be a 'missing link' which is then captured in the modified model in **Fig 3.1B** on the next page. **Fig 3.1B** attempts to account or explain how savings presented in the earlier model (Fig 3.1A) transform into investments to firms. **Fig 3.1B** adds capital markets into the model via which savings are converted into investments in firms.

Fig 3.1B: Modified Flow of savings from households to firms- Harrod-Domar Conceptualisation

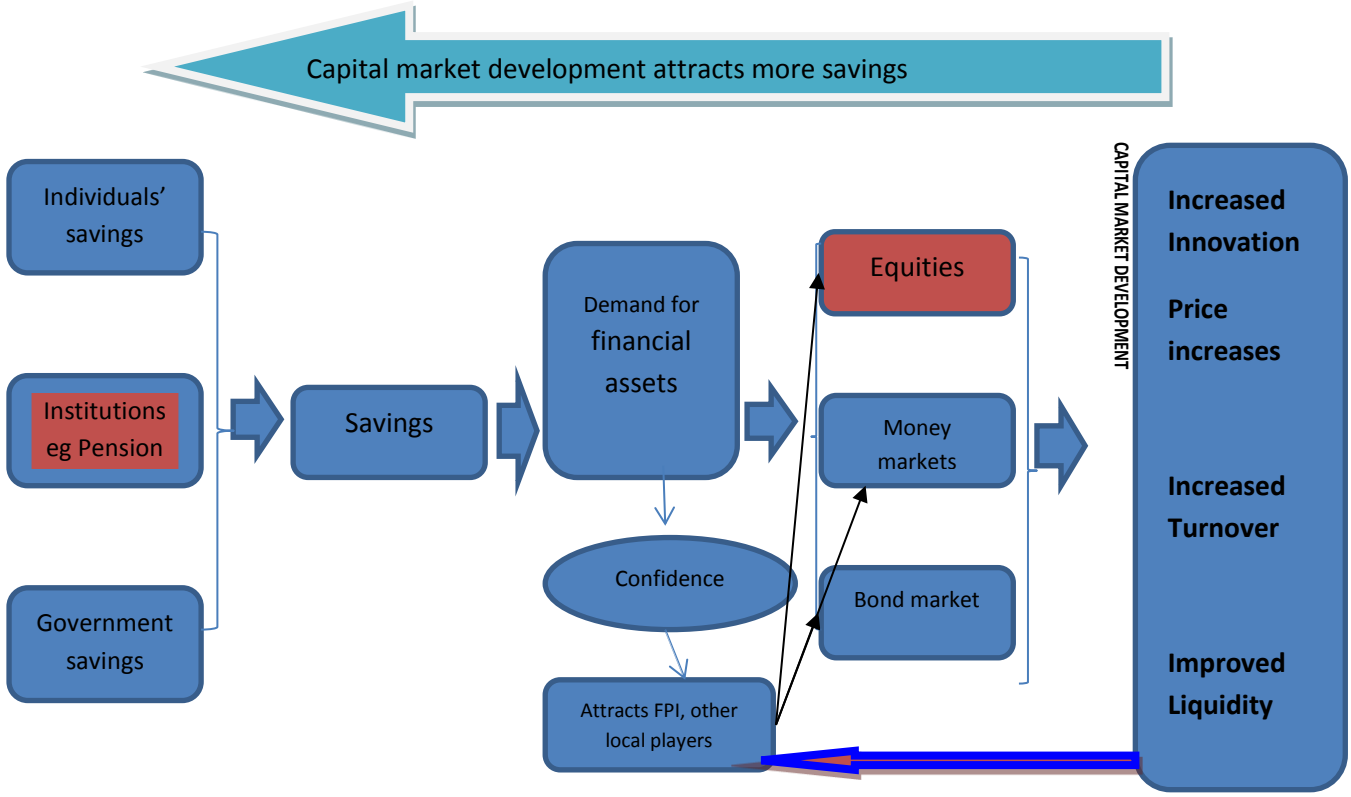


Source: Authors' modification of the original Harrod-Domar model (1942)

In **Fig 3.1B**, the researcher extends the Harrod-Domar model to account for the channel followed by the savings suggested in the Harrod-Domar model. Harrod and Domar (1942) do not account or explain how the savings find their way back into the firms in the form of investments. The extension of the Harrod-Domar model suggests that these savings find their way back into the firms as either equity market investments, money market investments or bond market investments (including loans). Specifically, the savings are allocated back into firms through capital markets. A critical analysis of the Harrod-Domar model shows that there is a missing aspect which Domar (1942) fails to capture. The theory fails to account for the whereabouts of 'savings' and also fails to define the source of the 'investments'. The above conceptualisation using the Harrod-Domar Model implies the following:

i. Savings(1) influence (cause) capital market development
ii. Capital market development (2) influences(causes) savings via (3), (4), (5) and (6)

Fig 3.2: Conceptual Relationship between Mandatory contractual savings and stock market development



Source: Authors' adaptation (2017)

The argument is that long term savings originate from pension funds and other long term savings avenues such as life assurance policies (Loayaza, 2004 and Deaton 2105). The focus here is however on pension funds (mandatory schemes). **Fig 3.2** above shows that pension contributions come from individuals and the government (the government is usually the largest employer in any economy and if not, it is the guarantor of these pension schemes). These contributions then find their way into the capital markets as pension funds demand investment assets in all sub-markets such as equities, bonds, money and property markets.

With increased demand for these investment assets, variants of these products are developed by seekers of finance as they attempt to attract more of these pension savings (Deaton, 2002; Davis, 2006). As pension schemes seek to manage their primary exposures to the capital markets through the same capital markets, new instruments are either generically or tailor-designed for such purposes (Modigliani, 1944). This increases the scope of assets being offered by capital markets mainly being driven by the demand from pension schemes (Meng, 2004; Catalan, 2004, and Impavido, 2005). However, there are also arguements that it is actually market development which attracts savings (Loayaza, 2008).Increases in pension assets in Chile between 1981 and 1990 was accompanied by a general increase in the number of companies issuing bonds (11%) and an increase in listed entities (19%). Besides the investment by pension schemes in capital markets, they (pension schemes) also play a role of attracting 'followers' in the form of both individual and corporate investors (both local and foreign) (Coulibaly, 2006). This important role by pension schemes suggested by Fig 3.2 (confidence aspect) increases the demand for financial assets. This in-turn, not only increases volumes traded, but also furthers the variants of these assets as these 'followers' have their different preferences and risk exposures. Capital markets with many buyers and sellers are characterised by a variety of these investments assets.

The hypotheses that are implied by the above conceptual model are:

Ho_1: there is no a relationship between pension assets and stock market development as measured by market capitalisation

H_{11}: there is a relationship between pension assets and stock market development as measured by market capitalisation

H_{02}: there is no a relationship between pension assets and the number of listed companies in an exchange.

H_{12}: there is a relationship between pension assets and the number of listed companies in an exchange

H_{03}: Pension assets are not related to the level of trading that takes place in the stock markets.

H_{13}: Pension assets are related to the level of trading that takes place in the stock markets.

H_{04}: There are no causal relationships between pension assets and the various measures of stock market development.

H_{14}: There are causal relationships between pension assets and the various measures of stock market development.

The research also borrows from the Five Stages of Economic Growth model by Rostow (1948) particularly the Pre-condition for Take-off stage. The hypothesised stage of development for SSA countries is the Pre-Condition for take-off stage. Rostow's theory of growth is identified by five distinct but related stages presented in **Fig 3.3** on page 78. The Traditional society stage is characterized by the stone-age type of survival where households rely on hunting and gathering. There is no processing of materials and technology does not seem to exist. The society is protective in terms of norms and cultures and therefore do not interact with other foreign societies this resultin in a closed system.

Pre-conditions to- Take-off stage is an improvement on the traditional society. In this stage, the society interacts with other societies as there is trading between them. Commercial agriculture is a core means of survival where crops are grown for both consumption and sale. There is deliberate action to create investments to process raw materials and improve on the efficiencies of the farming processes. Increasing spread of technology, and advances in existing technologies results changing social structure. There is potential for high investments and savings however savings rates are still very low. Capital market development and regulation is also low and poor especially when compared to the developed world. This is the stage that most developing countries are currently experiencing. The emphasis is on how the potential high savings can be unlocked and transformed into financial securities. Yartey (2008) argues that realising savings is a key step to not only achieving developed capital markets, but also towards achieving economic development. Developing countries struggle to move from this stage (Pre-condition for take-off stage) to the Take –Off stage (Rostow, 1960; Perrotti, 2001)

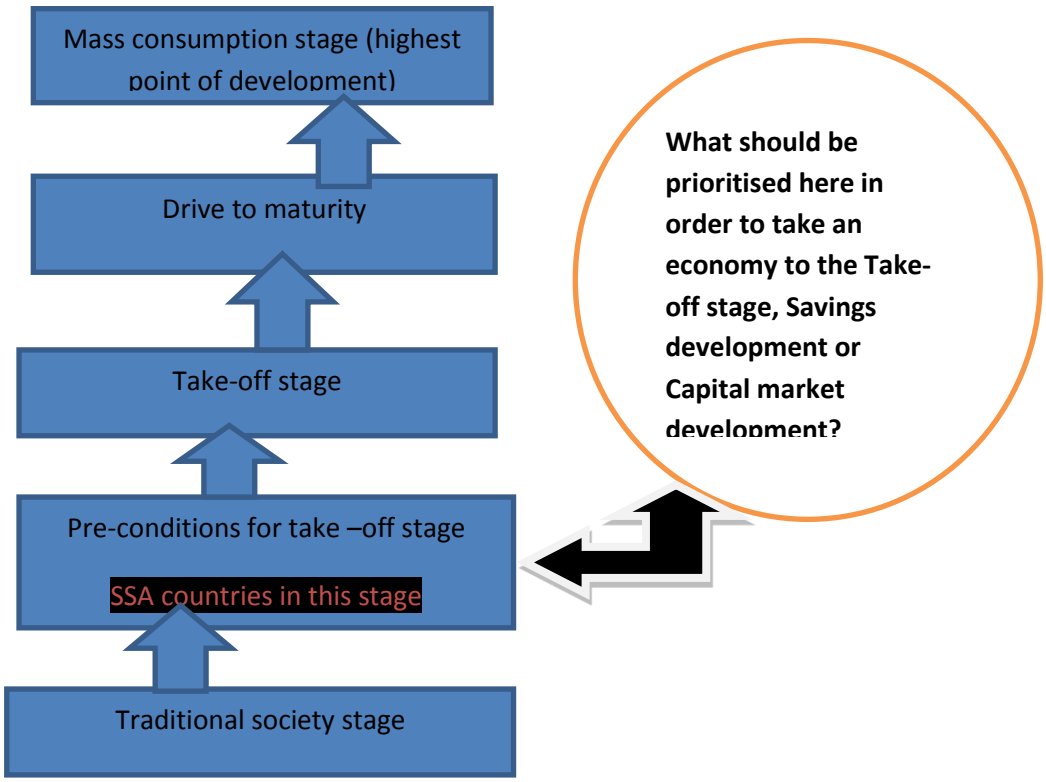
The Take off stage culminates in increases in Urbanization, development of industries become increasingly more visible as governments seek to expand processing of raw materials. Reliance on technology is also the priority of societies at this stage as they seek to be more efficient. Secondary industries increase compared to the primary sectors as the

economy seeks to increase value on raw materials. The Drive to maturity stage is characterised by not only increasing the processing industry but also deliberate actions to ensure that it is extensively diversified as well as relying on latest technologies. Industries become more biased to producing for the customer rather than mass production. Development of transportation networks driven by technology become the order of society. Human capital development also takes centre stage as governments invest more in social infrastructure such as schools, hospitals and universities.

Age of mass consumption stage is the highest point of economic and social progression. There is a clear dominance of the industrial sector which is highly computerised as human labour is replaced by robotics technology. The primary sector becomes almost non-existent. Production of high value goods is a priority at this stage as the consumers have high levels of disposable income and hence can afford the high value goods. Investment is driven from local sources of finance as saving rates are also very high.

The emphasis however is on the requirements for the Take off stage to occur. The questions are: How can an economy achieve high savings and capital development which are key inputs to economic growth? Theory generally implies that these two cannot occur at the same time especially at initial stages. Which of the two should occur first or at least put in place first by the policy makers?

Fig 3.3 Rostows' stages of economic development



Source: Authors' adaptation of Rostows' theory (2017)

In Rostows' model, developing countries are identified to be in the Pre-conditions for Take-off stage. This suggests that, inasmuch as savings are still very low, there is however a high savings potential in these countries. Once these savings are realised, investment is expected to grow. The other key characteristic of this stage is that of poorly developed and poorly regulated capital markets. This may also imply that savings may be difficult to mobilise without well-oiled capital markets while at the same time implying that capital markets may fail to develop if there is no demand for savings or investment instruments.

Developing countries need to move from The Pre-conditions for take- off stage to the Take-off stage. At the current stage, these developing countries are generally 'sitting' on 'potential'. There is potential of magnifying savings and spur economic growth. There is also vast potential of capital market development to lead economic growth. These two variables work together. It therefore remains unclear which of them should be addressed first.

3.4 The Proposed Mandatory Savings-Stock Market Development Model

While the above relationship in **Fig 3.2** is generic for capital markets, the specific relationship for equities markets is conceptualised as in **Fig 3.4** on page 99. In this conceptualisation, the starting point of the relationship is not clearly demarcated or clearly implied. Should optimal savings be put in place first or should developed capital markets be created first? The Harrod -Domar model of economic growth, which forms the basis of this conceptualisation, suggests that savings from households after consumption are invested back into firms to achieve economic growth. In this concept, the savings from the households are assumed to be channelled via capital markets, specifically stock markets, otherwise in the absence of these stock markets the savings will not be re-invested into firms. This conceptualisation also asserts that the savings may not necessarily find their way to firms via stock markets if these stock markets are not attractive enough, that is, if they are not adequately developed. This same reasoning implies that the developed stock markets may not necessarily exist if savings are not there. The existence of these two variables therefore is equivalent to the 'egg-chicken' puzzle which is being investigated in this research. While earlier studies focus on contractual savings, which includes pension funds savings, life assurance and other forms of insurance (Impavido, 2000; Catalan, Impavido & Meng, 2003& Meng, 2005 and Davis, 2006), this research considers only mandatory pension schemes. This is the only type of saving which is sustainable in the long term. The other savings included in earlier studies, in as much as they are contractual, they are not mandatory hence not sustainable.

Another important aspect implied by **Fig 3.4** is that of causation. If savings 'cause' stock market development initially, later we expect stock market development to start 'causing' savings. If stock market development 'causes' savings initially, then, later we expect savings to 'cause' stock market development. **Fig 3.4** captures a number of relationships which have been tested by economists in several regions. Firstly, it captures the relationship between economic growth and capital markets development. This relationship has been analysed immensely in recent years. Stock markets are an optional savings tool which however is efficient in terms of risk screening and general allocation of resources (N'Zué, 2006). High value and long term projects are better financed through the stock markets than through the banking sector (Bagehot 1906 and Hicks (1969), Greenwood & Smith 1996). Savings that are mobilised without coercion usually encourage more savings mobilisation in the future as

investors are comfortably with free market interactions (Levine & Zervos, 1998; Adjasi & Biekpe, 2006). Bencivenga (1996) and Levine (1991) argue that stock market liquidity is a vital element in building investors confidence hence success of IPOs and Rights issues by companies inturn spurring economic growth. Absence of a liquid stock market makes it difficult to enter the market but of much concern is also the comprised ease of exit.The cost of transacting in a liquid market is lower, secondly the required rate of return is low implying that companies actually raise funds at a cheaper cost. This and other factors contribute immensely to economic growth.

Liquid markets also make it easier to attract foreign capital. This further improves the operations of industry as the supply of foreign currency is improved especially for developing countries (Bencivenga, 1996 and Neusser and Kugler, 1998). The desire to gather information about a company is usually higher in liquid markets since investors can act on the information they find. This desire by investors to scrutinese companies and their operations forces these companies to improve on operational and governance issues which culminate in growth. (Kyle, 1984; Holmstrom et.al, 1993). There is improved flow of capital between banks as activity is high in a liquid stock market. The increased number of transactions encourages banks to be more innovative to allow for smooth transactions as such liquid stock markets are viewed as a driver of banking sector development (Levine, 2010). Acquah-Sam and Salami (2014) find a positive relationship between capital market development and economic growth in Ghana, one of the few positive relationships in developing nations.

There are studies which found no relationship between the stock market development and economic growth. Findings by Bencivenga and Smith (1991); Demirguc-Kunt and Levine (1996); Adjasi and Biekpe (2006); Ghazouani (2007) and Sarkar (2006) are examples worth noting. In also contracdicting studies, economic growth in China has been found to be driven by the banking sector with no influence from the stock markets being found (Rousseau and Xiao, 2007).

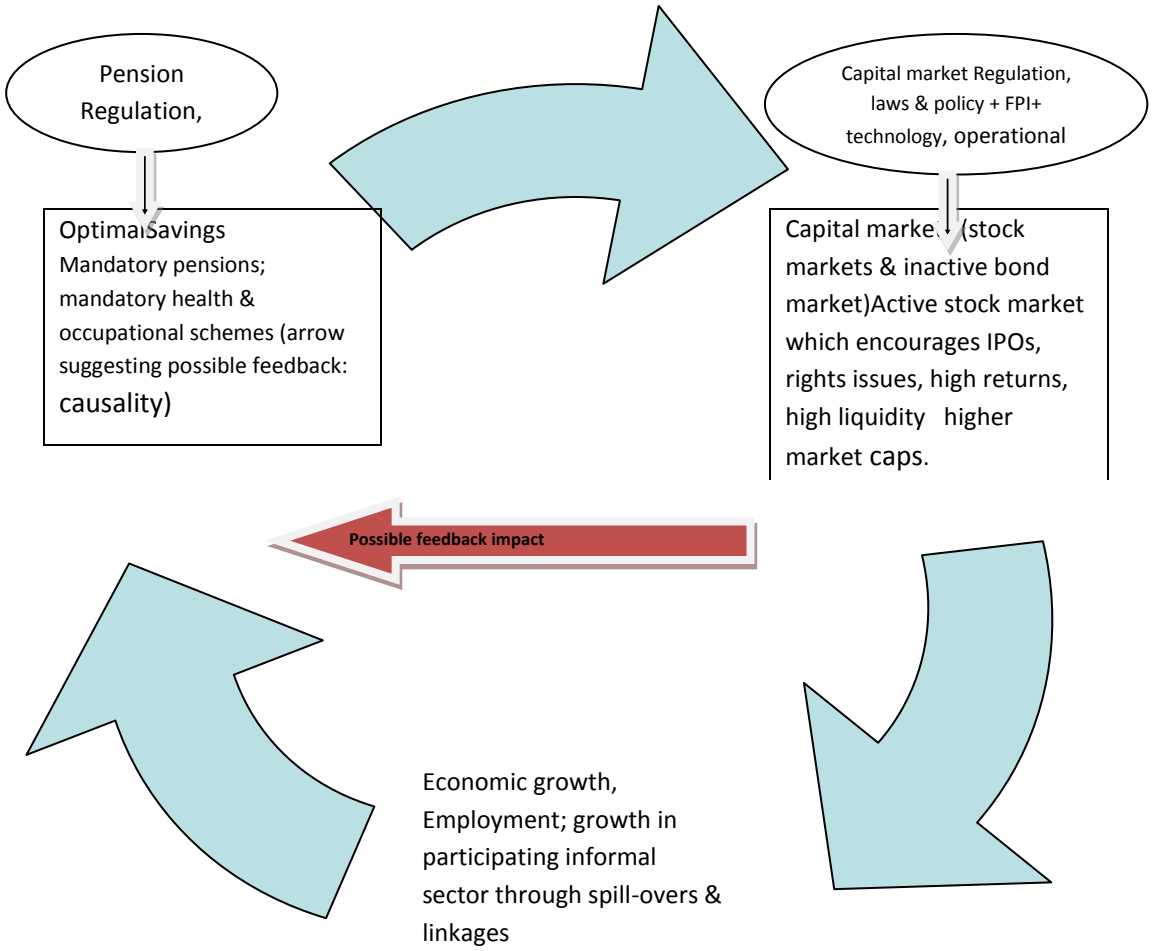
The second relationship depicted in **Fig 3.4** is that of savings and economic growth which has also been assessed in several economies using various methodologies. The theory on this relationship dates back to the Harrod-Domar model (1942) and Solow model (1957). Begovic & Ciftcigou (2010) find a positive relationship between savings and economic growth in

Eastern European countries. Studies by the World Bank (1993), Rodrik (1998), and Kuijs (2006) confirm a positive relationship between savings and income growth with bi-directional causality between savings rate and income growth being detected. While saving rate might positively affect income growth, an increase in the rate of income growth could raise the rate of savings in a market where household have a saving culture. It may not be trie in households with a poor savings culture as those of SSA (Carol & Weil, 1993; Singh, 2009 and Attanasio, Picci & Sorcu, 2000).

The third relationship concerns savings and stock market development. Again, there is evidence of a positive relationship between savings and stock market development in both developed and developing nations (Holzmann (1997), Feldstein (1974& 1996) and Whitehouse (1999). Samwick (2000), Schmidt-Hebbel and Servén (1999), Bailliu (1997) and Davis (1995) all find a relationship between contractual savings and stock market development.

Finally, the possible feedback from stock markets to savings depicted in **Fig 3.4** suggests that there is a causal relationship between the two variables, directly or indirectly. This relationship is also worth investigating since it has policy and regulatory implications.

Fig 3.4: Savings, capital markets and economic growth cycle



Source: Author's compilation: 2017

While mandatory savings are dependent on the population of the formally employed and the general level of incomes in an economy, there are also some exogenous factors which tend to affect these mandatory savings. Loayaza (2008) identifies regulation and policies on mandatory savings as key factors which possible determine the behaviour of these savings over time. Argawal (2013) also asserts that policy and regulation are major factors which determine the levels and behaviour of mandatory savings especially drawing from developments in Chile. The introduction of new policies and regulations on pensions in Chile resulted in mandatory savings growth between 1981 and 2007 (Mesa, 2006). The Chilean

experience and other reforms in countries such as Hungary and Ghana emphasise the importance of policy reforms in improving the level of savings. Savings are therefore not only determined by stock market development but also by national policies on savings.

Stock market development is also hypothesised to be affected not only by savings but also by national policies on these stock exchanges. In the hypothesised model in **Fig 3.4** on page 99, regulation and policy are also identified as input factors in the overall relationship between mandatory savings and stock market development. Economic growth is included in the relationship in **Fig 3.4** as a way of emphasising that savings and stock market development policies are not just pursued in isolation, but to ultimately foster economic growth. Different policies, laws and regulation should complement each other, be sustainable and compatible with the obtaining macro-economic environment. SSA has generally been characterised by inconsistent laws, regulation and policy (Argawal, 2008). At certain times, the regulatory authorities who commonly supervise certain institutions have contradicting objectives (Deaton, 2012).

FPI (Foreign portfolio inflows) directly into the stock markets is also a factor which has had an influence on stock market development although its role is still under dispute (Davis 2005; Meng, 2006; Adjasi, 2010 and Loayaza, 2015). It is hypothesised that FPI will improve stock market development indicators such as liquidity, market capitalisation and turnover through the demand for stocks and supply of cash.

3.5 Causality Analysis Theories

3.5.1 Counterfactual model

Causality or causal relationships are derived from the Counterfactual theories in philosophy. Causation or causal relationships investigate what could have transpired if the conditions had been different from the actually observed conditions. Accordingly, causation exists if one situation can only occur because of the occurence of another situation (Menzies 2009). The ustilisation of counterfactual models in economic research is increasing in recent years especially in policy formulation (Robins 1986). Maldonado & Greenland 2002) state that: "*According to the counterfactual approach, when assessing whether a variable causes an outcome, most of the time we are interested, even if not explicitly stated, in comparing the occurrence of the outcome when the variable is present with its occurrence if the variable*

was absent and all other factors remained equal" .Counterfactual models generally argue that the occurrence of a situation without a variable and the occerence of the same situation with the variable present should detect if there is causality or not.

In the context of this research, the occurrence of stock market development without mandatory contractual savings is expected to differ with the occurrence of stock market development with mandatory contractual savings. This expectation points towards the existence of causality

3.6 Chapter Summary

The role of savings in capital market development and overall economic growth cannot be underestimated. The low levels of these savings in SSA countries have also been perennial. The low capital market developments and low savings rates in SSA countries cannot be treated as a mere coincidence but a symptom of structural problems that need to be addressed. The theories looked at in this Chapter all emphasise the need for financial resources if both capital market development and economic development are to be achieved. Financial resources have always been the missing link in SSA countries quest for development. Development cannot be randomly achieved from the financial resources availed but these resources need to be efficiently allocated across an economy. The allocative efficiency of stock markets cannot be underestimated especially when compared to debt markets in SSA.

The models and theories discussed in this chapter also emphasise on regulation and general policies to be up to date and pro-development. Poor regulation and poor economic policies may stifle capital market development and economic growth even where financial resources are in urbandance.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

This chapter describes the philosophical and methodological approaches used in this research to answer the research questions. The relationship between savings and capital markets suggested in Chapter 3 are investigated through a positivist exploration approach where a panel Vector Auto Regressive (VAR) model is adopted in studying the interactions between mandatory contractual savings and stock market development in Sub-Saharan African countries is used to deduce the relationships. An interpretivist examination is later undertaken to reconcile findings with policies being adopted.The general aim of the study is to investigate how mandatory savings contribute to stock market development in Sub-Saharan Africa. The findings are expected to determine the type of policies to be adopted in order to achieve economic growth.

4.2 Ontological and Epistemological basis on stock market development and mandatory savings

Capital markets are made up firstly of rules, regulations, products and secondly of the participants (buyers and sellers). The fisrt components define the market hence act as an attraction or repellent to the second component. The second component may make demands on how the first component evolves over time (Fabozzi, 2003; Davis, 2012; Meng, 2016 and Hu, 2017).

Reality is that for markets to trade, there must be a buyer and seller of securities. In stock markets specifically, the continuous existence of the buyers is critical as it encourages sellers to be innovative in their product offering (Markop, 2015).As well, the existence of buyers and sellers to interact in a particular market is determined by the structure of the market in terms of rules and regulations. The structure of the market is to a greater extent shaped by demands of these buyers and sellers implying therefore a strong link between the quality of the market, what is being offered in the market and the size of buyers and sellers (Loayaza, 2016). Quality of the market on its own, no matter how strong it can be, may not create sufficient buyers/sellers if these buyers/sellers are not well resourced. The sustainability of trading in stock markets is therefore driven by the resourcefulness of buyers/sellers

(participants) which is mostly provided by mandatory contractual savings (Hu, 2019; Meng, 2013; Davis, 2016).

Buyers/sellers in the stock markets on the other hand only participate when there is a high probability of making a positive return otherwise they will remain in other risk-free markets (Fabozzi, 2013). Intuitively, without some forced participants or mandatory participation, stock markets would, at some point, crumble to zero. The existence of mandatory savings from mandatory sources of financing cannot therefore be under estimated as a major driver of stock market activity. The existence of mandatory contractual savings , who definitely have to invest these funds and their investments being of long term nature makes them a popular and permanent participant in stock markets (Musalem, 2010; Impavido, 2014; Loayaza, 2015). The rest of other investors can be viewed as temporary, discretionary or volatile participants who cannot sustain the existence of these stock markets.

According to Davis (2014), pension schemes, whether mandatory or discretionary would hardly survive in the long term if stock markets in particular did not exist.

On the other hand, while these mandatory contractual savings will definitely invest in stock markets, the extent of investment is also determined, among other things by the attractiveness of the stock market (Loayaza, 2015). An implication the two variables will tend to affect each other at different times.

The relationship between stock markets development and the 'permanent participant', that is, mandatory contractual savings becomes of paramount importance especially to the policy makers.

The ontological perspective discussed above culminates in a causal claim on observed associations, observed independencies, temporal cues, known mechanisms, theoretical connections, experiments, controlled trials, other causal knowledge and intuitions about the two variables. In trying to understand the nature of the relationship between stock market development and mandatory contractual savings, it is reasonable to attempt to analyse causal connections in terms of how each factor influences the other. According to Hume (2000), when two types of objects or events that "X causes Y", it means that (i) Xs are "constantly conjoined" with Ys, (ii) Ys follow Xs and not vice versa, and (iii) there is a "necessary connection" between Xs and Ys such that whenever an X occurs, a Y must follow. Unlike the ideas of contiguity and succession, however, the idea of necessary connection is subjective, in

the sense that it derives from the act of contemplating objects or events that we have experienced as being constantly conjoined and succeeding one another in a certain order, rather than from any observable properties in the objects or events themselves. In this research, this causal reasoning is also assumed to be occurring in both directions, that is, X causes Y and at some point Y causes X. According to Demetriades (2014), economic variables rarely have a causal relationship in one direction. He argues that most economic variables have a bi-directional causal relationship. The metaphysical ideology raised by Demetriades (2014) is that the causal effects are not only about what kind of variable can be a cause, and what kind of variable can be an effect, but also about whether there is reverse causality or not.

4.3 Research Philosophy and Design

The Ontological and epistemological stance presented above suggests a quantitative, positivist philosophy Approach to this research. According to Carson, (2001) positivist researchers maintain a suitable distance with the participants and avoid engaging with them. This is important because they believe that in order to make explicit differences between feeling and logic, it is essential to be emotionally uninvolved. The researcher in this case is also distanced from the participants emotionally and otherwise thereby allowing only the logic to prevail. This has also enabled the research to sustain a distinction between individual knowledge and science.

This culminated in an exploratory/deductive research design being adopted seeking to determine the relationship between mandatory savings and various forms of stock market development.

An archival strategy combined with an experiment strategy was utilised. The archival strategy premised on the archived data fro the various countries being the main source of data for the research. The experimental strategy aspect emanating from the scientific testing of the relationship between the variables being investigated. The use of an Archival and Experiment strategies led to mixed methods choices where both qualitative and quantitative analysis was conducted.

In order to critically analyse the relationship between these variables, the following techniques or further analysis were carried out:

i. Panel data general OLS regression using Fixed Effects or Random effects were used to ascertain the relationship between the variables under investigation. The choice between Fixed Effects and Random Effects was done through a Hausman Test. This has also been adopted in Calderon (2003), Boubakari (2010), Gunu (2012) and Nivakoski (2014).

ii. Granger- Causality analysis was utilised to further the relationship investigation. The Fixed effects or Random effects only established if there was a positive or negative relationship between the variables. Further, they also indicated the significance of the relationship found. Granger Causality tests go further to establish the nature of the relationships between the variables. It establishes if the relationship is of causal nature or not and whether it is a unidirectional or bi-directional causal relationship. According Bressler (2011), determining the direction of causality is critical to policy makers as it enables them to determine which factors tom prioritise in order to achieve certain results.

Granger-Causality analysis is utilised to determine which of the two variables between Stock market development and mandatory savings causes the other.

iii. Impulse Response Analysis and Variance decomposition were further used to underscore or elucidate the causal relationships suggested by the Granger causal analysis. The response of a chosen variable is analysed given a unit change in explanatory variables (Borovicka, 2014). Impulse response analysis is more informative than the Granger-causality analysis since it reflects the speed at which variables will respond to one another in terms of time (Diks and Fang, 2016). Granger-Causality analysis only tells which variable causes or influences the other but does not inform over what period a dependent variable will start responding to the explanatory variables. Varance decomposition helps in the interpretation of the VAR model once it has been fitted. It helps to determine the proportion of variation of the dependent variable explained by each of the independent variables (Ronayne, 2011). Variance decomposition enables you to determine how much of the variability in dependent variable is lagged by its own variance. In addition, it shows you which of the independent variables is "stronger" in explaining the variability in the dependent variables over time (Koop and Potter, 1996).

4.4 Research Population

The population is made up of 21 countries in Sub-Saharan Africa with active stock markets. The countries were included in the research based on the following criteria:

i. They are categorised as developing countries in Sub-Saharan Africa.

ii. They have stock markets that are operational and have been in operation for more than 5 years.

iii. They have some pension, social security and occupational health schemes or equivalent.

iv. They have at least 10 listed companies as at 2017.

4.5 Sample and Sampling Procedure

The purposive sampling technique, also called judgment sampling was used in this reaserch. It is the deliberate choice of a participant due to the qualities the participant possesses (Patton, 2002). It is a nonrandom technique that does not need underlying theories or a set number of participants. It is typically used in qualitative research to identify and select the information-rich cases for the most proper utilization of available resources (Zhi, 2014). This involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest. This approach has also been employed in quantitative research involving times series panel data by Fieldstein (1977); Karunaranthe (2005); Najarzadeh (2014) and Nivokoski (2014).

The whole population of countries with active stock markets and data on pension funds were included in the study. There are 21 countries in Sub-Saharan Africa with active stock markets, classified into the following income groups:

1. Upper middle income
2. Lower –middle income
3. Lower income

While countries in SSA may generally have the same characteristics in terms macro-economic fundamentals, there are notable differences in the behaviour of such macro-economic variables mainly driven by the different levels of income as indicated by different Gross National Income (GNI) per capita. Such stratification allowed for an indepth investigation of the relationship between stock market development and mandatory

contractual savings taking into account the differences inherent within these SSA countries hence more accurate prescriptive policy recommendations for each income group.

The stratification of countries was according to the classification by the World Bank Gross National Income (GNI) per capita approach. Low Income countries are economies with a GNI per capita of less than US$ 1,005. Lower-middle Income countries have a GNI per capita of between US$ 1,005 to US$ 3,955. The Upper Middle Income countries have a GNI per capita in excess US$3,955 (World Bank, 2017). The classification into income groups is critical in assessing the possible heterogeneity across income groups which may be driven by differences in economic progressions of the SSA countries.

Out of these 21 countries, seven (7) countries share a regional stock exchange. These are Sierra Leone, Togo, Burkina Faso, and Cote d'lvoire, Senegal, Eritrea and Gabon. Some countries which include Angola, Burundi, Mauritania, Mozambique, Rwanda, Sudan and Lesotho have very youthful stock exchanges with listed companies of less than 5(five). These countries were conveniently excluded from the sample since there was no meaningful data that could be found about their markets. Cameroon was also excluded because of very few listed companies despite the exchange having been in operation since 2001. Loayza (2016) argues that short time series data may not draw accurate results in relationship analysis since these may give spontaneous relationships which do reflect the actual situations on the ground.

4.6 Research Instruments and Data Collection Procedures

This research was pre-dominantly a desk-top based research. Desk-top researches using time series data are common in as evidenced by those by Wanjawa (2014), Yartey (2014) Joshi (2015) and Sen (2016). This was convenient since the study focuses on several countries and also depends much on official, actual historical data which is more authentic and hence expected to yield more accurate results. According to Loyaza (2014), desktop researches which use data from reliable sources such as the World Bank, IMF and AfDB amongst others, are lokey to get accurate results than survey researches. The World Bank Information repository and reports from each specific country were mainly used as sources of data although some other sources such as the IMF and ADB were used as supplementary sources of information as well. The African Stock Exchanges Association (ASEA) reports and

website also provided data on selected stock markets while the Price Water House (PWC) report was a source of data pertaining to pension funds' assets for all countries.

The data sought from the various reports from IMF, ADB and country specific reports were on the following variables from 1990-2016:

1. Stock market capitalisation,
2. Stock market trade volumes,
3. Assets of public pensions and occupational schemes,
4. Number of listed companies in a stock exchange
5. Portfolio composition of public pension and occupational schemes and GDP statistics.

4.7 Sources of data

The research is premised mainly on secondary data on mandatory pension schemes and stock market development in the target countries. The main categories of pension savings that were used are:

1. Traditional retirement pension schemes for formally employed people (common in almost all countries).
2. Mandatory pension schemes for informally employed people (for some countries)
3. Mandatory occupational health schemes.
4. Mandatory social security schemes.

Traditional retirement schemes for the formally employed have been used as a proxy for mandatory pension schemes by Davis (2005), Loyaza (2004; 2016), Meng (2014) and Musalem (2009) among others. Mandatory social security schemes such Work related schemes, occupational health schemes or their equivalent variants have been the most popular proxies in research for mandatory pension schemes because of the readily available data on these (Deaton, 2005; 2013). They are very useful and accurate in formal sector driven markets where the vast of the economically active population is formally sector. In most of the countries under study (except Ghana), there are no social security schemes for informal sector despite the rising contribution of this sector towards economic growth.

World Bank's World Development Indicators (WDI) and IMF's International Financial Statistics (IFS) were significant sources of data. It should however be noted that statistics on these variables are also available in specific country's Statistical Offices and Regional

reports. Stock market development measurement variables (capitalisation, liquidity, and activity) can be directly deduced from the time series analysis of data pertaining to a particular stock exchange. Information on any stock exchange is public information which can be easily accessed. The Acts governing pension schemes in terms of operations and subscriber base and type are also relatively public information which can be accessed especially for purposes of this research.

4.8 Data Analysis methods

4.8.1 General OLS panel regression to analyse relationship between stock market development and mandatory contractual savings

4.8.1.1 Fixed Effects regression

Fixed effects model is a branch of the Ordinary least squares (OLS) regression models in which the fundamental parameters are assumed to be fixed. In Fixed effects models, the averages across groups are generally held constant. Also worth noting is the fact that each group mean is a group-specific fixed quantity. For panel data, fixed effects relate to the variable specific means. In panel data analysis the term fixed effects estimator are the estimated coefficients in a regression model including those fixed effects. The assumptions of the fixed effects model are that individual–specific effects are related to the independent variables. The fixed effects model is generally specified as follows:

$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it}$ ……..*equation 4.1*

Where:

α_i (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).
Y_{it} is the dependent variable and where i = entity and t = time.
X_{it} represents one independent variable
β_1 is the coefficient for independent variables,
u_{it} is the error term
The Fixed effects model can also be specified as follows :

$Y_{it} = \beta_0 + \beta_1 X_{1,it} + \ldots + \beta_k X_{k,it} + c_2 E_2 + \ldots + c_n Z_n + u_{it}$ ……..*equation 4.2*

Where
Y_{it} is the dependent variable where i = entity and t = time.

$X_{k,it}$ represents independent variables

β_k is the coefficient for the Independent variables

u_{it} is the error term

Z_n is the entity Z representing binary dummies.

c_2 Is the coefficient for the binary repressors (entities)

4.8.1.2 Random Effects regression

Random effects model is the second branch of OLS regression estimator where the model parameters are assumed to random variables. The key assumption is that the data being analysed are derived from different populations whose differences relate to that hierarchy. Random effect models serve the purpose of taking into account unobserved heterogeneity where this heterogeneity is constant over time and not correlated with independent variables.Differencing is normally utilised to eliminate the constant, either through the first differencing or nth differencing which smoothens the data in the model. The random effects model assumes that individual specific effects are not related to the independent variables. The Random effects models are specified as follows:

$Y_{it} = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it}$ ..... *equation 4.3*

Where u_{it} is an between entity error and ε_{it} is within entity error

The Random effects approach models the behaviour of the individual effects from the pool data given. The individual effects are captured in the disturbance term.

4.8.1.3 Hausman Tests for choosing between Fixed Effects and Random Effects Models

Data is expected to fit either in a fixed effects model or random effects model. A Hausman test is used to determine wether to adopt a fixed or random effects model where the the null hypothesis favours the random effects against the alternative that fixed effects are appropriate (Green, 2008). The tests show whether the unique errors (*ui*) are correlated with the regressors. A fixed effects model was run and the estimates where saved, then run a random

model was run as well and results saved. The Hausman Test was done after running the two models.

4.8.2 Vector Autoregressive Model

A Panel VAR framework is adopted on the relationship between levels of stock market development and mandatory contractual savings, for the 21 countries with active stock markets in SSA for the period 1990 to 2016. Panel VARs have been extensively used in generating decision making points relating to issues of policy nature. This is because they are able to:

(i) Track dynamic relationships –The volatility in the behaviour of economic variables hence the relationship between two or more economic variables is also bound to be volatile over time and across obervations (Nerlove 2002; Hsiao, 2007). Estimation of such relationships therefore should be done using fairly accurate models whose restrictins and assumptions afford the capturing of these dynamic tendencies (Griliches, 2014). Panel data using VAR models is able to capture the heterogeinity between elements and thereby reducing the existence of collinearity current values and lagged values of variables allowing for a more accurate estimation of behaviour over time (Pakes and Griliches, 2012).

(ii) Address problems associated with Measurement errors - Measurement error is one of the key problems in econometric research which may nullify the results of a seemingly meaningful research (Aigner, 2014). Panel VAR models are characterised by several observations of the same variable over different elements. This affords the research to cancel out errors in a particular element due to the averaging effect. (Biørn, 2012; Griliches and Hausman, 2010; Wansbeek and Koning, 2009).

(iii) According to Bouvet, Brady and King (2013), the Panel VAR approach has several advantages over individual country VARs. First, we gain degrees of freedom by analysing a panel of countries. Further, we can better model the spill-overs from one country to another, since the panel approach captures country-level heterogeneity.

(iv) Analysis of non-stationary time series – Through the central limit theorem, Panel data allows a researcher, non-stationary data can still be utilised to estimate

relationships between econonmetric variables with minimum errors or white noise. (Anderson 1959; Dickey and Fuller 1979; Dickey and Fuller 1981; Phillips and Durlauf 1986; Binder, 2015; Levine, 2012; Im, 2003; Phillips and Moon 1999).

VAR models allow for the treatment of variables as endogenous and interrelated in the current case and in the past behaviours (Lagged variables) (Papanicolas, 2011). This research employs a 'quad-variate' VAR of stock market development with exogenous variables included, equivalent to the suggestions of Ramey and Shapiro, (1998).

If Y_t is a G x 1 vector of endogenous variables, then VAR for Y_t is:

$$Y_t = A_0(t) + A(l)Y_{t-1} + u_t \qquad u_t \sim i.i.d(0;\sum_u) \ldots\ldots\ldots\ldots \textit{equation 4.4}$$

A(l) represents the transformations of the lags in the time series data and is assumed to be identically and statistically independent. The coefficients of the matrices are restricted so as to allow for the existence of an inverse matrix which is crucial in creating transformations that detect all the dynamic interrelatedness in the data. The equation therefore captures both the immediate as well the remote future dynamics (Beveridge and Nelson, 1981; Blanchard and Quah, 1989).

Equation (4.4) can also be presented in the form that follows allowing for G in Y_t to be more linear functions of W_t, which represents a set of pre assumed exogenous variables.

$$Y_t = A_0(t) + A(l)\, Y_{1t-1} + F(l)W_{2t} + u_t:$$

W_t consists of stock market development indicators which include market capitalisation, liquidity and turnover.

Cushman and Zha (1997) have employed these VAR structures in policy analysis especially how the behaviour of interest rates is affected by factors such as money supply shocks both in the short run and long run. The same methodologies have also been used to investigate the behaviour of commodity prices in relation to levels of production and technology (Kilian & Vega, 2011). (Canova, 2007) uses several approaches to derive such VARs but generally the key assumptions are those of a linear relationship between variables and their past behaviours as well as stationarity of the time series used. All things being equal there is a possibility of

an infitite lag relatuionship which which can be transformed making the assumption that the contribution of past measures of a variable (Y_{t-j}) to current behaviours of itself (Y_t;) is small when j grows. This may also be true for stock market development and mandatory savings. Mandatory savings in the remote past may not be significantly influential in how the stock market develops today and vice-versa.

Panel VARs follow ordinary VARs since the treatment of variables is the same in both cases except that panel VARs have an extra characteristic of observations across elements ie they are a cross sectional view over time.

The Cushman and Zha representation is adopted such that Y_t is therefore a repeated version of an ordinary VAR, the vector of G variables for each unit i = 1;…. ;N, i.e., $Y_t = (y_{1t}; y_{2t}, \ldots\ldots y_{N\,t})$.
Then a panel VAR is:

$$y_{it} = A_{0i}(t) + A_i(l)Y_{t-1} + u_{it} \qquad i = 1;\ldots\ldots\ldots;N \qquad t = 1;\ldots\ldots; T \ldots\ldots \text{equation (4.5)}$$

Where u_{it} is a G x 1 vector of random disturbances and, as the notation makes it clear, $A_{0i}(t)$ and A_i may depend on the unit. When a panel VAR is considered, the representation is:

$$y_{it} = A_{0i}(t) + A_i(l)Y_{1t-1} + F_i(l)W_t + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{equation (4.6)}$$

where $u_t = [u_{1t}; u_{2t}; \ldots\ldots ; u_{Nt}] \sim iid(0; \sum)$, $F_{i;j}$ are $G \times M$ matrices for each lag j = 1; ….; q, and W_t is a M x1 vector of predetermined or exogenous variables, common to all units *i*.
Equations 4.5 or 4.6 emphasises on the three characteristics of a panel VAR. Holtz, (1988); Vidangos (2009) ; Benetrix & Lane, (2010) and Beetsma & Giuliadori, (2011) all agree on the following order of operations: (i) lags of all endogenous variables of all units enter the model for unit *i* thereby representing the dynamic interdependencies, (ii) u_{it} are generally correlated across *I* representing the static inter-dependencies and (iii) the intercept, the slope and the variance of the shocks u_{1it} may be unit specific.

In order to refine and ascertain findings in this research, the panel VAR model will be run in two fold. Firstly, the panel VAR is run in all Sub-Saharan countries in general and secondly countries are put into panels according to the levels of income as classified by the IMF in 2010. The general classes are Low income countries, Lower-middle income countries and Upper-middle income countries as alluded to earlier. This will be done to detect any common behaviour within a particular income group which may not be picked by the general VAR model.

4.8.2.1 Application of Panel VAR

Panel VARs have been employed extensively especially in economic policy research in the last six decades. While results from these have been varying from one case to the other in terms of accuracy and reliability, their use still remains an epicentre of policy formulation. Through the IRFs and FEVDs, Panel VARs are extensively used to investigate the impact of shocks other have in the whole system.

Canova *et al*. (2012) uses Panel VAR to investigate the macro-financial linkages across developed economies with particular focus on the transmission of real and financial shocks during the latest global recession. Cavano (2006) investigates how the shocks generated in one economy/country affects the behaviour of variables in another economy of country. This cross country analysis using VARs is leads or follows the analysis of inter-sectorial relationships within a country or economy depending on whether a government follows a Top-Down approach or a Bottom-up approach to economic policy formulation (Beetsman and Giuliadori, 2011. This analysis can be extended to inter firm relatedness especially in firms which are backwardly or fowardly intergrated (Love and Zicchino (2006).

4.8.2.2 Specification of VAR model

VAR approach seeks to investigate the fundamental behaviour and time related volatilies of a time series. There are no assumptions of known relationships in the structure of a time series a priori (Brandt & Williams, 2007). The VAR approach to identifying dynamic relationships investigates the interrelated dynamics of the series. A VAR model comprises endogenous and exogenous variables. The appropriate lag structures are chosen using other approaches linked to VARs that are going to be discussed later inthis chapter. VAR models generally involve a

number of multivariate autoregressive equations in which each variable is assumed to be a result of its past behaviour as well as past behaviours of all other variables defined in the VAR system.

For each of the sampled countries, the empirical model defining the relationship between stock market development and mandatory savings is defined through the following panel vector autoregressive model (VAR). The research uses a VAR approach to avoid making restrictions pertaining to the variables being investigated; secondly a VAR approach is ideal where the dependent is determined by not only the current values of the independent, but also the lagged values of the explanatory variables (Sims 1980).

$$\Delta Y_t = \sum_{i=1} b_{1,i}\ \Delta Y_{t-i} + \sum_{j=0} b_{2j} \Delta X_{t-j} + \sum_{j=0} b_{3j} \Delta Z_{t-j} + \sum_{j=0} b_{4j} \Delta W_{t-j} + \eta_{1,i} + \varepsilon_{1t}$$

……*equation (4.7)*

Where:

ΔY_t = annual change in stock development

ΔY_{t-i} =lagged change in stock market development

ΔX_t = annual change in mandatory contractual savings.

ΔZ_{t-j} = number of listed companies.

ΔW_{t-j} = annual change in stock market liquidity (Independent variable).

ε_{1t} = random error term, assumed not to be correlated across countries

b_j = coefficient measuring the magnitude impact of each explanatory variable

$\eta_{1,i}$ = accounts for controlling all other factors that may cause stock market development e.g. banking sector development, income levels, regulation, GDP and foreign capital inflows.

4.9 Explanation of variables used in the model

The variables used in both the OLS regression models and the VAR models are operationalised in Table 4.1 below.

Table 4.1 Description of variables used in VAR the model

VARIABLE	METHOD OF MEASURE	ECONOMIC JUSTIFICATION
Stock Market capitalisation (MC)	Market capitalisation as percentage of Real GDP	Broadly used measure of stock market growth in economic research (Impavido, 2005; Zervos 2000; Beck, 1999; Katsouli, 2003).Market capitalisation represents the amount of capital formation which can be passed through the exchange in anticipation of capital gains. It can therefore be concluded that more financial resources will find their way into the stock markets as MC increases.
Stock market liquidity (VT)	Value Traded as percentage Real GDP	MC falls short as a measure of stock market development since it does not reflect how liquid it is (Beck 1999). Liquidity reduces the disincentive to participate on stock markets. VT measures liquidity of stock market relative to the whole economy which is allocative efficiency of financial resources relative to the whole economy. The value of shares traded is a reflection of cash that exchanges hands on a given particular day and also provides a measure of how easy or difficult it is to dispose or buy shares in a particular exchange. It therefore should provide an indication of the extent of liquidity in the market (Levine 1991).
Number of listed companies	Number of listed companies	This measures size of stock markets with respect to the number of partoicipants/ number of companies listed in a particular stock exchange
Mandatory contractual Savings(SM)	Financial assets of [Social Security schemes +Occupational schemes+ public pensions] as percentage of real GDP OR The equivalent of these in different countries.	Contractual savings fund size is measured by the dollar value of assets being managed by contractual savings in an economy. These assets include both financial and non-financial assets. In this research, contractual savings size is measured by the financial assets under management. Non –financial assets are excluded since they are generally illiquid and are not traded on stock markets. As in Dermirguc-Kunt and Levine (1996), contractual savings size will be relatively measured as financial assets under management as a percentage of GDP.

Stock market development, at any given time, depends on its previous levels of development and previous level of mandatory savings. The lagging of variables under study will require lagging of both the dependent and the independent variable as indicated in the model above. Stock market development at $time_t$ depends not only on savings channelled towards it at that time but also on its prior development in the previous periods, for example the depth and

breadth of instruments developed in the previous periods and on savings channelled towards it in the previous period$_{t-k}$. The lagging is restricted to 1-year because the impact of both the lagged variables of dependent (stock market development) and independent (mandatory savings) is expected to be discrete and not continuous. This mainly stems from the dependency of stock market development and mandatory savings (like any other economic variable) to policy announcements (Coleman, 1968). The approach to be used to determine the lags will hence be determined at that point.

Although all measures of stock market development were tested against mandatory contractual savings, this research depended largely on the first indicator (i.e. MC) for two main reasons; (i) data pertaining to market capitalisation and GDP was readily available and (ii) the other indicators do not accurately measure the development of stock markets especially in developing countries.

Estimation of Mandatory Contractual savings varied from one country to the other. In Namibia, the Government Institutions Pensions Fund (GIPF) assets were used as a fair indicator of mandatory contractual savings. The GIPF in Namibia accounts serves more than 75% of the Namibian workforce (GIPF, 2013). In South Africa, assets under management of the Government Employees Pension Fund (GEPF) were also used as a fair estimator of mandatory savings in that country. The GEPF is currently the largest pension scheme in Africa with assets exceeding a trillion rands and membership of over 1.2 million people. Equivalent reasons as those of Namibia hold for the South African case. Governments are generally the highest employer and the GIPF in both countries capture the local authorities' employees as well. The Botswana Public Officers Pension Fund (BPOPF), established in 2001, was utilised to estimate mandatory contractual savings for Botswana. This pension scheme is mandatory in nature and caters for all government employees including those in local authorities.

In Swaziland, all pension schemes are managed by the Swaziland National Provident Fund (SNPF) which was established in 1974. All employers of labour in Swaziland are required by law to become members of the SNPF therefore all schemes for all formally employed Swazis are therefore pooled together into the SNPF. The SNPF was hence used as a fair estimator of mandatory contractual savings in Swaziland. In Zambia, the National Pension Scheme Authority (NAPSA) is the equivalent of SNPF in Swaziland. NAPSA assets were therefore

equally used as estimates of mandatory contractual savings in Zambia while the Public Sector Pension Fund (PSPF) was used for Uganda.

The National Social Security Fund (NSSF) in Kenya , the Social Security and National Insurance Trust (SSNIT) in Ghana, National Social Security Fund(NSSF) in and SNPF in Swaziland and were used to estimate mandatory savings in the respective countries. The SSNIT differs slightly with the other establishments in that it has an extended coverage to include domestic workers. For the countries in West Africa, in particular those trading on the BVRM, the average annual value of assets managed by the equivalents to SNFP were used as an estimation of mandatory savings for the group of countries. These countries include Togo, Cote D'livore, Burkina Fasso, Senegal, Sierra Leone, Gabon and Eritrea. The National Social Security and Insurance Trust (NASSIT) in Sierra Leone, National Social Security Fund(NSSF) in Cote D'livore , Institutoin de Prévoyance Retraite du Sénégal (IPRES) in Senegal are the respective country pension organisations used to estimate mandatory savings.

In order to acknowledge that the explanatory variables identified are not the only drivers of the dependent variable, control variables were also included in the model. The control variables included were banking sector development measured using domestic credit provided by banks as a percentage of GDP. This indicator has been widely adopted in literature as a measure of banking sector development (Dermigurc-Kunt, 2005; Foo, 2005; Davis, 2006; Levine, 2007; Impavido, 2008 and Yu, 2011). Secondly, regulation was also identified as a control variable which affects both stock market development and mandatory savings. The regulation quality index from the Heritage Foundation was used. This index captures the impact of regulation and laws on the ease to transact and carry out business in general. It is measured from -2.5 to 2.5, -2.5 indicate the worst point of regulation quality while 2.5 indicates perfect regulation in a given country. Foreign Portfolio inflows on direct share purchases (DSP) into the stock market also influence the development of the stock exchange (Davis, 2001 and Meng, 2011). It was hence the third control variable included in the model.

Zimbabwe is characterised by scarce data on mandatory pension schemes. Zimbabwe has two mandatory pension schemes for the formally employed. The first is operated at industry level while the second, the National Social Security Association (NSSA) being the only scheme that covers across industries. The Mining Industry Pension Fund (MIPF), the Local

Authorities Pension Fund (LAPF), the Clothing Industry Pension Fund (CIPF) account for 86% of the total contributors to these mandatory pension schemes. Assets for these named pension funds and NSSA assets summed together were used as a fair estimate of mandatory savings in Zimbabwe. Data on these three schemes was easily obtainable from reports.

4.9.1 Granger causality tests to assess causal relationship between stock market development and mandatory contractual savings

Granger causality tests were used to establish the nature and direction of relationship between mandatory savings and stock market development in Sub-Saharan Africa through a panel analysis study. Granger causality between the two variables mandatory savings and stock market development exists if historical and current observations of mandatory savings can be used to accurately predict stock market development or if historical observations of stock market development can be used to predict mandatory savings. Specifically, if past information pertaining to mandatory savings reduces the variance of errors in predicting stock market development beyond the variance of errors which would otherwise be made from past knowledge of stock market development alone, then 'mandatory savings are said to granger cause stock market development' (Granger, 1969). Where mandatory savings cause stock market development and stock market development causes mandatory savings, there is feedback causality or joint causality. Under normal circumstances, feedback causality does not usually occur simultaneously, at one point or initially, one variable causes the other dependent variable and at a later stage, the dependent variable starts contributing in determining the independent variable (Basmann, 1965).

Looking at the variables at hand, there is a possibility that mandatory savings may drive stock market development; the later may also have an influence on the former due to such factors as improved rates of return, variety of instruments and the ease of selling instruments on that stock market. There is therefore need to investigate feedback causality in this given model.

The Granger causality model specifications to be estimated for each of the group of countries are:

$$\Delta Y_t = \sum_{i=1} b_{1,i}\ Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{..... equation (4.8)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{.....equation (4.9)}$$

Where Y = change in stock market capitalisation and X= change in mandatory savings

Granger causality tests are done by testing for significance of the **Y *and* X** coefficients. According to Gujarati, Porter and Gunasekar (2012), the following interpretations can be derived in Granger Causality tests**:**

1. If the coefficients B_j on the lagged X in *equation 4.8* are statistically different from zero while the lagged *Y* coefficients c_i on *equation 4.9* are not statistically different from zero, Granger causality tests conclude that there is unidirectional causality from *X* to *Y*.

2. If the coefficients B_j on the lagged X in equation 4.7 are not statistically different from zero while the lagged *Y* coefficients c_i on *equation 4.9* are statistically different from zero, Granger causality tests conclude that there is unidirectional causality from *Y* to *X*.

3. Where both coefficients on lagged *X* and Y are statistically and significantly different from zero in both equations, there exists feedback or bilateral causality.

4. If coefficients in both regressions are not statistically significant, then there is independence between the variables hence we assume non-causality between the two variables.

Equation 4.8 and 4.9 above were generally used to test causal relationships between mandatory savings and the various stock market development indicators (capitalisation,

liquidity and turnover). However, these causal tests were extended to the stock market indicators themselves, that is, causal relationships were established between stock market capitalisation and stock market turnover, stock market capitalisation and stock market liquidity as well as between stock market liquidity and stock market turnover. This extension of causal tests helped in determining the most critical factor(s) in driving mandatory savings.

The equations below show the series of the extended Granger causal tests that were also applied:

$$\Delta Y_t = \sum_{i=1} b_{1,i}\ Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{…….....} \text{ equation (4.10)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{.....} \text{ equation (}\textit{4.11)}$$

Where Y = change in stock market liquidity and X= change in mandatory savings

Granger causality tests were done as explained above.

$$\Delta Y_t = \sum_{i=1} b_{1,i}\ Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{…….....} \textit{ equation (4.12)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{…….....} \text{ equation (}\textit{4.13)}$$

Where Y = change in stock market turnover and X =change in mandatory contractual savings.

$$\Delta Y_t = \sum_{i=1} b_{1,i}\ Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{…….....}\textit{equation (4.14)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \text{ ……..... equation } (4.15)$$

Where Y = change in stock market capitalisation and X= change in mandatory contractual savings

$$\Delta Y_t = \sum_{i=1} b_{1,i} Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{…….....equation (4.16)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{..... equation (4.17)}$$

Where Y = change in number of listed companies and X= change in mandatory savings

$$\Delta Y_t = \sum_{i=1} b_{1,i} Y_{t-i} + \sum_{j=0} B_j \Delta X_{t-j} + \varepsilon_{1t} \quad \text{……..... equation (4.18)}$$

$$\Delta X_t = \sum_{i=1} c_i Y_{t-i} + \sum_{j=1} C_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{..... equation } (4.19)$$

Where Y = change in stock market liquidity and X= stock market turnover

Control variables used in all the above equations include the quality of regulation of financial markets measured by the financial markets regulation index, the level of credit to the private sector measured by domestic private credit, economic growth as measured by GDP, Foreign Portfolio Investments measured by FDI. These control variables also affect the level of stock market development and the extent of savings development in an economy.

4.9.2 Impulse Response Analysis and Variance Decomposition

Impulse response function (IRF) is used to analyse the impact of any variable on others in a system. It is a useful and fundamental tool which is extensively utilised in empirical causal analysis and policy effectiveness analysis.

Further evidence of dynamic relationships between variables is provided by Variance Decomposition Analysis which is another way to explain the dynamic behavior of the model. Variance decompositions are used to explain the extent of the movements in the dependent variables that arise from their own volatilities in comparison to movements that arise from the volatilies of other variables (Ando and Brooks, 2002). It brings out the components of variances of dependent variables clearer than the impulse response functions. While these are generally regarded as a confirmation of impulse responses, the Variance decomposition approach has been more tolerated in empirical research than the impulse response functions (Simms, 2014).

4.9.3 Hybrid Measure of Stock market development

The different measures of stock market development used in literature may not be adequate since, when independently used, may fail to capture certain aspects of this development. Stock market capitalisation as a measure of stock market development may have a bias towards the price component and fail to capture the liquidity and number of listed companies' aspect. The same reasoning applies when the other measures of stock market development are used independently.

An attempt to come up with a comprehensive measure of stock market development is achieved using Principal Component Analysis (PCA). PCA is a statistical method of identifying similarities and differences in sets of data and expressing the different sets in a compressed manner, through reducing number of dimensions, without losing much information. This hybrid measure of stock market development is subjected to Granger causality tests against mandatory contractual savings and other control variables. It was done to confirm the relationships obtained through Granger causal analysis using the general measures of stock market development.

To test the accuracy of this hybrid measure of stock market development, the JSE was used. The hybrid measure for the JSE was compared with the ordinary stock market capitalisation of the JSE in order to check if there were any common trends between the two. Common trends would imply that the hybrid measure was also accurate. The JSE was chosen to be the checking mechanism mainly because of its extensive development when compared to other markets in SSA and also because of its tendency to respond to global occurrences. The behaviour of the hybrid measure can therefore be interpreted in terms of international phenomena which are expected to be depicted in the hybrid measures of stock market development.

4.9.4 Data Diagnostic tests

4.9.4.1 Unit root tests for stationarity

Data will have to be tested first for stationary using unit root tests as suggested by Dickey and Fuller (1979). Testing for unit roots (stationary) indirectly tests for co-integration as well. Non-stationary data in time series analysis often results in spurious regressions (Granger, 1969 and Dickey & Fuller, 1979). Unit root tests will be done using the Augmented Dickey-Fuller approach in line with similar, previous researches on causality (Davis & Hu, 2000 and Impavido & Catalan, 2005), to determine stationary and order of integration. This approach developed by Elliott (1996) yields better results than the ADF test.

The Augmented Dickey–Fuller (ADF) test ,developed by Dickey and Fuller(1979) is used check if a given variable (in this case Stock market development, mandatory saving growth rate) contains a unit root or not. The value of parameter α in equation 4.19 and 4.20 below determines if a series has unit roots or not. When α is equal to Zero, the time series contains a unit root hence it is non-stationary.

The three versions of the test are presented in the equations below.

1. Test for a unit root

$$\Delta y_t = \varphi y_{t-1} + \boldsymbol{\Sigma}_{i=1}\varphi_i + \Delta y_{t-i} + u_t \quad \text{.....(4.19)}$$

2. Test for a unit root with drift

$$\Delta y_t = \beta_0 + \varphi y_{t-1} + \boldsymbol{\Sigma}_{i=1}\varphi_i + \Delta y_{t-i} + u_t \quad \text{.....(4.20)}$$

3. Test for a unit root with drift and deterministic time trend

$\Delta y_t = \beta_0 + \varphi y_{t-1} + \boldsymbol{\Sigma}\varphi_i \Delta y_{t-i} + \beta_{1t} + u_t$ ……..……...(4.21)

Where y_t denotes the log price of stock market development at time period t and $\Delta y_t = y_t - y_{t-1}$. β_0 is the drift term, t is linear trend term and u_t is the error term.

H_0: φ=0 Non-stationary

H_1: φ<0 Stationary

The null hypothesis is that a series does contain a unit root and the alternative is that it is stationary.

4.9.4.2 Cointegration tests

Causality tests do not always indicate existence of a long run relationship between variables (Granger, 1969; Robert & Word, 1985; Gujarati et al, 2009). In economic policy formulation, long run relationships are relevant in crafting sustainable strategies. There is therefore need to carry out cointergration tests. Country by country unit root tests will therefore be done in order to investigate whether there exist long run relationships between mandatory savings schemes and stock market development hence allowing for heterogeneity amongst countries. It is well noting that while Granger causality tests are not the fulcrum for reliable policy formulation, they are an important indicator of fundamental underlying structural property between variables (White & Lu, 2010). Investigations pertaining to the existence of long run relationships should be assessed before utilising the Granger causality tests.

The stationarity of the variables in the models were also examined using LM tests, (Pesaran & Shin, 2003), also known as the IPS's panel unit root test, makes use of the following ADF model for each individual unit time series:

$$\Delta y_t = \alpha_i + \delta_i t + \rho_i y_{i,t-j} \sum_{i=1} \theta_{ij,i} \Delta y_{i\,t-i} + \varepsilon_{it} \quad \text{……..equation (4.23)}$$

Where:

- α and *t* relate to individual-specific intercepts and time trend, respectively.

- H_o is that each series contains a unit root (i.e. the autoregressive coefficient ρi =1 for all *i*),
- H_1 is that its not the whole that contains ubits roots (i.e. ρi <1 for some *i*; while ρi =1 for others).

Heterogeinity is allowed to exist in the absence of any cross sectional constraints on the parameters. The IPS test controls for the cross-dependency over time through regressing from the de-meaned data. It is specified as follows:

$$\bar{t}_{NT} = \frac{1}{N}\sum_{i=1}^{N} t_{iT}(p_i\beta_i) \quad \text{.....equation (4.24)}$$

The IPS t-bar statistic is defined as the average of the individual ADF t-statistics and this corresponds to the null hypothesis. When standardised, it naturally converges to a normal standard distribution for any observed population close to infinity.

Usually, time series data has a non-stationary property which will naturally force researchers to make use of cointegration. Cointegration tests for individual countries will be done using the Johansen's test/approach. However, since the individual cointegration test has its own weaknesses, the Seven Residual-Based tests can be used as an alternative (Pedroni, 2004). The Pedroni tests comprises of two basic steps: estimation an equation for each element separately:

$$y_t = \alpha_i + \delta_i t + B_i X_{it} + \mu_{it} \quad \text{.....equation (4.25)}$$

$$X_t = X_{it-1} + \varepsilon_{it} \quad \text{.....equation (4.26)}$$

Where:

- *y* and *x* are assumed to be an integrated process of order one.
- ε denotes a well-behaved disturbance term.

In the second step, residuals of equation, *u*, are pooled tested for stationarity. The seven residuals are deduced and put into two groups, one based data pooled within the dimensions of the panel and second group made up of rho statistics of the Phillips and Peron test is

pooled the data between dimensions. The null hypothesis is that there is no cointergration against an alternative hypothesis of presence of cointegration. The autoregressive coefficients are constrained in such a way that they are homogeneous across units.

4.9.4.3 Lag Length Selection

Model selection criterias are used to choose the lag length for the VAR (p) model. VAR (p) models are fitted in such a way that the chosen lag minimises the selection criteriaSelection of the lag to fit VAR (p) was done using a combination of the Akaike information criterion (AIC), Hannan–Quinn information criterion (HQC) and Bayesian Information Criteria (BIC). Akaike information criterion (AIC) estimates of a constant together with diversion or variance between the unknown true likelihood fit of the data and the fitted likelihood function of the model.A lower value of the AIC therefore suggests a fit that is more realistic and close to the true estimate. On the other hand, BIC estimates a function of the posterior probability of a model being true. Like the AIC, a lower BIC suggests that a model is considered to be more likely to be the true model. Despite various theoretical differences, their difference in practice is the the extent of accuracy or inaccuaracy in estimating the model. The BIC penalizes the model to a greater extent when compared to the AIC. The Hannan–Quinn information criterion (HQC) is an alternative to the AIC and BIC. The only way they should disagree is when AIC chooses a larger model than BIC. To balance the weaknesses of the three models, researchers combine them in selecting an optimal lag length.

$$AIC = -2L + 2(k + 2kp) \quad \text{.....(4.27)}$$

$$BIC = -2L + (k + 2kp)lnT \quad \text{.....(4.28)}$$

$$HQC = -2L + 2kln9\ln(n) \quad \text{.....(4.29)}$$

Where L is log-likelihood from model, k is the number of variables in the models and p is the estimated optimal lag.

The above three most common information criteria, that is, the Akaike (AIC), Schwarz-Bayesian (BIC) and Hannan-Quinn (HQ) were used to select the optimal lag length of the

VAR model. The AIC approach generally overestimates the order at higher probabilities than BIC and HQC criterias (Lutkepohl, 1991). The lag with the smallest AIC, BIC and HQC is selected as an optimal lag lenghth.

4.9.4.4 VAR model stability Checks

Stability refers to checking whether the model is a good representation of how the time series evolved over the sampling window period. The stability of a VAR system is evaluated using the roots of the polynomial of the coefficient matrix. Stability in a VAR model is indicated by roots that are all less than 0, and are typically shown in a graph. The rule of thumb is that if all the roots lie within the circle-graph, then the VAR model is said to be stable, if the roots lie outside the circle-graph, the VAR model is said to be unstable. Graphically, a VAR is stable if the result indicates that the Eigen values of the system in modulus lies within the unit circle. The estimated VAR model is stable if all roots have a modulus less than one implying that they must be located within the unit circle of the graph. For example a VAR (p) is called stable if all eigenvalues of modulus are less than p. The condition described above is equivalent to:

$$\det(In_{kp} - Az) \neq 0 \text{ for } |z| \leq 1 \quad \text{(4.30)}$$

This condition is equivalent to the stability condition

$$\det(I_K - A_{1z} - \ldots - Apzp) \neq 0 \text{ for } |z| \leq 1, \quad \text{(4.31)}$$

Stability of a VAR system should however not be mistaken for stationarity.

4.10 Assessment of the size and characteristics of mandatory Pension schemes

The assessment of size of mandatory pension schemes was done through analysis of the developments of these with respect to GDP over the 26-year period. Using various indicators of mandatory pension assets for each country, an assessment of whether there was growth or not was done through expressing the pension assets as a percentage of GDP. Firstly, histograms and Kernel density graphs were utilised to show how the overall SSA countries pension fund assets relate to GDP that is establishing the proportion of countries whose pension assets are below 10% of GDP, between 10% and 20% of GDP and so on. This was done for the beginning of the period in order to reflect the position at the beginning (ie 1990),

it was also done for the year 2000 in order to assess if there had been any improvements or deteriorations in the behaviour of this variable. Finally, the same assessment was done for the end of the period (i.e year 2016) to show then marks the trend over the whole 26-year period. Computations were also done for each respective country so as to identify outliers and also separate analysis of each country from the effects of the rest of these countries. In order to substantiate the analysis, countries were also analysed in terms of income groups in order to identify common trends amongst certain countries.

Pension schemes coverage in a country is also one of the characteristics that was analysed. The extent of coverage of mandatory pension schemes in a country is correlated to the size of the assets of these schemes. Wider coverage is expected to results in larger schemes while a narrow or shallow coverage is expected to result in smaller schemes in terms of pension scheme asset values. Coverage was analysed by assessing the levels of formal and informal employment in a country. Mandatory pension schemes are traditionally associated with formal employment. Where there is high level of informal employment, the coverage of mandatory pension schemes is also expected to be low except in those countries where regulation of pension schemes has been extended to cover the informal sector.

The portfolio composition of mandatory pension schemes for each country was analysed to determine the level of activity of these pension schemes and hence their possible impact on each of the markets. The main objective was to evaluate how their portfolio composition bias could be affecting the stock markets.

4.11 Analysis of stock market size and characteristics

Stocks markets in SSA countries were analysed also in three dimensions. Firstly, using descriptive statistics, SSA countries were analysed against the developed and other regional markets. Secondly, they were analysed in terms of how they have improved or deteriorated over the study period and thirdly in terms of the three income groups (Upper middle, middle and low income). This assessment was done in terms of the 4 (four) measures of stock market development: Market capitalisation, value traded, number of listed companies and stock market liquidity. Operational characteristics such as settlement time, days of trading, mode of trading (manual or automated) were also used to assess the characteristics of stock markets as the research sought to bring out the possible impact these stock markets could have on mandatory contractual savings.

4.12 Expected Results and Findings

'Micro' studies expect to establish a correlation between mandatory contractual savings' activity, efficiency and size and stock market development. Further than general correlation, it is expected that there would be two –way causality between the variables especially contractual savings size and stock market development, with the causal relationship initially from savings to stock markets and later from stock markets to savings. Two –way or feedback causality is expected to be strong between contractual savings efficiency and activity and stock market development. Consequently, we expect initial causality to be from mandatory contractual savings development to stock market development and later from stock market development to mandatory contractual savings development. The build-up of savings stock is expected to stimulate demand for a variety of assets on the stock market while at the same time increasing capitalisation and trade activity. In later years, the availability of a variety of instruments, high returns and increased hedging capacity via stock markets is expected to stimulate higher savings. Stock market development at time t_t is also expected to cause accelerated stock market development in later years.

4.13 Limitations

Availability of data, especially on mandatory contractual savings in certain countries is a challenge. The research was therefore forced to estimate data for certain periods. There was also heterogeneity amongst countries pertaining to the mandatory savings schemes available, this implied that different indicators of mandatory savings were used for different countries. Stock markets in some economies such as Botswana and Mozambique are still at 'very grass roots' level that information from these again was scarce and was difficult to analyse.

4.14 Chapter Summary

Research methodologies have their strengths and weaknesses. The methodologies used here, while they also have weaknesses, they have been widely utilised in research hence their popularity is driven by their accuracy in terms of results output. Quantifying relationships between economic variables may not be very helpful if not accompanied by a qualitative analysis of the implications of the relationship especially from a policy perspective. The qualitative analysis suggested in this chapter aims at unifying the

quantified relationships and policies being implemented. Chapter 5 that follows focuses on analysing data using methods suggested in chapter 4.

CHAPTER 5

PRESENTATION OF DATA AND ANALYSIS OF RESULTS

5.1 Introduction

This chapter presents data and an analysis of the data with respect to the research questions and hypotheses set. The main research question pertains to whether there is a relationship between mandatory contractual savings and stock market development in SSA countries. The nature of the relationship is also of utmost importance in this research, that is, the research seeks to find out the nature of causality between mandatory contractual savings and stock market development in SSA countries. An analysis of the characteristics of the main variables is however undertaken before the relationships are established.

Data used was gathered from twenty-nine (29) SSA countries for the period 1990 – 2016. Most of the data for stock market development, measured on an annual basis, was obtained from the WDI and from the various stock exchanges and the Association of Stock Exchanges in Africa (ASEA). Pension fund associations and World Bank Data indicators were the main sources of mandatory contractual savings data. Stock market development was measured through four indicators: Market capitalisation, Value of shares traded, number of listed companies and the turnover ratio. Mandatory contractual savings have traditionally been difficult to measure. They are a sub-set of the broad contractual savings (Davis, 2005) and in this research are measured using social contributions by the employer and employees. Previous researches have focused on the broad contractual savings and their impact and relationships on various measures of capital market development (Davis, 2005; Pfau, 2006 and Bartley, 2008). These approaches have failed to be relevant for policy formulation since results cannot be attributed to a particular source of savings. The approaches also lack the sustainability aspect since the other sources are volatile in nature.

This research focused on stock market development as opposed to general capital market development adopted by previous research (Davis, 2000; Impavido & Musalem, 2006, 2010; Meng, 2007 and Yartey, 2011). This research acknowledges that stock markets are more pronounced than debt markets in the developing countries hence are more relevant to general economic development.

5.2 Characteristics of mandatory contractual savings and Stock markets in SSA countries

5.2.1 Description of data collected and Descriptive statistics of key variables

Annual data was collected from 1990 to 2016 for Stock market capitalisation, Value Traded and Turnover, Mandatory Contractual savings (proxied by variants of compulsory pension fund schemes- all as percentages of GDP of each respective country) and other control variables which included Regulation quality, Domestic credit and Foreign Portfolio inflows *(see appendices for primary data).* This data was converted into annual annual chages through differencing once. The data panels remained however remained unbalanced as statistics for certain years; for certain countries were missing.For example, Zimbabwe had the shortest panel of 15(fifteen) years instead of a possible 26 years, mainly because of unavailability of data on mandatory contractual savings (pension funds) from 1990 to 2008. While the missing data on certain years reduces the observations, the disadvantages of such missing data are not very influential in the outcome of results in panel data analysis owing to the strengths of Panel data discussed in Chapter 4.

The key variables in this study are mandatory contractual savings and stock market development. The main thrust being to investigate the relationship that exists between the two variables in SSA. The assumed relationship being that there should be some causal effects between the two variables running from savings development to stock market development.

5.2.1.1 Descriptive statistics on Mandatory contractual savings in SSA

Mandatory contractual savings (measured by pension fund assets as a percentage of GDP) averages 10.57% in SSA with a standard deviation of 14.58 as shown in Table 5.1 below. This compares badly with developed countries in European Union with a mean of 64%, Asian Countries with a mean of 67% and American countries with a mean of 59%. This indicates a very low size of mandatory contractual savings in SSA. However, when the countries are grouped according to their income groups, some variations in these SSA countries are observed with respect to these mandatory contractual savings.

Table 5.1: Descriptive Statistics of Key Variables for all Countries

Variable	Mean	Standard Deviation	Kurtosis	Skewness
Pension Fund Assets(%GDP)	10.566	14.579	8.004	2.285
Number of listed companies	67.912	128.644	13.258	3.164
Market Capitalization(%GDP)	32.003	56.393	19.054	3.581
Value Traded(%GDP)	4.11	12.976	21.319	4.298

Source: Primary Data

Table 5.2 below show countries in the Upper Middle and Middle Income groups have a slightly higher size of mandatory contractual savings as indicated by a mean of 16.45% and 14.26% resepectively. Lower income groups' countries have a very low size of mandatory assets with a mean of 4.11%. The Upper middle and middle income groups consist of the better developed countries which include South Africa, Namibia, and Botswana, Mauritius and Nigeria. These countries have very formal economies where formal employment is still high. The low income group consist of the least developed countries in SSA, namely Lesotho, Swaziland, Zambia, Uganda, Zimbabwe and Benin. These low income group countries are characterised by very informal economies where self employment or informal sector is the highest employer.

Table 5.2: Descriptive Statistics of Key Variables by Income Group

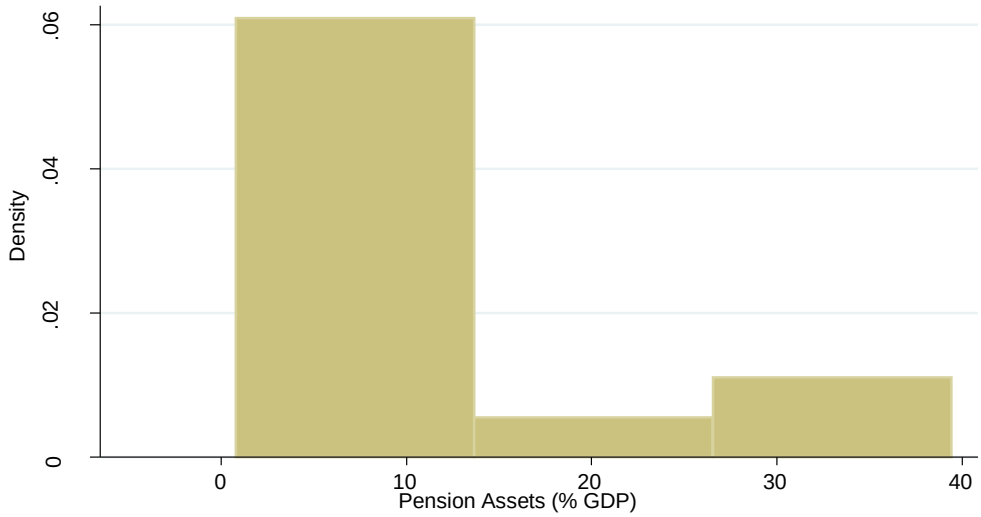
Income Group /Variable	Mean	Standard Deviation	Kurtosis	Skewness
Pension Fund Assets(%GDP)				
Upper Middle	16.452	20.326	4.111	1.432
Middle Income	14.258	14.893	2.793	1.105
Low Income	4.552	2.644	5.254	1.397
Number of listed companies				
Upper Middle	137.213	209.81	3.897	1.531
Middle Income	68.177	72.917	2.355	1.007
Low Income	21.877	24.942	3.054	1.147
Market Capitalization(%GDP)				
Upper Middle	68.825	79.709	3.495	1.321
Middle Income	14.510	10.741	4.060	1.205
Low Income	19.198	43.173	83.097	7.976
Value Traded(%GDP)				
Upper Middle	11.707	22.219	5.374	1.958
Middle Income	0.877	1.481	22.687	2.196
Low Income	1.205	3.227	14.231	3.469

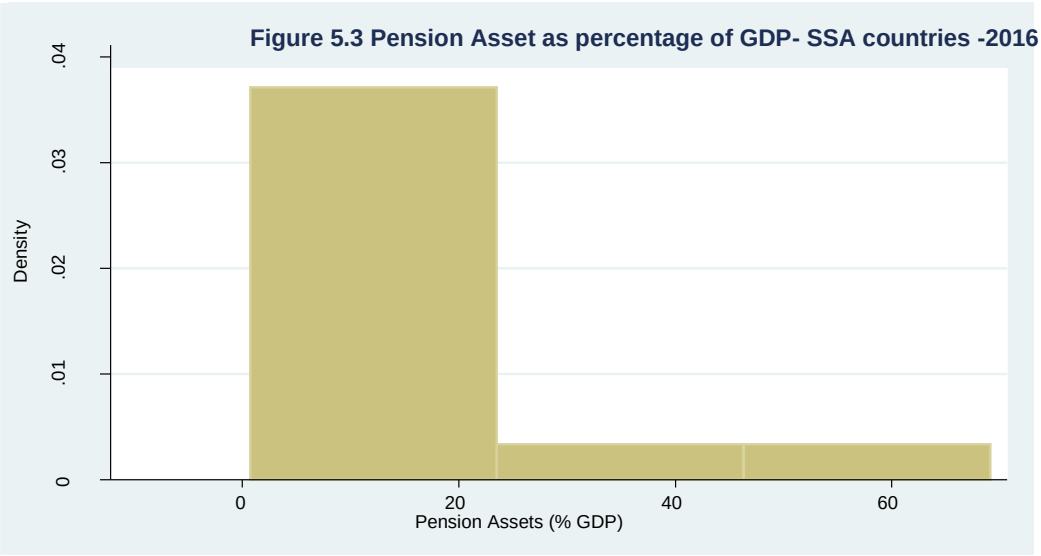
Source: Primary Data

Further analysis of the 26 year-period show that while mandatory contractual savings are still low in SSA countries, there has been however an improvement. In 1990, 70% of the SSA countries had their mandatory contractual savings being less than 10% of GDP and less than 20% of SSA countries with mandatory contractual savings of more than 25% as depicted in Figure 5.1 above. Figure 5.2, however show an improvement of these in year 2000 as some countries had their mandatory contractual savings now reaching 30% of GDP and only 60% of countrieswith mandatory contractual savings below 10% of GDP. Figure 5.3 below indicates an even higher improvement by year 2016 where most countries have their contractual savings as percentage of GDP being between 5% - 20% and a combined 8% breaking through the 40% mark.

Figure 5.1 Pension Asset as percentage of GDP- SSA countries -1990

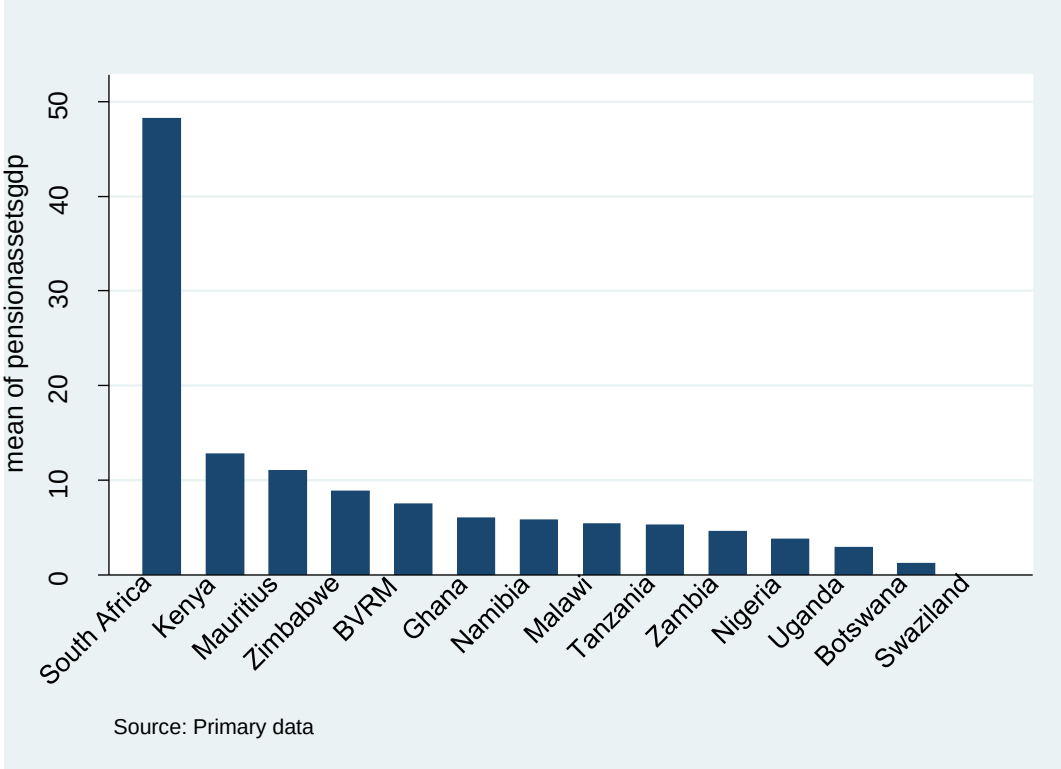
Figure 5.2 Pension Asset as percentage of GDP- SSA countries -2000





Source: Primary data

Figure 5.4: Pension asset as perecentage of GDP for all countries



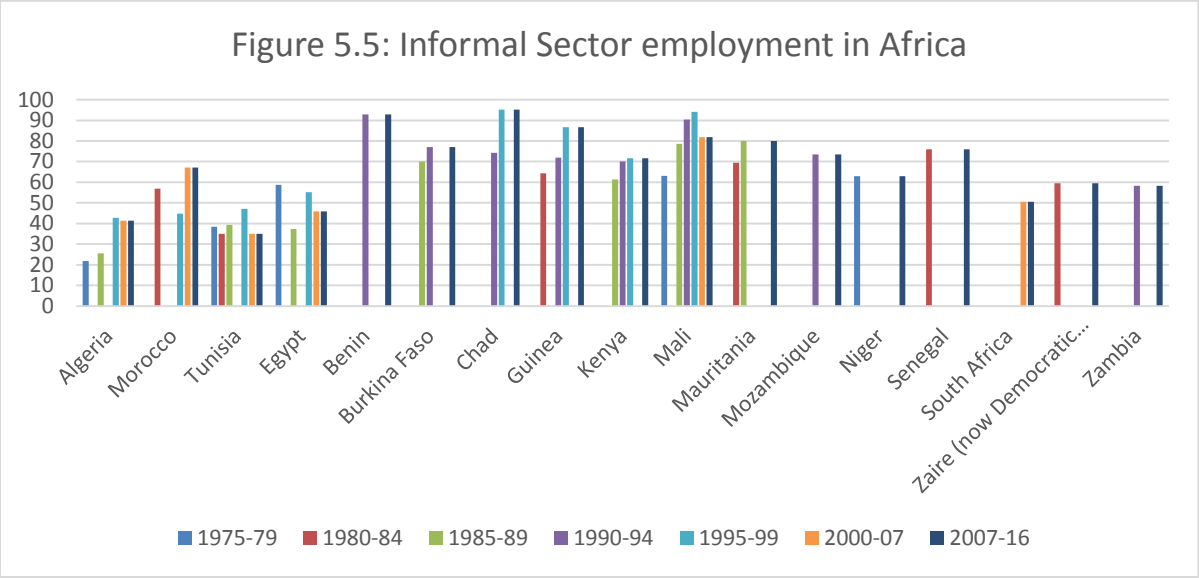
5.2.2 General characteristics of mandatory contractual savings in SSA

5.2.2.1 Regulation of Pension Funds in SSA

This section of analysis looks at regulation of pension funds in relation with the relationships between pension assets and stock market development deduced in earlier sections. Regulation is analysed by looking at three broad areas of regulation and policies. Firstly, regulation and policy pertaining to the contributory base of mandatory pension schemes is analysed. Secondly, this analysis focuses on regulations and policies on investments of pension schemes. Finally, the analysis assesses the extent of adoption of pension reforms by SSA countries.

5.2.2.1 (a) Contributory base of pension funds in SSA

Earlier findings in this research indicate that pension fund assets are low and still growing at a low rate yet there is a positive relationship between these pension assets and stock market development. There is a causal relationship from pension assets to stock market development. In SSA, the levels of formal employment are very low and shrinking. There is also a general increase in informal employment across SSA countries except in Namibia and Botswana where informal sectors are growing at a low rate. Figure 5.5 on the next page, shows that informal sector employment is significantly and has risen in most African countries over the past four decades. This suggests a reduction in the formally employed population which is the main contributing base for mandatory pension funds. According to the Word Bank Indicators, there is also a significant rise in contract employment amongst the formally employed especially in the Agricultural sector which is one of the highest employing sectors in SSA. Contract workers do not contribute towards a pension in SSA countries; some of the contracts are as short as 30 days making it expensive to collect pension contributions. Except in Ghana, there are no policies and regulations compelling contribution to pension funds by those that are informally employed. In Zambia, the policy has been a persuasive approach. It remains at the discretion of an individual or company to contribute to such. According to Dorfman (2009), the poor performance by most pension schemes in paying benefits discourages the informal sector to contribute towards pension.



Source: ILO, 2016

The shift of economic drivers from formal sectors to informal sectors therefore requires a paradigm shift in terms of regulation on contributing towards pension. There is need for compulsory contribution for the Informal sector by extending mandatory pensions to these sectors. Table 5.3 on the next page summarizes the regulation and policy status on informal sector pensions in SSA. There is no effort to expand pension coverage to informal sector yet in most countries despite the fact that the informal sector makes up the bulk of these economies.

Pension schemes in most SSA countries are generally unattractive as the formally employed who are contributing towards mandatory pensions are generally not happy because of three issues. Firstly, the pension schemes fail to deliver on time their promised benefits post retirement. Secondly, the benefits paid are usually not enough to enable beneficiaries to survive. Thirdly, the pension schemes are poorly administered with corruption rampant in the pension institutions. Management at NSSA (National Social Security Authority) in Zimbabwe lost more than a billion United States Dollars through inflated packages for executives and through unclear transactions suspected to have been benefiting management and politicians. Abuse of pension fund resources has also been a major problem in Kenya, Nigeria and South Africa (World Bank, 2016).

Table 5.3: Informal sector pension fund regulations & policies for selected SSA countries

Country	Existence of compulsory policies on informal sector pension contributions	Existence of policies to encourage informal sector participation	Incentives to participate
Botswana	No	No evidence of such policies	Public has confidence in the well run pension systems. Informal sector maybe incentivised by this.
Ghana	Yes	National policy in place and implemented	Tax benefits for participating SMEs and informal sectors.
Kenya	No	Awareness has been widely created .Evidence of efforts to craft policy	Existing pension systems generally well administered but payouts of benefits low.
Namibia	No	Through awareness/education of informal sector on pensions	Tax incentives being proposed for informal sector that adopts pension schemes.
Nigeria	No	Awareness campaigns on pensions	No incentives offered to date
South Africa	No	No evidence but financial infrastructure present	No incentives offered to date
Mauritius	No	Highly voluntary, financial infrastructure present	Contributors to claim tax benefit of pension contributions.Formal pension system well managed
Cote Dlvoire	No	No evidence of such policies	No clear incentives in place to date
Swaziland	No	No evidence of such policies	No incentives in place to date. Formal system not well managed
Uganda	No	No evidence of such policies	Current pension system mismanaged, no incentives in place for voluntary contribution
Tanzania	No	Awareness campaigns	Current pension system mismanaged, no incentives in place for voluntary contribution
Malawi	No	Awareness campaigns	Current pension system mismanaged, no incentives in place for voluntary contribution
Zambia	No	Recommendations in place since 2013 but not yet implemented.	Efforts to improve governance on existing pensions. Benefit pay-outs low
Zimbabwe	No	Issue been debated but no evidence action taken.	Existing pension schemes in shambles. Benefit pay-outs low and paid late.

Source: Authors' compilation from various pieces of legislation in different countries

5.2.2.1 (b) Regulation and policies on pension fund investments

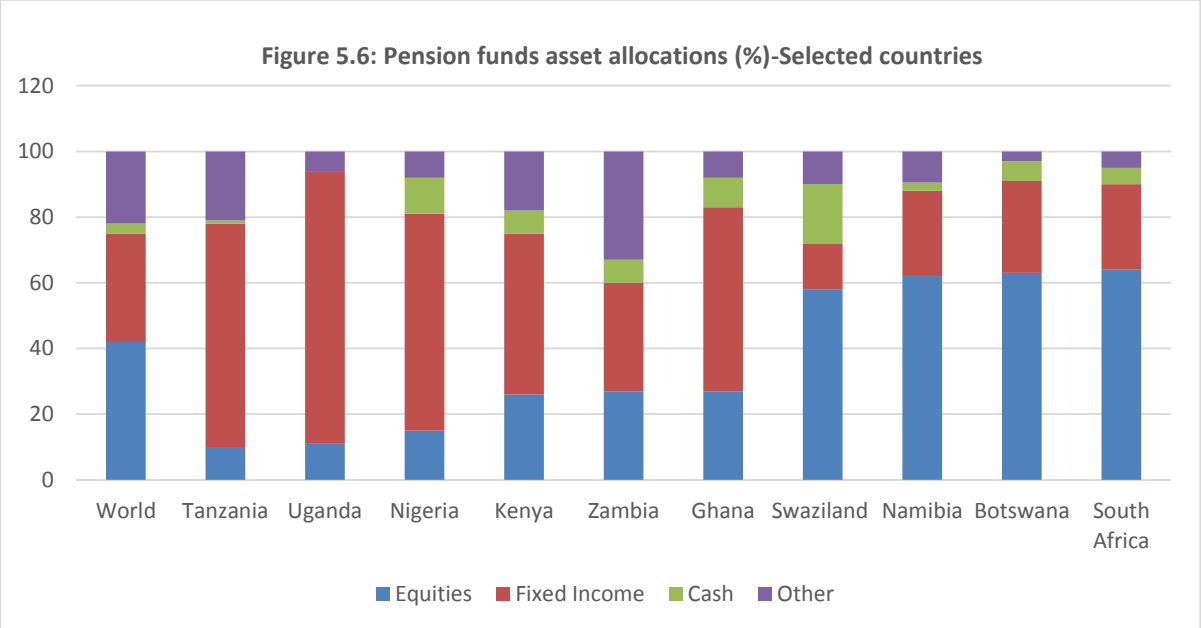
The operation of pension schemes is usually regulated by a number of institutions in SSA countries. Regulation has been observed to be under the direct arm of a quasi-government institution which supervises operations and an Act of parliament which directs registration. In Zimbabwe the quasi-government institution is Insurance and Pensions Commission (IPEC) and there is a Provident Funds and Pensions Act. In Nigeria there is the Nigeria Pensions Commission & Pensions Reform Act, Non-Bank Financial Authority in Botswana, Pensions and Insurance Authority (PIA) in Zambia, in Malawi the Central Bank of Malawi, jointly with the government monitors pension schemes. There are several variants of these in other countries but there is a general twin-monitoring in most countries. Pension funds' investments are directed by supervisory bodies which define asset classes to be invested in and places minimum and maximum thresholds on each assets class. Table 5.30 on the next page summarises the core regulations pertaining to pension schemes investments in selected SSA countries. The main regulations affect the proportion on equities, offshore investments and prescribed government assets. From the Table 5.4, high income countries in SSA have favourable regulations as indicated by a lower requirement on prescribed assets and a significant proportion on offshore investments. On the contrary, Low income countries have adverse regulations which do not allow offshore investments and have a higher required investment proportion on prescribed assets.

Table 5.4: Summary of pension funds Investment regulation in selected SSA countries

Country	Regulation/policies											
	Equities		Off-shore		Presc.Ass		Money.mkt		Pvt Equity		Real.Est	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Botswana	40%	55%	--	25%	7.5%	--	NA	NA	--	5%	NA	NA
Ghana	--	27%	NA	NA	NA	NA	NA	NA	--	4%	15%	--
Kenya	--	70%	NA	NA	--	90%	NA	NA	--	5%	--	30%
Namibia	40%	55%	--	25%	7.5%	--	NA	NA	NA	NA	NA	VNA
Nigeria	--	25%	NA	NA	--	100%	--	30%	NA	NA	NA	NA
South Africa	40%	55%	--	25%	7.5%	--	NA	NA	NA	NA	NA	NA
Mauritius	--	10%	--	25%	25%	--	--	15%	NA	NA	--	60%
Cote Dlvoire	--	20%	NA	NA	--	80%	NA	NA	NA	NA	--	15%
Swaziland	--	45%	NA	NA	--	70%	--	10%	NA	NA	NA	NA
Tanzania	-	70%	NA	NA	--	90%	NA	NA	--	5%	--	30%
Malawi	-	45%	NA	NA	--	70%	--	10%	NA	NA	NA	NA
Zambia	5%	25%	NA	NA	--	70%	NA	NA	--	5%	NA	NA
Zimbabwe	-	-	0%	0%	10%	--	--	20%	0%	0%	NA	20%

NA=not available -- = 0%

Source: Authors compilation from country specific Pension funds Acts



Source: ASEA (2016) and PWC (2016)

Low income SSA countries, characterised by very unattractive stock markets, have pension funds allocating very limited resources to equities (see Figure 5.6 above). The allocation towards equities in these countries is far below the world average equities allocation of 50%. Countries such as Tanzania, Kenya, Nigeria and Uganda have a below 20% allocation into equities despite the existence of regulations that allow them to invest more in equities. High income SSA countries however have shown a different attitude towards equity investments. South Africa, Namibia and Botswana have an average of 60% allocation to equities by pension funds. This is likely to be driven by the well-developed JSE this is a major investment destination for these SACU countries. Compared to regulation, these high income countries in SSA tend to be aggressive on equity asset allocations, that is, they invest more than what the regulation stipulates(60% versus maximum of 55%) mainly as a result of the attractiveness of stock market in these high income countries. This level of allocation of equities in low income countries, which is lower than the stipulated regulation on equity allocations in the respective countries, reflects the lack of confidence by pension funds on equities markets or the unattractiveness of the stock exchanges as an investment destination. According to Rostows' model of development, the Take –off stage is characterised by high savings potential which can only be realized if the markets are developed hence attracting savings. Low income countries in SSA are characterised by rising savings potential from both the formal and informal sectors. However these sectors do not have confidence in the capital markets in general which have remained clouded by policy inconsistency, repressive regulations and over-protective rules. These result in investors shunning the market (Meng, 2011 and Impavido, 2014).

5.2.1.2 Descriptive statistics on Stock market development in SSA

Stock market development is commonly measured using Market capitalisation, Number of listed companies and sometimes Value of stocks traded (Levine, 2015; Davis, 2016 and Impavido, 2017). The three measures are adopted in this study. Market capitalisation generally measures the size of a market in value terms. Number of listed companies' measures size in terms of how many companies are listed on the exchange, the higher the number the bigger the market is. Value traded reflects size in terms of levels of trading. The

higher the value traded periodically, the better the market is since this reflects a more liquid market.

5.2.1.2.1 Market Capitalisation in SSA countries

In SSA, the average market capitalisation for all countries is 32.01% of GDP as shown in Table 5.1 above. If South Africa is excluded, the average is 14%. This reflects that these markets are small especially when compared to the market capitalisations in developed economies in Europe, America and the Middle East with an average 110% of GDP. When split into income groups, the Upper Income group has an average of 68.25% of GDP which competes fairly well with the developed countries. This group is however mainly driven by South Africa. However, the Middle and Low income groups still have very small stock markets with group averages of 14.51% and 19.19% of GDP respectively. In terms of size, as measured by market capitalisation, SSA stock markets are relatively 'thin' when compared to other regions such as Europe and America. Market capitalisation is less than 20% of GDP in SSA countries except South Africa and Mauritius where market capitalisation is 40% -60% of GDP. In developed countries such as Switzerland and Germany, market capitalisation is on average 110% of GDP. Market capitalisation is largely driven by prices, number of listings and number of shares in circulation for the listed companies. Prices are largely driven by demand and supply forces. Market capitalisation will be high where prices of shares are also increasing and these increases are a result of activity by especially institutional investors.

While stock market development as measured by market capitalisation is generally low in SSA, during the period under review, there have been some significant developments in this regard. In the early 1990s, most of the countries in SSA had their market capitalisations being less than 20%. Figure 5.7 below indicate that more than 90% of these coutries had their market capitalisations being less than 20% of GDP in 1990 while only 4%, mainly comprised of upper middle income countries, had their market capitalisations being more than 40%.

Figure 5.7 Market Capitalisation as percentage of GDP- SSA countries 1990-2016

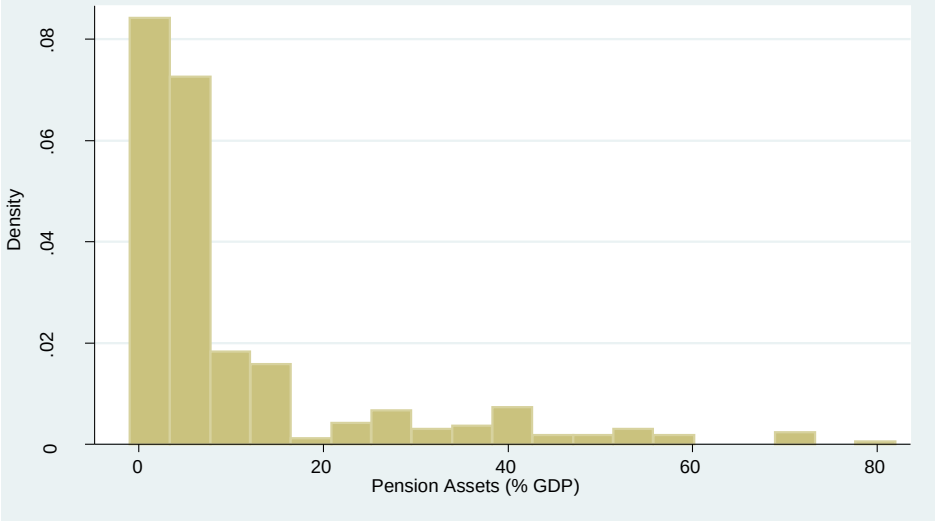


Figure 5.8 Market Capitalisation as percentage of GDP- SSA countries 1990

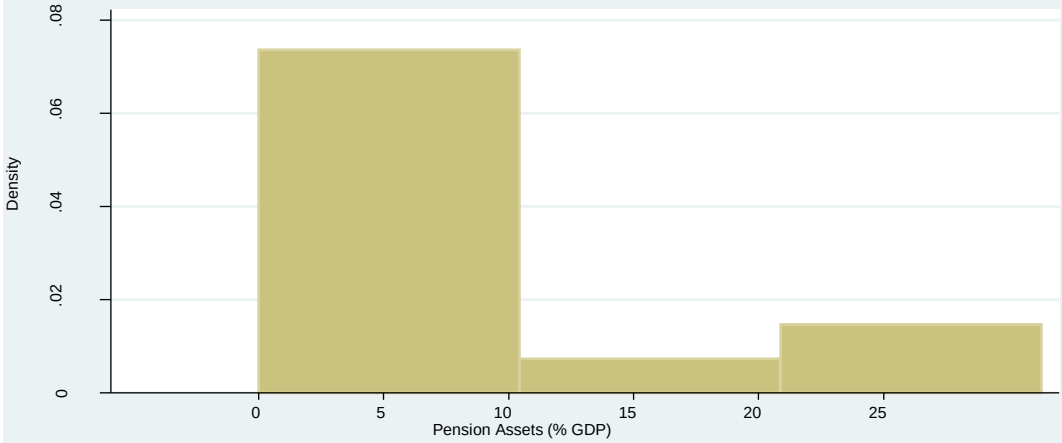
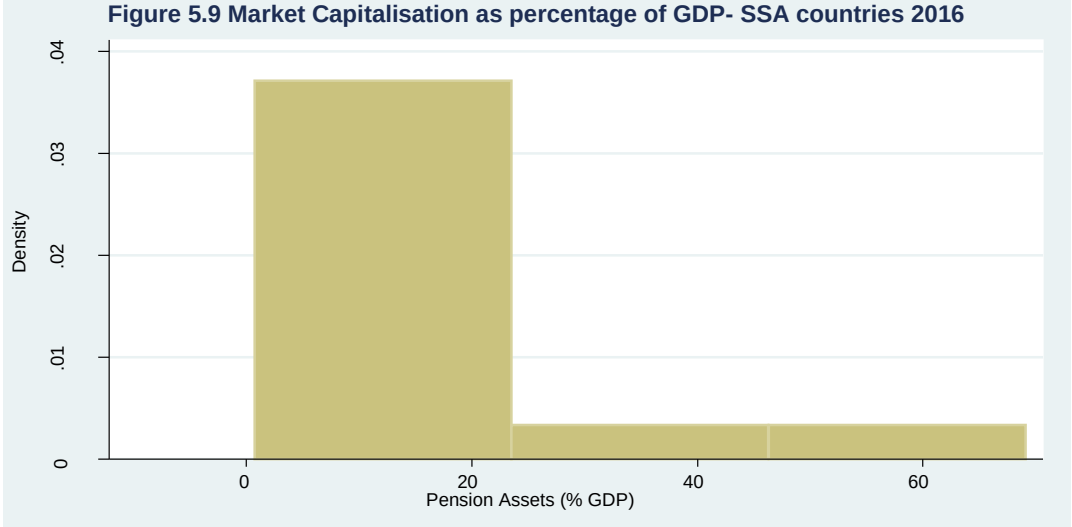
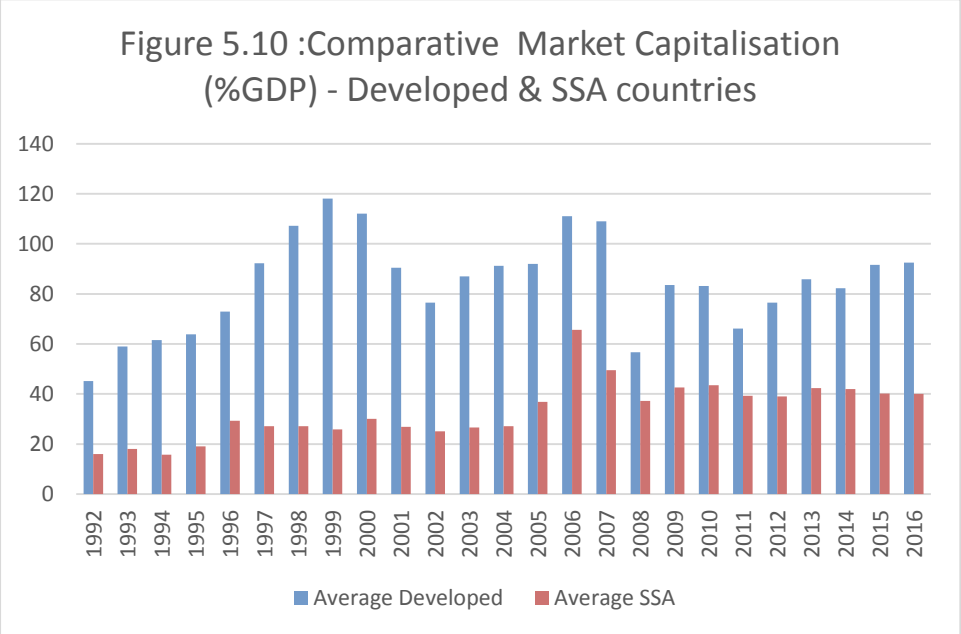


Figure 5.9 Market Capitalisation as percentage of GDP- SSA countries 2016



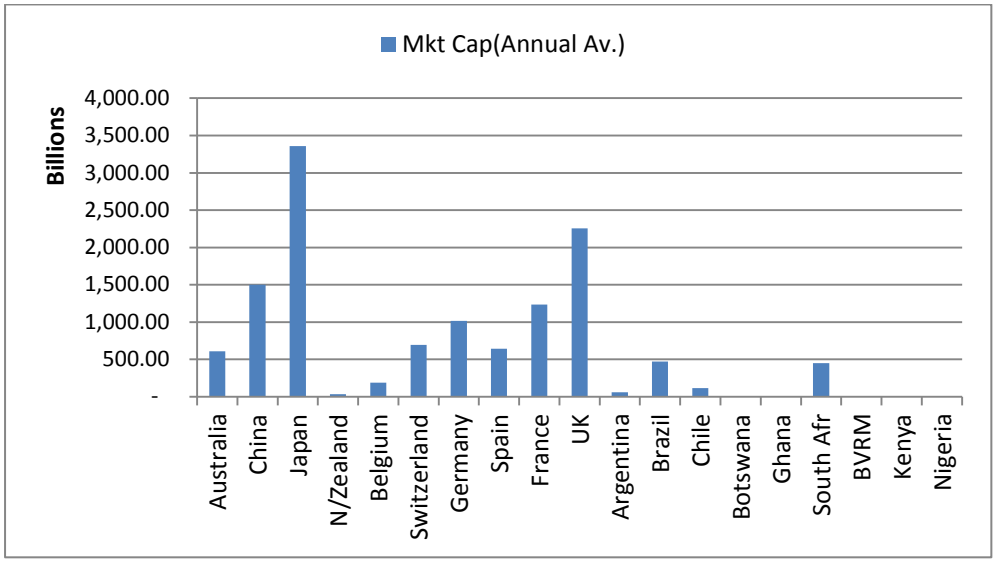
Despite these improvements in this measure of stock market development, SSA markets remained fairly underdeveloped when compared to the developed world. While there is no standard measure of level of market capitalisation, the sharp contrast between the advanced economies and SSA may be an indication of some problems or deficiencies in these SSA countries. Figure 5.10 on below, shows a 25-year comparison of annual market capitalisations in SSA and developed countries. SSA remains significantly less developed (at less than half of what happens in the developed countries).



Source: Author's compilation (2016)

Figure 5.11 below , show that the size of SSA stock markets therefore remained less than half of the developed world stock markets, suggesting that they are still relatively small hence under-developed.

Figure 5.11: Market capitalisation (Nominal Annual average) for selected countries



Source: Authors compilation for 1990-2016 (2016)

5.2.1.2.2 Number of listed companies in SSA countries

The listings on SSA stock exchanges have declined in the last 26 years. Average listings in SSA countries have been negative between 1990 and 2016 as there were more de-listings than new listings on several exchanges. The most recent GFC (Global Financial Crisis) partly causing some fears by investors to buy publicly traded securities. The leading de-listings were in South Africa and Nigeria. Zimbabwe, one of the largest stock exchanges in Africa, also saw the number of listings sharply increasing from 63 to 85 listed companies between 2003 and 2006 before dropping to 61 listed companies in 2016. In South Africa, 85 counters de-listed in 2002 only. The number of listed companies on the JSE peaked at 740 but has since decreased to 322 in 2016. Table 5.1 on page 132, show an average number of listed companies for SSA countries at 67.9 which compares badly with an average of 1,023 in Europe, 876 in Asia and 2,678 for America. Excluding South Africa, this average drops to 42 for SSA countries. When divided into income groups, the average number of listed companies for the low income group in SSA is as low as 21.87 reflecting some significant under-development of stock markets in SSA. Table 5.5 below show the characteristics of listings according to income groups.

Table 5.5: Descriptive statistics for Number of listed companies for all SSA countries

Income Group	Mean	Standard Deviation	Kurtosis	Skewness
Upper Middle	137.213	209.81	3.897	1.531
Middle Income	68.177	72.917	2.355	1.007
Low Income	21.877	24.942	3.054	1.147

Source: Primary data

SSA countries have been affected by delistings in the last 26 years. This has affected even the Upper Income group countries such as South Africa which is leading in terms of percentage decline of number of listed companies between 1990 and 2016 at -56% as shown in Table 5.5 below.

Table 5.6: Evolution of listings in SSA countries (1990- 2016)

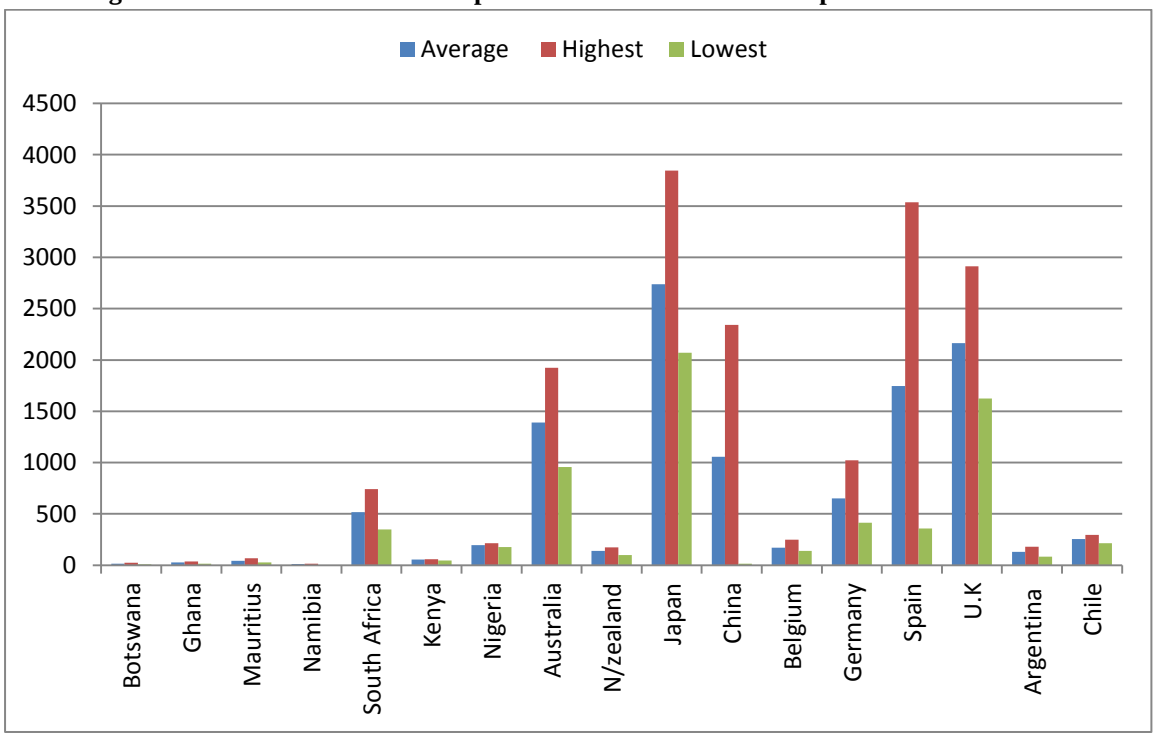
Country	Highest number attained	Current number as at 2016	Percentage increase/decrease
South Africa-JSE	740	322	-56
Zimbabwe –ZSE	82	63	-23
Nigeria –NSE	215	188	-13%
Ivory Coast-BVRM	41	39	-0.05
Namibia –NSE	13	7	-54
Zambia –LSE	20	14	-30
Botswana.-BSE	25	23	-0.08
Ghana -	36	34	-0.06
Malawi	15	14	-0.06
Uganda	10	10	-
Swaziland-	7	5	-29
Mauritius	71	66	-0.07
Tanzania	25	25	-
Kenya-NSE	66	61	-0.08

Source: Primary data (1990-2016)

Comparatively, the number of listed companies in SSA is far below that of developed countries. Most countries in SSA have less than 100 listed companies on average compared to an average of average of 1,023 in Europe, 876 in Asia and 2,678 for America. The number

of listed companies per 10,000 populations is used to further assess the level of listings in SSA countries. This measure quantifies the distribution of listed companies across the entire population of a country and a higher number of listed companies per 10,000 populations reflect a developed stock exchange. A lower number may signify a limited choice of listed companies in that country. A lower number may therefore be an indication of an unattractive market since diversification across companies by investors may also be a challenge.

Figure 5.12: Number of listed companies- Selected SSA & developed countries



Source: Primary data (1990-2016)

5.2.1.2.3 Levels of trading in SSA stock markets

Stock market development is also measured in terms levels of trading. Actively trading stock markets tend to be more attractive than thinly trading stock markets (Levine, 2016). It is easy to buy into and out of actively trading stock markets when compared to those that trade thinly as such buy and sell decisions can be quickly executed. Levels of trading are measured by Value Traded as a percentage of GDP as adopted by Levine, (2015); Impavido and Meng, (2017) and Aruna, (2013).

Table 5.1 on page 132 show a very low Value traded of 4.11% of GDP for SSA countries. This reflects constrained trading in general making these markets unattractive to investors

especially from the developed countries. This low value traded of 4.11% signifies markets in which it is difficult to enter and exit. Investors prefer markets with unconstrained entry and exit so as to allow for free movement of capital within and across markets. The Upper middle income group shows some improved levels of Value Traded at 11% of GDP although this is still low. In Middle and low income groups, Value Traded is extremely at 0.87% and 1.21% respectively. These markets are mainly those countries such as Uganda, Zambia and Kenya where trading is as low as 3 days per week for less than 3 hours per day. For various reasons, including that of small and few institutional investors, some stock markets in SSA trade for very few days. Table 5.7 on the next page, show the number of trading days and other operational characteristics of various stock markets in selected SSA and developed countries. In the table, Botswana Stock Exchange is open for only 3 hours a day, Kemya for 5 hours while Ghana Stock exchange is open for 6 hours. In developed countries the minimum number of hours is 8 hours a day.

Table 5.7: Characteristics of stock markets in selected SSA countries & developed countries

	Total trading hours/day	Capital Gains Tax	Foreign Investors(% value traded)	Trading System	Settlement Cycle	Number of lPOs (2011-2015)
Australia	8.00	25%	61%	Automated	T+2	849
China	6.00	10%	73%	Automated	T+2	344
Japan	6.00	20%	65%	Automated	T+2	150
N/Zealand	8.00	0%	60%	Automated	T+2	50
Belgium	8.00	8%	56%	Automated	T+2	96
Switzerland	8.00	0%	71%	Automated	T+2	66
Germany	14.00	23%	57%	Automated	T+2	40
Spain	8.00	25%	53%	Automated	T+2	31
France	8.00	35%	64%	Automated	T+2	41
UK	8.00	18%	63%	Automated	T+2	254
Argentina	7.00	22%	59%	Automated	T+2	29
Brazil	7.00	15%	45%	Automated	T+3	16
Chile	7.00	25%	47%	Automated	T+3	8
Botswana	3.00	15.00	33.00	Automated	T+3	7.00
Ghana	6.00	10.00	50.00	Automated	T+3	4.00
South Africa	8.00	10.00	49.00	Automated	T+3	35.00
BVRM	5.00	10.00	40.00	Automated	T+3	2.00
Kenya	6.00	15.00	32.00	Automated	T+3	8.00
Nigeria	5.00	0.00	60.00	Automated	T+3	3.00

Source: Authors compilation from ASEA reports & PWC global reports (2016)

5.3 Relationship between Mandatory contractual savings and Stock market development

The second aim of this research is to ascertain the relationship between Pension assets (a proxy for mandatory contractual savings) and stock market development measured by market capitalisation, value traded and number of listed companies. Generally, the research hypothesizes that there is a relationship of causal nature between pension assets and any of the measures of stock market development. This relationship can either be direct or indirect in nature. There are basically three hypotheses under scrutiny:

1. H_o : there is no relationship between pension assets and stock market development as measured by market capitalisation

   H_1 there is a relationship between pension assets and stock market development as measured by market capitalisation

2. H_0: there is no a relationship between pension assets and the number of listed companies in an exchange.

   H_1: there is a relationship between pension assets and the number of listed companies in an exchange

3. H_0: Pension assets are not related to the level of trading that takes place in the stock markets.

   H_1: Pension assets are related to the level of trading that takes place in the stock markets.

4. H_0: There are no causal relationships between pension assets and the various measures of stock market development.

   H_1: There are causal relationships between pension assets and the various measures of stock market development.

5.3.1 Diagnostic tests of data

Unit root tests

The Augmented Dickey Fuller (ADF) approach was employed to test for unit root tests in time series data that was used. Data was not stationary at first differencing and it was differenced once at which it was found to be stationary as shown in Table 5.9 that is in appendix 2. The null hypothesis under the ADF is that there is a unit root in the data. The existence of a unit root creates noise hence resulting in the estimators being biased leading to spurious findings. For pension fund assets, we reject the null hypothesis since the t-statistic is less than the critical values at all levels (1%, 5% and 10%). We therefore accept the alternative hypothesis that the data series has no unit root, hence stationary. After differencing once, all the data series of the core variables, that is, pension fund assets, market capitalisation, number of listed companies and value traded are found stationary at all levels.

Table 5.8 below, show the Fisher type of tests for all panels. The p-values show that at all levels, these panels are stationary.

Table 5.8: Augmented Dickey Fuller Tests for all panels

```
Fisher-type unit-root test for mcofgdpdiff
Based on augmented Dickey-Fuller tests

----------------------------------------

Ho: All panels contain unit roots           Number of panels       =     14

Ha: At least one panel is stationary        Avg. number of periods =  25.86

AR parameter: Panel-specific                Asymptotics: T -> Infinity

Panel means:  Included

Time trend:   Not included

Drift term:   Included                      ADF regressions: 2 lags

-------------------------------------------------------------------------------

                                  Statistic      p-value

-------------------------------------------------------------------------------

 Inverse chi-squared (28)    P       172.2290       0.0000

 Inverse normal              Z       -10.5135       0.0000

 Inverse logit t (74)        L*      -12.7626       0.0000

 Modified inv. chi-squared Pm        19.2734       0.0000

-------------------------------------------------------------------------------

P statistic requires number of panels to be finite.

 Other statistics are suitable for finite or infinite number of panels.

-------------------------------------------------------------------------------
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Source: Primary data analysis in stata

The individual time series for each variable for each country was also tested for unit roots. The results are shown in Table 5.8 which is appendixed. They are all found to be stationary**.**

5.3.2 Multi-collinearity tests

Variables that are fitted in the same model should be tested for multi-collinearity to avoid redundancy in the model or including variables that have the same impact on the dependent. The main dependent variable is stock market development which is hypothesized to be explained by mandatory contractual savings and other control variables which include the impact of foreign investment portfolios, economic growth, regulatory environment and domestic credit to the private sector. Related explanatory variables are supposed to be screened and excluded, that is, include only one in a pair or more of variables with no signs

of multi-collinearity. The explanatory variables do not have problems of multi-collinearity hence can be fitted into a regression model simultaneously. Table 5.10 below, show a weak multi-collinearity between the explanatory variables. The rule of thumb is that if correlation is above 80%, the two variables resemble a multi-collinear situation and one of them should not be included in the model. Levels of collinearity are all below 80% as shown in Table 5.10 below. The variables therefore qualify to be all included in the model.

Table 5.10: Correlation matrix for model variables

	Market Cap	Listed Co	Value Traded	Mand Sav	Dom Cred	Reg Qual	FDI	GDP
Market Cap	1.0000							
Listed Co	0.7018	1.0000						
Val Traded	0.8496	0.6404	1.0000					
Mand Sav	0.6066	0.4762	0.7056	1.0000				
Dom Cred	0.7594	0.7304	0.7477	0.6869	1.0000			
Reg Qual	0.1503	0.1957	0.2222	0.1680	0.4549	1.0000		
FDI	-0.1768	-0.1892	-0.1477	-0.1102	-0.0922	0.1137	1.0000	
GDP	-0.1325	-0.1112	-0.0853	-0.0674	-0.0958	0.0666	0.1874	1.0000

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Author' computations from prinmary data using Stata analysis package (2012)

5.3.3 Relationship between mandatory contractual savings and stock market development indicators

This research sought to assess the relationship between mandatory contractual savings and stock market development. The assessment is expected to assist policy makers in terms of how the two variables can be influenced since they have an impact on economic development and growth. The hypothesis being tested is as follows:

H_{01}There is no relationship between mandatory contractual savings and stock market development indicators (Market Capitalisation, Value Traded and number of listed companies) in SSA countries.

$H_{11:}$ There is a relationship between mandatory contractual savings and stock market development indicators (Market Capitalisation, Value Traded and number of listed companies) in SSA countries.

The development of mandatory savings is expected to influence stock market development through the demand of products offered on the stock market. On the other hand, the stock market itself is expected to attract mandatory savings and influence their growth through the offering of attractive products and a friendly trading environment.

5.3.3.1 Mandatory contractual savings and Stock market capitalisation

To investigate the relationship between mandatory savings and stock market capitalisation, a general least squares model is utilised. Both the random effects and fixed effects model are used yielding the following outputs on Table 5.11 and 5.12 below. Both show a positive and significant relationship between mandatory contractual savings and stock market development as indicated p-values of less than 0.05 and positive coefficients of 1.571329 and 2.023295 for Random effects and fixed effects respectively.

Table 5.11: Random Effects model between Mandatory savings and Market capitalisation

```
Random-effects GLS regression
Prob > chi2        =    0.0000
------------------------------------------------------------------------------
   MarketCap |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------------+----------------------------------------------------
Mand Sav     |   1.571329   .2937487     5.35   0.000*   .9955922    2.147066
 FDI         | -.0625993   .7016529    -0.09   0.929    -1.437814    1.312615
 Reg Qual    |   .0535591   5.742988     0.01   0.993    -11.20249    11.30961
DomesticCred |   .4756946   .1702377     2.79   0.005     .1420348    .8093545
         GDP |   .0197777   .3873496     0.05   0.959    -.7394136     .778969
       _cons |    1.49313   7.646029     0.20   0.845    -13.49281    16.47907
-------------------------+----------------------------------------------------
```

Source: Primary data

Table 5.11 below is for the Fixed Effects model for mandatory contractual savings and market capitalization. The relationship is still positive and significant with a coefficient of 2.023295 and a p-value of 0.00.

Table 5.12: Fixed Effects model between Mandatory savings and Market capitalisation

```
Fixed-effects (within) regression
Prob > F          =    0.0000

------------------------------------------------------------------------------
   MarketCap |   Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------------------+----------------------------------------------------
Mand Sav     |  2.023295   .3245935     6.23   0.000*   1.384761    2.661828
         FDI |   .3540556   .6934511     0.51   0.610    -1.010087    1.718198
    Reg Qual |   1.777271     6.6406     0.27   0.789    -11.28598    14.84052
Domesticcred |  -.0898845   .2086443    -0.43   0.667    -.5003251    .3205562
         GDP |   .0895068   .3794181     0.24   0.814    -.6568764      .83589
       _cons |    11.5938   5.463782     2.12   0.035     .8455663    22.34204
-------------------------+----------------------------------------------------
```

Source: Primary data

5.3.3.2 Hausman Test to choose between Fixed Effexts and Random Effects model

From an econometric view, Random Effects estimator have the advantage to secure more-efficient coefficient estimates because it saves N-1 degrees of freedom compared to its Fixed effects counterpart. Moreover, it offers the ability to estimate coefficients of time-invariant regressors, a characteristic not shared by the within fixed effects model estimator (Cameron and Trivedi, 2009). Nevertheless, the RE model might suffer from the over-identifying restriction which assumes that individual-specific effects are independently distributed. If this additional orthogonality is violated, meaning that cross-sectional characteristics are correlated with explanatory variables, the parameters estimated are inconsistent and biased (Podestà, 2002). So, the crucial issue is to test for the existence of such a correlation between the specific error term and the regressors. This is performed through the Hausman test, which assesses the appropriateness of the Random Effects estimator. Indeed, it tests for the null hypothesis that individual-specific are random. More specifically, a Hausman test checks if there are no systematic differences between the coefficient estimators of the two models (Baum, 2013).

Under the null hypothesis, both estimators are consistent and estimators should display similar results whereas under the alternative one estimator widely differs from the consistent estimator (Cameron and Trivedi, 2009). In light of this, the Random Effects estimator is

consistent and more efficient than the Fixed Effects estimator under H_o while only Fixed Effects remain consistent under the alternative.

Both models adequately explain the relationship as indicated by the Hausman tests on Table 5.13 below which fails to reject the null hypothesis thereby arguing for both the fixed effects and random effects. The Prob>chi2 = 0.3544, which is greater than 0.05 suggests that the difference between the coeficients is not significant hence the two models can be adopted adopt.

Table 5.13 Hausman Test to choose between Random effects and Fixed Effects

```
                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       fe           re         Difference          S.E.
-------------+------------------------------------------------------------
Mand Sav     |    1.629591     1.693664       -.0640727        .0691911
------------------------------------------------------------------------------
chi2 (1)    = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =         0.86
Prob>chi2 =       0.3544
```

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Both models adequately explain the relationship as indicated by the Hausman tests on Table 5.13 above which fails to reject the null hypothesis thereby arguing for both the fixed effects and random effects. The Prob>chi2 = 0.3544, which is greater than 0.05 suggests that the difference between the coeficients is not significant hence the two models can be adopted adopt.

The null is that the two estimation methods can both be adopted impying that the estimated coefficients are not statistically different. The alternative hypothesis suggests that the fixed effects estimation is better than the random effects estimation suggesting that the estimated coefficients are statistically different. A larger Hausman test suggests that the coefficients are statistically different leading to the rejection of the null hypothesis.

The linear model that is used to analyze the relationship between the two variables and other control variables is as follows:

$$market\ cap_t = \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \beta_t value\ traded_{t-n} \quad \textit{equation 5.1}$$

$$no.list.co_t = \beta_t market\ cap_{t-n} + \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t market\ cap_{t-n} + \beta_t value\ traded_{t-n} \quad \textit{equation 5.2}$$

$$value\ traded_t = \beta_t market\ cap_{t-n} + \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \beta_t market\ cap_{t-n} \quad \textit{equation 5.3}$$

Where $market\ Cap$ = market capitalisation as percentage of GDP, $pfassets$ =pension assets as percentage of GDP, fpi= foreign portfolio investments, reg= regulatory quality of financial institutions & markets, $domcred$= domestic credit to private sector, gdp = gross domestic product, $domsav$ = domestic savings and $_{t=}$ *current year and n=1,2,3…..n.*

Current and previous levels of explanatory variables as well as previous levels of the dependent variable influence the current levels of the dependent. This fits a general regression model whose results are shown in Table 5.4 below.

Using general regression models, there is a general positive relationship between stock market development and pension fund assets. Positive coefficients of 1.610133 imply that a one percent increase in pension assets will magnify stock market capitalization by 1.610133% and the coefficient is significant with a p-value of less than 0.05. Despite the marginal increases in pension assets in most SSA countries in the last three decades, these marginal increases have had an impact on stock market development. This contribution by pension assets to stock market capitalization is through the demand of securities which

increases demand hence price appreciation. It is also through the participation of these pension funds in IPOs. IPOs raise the number of listed companies hence increase in total market capitalization. The success of IPOs largely depends on institutional investors such as pension funds, among others.

Across income groups analysis reflect that the higher income countries have a higher and more significant impact of pension assets on stock market capitalisation. This results from the stronger and flexible regulation of capital markets in general and specifically institutional investors. These countries include South Africa, Mauritius, Namibia and Botswana. Firstly, and notably, in these countries, pension funds are allowed to invest in private equity which enables smaller companies to grow and finally list on bigger stock exchanges thereby increasing the number of listed companies hence market capitalisation. Secondly, the higher contributions in these countries have a bigger the capacity to demand stocks on the exchange compared to the low income countries suggesting that, all things being equal, an increase in pension assets will increase market capitalisation. Improved regulation in these upper middle income countries is evidenced by the strong influence of regulation in stock market capitalisation (a coefficient of 7.96 and p-value of 0.000).

The higher impact of pension assets on market capitalisation is also derived from the formalization of these economies. High income countries are still characterised by a larger formal sector than informal sector. The pension contributory base is therefore larger than that of low income countries whose contributory base has been affected by the shift from the formal to informal sectors. This is evidenced by the strong positive relationship between market capitalisation and domestic credit for the upper middle income group (see Table 5.5 in appendices). Increases in domestic credit are mainly targeted to the formal sector. The expansion or growth of this formal sector results in increased employment, higher incomes and hence more contributions to pension assets.

For all income groups, domestic credit does not seem to be a significant explanatory variable of stock market capitalisation. Ideally domestic credit has an indirect contribution to stock market development through provision of capital to companies which later grow to qualify for listing on the stock exchange (Meng, 2013). This increases the number of listed companies which is also a key indicator of stock market development. The over reliance on the informal sector and SMEs by SSA economies could be explaining this weak relationship.

Much of the domestic credit is directed to the informal sector and SMEs which are not listed on exchanges. The policy focus on these sectors is partly explained by political mileage gained by governments and also partly by the realization of employment created by these sectors.

5.3.3.3 Mandatory contractual savings and Stock market liquidity

Davis (2000), Pfau (2008) and Levine (2014) argue that institutional investors account for more than 60% of stock market activity especially on the buying process. Institutional investors such as pension funds invest in the long term therefore their activity in capital markets is more pronounced on buying and less frequent selling activity. There is a hypothesized relationship between mandatory contractual savings assets and stock market value traded which measures liquidity of the market. In SSA countries this relationship is found to be positive and significant. Stock market liquidity or trading is to a greater extent accounted for by pension fund activities as indicated by a significant coefficient of 0.5264 in Table 5.13 on the next page, which is also the highest positive coefficient and highly significant. Both The random effects models and the fixed effects model are adopted as the Hausman test on Table 5.15 below suggest that the difference in the coeficients is small.

Most SSA countries are characterised by not only low personal incomes but also very low voluntary savings (Davis, 2003; Pfau, 2006 and Deaton, 2010). Other institutional investors such as mutual funds, voluntary insurance funds and voluntary pension funds become 'starved' of resources in such environments as the majority of population cannot save. This leaves the mandatory institutional investors such as mandatory pensions being the only resourced investors albeit at low levels as well. The little resources of the mandatory pension funds are therefore the only significant players in the stock markets of SSA countries. Regulation is negatively related to stock market liquidity possibly underscoring the more unfriendly investment policies that most SSA countries adopt. The unfriendly regulation also minimizes the extent to which pension funds can contribute to the liquidity of stock markets as indicated by a very weak correlation of 0.015 between pension assets and regulation in Table 5.10 on page 154.

Table 5.14: Random Effects model between Mandatory savings and Value Traded

Random-effects GLS regression

Value Traded	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Mand Sav	.5264038	.0522333	10.08	0.000	.4240284	.6287792
FDI	-.1099885	.1200731	-0.92	0.360	-.3453275	.1253506
Reg Qual	-.0638126	1.03107	-0.06	0.951	-2.084673	1.957048
Dom Cred	.2725351	.0310186	8.79	0.000	.2117398	.3333305
GDP	.0435705	.0661069	0.66	0.510	-.0859966	.1731376
_cons	-8.491118	1.53142	-5.54	0.000	-11.49265	-5.48959

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Table 5.15: Fixed Effects model between Mandatory savings and Value Traded

Fixed-effects (within)

Value Traded	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Mand Sav	.6070548	.0553538	10.97	0.000	.4981639	.7159456
FDI	-.1452447	.1182561	-1.23	0.220	-.3778757	.0873862
Reg Qual	1.3079	1.13244	1.15	0.249	-.9198114	3.535612
Dom Cred	.2878522	.0355807	8.09	0.000	.2178586	.3578457
GDP	.0436781	.0647032	0.68	0.500	-.0836047	.1709609
_cons	-9.077665	.9317539	-9.74	0.000	-10.91059	-7.244738

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Table 5.16 Hausman Test to choose between Random effects and Fixed Effects

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
Mand Sav	.6070548	.5264038	.080651	.0183229
FDI	-.1452447	-.1099885	-.0352562	.
Reg Qual	1.3079	-.0638126	1.371713	.4683104
Dom Cred	.2878522	.2725351	.015317	.0174308
Gdp	.0436781	.0435705	.0001076	.

Test: Ho: difference in coefficients not systematic

Prob>chi2 = 0.0000

(V_b-V_B is not positive definite

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

The other measure of stock market liquidity is the turnover ratio, which expresses value traded of domestic shares as a percentage of market capitalisations. In SSA countries, the relationship between this measure of liquidity and pension funds assets is negative. Most SSA countries restrict off-shore investments by pension funds. In Zimbabwe, pension funds are not allowed to invest offshore. In South Africa, Namibia and Botswana, the limit is 10%, 75% of which should be within the SACU (Southern African Currency Union). This limits the diversification capabilities of pension funds within the equity asset class. Pension funds therefore tend to invest in foreign companies listed on domestic exchanges as this becomes their opportunity to diversify. Most domestic companies are not attractive as a form of investment because of several macro-economic factors but chiefly because they are generally mismanaged. As pension fund assets increase, the investment in domestic companies shrinks as more of these funds are invested in shares of international companies generally viewed as stable. This negative relationship is consistent across income groups suggesting that pension funds and possible other institutional investors prefer foreign or international companies than domestic companies.

5.3.3.4 Mandatory contractual savings and number of listed companies

Stock market development is also indicated by the number of listed companies on the exchange. Stock markets are considered to be larger when they have many companies listed on them and smaller when there are few companies listed on them (Pfau, 2000; Davis, 2006 and Meng, 2011). This research makes use of the annual changes in number of listed companies to stock market development. This approach enables this analysis to differentiate between big, stagnant markets and small but developing markets. There is a negative relationship between mandatory contractual savings assets and number of listed companies as indicated in Tables 5.17 and 5.18 for both the Fixed Effects model and random effects models. Both models were adopted following a Hausman test on Table 5.18 which argues for use of both.The expectation is that as mandatory contractual savings assets increase, they should participate more in IPOs and encourage more companies to list. This is in-line with the macro-funding of companies in SSA countries which are pre-dominantly bank based systems than stock market based systems. In bank based systems, companies grow by sourcing funding from the credit institutions, mainly commercial banks (Meng, 2001; Impavido, 2010 and Davis, 2011). In stock market based systems, companies rely mainly on the stock exchange to raise capital hence there would be more listings on stock exchanges of such economies directly linked to the development of institutional investors.

Table 5.17: Fixed Effects model between Mandatory savings and Number of listed companies

```
Fixed-effects (within) regression               Prob > F          =    0.0000

------------------------------------------------------------------------------

Listed Co |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]--------
----------+-----------------------------------------------------------

 Mand Sav |  -3.936839   .3065212   -12.84   0.000    -4.539821   -3.333857

      FDI |   2.273978   .6548421     3.47   0.001     .9857866     3.56217

Reg Qual  |  -12.02881   6.270875    -1.92   0.056    -24.36474    .3071224

 Dom Cred |  -1.374452   .1970277    -6.98   0.000    -1.762041   -.9868636

      GDP |   .3290377   .3582934     0.92   0.359    -.3757895    1.033865

    _cons |   135.7752   5.159578    26.32   0.000     125.6254     145.925

--------------------------+---------------------------------------------------

Prob > F = 0.0000
```

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Following below is Table 5.17 for the Random Effects model between mandatory contractual savings and number of listed companies.

Table 5.18: Random Effects model between Mandatory savings and Number of listed companies

```
Random-effects GLS

 Prob > chi2        =    0.0000

------------------------------------------------------------------------------
Listed Co |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------------------+---------------------------------------------------
  Mand Sav |   -3.85497   .3485804   -11.06   0.000    -4.538175   -3.171765
       FDI |   1.862815    .753314     2.47   0.013     .3863465    3.339283
  Reg Qual |  -6.890676    7.07391    -0.97   0.330    -20.75529    6.973933
  Dom Cred |    -.95918   .2203177    -4.35   0.000    -1.390995   -.5273651
       GDP |   .3072745   .4126577     0.74   0.456    -.5015199    1.116069
     _cons |    126.686   21.36844     5.93   0.000     84.80459    168.5674
--------------------------+---------------------------------------------------
```

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

The Hausman test below shows the goodness of both Fixed and Random Effects models as we fail to reject the null hypothesis that the coefficients are not different.

Table 5.19 Hausman Test to choose between Random effects and Fixed Effects

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	re	fe	Difference	S.E.
Mand Sav	-3.85497	-3.85497	0	0
FDI	1.862815	1.862815	0	0
Reg Qual	-6.890676	-6.890676	0	0
Dom Cred	-.95918	-.95918	0	0
GDP	.3072745	.3072745	0	0

Test: Ho: difference in coefficients not systematic

Prob>chi2 = .

(V_b-V_B is not positive definite)

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Companies in SSA countries mainly rely on domestic credit (bank loans sometimes directed by governments) and foreign direct investment (FDI). Table 5.7A (appedices) shows a positive relationship between number of listed companies and domestic credit and FDI. The prescribed asset status investment requirement on pension funds in SSA countries forces pension funds to invest the bulk of their resources in government bonds than in equity markets. The lack of motivation by pension funds to increase their equity investments emanates from two main reasons, firstly lack of adequate information about companies in developing countries. According to Dermiguc-Kunt (2005), information asymmetry demotivates institutional investors to buy into listed companies given the risk on equity investments. Secondly, the asset-liability management process of pension funds is not best managed through investments whose value can be erratic. In Nigeria, pension funds can only buy shares of listed companies who have paid dividends in the past five years. Such restrictions make it impossible for pension funds to participate in IPOs as well as restrict the

general purchase of shares of listed companies. Some few countries have however shown a strong bias towards equities. Namibia pension funds have to-date invested 60%-70% of their assets in equities and unit trusts (NSE, 2016). It is however difficult to ascertain the role of these pension assets in listing of companies on the Namibian Stock Exchange mainly because many of these are foreign companies.

5.3.3.5 Relationship between mandatory contractual savings and Hybrid measure of stock market development

The independent measures of stock market development may not be adequate indicators separately as they fail to capture certain dynamics of development of the capital markets. Market capitalization only captures the price movements but fails to account for the levels of activity within the market (Levine, 2009). Value traded captures the levels of activity within the market but fails to take into account the price process of assets (Pfau, 2011). An improvement on the deficiencies of these individual measures is achieved through taking into account the combined effect of the dynamics of price, activity, number of shares traded and number of listed companies. In this study, Principal Component Analysis (PCA) is used to calculate a composite measure of stock market development.

The proportions in Table 5.20 below are the weighting of each component in the Stock market index constructed. The numbers of listed companies contribute 36.64%, Market capitalization contributes 27.10% while stock market liquidity and stock market turnover make up 22.52% and 13.75% respectively. The degree of accuracy of the index is tested using the South African market, JSE. A plot of the index for the JSE yields a graph shown on Figure 5.24 on page 147. The index takes a sharp decline in 2007-2008 and again in 2012-2013. This probably shows the impact of the global financial crisis (GFC) and the Rand depreciation problems respectively. South Africa (JSE) is one of the few stock markets in Africa to suffer the consequences of the GFC (Mlambo, 2006).

Table 5.20 Principal component Analysis of Stock market development

Number of comp. = 4

Trace = 4

Rotation: (unrotated = principal) Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.4654	4 .381619	0.3664	0.3664
Comp2	1.0838	2 .182941	0.2710	0.6373
Comp3	0.90087	7 .351011	0.2252	0.8625
Comp4	0.549866	.	0.1375	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
No.list.co	0.4272	0.4007	-0.7497	0.3079	0
Marketcap	0.5189	-0.5921	0.2164	0.5774	0
VT(%GDP)	0.6984	-0.0508	0.0794	-0.7095	0
Vt(%DmaktCap)	0.2460	0.6974	0.6203	0.2615	0

. predict index,

(score assumed)

(3 components skipped)

Scoring coefficients

sum of squares(column-loading) = 1

Variable	Comp1	Comp2	Comp3	Comp4
No.list.co	0.4272	0.4007	-0.7497	0.3079
Marketcap	0.5189	-0.5921	0.2164	0.5774
VT(%GDP)	0.6984	-0.0508	0.0794	-0.7095
VT(%Dmaktcap)	0.2460	0.6974	0.6203	0.2615

Source: Authors data analysis using Stata analysis package (2012)

Figure 5.13: Hybrid Stock market development Index for (JSE) South Africa (1990-2016)

Source: Authors data analysis using Stata analysis package (2012)

The correlation matrix in Table 5.21 on the next page shows a positive relationship between the Market Capitalisation (Market cap) and Mandatory contractual savings (mand sav), domestic credit (Dom cred) and economic growth (GDP). Regulation (Reg Qual) tends to negatively impact on index. Pfu (2008) also found that increases in regulation negatively affected capital market development in developing countries mainly because of an increase in protective laws which prohibit international integration.

Table 5.21 : Correlation Matrix for model variables

(obs=333)					
	Market Cap Mand Sav	FDI	Dom cred	GDP	Reg Qual
Market Cap	1.0000				
Mand Sav	0.1475 1.0000				
FDI	-0.0560 -0.0482	1.0000			
Domestic cred	0.0824 0.0084	-0.0275	1.0000		
GDP	0.0724 -0.0239	0.0146	-0.0753	1.0000	
Reg Qual	-0.1133 0.0135	-0.0018	0.0455	-0.1781	1.0000

Source: Authors data analysis using Stata analysis package (2012)

Using the general model in Equation 5.1, the constructed Hybrid stock market index shows a strong and significant relationship between mandatory contractual savings assets, domestic credit to private sector as well as regulation. These results are similar to the results found when each of the stock market development measures was fitted separately as dependent variables using model Equation 5.1. The significant explanatory variables have their p-values in bold in Table 5.22 below.

Table 5.22: Composite Index & Mandatory contractual savings for SSA countries

Random-effects GLS regression			Number of obs =			333
Market Cap	Coef.	Std. Err.	Z	P>z	[95% Conf.	Interval]
Mand Sav	.0577909	.0211762	2.73	**0.006**	.0162863	.0992955
FDI	-.0253442	.0288111	-0.88	0.379	-.081813	.0311245
Dom cred	.0309855	.0187317	1.65	0.098	-.005728	.067699
GDP	.0156396	.0134014	1.17	0.243	-.0106266	.0419057
Reg Qual	-.6324781	.3211949	-1.97	0.049	-1.262009	-.0029477
_cons	-.0374758	.0686349	-0.55	0.585	-.1719978	.0970461

Source: Authors data analysis using Stata analysis package (2012)

A positive and significant relationship is found between the hybrid index and pension fund assets as well as domestic credit. The relationship between the index and GDP, while it is positive, it is however not significant mainly because of the nature of GDP growth in SSA countries. GDP for SSA countries is driven by the informal sector which does not quickly impact on capital markets. The negative relationship between the index and regulation pronounces the irrelevancy and inappropriateness of policies and regulations put in place by authorities in SSA countries. It could be an indication that the regulations are over protective in nature thereby shutting out the markets from the global village. More often, some of the policies are ill-timed which makes them impact negatively on these economies. According to Rostow (1948), the ill-timing of policies has resulted in countries failing to move beyond the Take-off stage of Rostow's development model.

This reiterates that policy formulation should focus on developing the supply side (pension fund assets) in order to develop capital markets in SSA. From the relationship deduced above, developing the supply side can be done indirectly by addressing the grassroots factors that

affect pension fund assets. Increasing domestic credit to the productive sectors is expected to increase production by various companies which in-turn should result in increased employment creation. Such creation of employment is then expected to increase the pension contributor base hence growth in pension assets. However, the informal sector –driven economic growth in SSA may then imply that strong regulation be put in place in order to manage and enforce remittance by all the active economic sectors. The increase in domestic credit should also be accompanied by enhanced regulation to ensure sustainability of such initiatives. SSA countries are characterized by perennial problems of high loan default rate which may be a result of poor regulation of suppliers and recipients of credit.

5.3.3.6. Income Group variations of relationships between stock market development and mandatory contractual savings

The fixed effects models were also generated for the various income groups. One of the research questions was to investigate if the relationship between stock market development and mandatory contractual savings vary between income groups *(See Table 5.23(II) to Table 5.31(II) under appendix III)*. While the relationships across are found to be generally the same, the levels of significance differ from one income group to the other. In Upper Middle income groups, the influence of mandatory savings on market capitalisation and value traded is more significant and this level of significance declines in lower income groups as indicated by p-values of **0.00**; **0.016** and **0.027** for Upper middle, middle and low income groups respectively.

Mandatory contractual savings influence on number of listed companies is significant in Low income and Upper Middle income countries only. It is found to be insignificant in middle income countries. This could be inline with the fact that the number of listed companies has been more stable in middle income countries than the low and upper middle income countries.

The relationship of mandatory contractual savings and value traded is found to be positive and significant across all income groups with the significane of the relationship declining from Upper middle income groups to low income groups.

5.3.4 Causal Relationship between Mandatory contractual savings and Stock market development.

Results presented under 5.4.3 do not show if there is causality between the variables under study. The other hypothesis under study is as follows:

$H_{03:}$ There is no causal relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries.

$H_{13:}$ There is causal relationship between mandatory contractual savings and stock market development indicators (MC, VT and number of listed companies) in SSA countries.

The VAR model used to check for causality is assumed to be as follows:

$$market\ cap_t = \beta_t market\ cap_{t-n} + \beta_t mand\ sav_{t-n} + \beta_t fdi_{t-n} + \beta_t reg\ qual_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \beta_t value\ traded_{t-n} \quad \text{equation 5.1}$$

$$no.list.co_t = \beta_t market\ cap_{t-n} + \beta_t mand\ sav_{t-n} + \beta_t fdi_{t-n} + \beta_t reg\ qual_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t market\ cap_{t-n} + \beta_t value\ traded_{t-n} \quad \text{equation 5.2}$$

$$value\ traded_t = \beta_t market\ cap_{t-n} + \beta_t mand\ sav_{t-n} + \beta_t fpi_{t-n} + \beta_t reg\ qual_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \quad \text{equation 5.3}$$

5.3.4.1 Optimal Lag length selection

Panel VAR analysis is predicated upon choosing the optimal lag order in both panel VAR specification and moment condition. Andrews and Lu (2001) proposed consistent moment and model selection criteria (MMSC) for GMM models based on Hansen's (1982) statistic of over-identifying restrictions. MMSC are related to mostly utilised maximum likelihood-based model selection criteria such the Akaike information criteria (AIC) (Akaike, 1969), the Bayesian information criteria (BIC) (Schwarz, 1978; Rissanen, 1978; Akaike, 1977), and the Hannan-Quinn information criteria (HQIC) (Hannan and Quinn, 1979). The first lag is chosen as an optimal VAR model since it has the smallest MBIC, MAIC and MQIC.

Table 5.32: Lag order selection criteria

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	.999972	141.557	.0167331	-467.3853	-74.44303	-232.035
2	.9999819	102.0647	.011402	-303.8968	-41.9353	-146.9966
3	.9999937	29.17747	.7826973	-173.8033	-42.82253	-95.35318

Source: Primary data

5.3.4.2 VAR models for Stock market development and mandatory contractual savings

Table 5.33 below suggests that lag 1 of Mandatory contractual savings have a positive and significant impact on market capitalisation as indicated by a coefient of 3.920663 and a p-value of 0.000. The development of pension fund assets in SSA countries impacts positively on the development of stock market capitalisation and level of trading in the market. As they abide to their investment regulations on exposures to various markets, their investments in these markets will increase proportionately to their growth thereby increasing demand for stocks hence prices firming. The demand for stocks also increase the value traded of shares in the market. Increases in savings, discretionary or mandatory, is expected to impact on the demand of securities in the market.

Stocks traded have a causal effect on stock market capitalisation. From theory, the more the activity on the market, the more likely that prices of assets will increase. Increases in stocks traded attracts more investors onto the market thereby triggering demand hence growth in stock market capitalisation. Increases in activity on the stock markets make entry and exit into that market simple. Due to the fixed investment guidelines of pension funds in SSA, both at macro and micro level, stocks traded fail to 'cause' pension fund assets.

Lags of market capitalisation however fail to influence future levels of itself as indicated by p-value of 0.903 which is higher than 0.05. The implication is that levels of market capitalisation today do not have a bearing on levels of market capitalisation in the future. Policy inconsistency which characterises most SSA countries could be explaining this. Changes in macro-economic policies result in a disconnect between what happens today and what happens in future.

Domestic credit and Regulation quality both have negative and significant impact on market capitalisation. Domestic credit in most SSAcountries is directed to the informal sectors which have become pillars for economic growth hence increases in such has no bearing on listed companies hence market capitalisation. Regulation quality has been on the decrease in most SSA countries as new regulations are directed towards providing an enabling environment for the informal sector. Such regulations are at cross-roads with the formal sector as they pertain mailnly to relaxation of trading rules, quality control among other things.

Table 5.33: VAR model for Market capitalisation as dependent variable for SSA countries

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Market cap						
Market cap						
L1.	.0032811	.0270555	-0.12	0.903	-.0563088	.0497466
Mandsav						
L1.	3.920663	.1904725	20.58	0.000	3.547344	4.293983
Domcred						
L1.	-2.63706	.1949638	-13.53	0.000	-3.019182	-2.254938
Reggual						
L1.	-24.32462	2.195879	-11.08	0.000	-28.62847	-20.02078
Valuetraded						
L1.	-.0112548	.1215542	-0.09	0.926	-.2494965	.226987
FDI						
L1.	2.185135	.4767909	4.58	0.000	1.250642	3.119628

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Low market capitalisations characterizing SSA stock markets have had a negative influence on mandatory contractual savings development as indicated in Table 5.34 below. The unattractiveness of stock markets discourages investment on these markets by pension funds that now tend to allocate more on real assets such as properties and buy private equity in

green field projects. Pension funds have also opted to invest in other alternatives such as loans as indicated by the positive and significant impact on domestic credit.

Table 5.34: VAR model for Mandatory contractual savings as dependent variable for SSA countries

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Mandsav						
Market cap						
L1.	-.0148016	.0025862	-5.72	0.000	-.0198704	-.0097328
Mandsav						
L1.	.738647	.0169363	43.61	0.000	.7054524	.7718416
Domcred						
L1.	.1277458	.0222965	5.73	0.000	.0840455	.1714461
Regqual						
L1.	3.821315	.3329316	11.48	0.000	3.168781	4.473849
Valuetraded						
L1.	.2159804	.0183975	11.74	0.000	.179922	.2520388
FDI						
L1.	-.4469261	.0700367	-6.38	0.000	-.5841955	-.3096568

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Mandatory contractual savings are expected to have an influence on value traded. Their wide financial resource base is expected to increase activity on the markets as they buy and sell stocks. Table 5.35, below show a positive and significant influence of pension funds on Value Traded as indicated by a positive coefficient of 0.3917 with a p-value of 0.000. Value traded today has a positive and significance influence on itself in future. This is explained by the fact that what is bought today has to be liquidated in future hence contributing to value traded at that futuristic point in time.

Table 5.35: VAR model for Stock market liquidity as dependent variable for SSA countries

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Valuetraded						
Market Cap						
L1.	-.002474	.0034773	-0.71	0.477	-.0092894	.0043414
Mandsav						
L1.	.3917371	.0235933	16.60	0.000	.3454952	.4379791
Domcred						
L1.	-.1357875	.0177215	-7.66	0.000	-.170521	-.101054
Regqual						
L1.	-3.156846	.2424245	-13.02	0.000	-3.63199	-2.681703
Valuetraded						
L1.	.5299629	.0156552	33.85	0.000	.4992792	.5606466
FDI						
L1.	.2439458	.0391939	6.22	0.000	.1671273	.3207644

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co=Number of listed Companies; Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

5.4 Stability of VAR model tests

Post-estimation VAR models require that the models be checked for stability. After running the VAR model, the VAR system was tested for stability using the Eigen values test. The requirement is that all the eigenvalues should lie within the required range. The system satisfied the stability condition as indicated by the stability table and graph below. All the Eigenvalues lie within the model limits.

Table 5.36: VAR model stability table

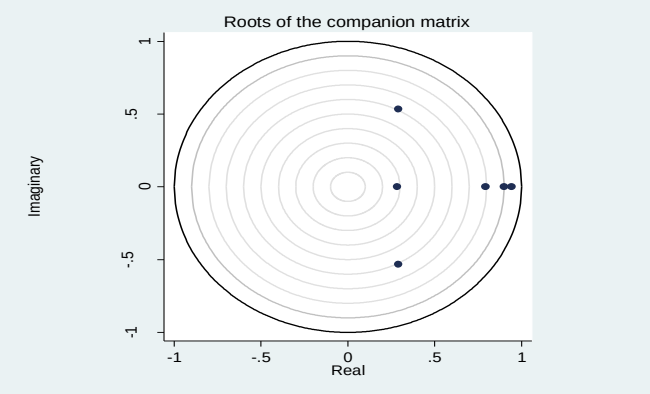
Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
.9413651	0	.9413651
.8997285	0	.8997285
.7930739	0	.7930739
.291544	-.5336787	.6081207
.291544	.5336787	.6081207
.2831006	0	.2831006

All the eigenvalues lie inside the unit circle.
pVAR satisfies stability condition.

The VAR model stability graph, with all eigenvalues that lie within the stability circle is shown below.

Fig 5.14: VAR model stability graph



Source: Primary data

5.5 Causal Relationship between Mandatory contractual savings and Stock market development indicators

5.5.1 Granger-Causality Wald Tests

The level and direction of causality between mandatory contractual savings and stock market development is assessed using the separate measures of stock market development as well as the composite measure adopted through principal component analysis. A panel VAR approach is adopted premised on the following equations:

$$market\ cap_t = \beta_t market\ cap_{t-n} + \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \beta_t value\ traded_{t-n} \quad \textit{equation 5.1}$$

$$no.list.co_t = \beta_t market\ cap_{t-n} + \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t market\ cap_{t-n} + \beta_t value\ traded_{t-n} \quad \textit{equation 5.2}$$

$$value\ traded_t = \beta_t market\ cap_{t-n} + \beta_t pfassets_{t-n} + \beta_t fpi_{t-n} + \beta_t reg_{t-n} + \beta_t domcred_{t-n} + \beta_t gdp_{t-n} + \beta_t domsav_{t-n} + \beta_t no.list.co_{t-n} + \quad \textit{equation 5.3}$$

Where $market\ Cap$ = market capitalisation as percentage of GDP, $pfassets$ =pension assets as percentage of GDP, fpi= foreign portfolio investments, reg= regulatory quality of financial institutions & markets, $domcred$= domestic credit to private sector, gdp = gross domestic product, $domsav$ = domestic savings, *no.listed co.* =number of listed companies, *value traded* = value traded as a percentage of GDP , *Turnover ratio*= value of shares traded as a percentage of domestic market capitalisation and $_{t=}$ *current year and n=1, 2, 3…..n.*

This research employs the VAR-Granger causality Wald Test to test for causality.The Hypothesis for granger tests are stated as:

Ho: Excluded variable does not Granger-cause Equation variable

H_1: Excluded variable Granger-causes Equation variable

Table 5.37 below show that there is strong Granger-causality from Stock market capitalisation to mandatory contractual savings and vice versa suggesting that stock market capitalisation does cause mandatory contractual savings development. Stock market capitalisation however fails to explain developments of other stock market variables such as stock market liquidity and number of listed companies. This suggests that the investments by pension funds are probably not responsive to stock market movements. Investments into stock markets by pension funds are controlled mostly by regulation, both at national and local level. It may also suggest that these regulations may be so rigid that regardless of how the stock market has improved, pension funds may still not increase their investments in this market.

Variable "A" is said to Granger cause variable "B", if the lags of "A" can improve a forecast for variable "B". In a VAR model, under the null hypothesis that variable "A" does not Granger cause variable "B", all the coefficients on the lags of variable "A" will be zero in the equation for variable "B". A Wald test is commonly used to test for Granger causality. Each row of Table 5.11 reports a Wald test that the coefficients on the lags of the variable in the "excluded" column are zero in the equation for the variable in the "equation" column. For example, the large p-value in the first section of Table 5.11 is evidence that the coefficients on the lags of market capitalisation are jointly zero in the equation for pension assets, value traded, FDI, domestic credit, regulation quality, turnover ratio, GDP and number of listed companies indicating that the evidence favors the null hypothesis that market capitalisation does not Granger cause all these variables.

From Table 5.37, Mandatory contractual savings assets granger cause stock market capitalisation and the value of stocks traded (% of GDP) as indicated by the small p-values of **0.000**. The development of pension fund assets in SSA countries impacts positively on the development of stock market capitalisation and level of trading in the market. As they abide to their investment regulations on exposures to various markets, their investments in these markets will increase proportionately to their growth thereby increasing demand for stocks hence prices firming. The demand for stocks also increase the value traded of shares in the market. Increases in savings, discretionary or mandatory, is expected to impact on the demand of securities in the market.

Stocks traded have a causal effect on stock market capitalisation. From theory, the more the activity on the market, the more likely that prices of assets will increase. Increases in stocks traded attracts more investors onto the market thereby triggering demand hence growth in stock market capitalisation. Increases in activity on the stock markets make entry and exit into that market simple. Due to the fixed investment guidelines of pension funds in SSA, both at macro and micro level, stocks traded fail to 'cause' pension fund assets.

Domestic credit granger causes fails to granger cause mandatory contractual savings as indicated by a weak p-value of 0.810. The supply of credit into SSA economies is mostly in the form of directed lending to small to medium enterprises and the informal sector. This drives economic growth. Credit to the well established companies results in increased production and higher employment levels which in-turn increases pension contributions from the formally employed. The weak 'causal' relationship between domestic credit and pension assets results from the fact that SSA economies are highly driven by the informal sector which does not contribute towards pension savings.

There is a significant 'causal' relationship from regulation of financial markets to stock market capitalisation and stocks traded and mandatory contractual savings. Results of Table 5.37 below suggest that increases in the quality of regulation of financial markets will 'granger cause' stock market capitalisation, stocks traded and pension fund development. According to Rostow (1948), markets trancede through some stages of development from the primitive stage to the stage of mass consumption. This research identified most SSA countries to be in the stage of Take Off. This stage is characterised by high potential of both financial markets and institutional investors. The potential is however argued to be only attainable if regulations, policies, political stability and consistency are put in place. This finding of a 'causal' relationship from regulation to both stock market capitalisation, stocks traded and pension funds assets could be suggesting that regulation has not yet reached its full potential in SSA countries and could be the missing factor to accelerate both pension fund development and stock market development.

Table 5.37A: Panel VAR-Granger causality Wald test

Equation \ Excluded	chi2	df	Prob > chi2
Market cap			
Mandsav	423.696	1	0.000
Domcred	182.950	1	0.710
Regqual	122.709	1	0.030
Valuetraded	0.009	1	0.026
FDI	21.004	1	0.000
ALL	984.657	5	0.000
Mandsav			
Market Cap	32.756	1	0.000
Domcred	32.826	1	0.810
Regqual	131.739	1	0.000
Valuetraded	137.820	1	0.000
FDI	40.721	1	0.000
ALL	542.831	5	0.000
Valuetraded			
Market Cap	0.506	1	0.477
Mandsav	275.685	1	0.000
Domcred	58.711	1	0.000
Regqual	169.572	1	0.000
FDI	38.739	1	0.000
ALL	662.695	5	0.000

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co*=Number of listed Companies; *Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Mandatory contractual savings have a causal influence on number of listed companies although the influence is not very significant. The weak causal relationship is possibly a result of the reduced activity by pension funds in IPOs in most SSA countries. Most importantly, it could be a result of reduced financial resources at the disposal of pension funds due to continued shift to informal sector based economies in SSA. In some SSA

countries, Pension funds are required to invest in companies who have declared a dividend in the previous five consecutive years.

Table 5.37B: Causality tests results on Number of listed companies

Equation \ Excluded | chi2 df Prob > chi2			
ListedCo.			
Market cap	3.362	2	0.186
Mand Sav	7.850	2	0.047
Valuetraded	8.059	2	0.018
FDI	0.511	2	0.775
Dom credit	0.943	2	0.624
GDP	2.749	2	0.253
Reg.Qual	4.588	2	0.101
ALL	26.198	16	0.051

Mand Sav= mandatory contractual savings; Market Cap=Market capitalisation; Listed Co=Number of listed Companies; Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

Granger causality tests were also applied to the Composite Index which measures stock market development. The results presented in Table 5.27b (below), reflect that there is some causal relationship between pension fund assets and the Composite Index. There is no evidence of Granger causality from Composite Index to pension assets however pension assets seem to Granger-cause the Composite index. There is no evidence of causality in either direction between the Composite Index and the rest of the other variables.

5.5.2 Impulse response functions and Forecast error variance decomposition

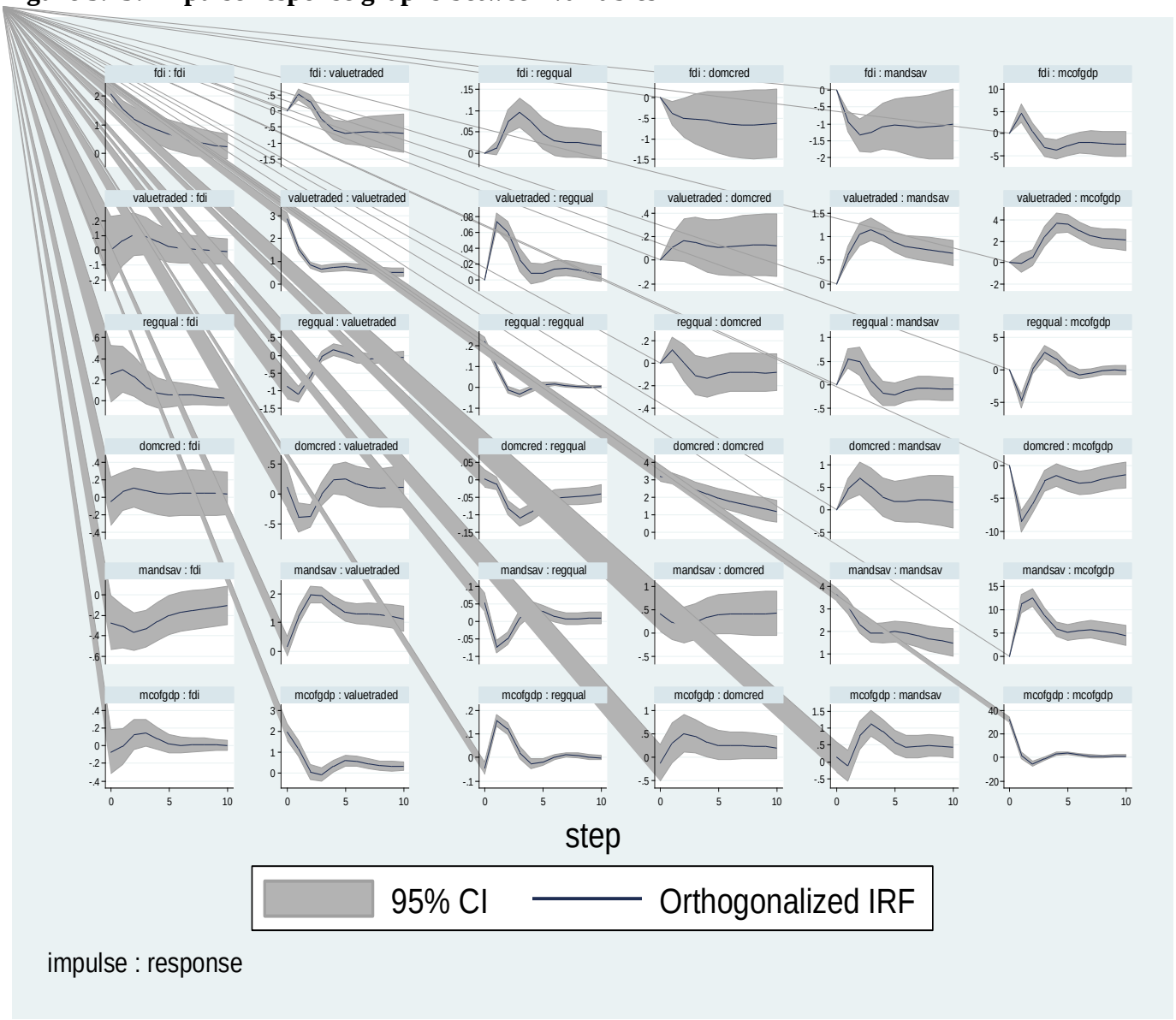
Impulse Response functions and Variance decomposition helps in the interpretation of the VAR model once it has been fitted. It helps to determine the proportion of variation of the dependent variable explained by each of the independent variables. The Forecast Error Variance Decomposition (FEVD) show how much of the future uncertainty of one time series is due to future shocks into the other time series in the system. This evolves over time, so the shocks on one time series may be not very important in the short-run but very important in the long run. Figure 5.15 below show the Impulse Response Function graphs for the variables in the models. Of particular focus is the impact of mandatory contaractual savings

on stock market development indicators. A one standard deviation increase in mandatory savings causes an almost 2% increase in value traded in period 2. In the long-run, the impact of mandatory contractual savings remains positive and steady around 1%. An almost similar impact on market capitalisation is also observed however the response of market capitalisation to shocks in mandatory contractual savings in higher at approximately 10% in period 2. The long-run response however stabilises at 5%. This underscores the importance of mandatory contractual savings in determining market capitalisation.

Mandatory contractual savings cause itself in earlier periods (i.e periods 1). This means increases in mandatory contractual savings will immediately trigger itself in the following year possibly through the 'confidence effect'. The confidence effect relates to increases in mandatory contractual savings contributions emanating from the reliability and good performance of pension funds. This reduces contribution evasion while at the same time attracting new contributors. The effect however gradually reduces overtime, to almost zero in periods 10. Increasing mandatory contractual savings today is therefore critical in driving the same in the short to medium term. The impact of mandatory savings on stock market development diminishes in the long term but still remaining positive.

The role of stock market development indicators in determining mandatory contractual savings is mild. Both value traded and market capitalisation does cause mandatory contractual savings in the early periods. There is a delayed 1% response by mandatory contractual savings to one standard deviation shocks on both value traded and market capitalisation. The response gradually declines after period 3 and stabilises at a response level of 0.5 in the long term. Despite the small response, there is need to focus on stock market development in order to encourage mandatory savings. Mandatory savings institutions can only convince the participants to increase contributions if there a positive return that is being generated on current mandatory contractual savings portfolios. Pension Funds for example can only attract new contributors if the current contributors are satisfied with the performance of their portfolios. This also avoids contribution evasion. More often than not, if contributors to pension funds are not happy with the performance of their portfolios, contribution evasion increases.

Figure 5.15: Impulse response graphs between variables



Mand Sav= mandatory contractual savings; mcofgdp =Market capitalisation; Listed Co=Number of listed Companies; Dom Cred=Domestic Credit; Reg Qual=Regulation quality; FDI=Foreign Direct Investment

Source: Primary data

The FEVD table (appendixed) show the level of contribution of shocks in explanatory variables on the dependent (including shocks of dependent variable on itself) at each period. While the vast of the shocks on market capitalisation come from its own variations in period 1. Variations in mandatory contractual savings start contributing significantly to the developments of market capitalisation in periods 3 onwards, becoming the highest contributor to these developments in period 4 (33%) onwards. Mandatory contractual savings contribute

as high as 43% of the variations in market capitalisation. Market capitalisation contributes to its variations only in earlier periods however the contribution deteriorates very quickly to as as low as 14% in later periods. Also worth noting is the contribution of regulation quality on developments in market capitalisation. A contribution of 21% in periods 1 to as high as 38% in later periods suggests that regulation quality is a key factor in forecasting market capitalisation in SSA. Regulation and policy inconsistency has always been major factors affecting the behaviour of capital markets, not only in SSA but in many other markets.

Forecasting mandatory contractual savings can be best done using itself and regulation quality. An average of 54% variation in mandatory savings in explained by itself in periods 4 and beyond while regulation quality accounts for an average of 30%. Market capitalisation does not seem to help in forecasting contractual savings with an average explaining power of 10% beyond period 4. So, in as much as mandatory contractual savings seem to explain market capitalisation (stock market development), market capitalisation does not seem to explain mandatory savings much. This is also in line with the causality results established earlier.

5.7 Chapter Summary

Stock markets in SSA are very thin characterised by low market capitalisation and low trading activity. Mandatory savings and pension assets are also low mainly due to the low contributory base emanating from shrinking formal employment and rising informal employment. Stock markets are generally unattractive except in upper income countries such as South Africa, Mauritius and Botswana. There is a relationship between mandatory contractual savings and various indicators of stock market development. Mandatory contractual savings 'Granger' cause stock market capitalisation and value traded in SSA countries. Mandatory savings institutions however are hesitant to invest in stock markets especially in the very low income countries. They prefer to invest in government securities, real estate and other fixed income securities. Policies to grow savings hence stock markets are generally non-existent in most countries except some limited efforts in Ghana. Results suggest that there is a strong causal relationship from regulation to stock market development. Not only do mandatory savings need to be increased but regulation also needs to be improved for stock markets to develop. Regulatory quality of financial markets also has a greater bearing on all forms of stock market development implying that regulation also

needs to be addressed in order to develop both stock markets and mandatory contractual savings. The next chapter summarises the implications of these findings hence concluding the research with respect to the objectives and also provides recommendations based to policy makers.

CHAPTER 6

CONCLUSIONS, CONTRIBUTION AND FURTHER RESEARCH

6.1 Introduction

The previous chapter presented findings showing that mandatory contractual savings in SSA countries do affect the various forms of stock market development although the extent of impact varies from one income group to the other. This chapter marks the end of the thesis and presents, firstly conclusions on the objectives of the study. Secondly, this chapter outlines the major contributions which this research adds to literature, theory and policy formulation. Thirdly, a recommendation for what future studies or research can focus on is outlined. This is focuses mainly on what this study failed to address due time and scope constraints.

The interaction of stock markets and mandatory savings has not been attended to despite its importance to sustainable capital market development. Previous research has focused on the broad categorisation of contractual savings (Davis, 2000; Meng 2003; 2006; 2010; Pfau 2010 and Dermiguc-Kunt, 2013) which include insurance contracts and voluntary pensions. The assessment of contractual mandatory savings in SSA has also not been given priority by researchers as it has been regarded as a social security instrument than a capital market development pre-requisite. The uniqueness of SSA economies however has always implied that the role of these institutions may not be treated the same as those in developed countries, that is, in as much as they are similar; their economic roles differ across these countries. Mandatory contractual savings in the developed economies save the sole purposes of being a social insurance product post-retirement, however, in developing countries, SSA in particular, mandatory contractual savings roles go beyond just being a social insurance product (Impavido, 2014).

6.2 Conclusions

This section discusses conclusions based on objectives and research questions presented in Chapter 1. In this section, these objectives and research questions are directly answered using findings from Chapter 5.

6.2.1 Characteristics of stock markets in SSA and mandatory contractual savings in SSA.

This research also aimed at investigating the characteristics of mandatory contractual savings in SSA. Mandatory contractual savings in SSA are low, with an average of less than 10% of GDP in the last 26 years. This compares badly with an average of 25%-30% of GDP in developed economies. The research also found that comparatively between income groups in SSA; mandatory contractual savings are fairly higher in the upper middle income group than middle income group. The levels of these are even more insignificant in low income groups. The low mandatory savings in SSA, especially in the middle income group and low income group could be mainly driven by the shift in economic drivers. The meltdown of the formal sectors in most SSA countries (except the upper middle income group) has resulted in an increase in informal employment which does not contribute to pension. Informal sector accounts for more than 65% of total employment in SSA countries. Conclusively, mandatory contractual savings coverage and general social security coverage is very thin in SSA countries as indicated by the low levels of formal employment in Chapter 5.

Pension funds were also found to be reluctant in investing on the stock exchange in most low income SSA countries. Their investment allocations in listed equities trail the benchmark allocations of this asset class. This suggests that pension schemes are not attracted to the stock markets and prefer to invest in other asset classes such as fixed income securities and property.

Stock markets are very thin. Key measures of stock market development , that is , stock market capitalisation, is on average less than 20% of GDP in most SSA countries except South Africa and Mauritius with an average of 25% -30%. In developed countries, stock market capitalisation averages a minimum of 80% -120% of GDP. The level of activity is also very low; values traded annually are less than 10% of GDP in SSA countries. Value traded in developed economies is in excess of 70% of GDP. This suggests that the number of

participants in SSA countries is low mainly led by the very weakly resourced pension schemes. The number of listings has also dropped sharply in most SSA countries in the past 26 years. This has also contributed to the poor development of these stock market.

Stock markets in SSA are very unattractive. They are characterised by a poor operational framework. The number of trading days is limited in most SSA countries, in some instances less than 50% of trading days in developed countries. Within those few trading days, some are open just for a few hours, as low as two (2) hours per day. The settlement cycle is longer compared to the rest of the world, at T+3 compared to T+2. Foreign participation is also limited in most SSA countries. In the developed countries, participation is open without limitations. This unattractiveness repels even the local investors who prefer to then invest offshore. This reduces activity thus lowering value traded and market capitalisation. In the long term it also discourages new listings on these markets.

6.2.2 Relationship between the various measures of stock market development and mandatory contractual savings in SSA.

It emerged in this research that mandatory contractual savings in SSA countries affect the various forms of stock market development differently. Mandatory pension assets are positively correlated to stock market capitalisation and value traded in most of the SSA countries.

6.2.3 Nature of the relationship across the income groups of SSA countries

The positive relationship is higher and more significant in those countries with higher income such as South Africa, Botswana, Mauritius and Namibia suggesting that higher savings lead to more development of stock markets. These high income countries are also associated with more flexible and friendly regulations and policies on pension fund investments and general operations. The development of stock markets in high income SSA countries is not only a result of higher savings in these countries but also a result of improved regulation in these countries. According to Rostow (1948), countries in the Take –off stage of economic development need regulations and policies which encourage savings mobilisation which will be efficiently allocated through the market. The markets will equally need to be efficiently regulated to attract these savings.

The positive but weak relationship between mandatory savings and stock market development in low income countries confirms the need for mandatory savings for capital markets to develop in SSA. The fact that these countries have weak financial market regulations and policies may be explaining the lengthy period taken by these countries to achieve meaningful development. Low income countries have remained in the Take-off stage for a very long time because of the poor regulation and poor policies on both savings mobilisation and capital markets operation.

6.2.4 Causal relationship between mandatory contractual savings and stock market development in SSA countries.

The positive relationship between mandatory contractual savings and stock market capitalisation is also of 'causal' relationship in nature. Granger causality Wald tests confirm a 'causal' relationship running from mandatory savings to stock market capitalisation but no feedback causality from stock market capitalisation to mandatory savings. The lack of feedback causality maybe explained by the fact that stock market development levels are still at low levels to trigger mandatory savings development. It is however expected that, as development in capital markets increases, there should be a response from mandatory savings.

Mandatory contractual savings also explain the level of activity in stock markets of SSA countries. The Granger 'causal' relationship runs from mandatory contractual savings to Value traded. The relationship is stronger in countries with well-developed stock markets such as South Africa. Pension funds in South Africa allocate a significant portion of their investments to the JSE because of its high levels of development and fairly transparent and effective regulation. In low income countries, the causal relationship running from mandatory savings to value traded is weak. This has mainly being a result of the little confidence pension funds have in these least developed stock markets in terms of operational efficiency hence pension funds prefer to use the buy and hold strategy on their investments in stock markets. This reduces transaction costs, taxes and difficulties of selling & buying securities in these illiquid markets.

For all income groups, findings show no relationship between mandatory contractual savings and number of listed companies. Ideally, pension funds, both mandatory and voluntary are

expected to be major participants in IPOs. However results from SSA countries reveal that pension funds in these countries may not be as active as expected. Findings show no 'causal' relationship in either direction. Regulation of pension funds in some SSA countries show a requirement that pension funds should only buy into companies that have declared and paid dividends for a certain minimum number of years. Nigeria requires a minimum of 5 consecutive years of dividend payments and Zimbabwe, Botswana, Namibia and Kenya require a minimum of 3 years of consecutive dividend payments. This suggests that pension funds will only buy into listed companies at a later stage than at IPO stage. Interestingly, while there was a positive and causal relationship between mandatory savings and value traded as a percentage of GDP, there is a weak relationship between mandatory savings and value traded as a percentage of domestic capitalisations. This suggests that pension funds have low interest in domestic companies in SSA countries due to the weak macro –economic fundamentals which have resulted in most of these domestic companies performing poorly. This may also explain the low participation in IPOs by pension funds.

6.2.5 Income group and country variations in the nature of the causal relationship between mandatory contractual savings and stock market development in SSA.

The Granger-Causality relationship between mandatory contractual savings and stock market development which is found to be running in a one-way direction from savings to stock market development is stronger in the Upper Middle Income Group of SSA countries. These upper income group countries include South Africa, Botswana, Namibia and Mauritius. The Granger-Causality relationship weakens as we move to the Middle Income Group and is found to further weak in Low Income Countries. This may imply that the low income countries must boost/increase their levels of mandatory contractual savings by expanding the contributory base through capturing the rising informal sector in order to complement the declining formal sector.

6.3 Contributions of study

6.3.1 Contributions relating to Characteristics of Mandatory contractual savings and stock markets

This research identifies SSA countries as being in the Pre-conditions for Take-off stage of Rostows model of economic development. In this stage, there is potential for growth characterised by high savings potential and general potential of financial markets in terms of

product offering and product knowledge. The rise in the informal sector in most SSA countries has turned a significant proportion of the economically active population into active economic participants. The colonial era only accommodated the skilled participants into formal employment. Over the years, knowledge about financial markets has also become ubiquitous and financial products are generally, potentially accessible to a significantly vast population than during the colonial era. In this stage of economic development, the two keys aspects that need to be attended to are:

i. The financing side, that is, increase both discretionary and mandatory savings mobilisation and

ii. The allocation of these savings across the economy in an a fair and efficient manner by developing capital markets

Key recommendations therefore relate to the increase in the mobilisation of savings which guarantee economic growth and the improvement in the allocation of these savings to economic agents. Accordingly, SSA countries need to critically re-assess the idea that economic agents will increase voluntary savings with increases in income. The increase in voluntary savings especially via pensions and insurance is more of a 'culture' than a process. It may not happen in SSA in a very short time owing to cultural and traditional entrenchments. Both the Life-Cycle and Permanent Income models of consumption and savings suggests the dependency of savings on demographic trends in an economy and the the nature of amortisation of the population. The dependency ratio i.e population of the unemployable children and the old-age affect the level of discretionary savings. In the life cycle hypothesis, people save during their economically active life and dis-save as they get older. Households with higher dependency ratios save less until all the dependents become independent. In SSA, there is a new dependency cycle which has seen dependency affecting even those that have retired. The HIV/AIDS pandemic has doubled the dependency for the working and non-working class (Arion, 2009). This has worsened the levels of discretionary savings in these countries.

There is also need to look into the administration of stock markets. Findings in Chapter 5 suggested a strong relationship between regulation of financial markets, stock market development indicators and pension assets. The unattractiveness of SSA countries stock

markets may be improved through revisiting the rules, regulations and policies on how these operate. It is critical for a stock market to attract investors as this paves way for the efficient allocation of capital across the economic sectors. Improvements of SSA stock markets will involve focusing on:

i. The regulation pertaining to foreign investors

ii. The regulations pertaining to operational modalities especially number of trading days, settlement and hours of trading per day.

iii. Taxes and other transaction costs on trading

Investors are attracted to stock markets where they can easily enter and exit at minimal costs. Such stock markets are characterised by many traders who are significantly large and trading is continuous. There is therefore need to increase the number of trading days in SSA stock markets. The study revealed that some markets such as Swaziland, Namibia, Uganda and Kenya trade for at most 3 days a week and less than 3 hours a day. This is coupled with the long settlement period of T+3 which reduces the ease of entry and exit. The integration of SSA stock markets regulation with international benchmarks will encourage international investor participation. This is expected to increase activity, build confidence amongst local institutional investors, generate higher asset growth for pension funds and improve performance of these pension funds to retirees. While it is accepted that international integration may take long to be achieved, regional integration may be the starting point. Challenges that are likely to be faced are those of national pride. Most stock exchanges are regarded as a national symbol and countries may be reluctant to integrate them even regionally

While most SSA stock markets have adopted automated trading, there is however, need to make this accessible to all potential participants through improving internet access. Mlambo (2013) finds very limited internet access to SSA traders thereby limiting the use of automated trading. There is also poor investor education on the functionalities of the automated trading system. It remains only known to Stock Brokers. For investors to have confidence in the trading system there is need for them to be fully educated about how it operates. While the internet is still considered a luxury in most SSA countries, internet connectivity has played a pivotal role in shaping stock exchanges of developed countries.

Lack of information on listed companies also discourages pension funds and other institutional investors to invest on the stock exchange. Findings in Chapter 5 revealed that pension schemes in SSA countries trail their benchmark equity allocations in their active portfolios. There is need to put in place strong regulation on information dissemination especially by the public companies. Such information availability is critical to attracting institutional investors as they are able to make investment decisions from an informed perspective. It also enhances pricing efficiency making the market attractive to international investors. Attracting international investors increases buying and selling activity on the market, thereby enhancing market development.

6.3.2 Contributions relating to the positive relationship between mandatory contractual savings and stock market development

In order to increase savings mobilisation, especially in Low-Income SSA countries need to expand the contributions into mandatory contractual savings. This is not only necessary because of the poor voluntary savings culture that currently exists, but also because of the rapid replacement of formal employment by informal employment. Existing theory argues that mandatory savings will tend to crowd-out discretionary savings, however in SSA, there does not seem to be an increase in discretionary savings given decreases in mandatory savings (Deaton, 2003; Yartey 2009; Meng, 2010 & Dermiguc-Kunt, 2011). This suggests that savings will not increase if mandatory savings are not increased. The expansion of contributions to mandatory contractual savings requires that the informal sector be ring-fenced to contribute. To this end, the following key steps may be required to be taken: To improve collection of contributions from the formal sector. There is evidence that collection of these mandatory contributions from the formal sector is still poor in most SSA countries. Some contributors never remit these or remit contributions very late. In this regard;

i. There is need to undertake a vigorous awareness drive on pensions and their importance to the informal sector. Education is key since most of the informally employed may be entrenched into the traditional social security systems.

ii. There is an implied overhaul of policy and regulations that needs to be done. Existing policies in SSA countries make it optional for the informal sector to participate in pension schemes. Authorities are more persuasive than authoritative on the informal sector. To ensure that all informal players participate, SSA countries may introduce systems that make them

contribute at registration of business, the same way they register for tax payments at registration point. While it is arguably true that collecting pension from the informal sector will be expensive and difficult, it remains the only option to sustain pension schemes in SSA countries.

Governments in SSA countries are expected to be motivated to expand pension coverage to include the informal sector for two main reasons. Firstly, the increase in the informal sector which is not contributing to pensions is likely to increase the governments' burden of taking care of the old aged without means of survival. This should act as motivation to current governments to implement a mandatory contribution law for the informal sector. Secondly, widening the mandatory pension contribution may also imply an increased base from which government can borrow.

6.3.6 Contributions relating to the positive relationship between Regualtion quality and mandatory contractual savings

The positive relationship between the two critical variables under study (i.e mandatory contractual savings and stock market development) and regulation quality has critical implications to general policy issues. Addressing the supply side of mandatory pension schemes may not be the only solution since it may face some resistance from potential contributors through evasion. There is also need to make these pension schemes attractive through:

i. Improving the performance of pension schemes on their key delivery aspects. There is need to ensure that pension schemes pay-outs are sufficient to retirees post-retirement. Over the years, pension schemes in SSA and other developing countries are known for their irrelevancy post retirement. Most of these schemes pay benefits that are well below the poverty datum line (World Bank, 2015). Secondly, retirees or their beneficiaries struggle to access the benefits, in some instances beneficiaries fail to get the benefits of the deceased contributor. This discourages contributions especially by the informal sector.

ii. Enlightening the management of the pension schemes and reduces cases of leakages. Pension schemes in SSA and other developing countries are associated with fraudulent activities by management and also abuse of the schemes resources by the government through politically motivated transactions and the borrowing appetite of the governments.

This has been a major root cause of pension schemes failure in Africa (World Bank, 2015). Examples include Zimbabwe, Zambia, Kenya, Nigeria and Swaziland. These have not only reduced the resources of pension schemes but have also seriously discouraged the willingness to participate in the schemes by the general qualifying population who do see any benefit post-retirement as pay-outs are either too low to enable descent survival or the pay-outs are never paid on time.

iii. Refining the management of pension schemes may also require that pension institutions be divorced from the central government. This will increase the attractiveness of pension scheme to the potential private participants. In most SSA countries, the close relationship between pension institutions has led to these institutions resources being abused by government through politically motivated transactions. Pension schemes have been forced to invest in projects that do not make any meaningful economic contribution to the scheme but instead gives the ruling government some political mileage (Meng, 2012 and World Bank, 2015)

Governments have also been the largest borrower from pension schemes through the prescribed assets which offer a very low return. The limits on prescribed assets investments have been set very high in most countries, as high as 100%. This needs to be reduced so as to allow pension schemes to invest in other high yielding investments such as private equity. Allowing pension funds to invest in private equity will not only improve the return on assets for the pension schemes but also allow smaller companies to grow until they list on the stock exchange. This will increase listings hence stock markets will develop.

iv. The investment asset allocation policies and regulations of pension schemes is another aspect which is negatively affecting the performance of pension funds in SSA countries. Most SSA countries except South Africa, Botswana, Namibia and Swaziland, restrict offshore investments by pension funds. This has not only reduced diversification of assets but also reduced the ability to generate higher returns. It is recommended that pension schemes be allowed to invest offshore, probably starting with regional markets and the regulation can be relaxed over time to allow for fully fledged international investments.

6.3.7 Contribution of study to body of knowlegde

Proponents of savings theory argue against mandatory savings. Any suggestions to argue for mandatory savings are likely to face stiff resistance from the perspective of the crowding-out effect and substitution effect of mandatory and discretionary savings. However, this study presents a beginning to challenging this notion. It would seem, to this research , that these theories have been defended over a long period of time without critically looking at the fundamental differences between the savings culture of populations across regions, the 'accrued' attitudes towards saving arising from the long-term macro-economic fundamentals of countries and regions. This research suggests that the view that mandatory savings are 'bad' and will substitute discretionary savings needs to be re-assessed especially for countries or regions similar to SSA countries. Accordingly, SSA countries need to critically re-assess the idea that economic agents will increase voluntary savings with increases in income. The increase in voluntary savings especially via pensions and insurance is more of a 'culture' than a process. It may not happen in SSA in a very short time owing to cultural and traditional entrenchments. In SSA, there is a new dependency cycle which has seen dependency affecting even those that have retired. The HIV/AIDS pandemic has doubled the dependency for the working and non-working class (Arion, 2009). This has worsened the levels of discretionary savings in these countries

6.4 Recommendations for further research

Literature on mandatory contractual savings is still new and developing. There are still no conclusive findings on their economic roles except that of being an old age income stream. There are fundamental differences between countries as well in terms of implementation of regulations and policies on financial markets and institutions. Political attitudes and differences are also glaring between countries and regions and yet these determine the extent of economic policy implementation. Without taking these issues into account, economic research remains generalised.

Findings in this research are that mandatory contractual savings are generally less developed in SSA countries although variations are found between income groups. High Income countries are found to have more developed mandatory contractual savings compared to low

income groups. Stock market characteristics have also displayed the same trend over the income groups.

The research also finds that there is a positive relationship between mandatory contractual savings and stock market development in SSA countries. The relationship is found to be stronger in high income SSA countries and weakens as we move to lower income countries. Coverage of these mandatory contractual savings is also found to be higher in high income countries which are generally very formal economies. In informal economies (those driven largely by the informal sector), coverage of mandatory contractual savings is found to be low. The relationship is also found to be of causal nature where mandatory contractual savings cause stock market development. Again, the causal relationship being found to be stronger in high income countries and weakens in low income countries.

Further research should focus quantifying the marginal stock market development emanating from a marginal increase in mandatory savings on a country by country basis. One of the arguments of this research is that mandatory savings may not substitute discretionary savings in SSA as suggested by traditional theories of economics. It would also be interesting to establish the exact extent to which mandatory savings substitute discretionary savings in SSA countries on a contry by country basis or on an income group basis.

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APPENDICES

Appendix 1

Table 2.5: Summary of selected countries pension & social security reforms in SSA

Country	Pension laws/Policies	Current status
Botswana	• Pensions & ProvidentAct 1987, Workers • Compensation Act , • Universal Old age Pension scheme	Pension laws not in constitution. Poor coverage of the informal sector, low pay-outs in light of rising inflation.
Malawi	• Pension Bill (2010). • Malawi National Social Security Fund (1994); • General Public Pension Scheme(GPPS 1990)	Pension legislation generally unclear. Not in constitution. Informal safety nets existed between 1964-1981 in the form of subsidies. Second phase of 1981-1992 subsidies were scrapped and replaced with Structural Adjustment Programmes. Pension bill of 2010 introduced mandatory contributory National Pension Scheme. GPPS is a pay-as –go scheme.
Ghana	• Pension and Provident Fund Act (1965); • National Pension Act (1987) • Compensation of Workers Act(1988) • Social Security Law (1991) • Three –tier Pension scheme (2010)	Pension laws covered in constitution in Article 37A of 1992 Constitution.
Kenya	• National Social Security Act (1965); • Pensions and Provident Fund Act (1965); • Workers Benefits Act(1978)	Pension laws covered in Constitution
Zimbabwe	• Universal Declaration of Human Rights (1948). • International Covenant on Economic, Social and Cultural Rights (1966). • Pension and Provident Funds Act (1976); • Pensions Act (1985) • National Social Security Authority (NSSA Act of 1989; • War Victims Compensation Act (1997)	Pension and social security are constitutional in Zimbabwe. A regulatory body oversees operations of pension funds, insurance companies and social security schemes.
Nigeria	• National Provident Fund(1964) • Nigeria Social Insurance Trust Fund (1993) • Pension Reform Act (2004) • Employee Compensation Act (2010)	Social security and Pension schemes constituted in national constitution in Nigeria. Some regulatory aspects compete against each other.
Ivory coast	• Old -age Insurance(1960,1999) • Workers Compensation Fund (1957, 1999)	Effort has been put in transforming regulation. Still not covered in constitution
Zambia	• National Pension Scheme Authority (NAPSA) • Public Service Pensions Fund (PSPF) • Local Authorities Superannuation Fund (LASF) • Workers Compensation Fund Control Board (WCFCB). • Pension Scheme Regulation Act, 1996 (amended in 2005) • National Social Security Bill, 2007 • National Pensions Authority Act, 1996 • Public Service Pension Fund Act, 1996 • Local Authorities Superannuation Fund Act. The Pension Scheme Regulation Act, 1996 (amended in 2005)	Zambian National Provident Fund transformed to NAPSA in 2000. No policy framework in place by 2010. Framework under formulation. Ministry of Finance and Planning supervises Pensions and Insurance schemes.
Tanzania	All contributory schemes • National Social Security Fund (NSSF) 1997 • Public Services Pensions Fund (PSPF) 1999 • Local Authorities Pensions Fund (LAPF) 2006	While not in constitution, there is also no regulatory authority to control activities.

	• Parastatal Pensions Fund (PPF) • Government Employees Provident Fund (GEPF) • Community Health Fund (CHF) • National Health Insurance Fund (NHIF)	
Mauritius	• Basic non-contributory scheme(1950) • Mandatory contributory scheme(1978) • Voluntary contributory scheme (1990)	Provided for in constitution
South Africa	• Pension Fund Act (1928 amended 1956); • Social Assistance Act (2004, amended 2008)	Provided for in the 1996 constitution.
Namibia	• National Pensions Act (1992) • Social Security Act (1992) • Government Institution Pension Act (1989)	Pension and social security part of the constitution. Most pension schemes financed by government taxes.
Angola	Pension scheme is 8 years old as at 2018. • Universal Old-age Pension scheme(2010) • Mandatory Contributory Scheme (2010).	Pension scheme still very new. Coverage mainly restricted to formally employ. Not covered in constitution
Mozambique	First pilot pension scheme in 2010. • Basic Social Security cover • Compulsory Social Security cover.	Comprehensive statutory social security framework in place, Social Security law(2007) and Social regulation law (2009)
Lesotho	• Non-Contributory universal Pension cover (2004)	Still at infancy. Relies mainly on fiscal support

Source: Authors compilation from country Acts (2017)

Table 2.8:Sub-Saharan Africa: Overall Savings and Investment (%GDP) Balances (1991 & 2012)

Countries	Saving (1991)	Investment (1991)	Savings (2012)	Investment (2012)
Angola	33.8	12.7	28.3	11.9
Benin	12.4	20.7	12.4	19.2
Botswana	51.0	40.9	43.9	33.4
Burkina Faso	7.1	18.1	10.0	19.0
Burundi	8.7	19.7	4.4	11.9
Cameroon	19.4	19.1	14.9	17.8
Cape Verde	30.7	43.0	28.1	39.0
CAR	3.0	11.6	5.6	9.9
Chad	3.3	15.7	6.1	23.5
Comoros	4.2	13.5	7.4	11.4
DRC	6.5	21.9	9.4	15.4
Congo,	15.2	22.0	16.8	25.5
Côte d'Ivoire	2.6	10.1	10.4	11.3
Djibouti	7.5	46.7	35.1	39.2
Eritrea	8.2	10.9	18.3	20.5
Ethiopia	17.8	21.8	16.5	20.3
Gabon	41.5	24.2	35.9	24.4
Gambia, The	-2.5	14.6	6.6	16.7
Ghana	16.4	34.6	19.3	28.6
Guinea	5.5	17.2	12.2	18.2
Guinea-Bissau	10.0	24.8	8.8	32.7
Kenya	9.5	16.2	14.5	15.4
Lesotho	25.2	28.4	24.4	36.8
Madagascar	10.8	35.1	11.9	22.2
Malawi	20.3	26.5	14.7	21.2
Mali	12.4	20.4	15.2	22.1
Mauritania	5.7	21.0	21.1	28.2
Mauritius	21.1	29.8	23.3	25.7
Niger	13.9	26.4	8.7	16.3
Nigeria	29.2	24.7	28.1	23.9
Rwanda	15.5	22.7	14.0	19.4
Senegal	17.9	30.2	15.2	22.4
South Africa	15.4	22.1	15.4	18.2
Sudan	13.5	22.8	11.5	22.0
Swazi land	11.0	17.3	15.7	17.7
Tanzania	21.4	31.8	16.1	23.1
Togo	5.7	12.4	6.8	11.8
Uganda	20.3	23.6	16.4	20.3
Zambia	16.2	23.6	14.1	22.7
Zimbabwe	22.2	23.6	11.1	11.8
Average	**18.1**	**27.3**	**16.8**	**22.7**
Minimum	**-5.5**	**10.1**	**4.4**	**9.9**
Maximum	**51.0**	**46.7**	**43.9**	**39.2**
Median	**14.5**	**22.4**	**14.8**	**20.7**

Sources: International Financial Statistics (2014), World Economic Outlook (2013), authors' calculations

Appendix 2

STATIONARITY/UNIT ROOT TESTS OUTPUT

Table 5.9: Augmented Dickey-Fuller Stationarity tests

Mandatory contractual savings=="**Botswana**"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -5.297	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
Mandatory contractual savings ==**"Ghana"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -4.212	-4.138	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0043			
Mandatory contractual savings ==**"Malawi"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critic Value
Z(t) -3.665	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0248			
Mandatory contractual savings ==**"Namibia"**			
Dickey-Fuller test for unit root Number of obs = 24			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value

Z(t) -4.114	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0060			
. Mandatory contractual savings ==**"South Africa"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -7.839	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Mandatory contractual savings ==**"Nigeria"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -6.342	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
. Mandatory contractual savings ==**"Zimbabwe"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t) -4.109	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0061			
Mandatory contractual savings ==**"Zambia"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)-8.654	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			

Mandatory contractual savings ==**"Swaziland"**			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.796	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0167			
Mandatory contractual savings ==**"Kenya"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.280	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
Mandatory contractual savings ==**"BVRM"**			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -2.347	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.4079			
Mandatory contractual savings ==**"Uganda"**			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.346	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Mandatory contractual savings ==**"Tanzania"**			
Dickey-Fuller test for unit root Number of obs = 25			

---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.559	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Mandatory contractual savings ==**"Botswana"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.297	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
. Mandatory contractual savings ==**"Mauritius"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.013	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0002			
Number of listed Companies =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.028	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0002			
Number of listed Companies =="Ghana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.295	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
Number of listed Companies =="Malawi"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.129	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0057			
Number of listed Companies =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.732	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0203			
Number of listed Companies =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -2.138	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.5250			
Number of listed Companies =="Nigeria"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -5.879	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Number of listed Companies =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.374	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Number of listed Companies =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.684	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Number of listed Companies =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.095	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
Number of listed Companies =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.238 -4.380 -3.600 -3.240			
MacKinnon approximate p-value for Z(t) = 0.0039			

Number of listed Companies =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.891	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0125			
Number of listed Companies =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.556	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Number of listed Companies =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.151	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Number of listed Companies =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.028	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0002			
Number of listed Companies =="Mauritius"			
Dickey-Fuller test for unit root Number of obs = 25			

---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.284	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0033			
Value Traded=="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.476	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Ghana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.824	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Malawi"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.807	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical

Statistic	Value	Value	Value
Z(t) -7.694	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.839	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0004			
Value Traded =="Nigeria"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.425	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0020			
Value Traded =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.198	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0045			
Value Traded =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.379	-4.380	-3.600	-3.240

MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.131	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.842	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0004			
Value Traded =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.709	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0218			
Value Traded =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.706	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Tanzania"			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.947	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.476	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Value Traded =="Mauritius"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.647	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
.			
Domestic Credit by banks=="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.696	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0007			
Domestic Credit by banks =="Ghana"			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.622	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0280			
. **Domestic Credit by banks =="Malawi"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.066	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Domestic Credit by banks =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.504	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Domestic Credit by banks =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.739	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0006			
Domestic Credit by banks =="Nigeria"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.439	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0019			
Domestic Credit by banks =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.603	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0010			
Domestic Credit by banks =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.728	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0006			
Domestic Credit by banks =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.824	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0004			
Domestic Credit by banks =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -6.457	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
. Domestic Credit by banks =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Interpolated Dickey-Fuller ---------			
Test	1%Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.497	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.5480			
Domestic Credit by banks =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.506	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0387			
Domestic Credit by banks =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.584	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.2875			
Domestic Credit by banks =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.696	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0007			

Domestic Credit by banks =="Mauritius"
Dickey-Fuller test for unit root Number of obs = 25
---------- Interpolated Dickey-Fuller ---------
Test 1% Critical 5% Critical 10% Critical
Statistic Value Value Value
Z(t) -4.983 -4.380 -3.600 -3.240
MacKinnon approximate p-value for Z(t) = 0.0002
.
Regulation quality=="Botswana"
Dickey-Fuller test for unit root Number of obs = 25
---------- Interpolated Dickey-Fuller ---------
Test 1% Critical 5% Critical 10% Critical
Statistic Value Value Value
Z(t) -4.841 -4.380 -3.600 -3.240
MacKinnon approximate p-value for Z(t) = 0.0004
. **Regulation quality =="Ghana"**
Dickey-Fuller test for unit root Number of obs = 25
---------- Interpolated Dickey-Fuller ---------
Test 1% Critical 5% Critical 10% Critical
Statistic Value Value Value
Z(t) -8.787 -4.380 -3.600 -3.240
MacKinnon approximate p-value for Z(t) = 0.0000
. **Regulation quality =="Malawi"**
Dickey-Fuller test for unit root Number of obs = 25
---------- Interpolated Dickey-Fuller ---------
Test 1% Critical 5% Critical 10% Critical
Statistic Value Value Value
Z(t) -5.907 -4.380 -3.600 -3.240
MacKinnon approximate p-value for Z(t) = 0.0000
Regulation quality =="Namibia"

Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.886	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Regulation quality =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.446	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0018			
Regulation quality =="Nigeria"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.317	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Regulation quality =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.507	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0015			
Regulation quality =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.799	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Regulation quality =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.656	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Regulation quality =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.350	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0026			
. **Regulation quality =="BVRM"**			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.468	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0017			
Regulation quality =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -5.244	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
Regulation quality =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.882	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0000			
Regulation quality =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.841	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0004			
Regulation quality =="Mauritius"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Interpolated Dickey-Fuller ---------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.291	-4.380	-3.600	-3.240
MacKinnon approximate p-value for Z(t) = 0.0001			
.			
. **Pension Assets/gdp,drift, if country=="Botswana"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.185	-2.500	-1.714	-1.319

p-value for Z(t) = 0.0000			
. . Pension Assets/gdp,drift, if country =="Ghana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.222	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0002			
. . Pension Assets/gdp,drift, if country =="Malawi"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.756	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0005			
. Pension Assets/gdp,drift, if country =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 24			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.179	-2.508	-1.717	-1.321
p-value for Z(t) = 0.0002			
. . Pension Assets/gdp,drift, if country =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.015	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. . Pension Assets/gdp,drift, if country =="Nigeria"			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.036	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. . Pension Assets/gdp,drift, if country =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.072	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0002			
. Pension Assets/gdp,drift, if country =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.541	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Pension Assets/gdp,drift, if country =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.915	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0004			
. . Pension Assets/gdp,drift, if country =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.391	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. . Pension Assets/gdp,drift, if country =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -2.600	-2.821	-1.833	-1.383
p-value for Z(t) = 0.0144			
. . Pension Assets/gdp,drift, if country =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.306	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0000			
. . Pension Assets/gdp,drift, if country =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.740	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Pension Assets/gdp,drift, if country =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -5.185	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. . **Pension Assets/gdp,drift, if country =="Mauritius"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.064	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
.			
No.of listed Co,drift, if country=="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.966	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Ghana"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.752	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Malawi"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.221	-2.500	-1.714	-1.319

p-value for Z(t) = 0.0002			
. No.of listed Co,drift, if country =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.117	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0024			
. No.of listed Co,drift, if country =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -2.154	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0210			
. **No.of listed Co,drift, if country =="Nigeria"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.884	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Zimbabwe"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.819	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. No.of listed Co,drift, if country =="Zambia"			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -9.115	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Swaziland"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.840	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Kenya"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.098	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0002			
. **No.of listed Co,drift, if country =="BVRM"**			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.478	-2.821	-1.833	-1.383
p-value for Z(t) = 0.0035			
. No.of listed Co,drift, if country =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.239	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0000			
. No.of listed Co,drift, if country =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.229	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. No.of listed Co,drift, if country =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.966	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **No.of listed Co,drift, if country =="Mauritius"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.378	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
.			
. Stocks traded/gdp, drift, if country, if country=="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical

Statistic	Value	Value	Value
Z(t) -5.405	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Stocks traded/gdp, drift, if country, if country =="Ghana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.880	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="Malawi"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.982	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Stocks traded/gdp, drift, if country, if country =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.755	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Stocks traded/gdp, drift, if country, if country =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.917	-2.500	-1.714	-1.319

p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="Nigeria"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.523	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. **Stocks traded/gdp, drift, if country, if country =="Zimbabwe"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.293	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. **Stocks traded/gdp, drift, if country, if country =="Zambia"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.498	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Stocks traded/gdp, drift, if country, if country =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.300	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="Kenya"**			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.941	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="BVRM"**			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.775	-2.821	-1.833	-1.383
p-value for Z(t) = 0.0022			
. **Stocks traded/gdp, drift, if country, if country =="Uganda"**			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.848	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="Tanzania"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.063	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Stocks traded/gdp, drift, if country, if country =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.405	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **Stocks traded/gdp, drift, if country, if country =="Mauritius"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.761	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
.			
. Domestic Credit by banks,drift, if country=="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.627	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Domestic Credit by banks,drift, if country =="Ghana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.567	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0008			
. **Domestic Credit by banks,drift, if country =="Malawi"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.054	-2.500	-1.7	-1.319
p-value for Z(t) = 0.0000			
. Domestic Credit by banks,drift, if country =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.778	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0005			
. **Domestic Credit by banks,drift, if country =="South Africa"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.168	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0002			
. **Domestic Credit by banks,drift, if country =="Nigeria"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.510	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. **Domestic Credit by banks,drift, if country =="Zimbabwe"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -4.685	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Domestic Credit by banks,drift, if country =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.264	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Domestic Credit by banks,drift, if country =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.912	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Domestic Credit by banks,drift, if country =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.567	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Domestic Credit by banks,drift, if country =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.689	-2.821	-1.833	-1.383
p-value for Z(t) = 0.0628			

. Domestic Credit by banks,drift, if country =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -3.786	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0005			
. Domestic Credit by banks,drift, if country =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -2.468	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0107			
. Domestic Credit by banks,drift, if country =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.627	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Domestic Credit by banks,drift, if country =="Mauritius"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.709	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
.			
. Regulation quality,drift, if country=="Botswana"			

Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.944	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. **Regulation quality,drift, if country =="Ghana"**			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -7.923	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Malawi"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.961	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Namibia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -6.983	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="South Africa"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			

Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.388	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Regulation quality,drift, if country =="Nigeria"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.371	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Zimbabwe"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.564	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0001			
. Regulation quality,drift, if country =="Zambia"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.771	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Swaziland"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value

Z(t) -5.771	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Kenya"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.159	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0002			
. Regulation quality,drift, if country =="BVRM"			
Dickey-Fuller test for unit root Number of obs = 11			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.743	-2.821	-1.833	-1.383
p-value for Z(t) = 0.0005			
. Regulation quality,drift, if country =="Uganda"			
Dickey-Fuller test for unit root Number of obs = 23			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.329	-2.518	-1.721	-1.323
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Tanzania"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -8.057	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			

. Regulation quality,drift, if country =="Botswana"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -4.944	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			
. Regulation quality,drift, if country =="Mauritius"			
Dickey-Fuller test for unit root Number of obs = 25			
---------- Z(t) has t-distribution ----------			
Test	1% Critical	5% Critical	10% Critical
Statistic	Value	Value	Value
Z(t) -5.237	-2.500	-1.714	-1.319
p-value for Z(t) = 0.0000			

Appendix 3

Table 5.23(II): Market capitalization and Mandatory contractual savings for Low Income Group

```
Fixed-effects (within)

  Prob > F           =     0.0055

------------------------------------------------------------------------------
   marketcap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   3.843278   1.409491     2.73   0.027     1.058406    6.628149
     domcred |  -1.058094   .4855628    -2.18   0.031    -2.017469   -.0987198
     regqual |   3.896909   10.88069     0.36   0.721    -17.60115    25.39496
         fdi |   .8073592   1.598711     0.51   0.614    -2.351373    3.966091
   gdpgrowth |  -.1968307    .664863    -0.30   0.768    -1.510466    1.116805
       _cons |   16.39695   11.04031     1.49   0.140    -5.416477    38.21037
```

```
-------------+----------------------------------------------------------------
     sigma_u |  28.300572
     sigma_e |  36.665229
         rho |  .37334489   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5, 151) =     4.30              Prob > F = 0.0011
```

Table 5.24(II): Market capitalization and Mandatory savings for Middle Income Group

```
Fixed-effects (within)
   Prob > F           =    0.0498
------------------------------------------------------------------------------
   marketcap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   .0596037   .2698823     0.22   0.016    -.4761085    .5953159
     domcred |  -.3419158     .23574    -1.45   0.150     -.809856    .1260243
     regqual |  -6.516475   4.424976    -1.47   0.144    -15.29998    2.267032
         fdi |  -.1407127   .4062933    -0.35   0.730    -.9471984    .6657731
   gdpgrowth |  -.0378219   .2423406    -0.16   0.876    -.5188642    .4432204
       _cons |    20.2066   4.899066     4.12   0.000     10.48203    29.93117
-------------+----------------------------------------------------------------
     sigma_u |  9.4435802
     sigma_e |  9.8546297
         rho |  .47870978   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(3, 96) =     2.60              Prob > F = 0.0567
```

Table 5.25(II): Market capitalization and Mandatory savings for Upper middle Income Group

```
Fixed-effects (within)

              Prob > F           =    0.000
------------------------------------------------------------------------------
   marketcap |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   1.389818   .3361547     4.13   0.000     .7197061     2.05993
     domcred |   .7407898   .2283268     3.24   0.002     .2856286    1.195951
     regqual |  -5.683048   20.17741    -0.28   0.779    -45.90597    34.53988
         fdi |  -.3431226   1.010893    -0.34   0.735    -2.358301    1.672056
   gdpgrowth |  -.0958819   .8170786    -0.12   0.907    -1.724698    1.532934
       _cons |   10.37444   12.94958     0.80   0.426    -15.44009    36.18896
-------------+----------------------------------------------------------------
     sigma_u |  34.137289
     sigma_e |  20.836393
         rho |  .72856979   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(2, 72) =    20.75              Prob > F = 0.00
```

Table 5.26 (II): Value Traded and Mandatory savings for Low Income Group

```
Fixed-effects (within) regression

         Prob > F           =    0.0000

------------------------------------------------------------------------------
   valtraded |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   .4807515   .0658377     7.30   0.041     .3506695    .6108335
     domcred |  -.1265831   .0226808    -5.58   0.000    -.1713957   -.0817705
     regqual |   1.220869   .5082396     2.40   0.018     .2166899    2.225048
         fdi |   .0289277   .0746762     0.39   0.699    -.1186174    .1764728
   gdpgrowth |   .0239976   .0310559     0.77   0.441    -.0373626    .0853578
       _cons |   1.319647   .5156952     2.56   0.011     .3007368    2.338557
-------------+----------------------------------------------------------------
     sigma_u |  3.5008625
     sigma_e |  1.7126413
         rho |  .80689276   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5, 151) =    29.11              Prob > F = 0.0000
```

Table 5.27(II): Value Traded and Mandatory savings for Lower Middle Income Group

Fixed-effects (within)

Prob > F = 0.02102

valtraded	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
mandsav	.0444847	.0363686	1.22	0.004	-.0277064	.1166759
domcred	.0155302	.0317677	0.49	0.626	-.0475282	.0785885
regqual	-.0661541	.5962979	-0.11	0.912	-1.249796	1.117488
fdi	.0073069	.054751	0.13	0.894	-.1013729	.1159868
gdpgrowth	.0567773	.0326572	1.74	0.085	-.0080467	.1216012
_cons	-.4223008	.6601852	-0.64	0.524	-1.732758	.8881564
sigma_u	1.4147683					
sigma_e	1.3279837					
rho	.5316098	(fraction of variance due to u_i)				

F test that all u_i=0: F(3, 96) = 5.34 Prob > F = 0.0019

Table 5.28(II): Value Traded and Mandatory savings for Upper Middle Income Group

```
Fixed-effects (within)

      Prob > F           =    0.0000

------------------------------------------------------------------------------
   valtraded |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   .3846589   .1155782     3.33   0.001      .154258    .6150599
     domcred |    .614248   .0785044     7.82   0.000     .4577525    .7707436
     regqual |  -16.56989   6.937486    -2.39   0.020    -30.39951   -2.740259
         fdi |  -.3243629   .3475697    -0.93   0.354    -1.017231    .3685046
   gdpgrowth |   .1958786   .2809316     0.70   0.488    -.3641484    .7559055
       _cons |  -21.29382   4.452383    -4.78   0.000    -30.16948   -12.41816
-------------+----------------------------------------------------------------
     sigma_u |  20.437651
     sigma_e |  7.1640621
         rho |   .8905726   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(2, 72) =    26.49              Prob > F = 0.0000
```

Table 5.29(II): Number of listed companies and Mandatory savings for Low Income Group

```
Fixed-effects (within) regression

    Prob > F           =    0.0000

------------------------------------------------------------------------------
    listedCo |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     mandsav |   1.516643   .2481047     6.11   0.000     1.026438    2.006848
     domcred |  -.2179273   .0854708    -2.55   0.012    -.3868005   -.0490542
     regqual |  -2.332042   1.915265    -1.22   0.225    -6.116221    1.452137
         fdi |    1.41266    .281412     5.02   0.000     .8566467    1.968674
   gdpgrowth |  -.2068403    .117032    -1.77   0.079     -.438072    .0243914
       _cons |   12.97463   1.943361     6.68   0.000     9.134942    16.81433
-------------+----------------------------------------------------------------
     sigma_u |  25.636586
     sigma_e |  6.4539692
         rho |  .94040003   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(5, 151) =    92.85              Prob > F = 0.0000


------------------------------------------------------------------------------------------
```

Table 5.30(II): Number of listed companies and Mandatory savings for Lower middle Income Group

Fixed-effects (within)

Prob > F = 0.0000

listedCo	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
mandsav	.2908844	.2996794	0.97	0.334	-.3039745	.8857434
domcred	1.034993	.2617675	3.95	0.000	.5153891	1.554598
regqual	1.694946	4.913527	0.34	0.731	-8.058327	11.44822
fdi	.9536417	.4511511	2.11	0.037	.0581137	1.84917
gdpgrowth	.6545309	.2690969	2.43	0.017	.1203778	1.188684
_cons	35.35456	5.439961	6.50	0.000	24.55633	46.1528
sigma_u	91.964714					
sigma_e	10.942656					
rho	.98603961	(fraction of variance due to u_i)				

F test that all u_i=0: F(3, 96) = 306.53 Prob > F = 0.0000

Table 5.31(II): Number of listed companies and Mandatory savings for Upper Middle Group

```
Fixed-effects (within)

      Prob > F           =    0.0000

------------------------------------------------------------------------------

    ListedCo |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

     Mandsav |  -5.386271   .5620036    -9.58   0.000    -6.506605   -4.265938

     Domcred |  -1.528418   .3817305    -4.00   0.000    -2.289384   -.7674526

     Regqual |    18.3685    33.7338     0.54   0.588     -48.8786     85.6156

         Fdi |   2.205039   1.690071     1.30   0.196    -1.164057    5.574135

   Gdpgrowth |  -2.038768   1.366041    -1.49   0.140    -4.761921    .6843849

       _cons |   348.0563   21.64989    16.08   0.000     304.8981    391.2146

-------------+----------------------------------------------------------------

     sigma_u | 482.98202

     sigma_e |  34.835534

         rho |  .99482477   (fraction of variance due to u_i)

------------------------------------------------------------------------------

F test that all u_i=0:     F(2, 72) =   503.30              Prob > F = 0.0000
```

Appendix 4

Table 5.1(II): PRINCIPAL COMPONENT ANALYSIS FOR COMPOSITE STOCK EXCHANGE INDEX

Table 5.15 :Eigenvalue stability condition		
+----------+		
Eigenvalue		
Real	Imaginary	Modulus
----------+----------		
.0479015	-.600462	.6023696
.0479015	.600462	.6023696
-.2952695	.5036344	.5838079
-.2952695	-.5036344	.5838079
.4029994	.4041592	.5707479
.4029994	-.4041592	.5707479
.5636622	0	.5636622
-.3336724	-.4125651	.5306102
-.3336724	.4125651	.5306102
-.3852887	.2435509	.4558118
-.3852887	-.2435509	.4558118
-.0796932	.4467713	.4538233
-.0796932	-.4467713	.4538233
.0992583	-.4281967	.4395505
.0992583	.4281967	.4395505
-.4336363	0	.4336363
-.3233524	.2764207	.4254
-.3233524	-.2764207	.4254
+----------+		
All the eigenvalues lie inside the unit circle.		
pVAR satisfies stability condition.		

Forecast-error variance decomposition (FEVD)

Response variable and Forecast horizon	Impulse variable: mcofgdp	mandsav	domcred	regqual	fdi
mcofgdp					
0	0	0	0	0	0
1	1	0	0	0	0
2	.545802	.0696984	.0000785	.2117167	.1727043
3	.252325	.2233752	.0108814	.3762657	.1371527
4	.1723232	.3344336	.0270502	.385863	.0803301
5	.155724	.3898419	.0362947	.3631219	.0550176
6	.1512782	.4159933	.0405269	.3468115	.04539
7	.1496715	.4284207	.0423916	.3379744	.0415418
8	.1490193	.4343862	.0432042	.3334983	.039892
9	.1487366	.4372691	.0435519	.3312865	.0391558
10	.1486051	.4386671	.043697	.3302092	.0388215
mandsav					
0	0	0	0	0	0
1	.0002737	.9997263	0	0	0
2	.0292009	.9266171	.0059715	.0380071	.0002034
3	.0760743	.779945	.0165928	.1208351	.0065527
4	.110827	.637351	.0268047	.2068337	.0181835
5	.1299497	.5429389	.034032	.265436	.0276434
6	.1394621	.4912334	.038419	.2977232	.0331624
7	.1440851	.4650486	.0409006	.3139853	.0359803
8	.1463282	.4521669	.0422577	.3219041	.0373431

9	.1474207	.4458939	.0429858	.3257139	.0379857
10	.1479555	.4428496	.0433715	.3275389	.0382845
domcred					
0	0	0	0	0	0
1	.0000642	.0021527	.9977831	0	0
2	.0086976	.1173877	.7278324	.0560344	.0900479
3	.0433125	.3288995	.2782014	.221897	.1276896
4	.0922543	.4320676	.0684822	.3147482	.0924477
5	.1224479	.4506607	.028623	.3343075	.0639609
6	.1366692	.4489376	.0295365	.3346947	.050162
7	.1430492	.4453083	.0351252	.3326081	.0439092
8	.145945	.4428183	.0391527	.3310369	.0410471
9	.147285	.4414186	.0414448	.3301347	.0397168
10	.1479129	.4406916	.0426385	.3296638	.0390931
regqual					
0	0	0	0	0	0
1	.0288936	.2033575	.0005361	.7672129	0
2	.1855835	.3276747	.0092001	.4593689	.0181728
3	.1674499	.3910027	.0200023	.3776751	.0438699
4	.1517378	.4182061	.0298498	.3531439	.0470625
5	.1480326	.4299011	.0364831	.3416462	.0439369
6	.1478609	.4351741	.0401867	.3354498	.0413284
7	.1481309	.4376563	.0420676	.3322516	.0398936
8	.1483102	.4388516	.0429805	.3306735	.0391842
9	.1483992	.4394327	.0434136	.3299109	.0388437
10	.1484405	.4397163	.0436163	.3295451	.0386818
fdi					
0	0	0	0	0	0

```
         1 | .0839724  .2891781   .001346  .2436974  .3818061
         2 | .0833161  .3699742  .0114857  .3665238  .1687002
         3 | .1223789   .407995   .027204  .3627103  .0797119
         4 | .1410314  .4246883  .0359468  .3464725  .0518609
         5 | .1465392  .4325942  .0400944  .3373934  .0433788
         6 | .1479253  .4364052  .0420534  .3331099  .0405062
         7 | .1482954  .4382462  .0429824  .3310843  .0393916
         8 | .1484122  .4391391  .0434187  .3301105  .0389196
         9 | .1484528  .4395737  .0436208  .3296413  .0387113
        10 | .1484671  .4397858  .0437134  .3294163  .0386175
-------------------------------------------------------------

FEVD standard errors and confidence intervals based
on 200 Monte Carlo simulations are saved in file
fevd.dta
```

Appendix 5

Table 5.1(IV): Trading activity in selected SSA stock markets

Stock Exchange	Quartile*	Number of Stocks	Nontrading frequency (%)		Mean duration of nontrading (days)		Distribution of duration of nontrading (days)								Average number of observations per stock
			Range		Range		0	1 to 2	3 to 5	6 to 10	11 to 20	21 to 40	Over 40	Total	
			from	to	from	to	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	
Botswana	1	3	34.5	50.0	0.53	1.00	61.6	29.9	7.1	1.2	0.2	0.0	0.0	100.0	600
	2	3	50.6	68.4	1.01	2.17	47.5	31.6	14.8	5.0	1.1	0.0	0.0	100.0	425
	3	3	77.6	85.2	3.45	5.80	19.2	28.2	21.9	17.4	11.0	1.9	0.3	100.0	183
	4	3	89.8	93.6	8.71	13.85	14.0	18.4	13.3	20.4	20.8	9.1	4.0	100.0	91
BRVM	1	6	3.2	49.6	0.03	0.97	72.0	21.6	4.1	1.5	0.6	0.0	0.0	100.0	442
	2	6	54.7	63.5	1.21	1.67	57.3	27.2	8.7	4.2	1.8	0.7	0.1	100.0	272
	3	6	67.2	82.8	2.06	4.74	40.4	30.6	14.2	7.4	3.9	2.7	0.7	100.0	163
	4	6	84.4	94.9	4.65	17.42	30.5	28.0	13.4	9.7	7.6	4.9	6.0	100.0	77
Egypt	1	14	4.8	6.8	0.05	0.07	95.7	3.9	0.4	0.0	0.0	0.0	0.0	100.0	1263
	2	13	7.2	17.7	0.08	0.21	92.2	7.0	0.7	0.1	0.0	0.0	0.0	100.0	1192
	3	13	18.6	51.1	0.23	1.02	76.8	17.0	4.1	1.3	0.5	0.1	0.1	100.0	848
	4	14	52.5	74.2	1.10	2.87	59.5	25.3	8.7	3.7	1.7	0.7	0.4	100.0	515
Ghana	1	5	9.8	38.0	0.10	0.56	80.0	17.5	2.1	0.3	0.1	0.0	0.0	100.0	578
	2	5	43.0	69.8	0.68	1.90	56.9	30.2	9.4	2.5	1.0	0.1	0.0	100.0	376
	3	5	70.6	76.6	1.90	2.47	41.9	30.6	16.7	7.4	3.0	0.4	0.0	100.0	238
	4	5	80.6	87.2	2.78	3.99	41.7	28.7	15.1	7.8	4.0	1.5	1.2	100.0	174
Kenya	1	10	2.0	15.8	0.02	0.19	92.6	6.9	0.5	0.0	0.0	0.0	0.0	100.0	1246
	2	10	17.5	51.5	0.21	1.04	68.8	24.2	5.2	1.5	0.2	0.0	0.0	100.0	848
	3	10	54.8	74.5	1.21	2.89	45.3	30.6	14.4	6.5	2.7	0.4	0.1	100.0	479
	4	10	75.8	97.1	3.13	31.32	28.1	24.0	18.3	11.8	9.4	4.9	3.5	100.0	203
Mauritius	1	2	13.6	18.2	0.16	0.22	84.9	14.4	0.7	0.1	0.0	0.0	0.0	100.0	1006
	2	2	19.1	21.4	0.24	0.27	82.2	16.1	1.6	0.1	0.0	0.0	0.0	100.0	954
	3	2	29.3	32.3	0.42	0.48	71.2	25.3	3.3	0.2	0.0	0.0	0.0	100.0	827
	4	3	41.7	51.9	0.71	1.07	59.2	29.5	9.0	1.8	0.5	0.1	0.0	100.0	623
Morocco	1	9	0.9	13.1	0.01	0.15	95.1	4.8	0.2	0.0	0.0	0.0	0.0	100.0	1276
	2	9	14.4	45.9	0.17	0.85	77.4	18.7	3.3	0.5	0.1	0.0	0.0	100.0	982
	3	9	51.3	72.3	0.52	2.58	53.1	30.0	10.9	4.3	1.2	0.3	0.2	100.0	539
	4	9	73.8	97.5	2.81	35.91	24.8	23.1	15.1	12.5	8.3	8.0	8.2	100.0	164
Namibia	1	4	62.4	75.5	1.66	3.07	43.9	27.1	15.6	7.8	4.4	0.8	0.3	100.0	396
	2	4	82.7	86.7	4.77	6.20	33.1	23.9	16.6	10.7	8.6	5.3	1.8	100.0	197
	3	3	87.8	90.5	6.74	8.58	27.2	23.5	15.9	12.6	10.5	5.6	4.8	100.0	143
	4	4	93.3	97.6	10.03	17.78	21.5	17.1	16.9	13.6	11.9	8.5	10.5	100.0	65
Tunisia	1	9	1.8	8.8	0.02	0.10	95.6	4.2	0.2	0.0	0.0	0.0	0.0	100.0	1183
	2	9	11.1	31.6	0.12	0.45	83.8	14.0	1.9	0.3	0.0	0.0	0.0	100.0	996
	3	8	35.3	65.8	0.54	1.93	60.9	25.3	8.4	3.8	1.3	0.3	0.0	100.0	603
	4	9	72.7	91.4	2.64	10.35	32.6	25.1	17.9	10.0	8.3	4.2	1.9	100.0	225
Zimbabwe	1	10	4.4	31.6	0.05	0.46	79.3	18.3	2.3	0.1	0.0	0.0	0.0	100.0	1045
	2	10	34.5	48.9	0.53	0.96	62.2	29.2	7.2	1.3	0.1	0.0	0.0	100.0	780
	3	9	49.2	66.3	0.97	1.96	47.0	33.8	13.6	4.6	1.0	0.1	0.0	100.0	562
	4	10	69.8	93.9	2.31	15.43	26.3	27.3	19.4	14.3	7.6	3.7	1.5	100.0	264

Source: Adopted from Mlambo (2006)

Table 5.2(IV): Trading days and hours for selected SSA countries stock markets adopted from Mlambo (2006)

Stock Exchange	Trading days	Trading hours	Trading method
Algeria			
Botswana	Mon to Fri	09h00 and 15h00 (call over times)	Open outcry system
Cameroon (Douala)	N/A	N/A	N/A
Cote d'Ivoire (Abidjan)	Closed	Closed	Closed
Cote d'Ivoire (BRVM)	Mon to Fri	10h45 to 12h00	Decentralised electronic fixing system
Egypt (Cairo & Alexandria)	Sun to Thurs	11h30 to 15h30	Electronic order-driven trading
Ghana	Mon, Wed, & Fri	10h00 to 13h00	Call-over with a limited auction
Kenya (Nairobi)	Mon to Fri	10h00 to 12h00	Open outcry system
Malawi (Blantyre)	Mon to Fri	09h00 to 12h00	Call-over system
Mauritius (Port Louis)	Mon to Fri (Official); Tues & Thurs (OTC)	10h00 to 11h00 (Official); 14h00 to 15h00 (OTC)	Open outcry, order-driven and single price auction system
Morocco (Casablanca)	Mon to Fri	08h30 to 12h30	Electronic order-driven (liquid stocks). Fixing basis (less liquid stocks)
Mozambique (Maputo)	-	-	-
Namibia	Mon to Fri	09h00 to 16h00 (summer) 08h00 to 15h00 (winter)	Computer-based JSE Equity Trading System (JET)
Nigeria	Mon to Fri	From 11h00 until all bids are done	Automated computer-based system
South Africa (Johannesburg)	Mon to Fri	09h00 to 16h00	Open outcry, continuous auction on a trading floor; order-driven
Sudan (Khartoum)			
Swaziland	Mon to Fri	10h00 to 12h00	Call-over system
Tanzania (Dar es Salaam)	Tue, Wed, Thurs	10h00 to 11h00	Open outcry auction system
Tunisia (Tunis)	Mon to Fri	08h00 to 11h00	
Uganda	Tue to Thurs	10h00 to 12h00	Open outcry auction system
Zambia (Lusaka)	Mon to Fri	10h00 to 11h00 (1st session) 12h00 to 13h00 (2nd session)	Single price auction
Zimbabwe	Mon to Fri	08h00 to 16h30	Call-over system

Sources: Stock exchange websites

Table 5.3(IV): Transaction costs for selected SSA stock markets

Stock Exchange	Withholding taxes			Commission rates	Foreign Investment Ceilings	
	Interest	Dividends	Capital gains		Individual	Collectively
Algeria	-	-	-	-	-	-
Botswana	15%	15%	None	1% to 2%	5%	49%
Cameroon (Doula)	-	-	-	-	-	-
Cote d'Ivoire (Abidjan)	N/A	N/A	N/A	N/A	N/A	N/A
Cote d'Ivoire (BRVM)	-	-	-	-	-	-
Egypt (Cairo & Alexandria)	0.20%	-	2%	No fixed rates	No restrictions	
Ghana	10%	10%	None	1% to 2.5%	10%	74%
Kenya (Nairobi)	15%	10%	None	1.1% to 2%	5%	40%
Malawi (Blantyre)	15%	None	35%	1% to 2%	10%	49%
Mauritius (Port Louis)	None	None	None	0.9% to 1.25%	Open to foreign investors	
Morocco (Casablanca)	None	-	None	0.6%–0.3%	No restrictions	
Mozambique (Maputo)	-	-	-	-	-	-
Namibia	None	10%	None	0.35% to 1.1%	No restrictions	
Nigeria	10%	10%	None	1% to 2.75%	No restrictions	
South Africa (Johannesburg)	None		None	1.2%–0.2%	15% (banks), 25% (insurance companies)	
Sudan (Khartoum)	-	-	-	-	-	-
Swaziland	10%	15%	None	1% to 2%	None	
Tanzania (Dar es Salaam)	5%	5%	None	1.1% to 2%	Closed to foreign investors	
Tunisia (Tunis)	None	None	None		No restrictions	
Uganda	15%	15%	None	1.1% to 2%	No restrictions	
Zambia (Lusaka)	15%	15%	None	fixed 0.25%	No restrictions	
Zimbabwe	10%	15%	10%	1% to 2%	10%	40%

Source: Stock exchange websites

Appendix 6

Primary data used in this research for SSA countries

Country	ID	Income Group	Year	MC(% of GDP)	No. of listed Co.	Stocks traded (% of GDP)	Stocks traded, TR of domestic shares (%)	Pension Assets (% GDP)	GDP/CAPITA(% growth)	Domestic Credit by banks	Regulation Quality	FDI	Domestic sav	GDP growth (%)
Botswana	**1**	**Upper middle**	**1990**	**5.12**	**9.00**	**0.19**	**4.65**	**0.99**	**3.68**	**11.98**	**0.43**	**2.53**	**42.63**	**6.77**
Botswana	1	Upper middle	1991	6.62	9.00	0.20	4.98	1.00	4.41	11.45	0.56	(0.21)	39.71	7.46
Botswana	1	Upper middle	1992	7.11	11.00	0.36	5.40	1.10	0.07	10.56	0.51	(0.04)	37.03	2.92
Botswana	1	Upper middle	1993	6.27	11.00	0.48	7.19	1.03	(0.79)	13.42	0.51	(6.90)	36.76	1.92
Botswana	1	Upper middle	1994	8.85	11.00	0.73	9.72	1.03	1.02	15.11	0.50	(0.33)	33.45	3.63
Botswana	1	Upper middle	1995	8.41	12.00	0.80	9.81	1.03	4.51	13.38	0.49	1.49	34.21	7.03
Botswana	1	Upper middle	1996	6.72	12.00	0.64	8.56	1.03	3.50	12.17	0.49	1.47	40.14	5.83
Botswana	1	Upper middle	1997	12.23	12.00	1.18	12.55	1.03	5.79	9.94	0.51	1.99	37.21	8.03
Botswana	1	Upper middle	1998	15.11	14.00	1.46	10.46	1.03	(1.21)	9.12	0.61	1.99	34.67	0.72
Botswana	1	Upper middle	1999	19.19	15.00	0.68	4.22	1.03	7.72	9.30	0.52	0.67	37.09	9.67
Botswana	1	Upper middle	2000	16.89	16.00	0.82	4.66	1.03	0.33	11.06	0.43	0.99	41.29	1.99
Botswana	1	Upper middle	2001	23.11	16.00	1.18	5.79	1.03	(1.23)	13.78	0.53	0.56	39.68	0.25
Botswana	1	Upper middle	2002	31.68	18.00	1.02	3.70	1.85	4.64	13.72	0.66	7.42	42.67	6.07
Botswana	1	Upper middle	2003	28.37	19.00	1.15	4.50	1.61	3.25	15.45	0.67	5.56	41.96	4.63
Botswana	1	Upper middle	2004	28.45	18.00	0.56	2.15	1.96	1.29	17.71	0.66	4.37	39.71	2.71
Botswana	1	Upper middle	2005	24.54	18.00	0.45	1.81	2.02	2.97	17.73	0.67	4.24	44.49	4.56
Botswana	1	Upper middle	2006	39.12	18.00	0.72	2.27	1.77	6.55	18.89	0.50	4.80	44.08	8.36
Botswana	1	Upper middle	2007	53.82	18.00	1.01	2.24	1.43	6.33	18.89	0.44	4.52	44.72	8.28
Botswana	1	Upper middle	2008	32.49	20.00	1.32	3.05	1.26	4.22	20.28	0.48	4.76	30.82	6.25
Botswana	1	Upper middle	2009	41.67	20.00	1.01	2.64	1.06	(9.46)	22.99	0.48	2.03	21.85	(7.65)
Botswana	1	Upper middle	2010	31.88	21.00	1.09	3.35	1.10	6.41	28.04	0.46	1.71	33.78	8.56
Botswana	1	Upper middle	2011	26.19	23.00	0.93	3.55	1.07	3.92	24.12	0.50	8.74	34.19	6.05

Botswana	1	Upper middle	2012	31.01	24.00	0.77	2.60	0.88	2.34	25.16	0.69	3.32	26.20	4.46
Botswana	1	Upper middle	2013	25.00	25.00	0.77	2.97	0.80	7.65	28.78	0.65	2.69	32.95	9.86
Botswana	1	Upper middle	2014	26.00	23.00	0.77	2.99	0.75	1.19	30.20	0.64	3.24	37.68	3.20
Botswana	1	Upper middle	2015	26.00	23.00	0.77	2.99	0.75	(2.13)	30.20	0.64	2.74	29.80	(0.25)
Botswana	1	Upper middle	2016	26.00	23.00	0.77	2.99	0.75	(2.13)	30.20	0.64	2.74	29.80	(0.25)
BVRM	10	Low Income	1990	-	-	-	-	3.12	(4.52)	39.76	(0.45)	0.45	11.27	(1.10)
BVRM	10	Low Income	1991	-	-	-	-	3.56	(3.41)	35.87	(0.56)	0.16	10.38	0.04
BVRM	10	Low Income	1992	-	-	-	-	2.91	(3.65)	34.29	(0.43)	(2.07)	10.72	(0.24)
BVRM	10	Low Income	1993	3.01	30.00	0.05	1.56	2.88	(3.54)	30.97	(0.54)	0.80	13.33	(0.19)
BVRM	10	Low Income	1994	0.23	30.00	0.14	58.88	3.23	(2.47)	22.17	(0.65)	0.94	24.93	0.81
BVRM	10	Low Income	1995	0.57	31.00	0.13	22.56	4.23	3.77	17.28	(0.65)	1.92	22.91	7.13
BVRM	10	Low Income	1996	0.51	31.00	0.16	30.55	5.23	4.48	16.33	(0.54)	2.22	20.79	7.73
BVRM	10	Low Income	1997	0.51	31.00	0.16	30.55	4.68	0.73	15.98	(0.54)	3.54	22.05	3.74
BVRM	10	Low Income	1998	14.47	35.00	0.15	1.04	5.00	2.05	16.06	(0.87)	3.01	19.95	4.93
BVRM	10	Low Income	1999	10.45	38.00	0.61	5.83	4.99	(0.96)	15.10	(0.76)	2.62	21.57	1.62
BVRM	10	Low Income	2000	4.07	41.00	0.31	7.56	3.99	(4.32)	14.75	(0.89)	2.19	17.41	(2.07)
BVRM	10	Low Income	2001	8.79	38.00	0.08	0.87	2.88	(1.94)	14.41	(0.80)	2.44	18.37	0.12
BVRM	10	Low Income	2002	10.65	38.00	0.14	1.33	3.77	(3.50)	13.87	(0.79)	1.72	24.43	(1.67)
BVRM	10	Low Income	2003	10.78	39.00	0.16	1.47	6.10	(3.09)	12.89	(0.96)	1.08	17.59	(1.36)
BVRM	10	Low Income	2004	12.58	39.00	0.30	2.41	6.00	(0.54)	12.86	(0.96)	1.71	18.30	1.23
BVRM	10	Low Income	2005	13.65	39.00	0.20	1.50	7.10	(0.13)	13.11	(0.91)	2.04	19.81	1.72
BVRM	10	Low Income	2006	23.34	40.00	0.60	2.58	7.20	(0.43)	13.32	(0.85)	1.97	20.26	1.52
BVRM	10	Low Income	2007	40.82	38.00	0.81	1.98	7.00	(0.26)	14.52	(0.84)	2.18	17.68	1.77
BVRM	10	Low Income	2008	29.26	38.00	1.20	4.12	7.00	0.42	15.15	(0.89)	1.93	19.03	2.54
BVRM	10	Low Income	2009	25.23	38.00	0.99	3.93	7.00	1.03	15.56	(0.95)	1.63	19.63	3.25
BVRM	10	Low Income	2010	28.77	39.00	0.91	3.17	6.90	(0.25)	15.79	(0.91)	1.44	20.74	2.02
BVRM	10	Low Income	2011	24.77	39.00	0.46	1.85	10.00	(6.58)	16.92	(0.86)	1.19	21.19	(4.39)
BVRM	10	Low Income	2012	24.77	37.00	0.64	1.85	11.00	8.09	15.64	(0.77)	1.22	19.26	10.71

BVRM	10	Low Income	2013	37.80	37.00	1.18	3.11	11.00	6.27	16.59	(0.77)	1.30	23.65	8.89
BVRM	10	Low Income	2014	34.22	38.00	1.17	3.41	11.00	5.87	18.48	(0.77)	1.28	23.97	8.49
BVRM	10	Low Income	2015	39.34	39.00	1.64	4.18	11.00	6.55	24.92	(0.77)	1.35	24.06	9.16
BVRM	10	Low Income	2016	39.34	39.00	1.64	4.18	11.00	6.55	24.92	(0.77)	1.35	24.06	9.16
Ghana	2	low middle income	1990	1.14	13.00	0.09	3.74	0.00	0.53	29.88	0.64	0.25	5.47	3.33
Ghana	2	Lower middle Income	1991	1.15	13.00	0.08	3.88	-	2.38	30.12	0.64	0.30	7.32	5.28
Ghana	2	Lower middle Income	1992	1.31	15.00	0.09	3.75	0.98	1.00	31.26	0.64	0.35	1.26	3.88
Ghana	2	Lower middle Income	1993	1.98	15.00	0.08	4.95	0.96	1.98	32.12	0.64	2.10	6.05	4.85
Ghana	2	Lower middle Income	1994	34.33	17.00	1.38	7.55	1.97	0.57	31.02	0.64	4.28	12.45	3.30
Ghana	2	Lower middle Income	1995	25.51	19.00	0.34	1.25	1.65	1.49	30.14	0.64	1.65	11.59	4.11
Ghana	2	Lower middle Income	1996	21.52	21.00	0.25	1.08	3.70	2.12	31.97	(0.38)	1.73	13.22	4.60
Ghana	2	Lower middle Income	1997	16.51	21.00	0.71	3.73	3.25	1.83	35.91	(0.25)	1.19	4.22	4.20
Ghana	2	Lower middle Income	1998	18.50	21.00	0.80	4.76	0.81	2.37	41.30	(0.10)	2.24	10.25	4.70
Ghana	2	Lower middle Income	1999	11.87	22.00	0.32	2.14	1.53	2.04	47.92	(0.47)	3.16	3.45	4.40
Ghana	2	Lower middle Income	2000	10.08	22.00	0.20	1.42	4.44	1.27	48.64	(0.28)	3.33	5.55	3.70
Ghana	2	Lower middle Income	2001	9.93	22.00	0.25	2.58	9.60	1.47	44.20	(0.28)	1.68	7.02	4.00
Ghana	2	Lower middle Income	2002	12.01	24.00	0.18	1.78	10.30	1.89	46.33	(0.28)	0.96	7.44	4.50
Ghana	2	Lower middle Income	2003	18.68	25.00	0.60	4.20	9.44	2.52	46.82	(0.28)	1.79	7.01	5.20
Ghana	2	Lower middle Income	2004	29.77	29.00	0.74	3.22	10.46	2.89	45.94	(0.35)	1.57	7.31	5.60
Ghana	2	Lower middle Income	2005	15.47	30.00	0.63	3.15	11.01	3.18	49.45	(0.11)	1.35	3.73	5.90
Ghana	2	Lower middle Income	2006	15.84	32.00	0.26	2.14	8.51	3.67	46.83	(0.08)	3.12	6.10	6.40
Ghana	2	Lower middle Income	2007	9.61	32.00	0.44	3.88	9.02	1.68	41.84	(0.06)	5.59	3.80	4.35
Ghana	2	Lower middle Income	2008	11.90	35.00	0.53	5.19	7.81	6.37	36.86	(0.04)	9.52	2.00	9.15

Ghana	2	Lower middle Income	2009	9.65	35.00	0.22	1.96	9.14	2.21	37.16	0.09	9.13	7.66	4.85
Ghana	2	Lower middle Income	2010	10.98	35.00	0.32	3.37	9.02	5.22	39.15	0.12	7.86	9.57	7.90
Ghana	2	Lower middle Income	2011	7.83	36.00	0.35	4.13	8.64	11.25	39.12	0.13	8.21	14.02	14.05
Ghana	2	Lower middle Income	2012	8.26	34.00	0.13	1.64	10.21	6.66	40.12	0.12	7.86	19.34	9.29
Ghana	2	Lower middle Income	2013	8.16	34.00	0.13	1.64	10.21	4.77	41.88	0.90	6.75	14.46	7.31
Ghana	2	Lower middle Income	2014	8.56	34.00	0.13	1.64	10.21	1.57	38.23	0.11	8.71	17.74	3.99
Ghana	2	Lower middle Income	2015	8.91	34.00	0.13	1.64	10.21	1.55	40.99	0.79	8.50	13.08	3.92
Ghana	2	Lower middle Income	2016	8.10	34.00	0.13	1.64	10.21	1.55	40.99	0.79	8.50	13.08	3.92
Kenya	13	Lower middle Income	1990	18.48	23.00	0.32	1.34	6.12	0.73	17.79	(0.37)	0.67	18.53	4.19
Kenya	13	Lower middle Income	1991	18.01	25.00	0.32	1.67	5.12	(1.86)	18.33	(0.34)	0.23	19.46	1.44
Kenya	13	Lower middle Income	1992	17.12	29.00	0.21	1.14	4.12	(3.95)	20.22	(0.31)	0.08	16.51	(0.80)
Kenya	13	Lower middle Income	1993	18.48	38.00	0.21	1.14	5.12	(2.74)	19.46	(0.30)	2.53	22.56	0.35
Kenya	13	Lower middle Income	1994	42.62	40.00	0.96	2.25	4.21	(0.39)	18.66	(0.26)	0.10	22.11	2.63
Kenya	13	Lower middle Income	1995	22.30	56.00	0.66	2.97	5.12	1.49	21.45	(0.23)	0.47	15.26	4.41
Kenya	13	Lower middle Income	1996	14.93	57.00	0.59	3.96	4.57	1.39	19.58	(0.20)	0.90	8.09	4.15
Kenya	13	Lower middle Income	1997	13.82	57.00	0.74	5.38	6.32	(2.05)	21.94	(0.20)	0.47	6.46	0.47
Kenya	13	Lower middle Income	1998	14.82	57.00	0.53	3.55	7.12	0.77	23.39	(0.10)	0.19	8.13	3.29
Kenya	13	Lower middle Income	1999	14.82	57.00	0.38	3.55	7.12	(0.18)	25.12	(0.01)	0.40	8.99	2.31
Kenya	13	Lower middle Income	2000	9.88	56.00	0.30	3.01	7.21	(1.88)	25.79	(0.01)	0.87	7.28	0.60
Kenya	13	Lower middle Income	2001	8.05	57.00	0.30	3.76	8.11	1.18	24.87	(0.07)	0.04	8.71	3.78
Kenya	13	Lower middle Income	2002	10.89	49.00	0.28	2.61	9.68	(2.00)	25.23	(0.07)	0.21	9.76	0.55
Kenya	13	Lower middle Income	2003	28.06	47.00	1.34	4.78	10.70	0.30	24.99	(0.07)	0.55	10.52	2.93

Kenya	13	Lower middle Income	2004	24.17	48.00	1.76	7.29	11.30	2.40	25.17	(0.26)	0.29	10.71	5.10
Kenya	13	Lower middle Income	2005	34.07	48.00	2.69	7.90	12.50	3.18	25.55	(0.23)	0.11	10.19	5.91
Kenya	13	Lower middle Income	2006	44.06	52.00	5.28	11.99	14.20	3.72	25.34	(0.17)	0.20	9.37	6.47
Kenya	13	Lower middle Income	2007	41.76	55.00	3.53	8.45	11.50	4.08	24.98	(0.23)	2.28	10.40	6.85
Kenya	13	Lower middle Income	2008	30.24	55.00	2.07	6.84	13.20	(2.37)	28.00	(0.20)	0.27	7.38	0.23
Kenya	13	Lower middle Income	2009	29.62	55.00	0.54	1.81	16.60	0.61	28.37	(0.13)	0.31	8.53	3.31
Kenya	13	Lower middle Income	2010	36.15	55.00	1.98	5.49	15.90	5.56	30.55	(0.07)	0.45	7.82	8.40
Kenya	13	Lower middle Income	2011	24.32	58.00	2.19	8.99	15.90	3.31	32.94	(0.21)	0.33	4.51	6.11
Kenya	13	Lower middle Income	2012	5.28	60.00	2.00	8.07	14.00	1.79	34.81	(0.31)	0.32	5.95	4.55
Kenya	13	Lower middle Income	2013	5.28	61.00	3.28	8.07	14.00	2.91	29.31	(0.31)	0.67	5.18	5.69
Kenya	13	Lower middle Income	2014	5.28	65.00	2.00	8.07	14.00	2.58	31.45	(0.31)	1.54	5.22	5.33
Kenya	13	Lower middle Income	2015	5.28	64.00	2.00	8.07	14.00	2.93	31.45	(0.31)	2.27	7.94	5.65
Kenya	13	Lower middle Income	2016	5.28	66.00	2.00	8.07	14.00	2.93	31.45	(0.31)	2.27	7.94	5.65
Malawi	3	Low Income	1990	-	-	-	-	3.21	1.92	9.35	(0.23)	1.24	13.40	5.69
Malawi	3	Low Income	1991	-	-	-	-	3.00	6.52	9.64	(0.23)	(1.30)	14.20	8.73
Malawi	3	Low Income	1992	-	-	-	-	2.89	(8.09)	12.01	(0.28)	(0.39)	0.69	(7.33)
Malawi	3	Low Income	1993	-	-	-	-	2.34	9.53	9.17	(0.30)	0.39	(0.92)	9.69
Malawi	3	Low Income	1994	-	-	-	-	2.12	(10.50)	8.60	(0.56)	2.11	(3.01)	(10.24)
Malawi	3	Low Income	1995	-	-	-	-	2.12	15.57	5.99	(0.45)	0.40	(0.33)	16.73
Malawi	3	Low Income	1996	-	-	-	-	2.12	5.34	3.91	(0.44)	0.69	3.28	7.32
Malawi	3	Low Income	1997	-	-	-	-	4.12	1.23	3.47	(0.51)	0.56	(0.63)	3.79
Malawi	3	Low Income	1998	-	-	-	-	5.23	0.91	4.29	(0.53)	0.69	8.13	3.90
Malawi	3	Low Income	1999	-	-	-	-	5.23	0.02	4.71	(0.56)	3.30	(0.62	3.04

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Malawi	3	Low Income	2000	-	-	-	-	4.22	(1.24)	4.51	(0.48)	1.49	3.83	1.58
Malawi	3	Low Income	2001	-	-	-	-	4.10	(7.44)	4.90	(0.73)	1.12	3.76	(4.97)
Malawi	3	Low Income	2002	-	-	-	-	4.12	(0.86)	2.59	(0.67)	0.17	2.12	1.70
Malawi	3	Low Income	2003	-	-	-	-	4.63	3.07	2.72	(0.54)	2.05	2.42	5.71
Malawi	3	Low Income	2004	8.90	8.00	0.00	0.02	4.90	2.73	3.09	(0.52)	3.10	(0.02)	5.42
Malawi	3	Low Income	2005	8.31	9.00	0.00	0.01	5.82	0.51	3.60	(0.48)	3.82	(4.11)	3.27
Malawi	3	Low Income	2006	6.50	10.00	0.00	0.03	5.19	1.79	4.13	(0.52)	0.89	0.92	4.70
Malawi	3	Low Income	2007	6.51	12.00	0.03	4.21	5.19	6.47	4.94	(0.48)	2.81	13.25	9.60
Malawi	3	Low Income	2008	41.40	15.00	1.40	4.21	5.19	4.49	6.69	(0.48)	3.67	6.58	7.64
Malawi	3	Low Income	2009	27.49	15.00	0.39	1.25	5.19	5.12	9.21	(0.44)	0.79	12.84	8.33
Malawi	3	Low Income	2010	25.25	14.00	0.37	1.46	5.19	3.68	11.34	(0.58)	1.39	10.75	6.87
Malawi	3	Low Income	2011	24.60	14.00	0.95	3.88	5.60	1.71	14.10	(0.70)	10.18	5.20	4.85
Malawi	3	Low Income	2012	17.77	14.00	0.38	1.51	6.80	(1.19)	13.99	(0.71)	(0.15)	(3.41)	1.89
Malawi	3	Low Income	2013	17.77	14.00	0.38	1.51	6.80	(1.82)	12.39	(0.71)	8.31	(3.41)	0.47
Malawi	3	Low Income	2014	17.77	14.00	0.38	1.51	6.80	(1.19)	10.81	(0.71)	9.88	(3.41)	1.89
Malawi	3	Low Income	2015	17.77	14.00	0.38	1.51	6.80	(1.19)	27.79	(0.71)	8.05	(3.41)	1.89
Malawi	3	Low Income	2016	17.77	14.00	0.38	1.51	6.80	(1.19)	27.79	(0.71)	8.05	(3.41)	1.89
Mauritius	4	Upper middle	1990	21.46	23.00	1.88	5.36	12.12	6.43	31.86	0.56		23.01	7.19
Mauritius	4	Upper middle	1991	37.14	26.00	1.68	6.31	12.76	3.31	34.18	0.71		24.48	4.44
Mauritius	4	Upper middle	1992	33.10	28.00	1.77	4.00	13.65	5.12	37.74	0.68		25.82	6.51
Mauritius	4	Upper middle	1993	33.58	30.00	1.15	6.68	13.67	3.84	41.78	0.65		24.50	5.08
Mauritius	4	Upper middle	1994	36.40	30.00	2.35	6.91	13.99	2.69	44.37	0.53		23.04	4.14
Mauritius	4	Upper middle	1995	40.82	30.00	1.33	6.12	13.65	3.39	42.73	0.65		23.16	4.29
Mauritiu	4	Upper middle	1996	35.46	31.00	2.24	6.79	13.44	4.51	44.47	0.76		23.99	5.59

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Mauritius	4	Upper middle	1997	27.12	31.00	2.92	5.26	13.78	4.37	50.05	0.54		24.51	5.69
Mauritius	4	Upper middle	1998	21.56	31.00	2.27	10.77	14.28	4.96	54.25	0.51		24.95	6.07
Mauritius	4	Upper middle	1999	24.97	30.00	1.65	4.62	15.33	1.31	53.25	0.51		23.29	2.61
Mauritius	4	Upper middle	2000	33.79	28.00	1.43	5.42	15.95	7.96	54.15	0.51		25.58	9.03
Mauritius	4	Upper middle	2001	33.18	29.00	2.32	5.38	16.56	1.77	55.69	0.51		26.62	2.57
Mauritius	4	Upper middle	2002	37.02	30.00	1.15	6.01	1.14	1.41	61.02	0.51		25.13	2.11
Mauritius	4	Upper middle	2003	70.55	62.00	1.83	3.16	1.08	2.91	67.11	0.51		24.89	3.66
Mauritius	4	Upper middle	2004	97.16	67.00	1.79	5.20	1.06	5.08	70.07	0.42		22.05	5.75
Mauritius	4	Upper middle	2005	46.66	65.00	2.22	7.48	1.08	0.64	69.30	0.44		16.53	1.24
Mauritius	4	Upper middle	2006	72.10	64.00	2.23	5.17	1.01	8.03	68.63	0.54		15.40	8.54
Mauritius	4	Upper middle	2007	77.50	62.00	5.05	4.71	0.94	5.25	76.90	0.51		16.84	5.73
Mauritius	4	Upper middle	2008	68.11	63.00	3.49	6.50	0.93	5.01	82.86	0.79		12.00	5.39
Mauritius	4	Upper middle	2009	61.53	60.00	3.73	4.12	29.40	3.04	82.46	0.87		14.69	3.32
Mauritius	4	Upper middle	2010	73.72	63.00	3.65	3.59	27.74	4.13	86.73	0.90		16.12	4.38
Mauritius	4	Upper middle	2011	68.35	66.00	4.43	5.29	25.70	3.91	93.51	0.85		11.30	4.08
Mauritius	4	Upper middle	2012	61.53	60.00	2.54	4.12	25.70	0.13	101.52	0.85		11.30	4.08
Mauritius	4	Upper middle	2013	73.72	63.00	2.65	3.59	25.70	0.13	102.54	0.85		11.30	4.08
Mauritius	4	Upper middle	2014	68.35	66.00	3.62	5.29	25.70	0.13	16.84	0.85		11.30	4.08
Mauritius	4	Upper middle	2015	61.96	71.00	3.94	6.37	25.70	0.13	16.84	0.85		11.30	4.08
Mauritius	4	Upper middle	2016	68.35	66.00	4.43	5.29	25.70	0.13	16.84	0.85		11.30	4.08
Namibia	5	Upper middle	1990	-	-	-	-		(1.88)	21.71	0.32	1.05	20.31	2.05
Namibia	5	Upper middle	1991	-	-	-	-	1.98	4.42	20.88	0.21	4.00	9.50	8.17

Namibia	5	Upper middle	1992	-	-	-	-	1.01	3.82	28.01	0.45	3.43	12.44	7.19
Namibia	5	Upper middle	1993	0.86	4.00	0.34	-	2.99	(4.47)	37.29	0.32	1.72	12.53	(1.58)
Namibia	5	Upper middle	1994	5.40	8.00	0.08	6.21	2.10	(1.21)	37.97	0.24	2.69	17.93	1.73
Namibia	5	Upper middle	1995	4.80	10.00	0.96	1.58	3.10	0.86	43.99	0.61	3.88	15.30	3.90
Namibia	5	Upper middle	1996	12.00	12.00	0.56	7.96	1.99	0.10	44.23	0.54	3.26	14.90	3.19
Namibia	5	Upper middle	1997	16.80	13.00	0.34	3.35	1.99	1.09	44.69	0.44	2.22	10.30	4.22
Namibia	5	Upper middle	1998	11.17	15.00	0.59	3.04	4.99	0.33	44.46	0.32	2.51	13.12	3.29
Namibia	5	Upper middle	1999	17.47	14.00	0.47	3.36	5.99	0.73	43.48	0.45	0.04	12.43	3.37
Namibia	5	Upper middle	2000	7.76	12.00	0.15	6.11	3.99	1.28	42.27	0.12	5.02	13.43	3.49
Namibia	5	Upper middle	2001	4.24	13.00	0.05	3.46	2.99	(0.55)	42.27	0.40	10.70	15.83	1.18
Namibia	5	Upper middle	2002	2.47	13.00	0.05	1.95	3.99	3.36	39.90	0.12	4.39	16.45	4.79
Namibia	5	Upper middle	2003	6.24	13.00	0.03	0.71	3.00	3.04	42.55	0.15	1.32	10.28	4.24
Namibia	5	Upper middle	2004	6.70	13.00	0.27	4.71	(1.00)	11.02	43.47	0.66	3.38	16.80	12.27
Namibia	5	Upper middle	2005	5.71	13.00	0.09	1.50	3.00	1.30	47.40	0.67	5.41	19.83	2.53
Namibia	5	Upper middle	2006	6.79	9.00	0.23	3.78	7.00	5.67	47.54	0.71	7.64	26.17	7.07
Namibia	5	Upper middle	2007	8.03	9.00	0.26	3.67	10.00	5.12	47.80	0.53	7.66	19.03	6.62
Namibia	5	Upper middle	2008	7.31	7.00	0.22	2.84	9.00	1.07	46.67	0.50	8.83	15.33	2.65
Namibia	5	Upper middle	2009	9.54	7.00	0.25	3.03	8.00	(1.41)	47.09	0.40	5.60	5.67	0.30
Namibia	5	Upper middle	2010	10.43	7.00	0.16	1.82	7.00	4.04	47.17	0.36	6.80	11.23	6.04
Namibia	5	Upper middle	2011	9.29	7.00	0.12	1.23	6.00	2.91	47.49	0.40	6.00	10.43	5.09
Namibia	5	Upper middle	2012	10.02	7.00	0.16	1.71	6.00	2.70	45.28	0.37	8.28	9.98	5.06
Namibia	5	Upper middle	2013	10.02	7.00	0.16	1.71	6.00	3.18	44.83	0.37	6.71	9.27	5.65
Namibia	5	Upper middle	2014	10.02	7.00	0.16	1.71	6.00	3.97	44.61	0.37	3.15	12.12	6.46
Namibia	5	Upper middle	2015	10.02	7.00	0.16	1.71	6.00	2.90	35.78	0.37	9.22	10.38	5.30
Namibia	5	Upper middle	2016	10.02	7.00	0.16	1.71	6.00	2.90	35.78	0.37	9.22	10.38	5.30
Nigeria	14	Lower middle Income	1990	10.09	131.00	1.14	0.92	0.68	9.89	10.67	(0.54)	1.91	32.09	12.77
Nigeria	14	Lower middle Income	1991	11.90	142.00	1.70	0.55	0.53	(3.12)	8.55	(0.54)	2.60	32.32	(0.62)
Nigeria	14	Lower middle	1992											

		Income		11.90	142.00	0.99	1.67	0.99	(2.07)	8.70	(0.72)	3.06	26.79	0.43
Nigeria	14	Lower middle Income	1993	13.57	174.00	0.19	1.41	0.77	(0.44)	9.80	(0.69)	8.52	23.16	2.09
Nigeria	14	Lower middle Income	1994	16.46	177.00	0.25	1.50	0.90	(1.58)	13.04	(0.79)	10.83	17.51	0.91
Nigeria	14	Lower middle Income	1995	27.24	181.00	0.29	1.07	0.56	(2.76)	12.59	(0.82)	3.78	18.84	(0.31)
Nigeria	14	Lower middle Income	1996	36.34	183.00	0.90	2.47	0.54	2.41	9.39	(0.65)	4.55	14.09	4.99
Nigeria	14	Lower middle Income	1997	35.06	182.00	1.39	3.97	0.65	0.27	8.80	(0.78)	4.30	15.06	2.80
Nigeria	14	Lower middle Income	1998	32.25	186.00	1.90	5.91	0.44	0.18	10.19	(0.87)	3.28	1.83	2.72
Nigeria	14	Lower middle Income	1999	8.19	194.00	0.31	3.83	0.56	(2.01)	12.58	(0.76)	2.80	18.90	0.47
Nigeria	14	Lower middle Income	2000	8.19	194.00	0.31	3.83	0.77	2.70	12.96	(0.65)	2.46	39.11	5.32
Nigeria	14	Lower middle Income	2001	8.19	194.00	0.38	3.83	0.65	1.81	11.33	(0.88)	2.70	16.68	4.41
Nigeria	14	Lower middle Income	2002	8.19	194.00	0.38	3.83	0.46	1.19	15.25	(0.88)	3.17	15.57	3.78
Nigeria	14	Lower middle Income	2003	8.19	194.00	0.38	3.83	0.77	7.58	12.97	(0.88)	2.96	14.27	10.35
Nigeria	14	Lower middle Income	2004	16.47	206.00	1.91	10.59	0.46	30.34	12.47	(1.32)	2.13	19.27	33.74
Nigeria	14	Lower middle Income	2005	17.24	215.00	1.74	8.78	0.34	0.79	11.77	(0.77)	4.44	18.03	3.44
Nigeria	14	Lower middle Income	2006	22.57	201.00	2.47	10.96	1.62	5.41	12.45	(0.89)	3.34	29.89	8.21
Nigeria	14	Lower middle Income	2007	51.88	211.00	10.43	20.45	4.13	4.04	12.20	(0.86)	3.63	12.25	6.83
Nigeria	14	Lower middle Income	2008	23.94	212.00	8.04	34.79	3.80	3.48	18.41	(0.78)	3.94	23.12	6.27
Nigeria	14	Lower middle Income	2009	19.66	214.00	2.65	13.94	6.03	4.12	27.77	(0.73)	5.05	11.83	6.93
Nigeria	14	Lower middle Income	2010	13.79	215.00	1.38	10.10	5.91	4.99	36.01	(0.71)	1.63	25.17	7.84
Nigeria	14	Lower middle Income	2011	9.54	196.00	0.94	9.92	6.33	2.10	16.64	(0.67)	2.15	26.08	4.89
Nigeria	14	Lower middle Income	2012	12.23	189.00	0.89	9.92	6.37	1.51	13.05	(0.72)	1.53	33.41	4.28
Nigeria	14	Lower middle Income	2013	15.65	188.00	1.21	9.92	5.10	2.60	11.54	(0.67)	1.08	19.95	5.39
Nigeria	14	Lower middle	2014											

		Income		11.16	188.00	0.90	8.18	7.70	3.52	11.57	(0.82)	0.82	21.79	6.31
Nigeria	14	Lower middle Income	2015	11.16	183.00	0.85	8.17	7.70	(0.01)	12.89	(0.82)	0.65	15.36	2.65
Nigeria	14	Lower middle Income	2016	11.16	188.00	0.90	8.18	7.70	30.34	12.89	(0.82)	0.65	15.36	2.65
South Africa	6	Upper middle	1990	122.19	740.00	7.36	6.02	22.88	(2.33)	73.62	0.43	(0.07)	23.21	(0.32)
South Africa	6	Upper middle	1991	153.63	698.00	6.72	4.37	23.65	(3.04)	59.47	0.33	0.21	21.67	(1.02)
South Africa	6	Upper middle	1992	125.69	642.00	5.55	4.42	24.92	(4.16)	71.09	0.33	0.00	18.79	(2.14)
South Africa	6	Upper middle	1993	161.64	615.00	5.89	3.65	24.01	(0.88)	99.29	0.41	0.01	19.69	1.23
South Africa	6	Upper middle	1994	185.70	600.00	9.56	5.15	23.84	1.02	104.64	0.50	0.27	19.90	3.20
South Africa	6	Upper middle	1995	178.43	612.00	10.26	5.75	23.12	0.89	110.14	0.66	0.80	19.83	3.10
South Africa	6	Upper middle	1996	163.66	599.00	18.05	11.03	25.01	2.00	112.62	0.67	0.55	19.53	4.30
South Africa	6	Upper middle	1997	150.76	615.00	27.57	18.29	29.12	0.28	113.00	0.71	2.50	18.84	2.60
South Africa	6	Upper middle	1998	122.33	650.00	39.40	32.21	29.12	(1.84)	112.98	0.53	0.40	19.10	0.50
South Africa	6	Upper middle	1999	190.10	652.00	53.30	28.04	31.25	(0.04)	121.10	0.50	1.10	19.56	2.40
South Africa	6	Upper middle	2000	149.82	604.00	51.70	34.51	35.12	1.65	127.04	0.40	0.71	19.25	4.20
South Africa	6	Upper middle	2001	121.36	510.00	29.10	23.98	38.86	0.62	132.56	0.45	5.98	19.69	2.70
South Africa	6	Upper middle	2002	157.60	429.00	41.29	26.20	57.18	2.47	122.09	0.42	1.28	20.08	3.70
South Africa	6	Upper middle	2003	148.78	390.00	27.99	18.81	52.48	1.64	114.70	0.42	0.45	19.47	2.95
South Africa	6	Upper middle	2004	193.58	369.00	36.65	18.93	57.04	3.19	120.09	0.67	0.31	18.32	4.55
South Africa	6	Upper middle	2005	213.10	348.00	43.18	20.26	51.47	3.88	127.86	0.71	2.53	18.06	5.28
South Africa	6	Upper middle	2006	261.83	359.00	63.96	24.43	55.66	4.15	140.58	0.53	0.23	18.46	5.59
South Africa	6	Upper middle	2007	276.60	374.00	86.08	31.12	59.87	3.90	150.21	0.50	2.20	19.66	5.36
South Africa	6	Upper middle	2008	168.32	367.00	70.66	41.98	45.87	1.73	148.18	0.40	3.45	21.38	3.19
South Africa	6	Upper middle	2009	270.00	353.00	73.50	27.22	55.13	(2.96)	147.08	0.36	2.58	21.13	(1.54)
South Africa	6	Upper middle	2010	246.44	352.00	73.86	29.97	54.32	1.52	146.17	0.40	0.98	20.75	3.04
South Africa	6	Upper middle	2011	189.40	347.00	54.21	28.62	41.64	1.73	141.33	0.37	0.99	20.53	3.28
South Africa	6	Upper middle	2012	228.42	338.00	57.09	24.99	82.00	0.64	143.02	0.41	1.17	18.51	2.21
South Africa	6	Upper middle	2013	257.43	322.00	63.41	24.63	71.23	0.72	149.37	0.32	2.24	18.66	2.33
South	6	Upper	2014											

Africa		middle		266.73	322.00	70.17	26.31	69.13	0.00	147.28	0.34	1.65	19.03	1.63
South Africa	6	Upper middle	2015	266.73	322.00	70.17	31.79	69.13	(0.39)	147.28	0.34	0.50	19.72	1.26
South Africa	6	Upper middle	2016	266.73	322.00	70.17	61.15	69.13	(0.39)	147.28	0.34	0.50	19.72	1.26
Swaziland	7	Lower middle Income	1990	-	1.00	-	-	31.33	16.96	14.16	(0.52)	2.70	5.25	21.02
Swaziland	7	Lower middle Income	1991	-	2.00	-	-	32.13	(1.05)	17.67	(0.43)	7.10	4.27	1.76
Swaziland	7	Lower middle Income	1992	-	4.00	-	-	31.54	0.87	18.13	(0.41)	6.80	0.97	3.23
Swaziland	7	Lower middle Income	1993	-	4.00	-	-	35.55	1.07	16.08	(0.32)	5.30	(1.03)	3.11
Swaziland	7	Lower middle Income	1994	23.86	4.00	0.14	0.63	38.40	0.45	16.42	(0.44)	4.46	8.17	2.40
Swaziland	7	Lower middle Income	1995	19.94	4.00	0.02	0.11	29.30	2.74	15.00	(0.66)	3.05	2.29	4.83
Swaziland	7	Lower middle Income	1996	29.40	5.00	0.12	0.49	30.23	1.62	13.71	(0.57)	1.35	(4.25)	3.84
Swaziland	7	Lower middle Income	1997	7.54	4.00	0.01	0.08	34.89	0.82	13.12	(0.57)	(0.89)	2.42	3.10
Swaziland	7	Lower middle Income	1998	5.39	6.00	0.01	0.21	38.35	0.42	13.18	(0.71)	9.68	1.50	2.60
Swaziland	7	Lower middle Income	1999	6.13	7.00	0.01	0.17	40.00	1.04	12.78	(0.58)	6.35	0.41	2.95
Swaziland	7	Lower middle Income	2000	4.28	6.00	0.02	0.27	39.45	0.27	12.70	(0.55)	5.32	12.39	1.76
Swaziland	7	Lower middle Income	2001	8.34	5.00	0.74	9.97	37.12	0.85	11.09	(0.60)	1.92	14.96	1.90
Swaziland	7	Lower middle Income	2002	10.51	5.00	0.01	0.13	36.45	2.53	10.92	(0.60)	6.61	14.74	3.24
Swaziland	7	Lower middle Income	2003	7.94	5.00	0.00	0.03	39.10	4.00	13.40	(0.60)	(2.77)	19.98	4.56
Swaziland	7	Lower middle Income	2004	8.04	6.00	0.00	0.02	41.45	2.47	15.64	(0.66)	2.52	14.64	3.11
Swaziland	7	Lower middle Income	2005	6.32	6.00	0.00	0.01	42.46	4.25	18.92	(0.57)	(1.48)	8.38	5.19
Swaziland	7	Lower middle Income	2006	6.21	6.00	0.00	0.03	39.32	3.80	19.19	(0.57)	3.81	9.08	5.07
Swaziland	7	Lower middle Income	2007	6.97	6.00	0.00	0.04	37.23	2.53	21.99	(0.71)	1.12	8.51	4.05
Swaziland	7	Lower middle Income	2008	6.65	6.00	0.00	0.04	41.00	2.71	21.80	(0.71)	3.26	4.40	4.42
Swaziland	7	Lower middle Income	2009	6.65	6.00	0.00	0.04	50.00	0.84	22.05	(0.71)	1.84	3.20	2.57

Swaziland	7	Lower middle Income	2010	5.99	6.00	0.00	0.04	46.90	0.14	24.22	(0.71)	3.00	3.48	1.81
Swaziland	7	Lower middle Income	2011	4.91	6.00	0.00	0.04	46.25	0.28	19.48	(0.71)	1.88	2.00	1.90
Swaziland	7	Lower middle Income	2012	6.09	6.00	0.00	0.04	50.10	1.81	19.51	(0.71)	1.84	3.99	3.43
Swaziland	7	Lower middle Income	2013	5.09	6.00	0.00	0.04	50.25	2.99	19.32	(0.71)	0.64	8.28	4.57
Swaziland	7	Lower middle Income	2014	4.98	6.00	0.00	0.04	40.88	1.25	20.45	(0.71)	0.59	10.81	2.75
Swaziland	7	Lower middle Income	2015	4.67	6.00	0.00	0.04		0.45	19.20	(0.71)	0.77	10.91	1.87
Swaziland	7	Lower middle Income	2016	5.00	6.00	0.00	0.04		0.45	19.20	(0.71)	0.77	10.81	1.81
Tanzania	8	Low Income	1990	-	-	-	-	3.98	3.71	12.39	(0.42)	0.00	1.28	7.05
Tanzania	8	Low Income	1991	-	-	-	-	2.99	(1.22)	12.64	(0.45)	0.00	2.96	2.07
Tanzania	8	Low Income	1992	-	-	-	-	3.10	(2.72)	10.93	(0.52)	0.26	0.32	0.58
Tanzania	8	Low Income	1993	-	-	-	-	3.01	(2.09)	10.12	(0.42)	0.48	(4.60)	1.21
Tanzania	8	Low Income	1994	-	-	-	-	3.79	(1.60)	9.47	(0.52)	1.11	1.64	1.57
Tanzania	8	Low Income	1995	-	-	-	-	3.76	0.55	7.31	(0.44)	2.28	2.36	3.57
Tanzania	8	Low Income	1996	-	-	-	-	3.55	1.73	4.42	(0.65)	2.31	4.63	4.54
Tanzania	8	Low Income	1997	-	-	-	-	3.67	0.91	3.08	(0.43)	2.05	5.43	3.53
Tanzania	8	Low Income	1998	-	-	-	-	2.10	1.18	3.73	(0.33)	1.84	7.48	3.71
Tanzania	8	Low Income	1999	1.86	4.00	0.07	3.36	2.99	2.28	4.27	(0.42)	5.33	7.21	4.84
Tanzania	8	Low Income	2000	2.29	4.00	0.39	19.40	3.61	2.30	4.43	(0.36)	4.55	10.05	4.93
Tanzania	8	Low Income	2001	3.83	5.00	0.08	2.54	3.73	3.25	4.34	(0.33)	5.29	13.17	6.00
Tanzania	8	Low Income	2002	6.55	5.00	0.18	3.44	3.68	4.31	5.17	(0.43)	3.66	14.93	7.16
Tanzania	8	Low Income	2003	5.65	6.00	0.17	2.89	3.90	3.96	6.27	(0.43)	2.73	14.92	6.89
Tanzania	8	Low Income	2004	5.22	6.00	0.13	2.52	4.50	4.79	7.42	(0.44)	3.45	16.16	7.83
Tanzania	8	Low Income	2005	3.47	6.00	0.09	2.29	5.00	5.05	8.46	(0.45)	5.53	16.22	8.17
Tanzania	8	Low Income	2006	2.91	6.00	0.06	2.10	5.10	1.56	10.31	(0.37)	2.17	18.13	4.66
Tanzania	8	Low Income	2007	2.91	6.00	0.06	2.10	5.70	5.18	12.40	(0.40)	2.70	20.08	8.46
Tanzania	8	Low Income	2008	4.72	14.00	0.10	2.10	6.10	2.31	13.98	(0.50)	5.05	19.94	5.57

Tanzania	8	Low Income	2009	4.81	15.00	0.19	2.10	6.80	2.11	14.64	(0.42)	3.33	16.22	5.38
Tanzania	8	Low Income	2010	4.06	11.00	0.08	3.21	7.00	3.04	14.60	(0.41)	5.77	16.91	6.36
Tanzania	8	Low Income	2011	4.58	17.00	0.10	2.45	6.80	4.53	15.69	(0.40)	3.63	17.96	7.90
Tanzania	8	Low Income	2012	4.65	17.00	0.07	1.60	6.90	1.86	16.38	(0.40)	4.60	16.68	5.14
Tanzania	8	Low Income	2013	4.65	17.00	0.07	1.60	6.90	3.92	16.06	(0.40)	4.71	16.91	7.26
Tanzania	8	Low Income	2014	4.65	17.00	0.07	1.60	6.90	3.65	12.75	(0.40)	4.24	19.76	6.97
Tanzania	8	Low Income	2015	4.65	17.00	0.07	1.60	6.90	3.67	12.75	(0.40)	4.30	23.15	6.96
Tanzania	8	Low Income	2016	4.65	17.00	0.07	1.60	6.90	3.67	12.75	(0.40)	4.30	23.15	6.96
Uganda	9	Low Income	1990	-	-	-	-	0.92	2.91	3.19	(0.45)	(0.14)	0.58	6.47
Uganda	9	Low Income	1991	-	-	-	-	0.99	2.09	2.65	(0.68)	0.03	0.70	5.55
Uganda	9	Low Income	1992	-	-	-	-	0.88	0.09	2.87	(0.65)	0.10	0.41	3.42
Uganda	9	Low Income	1993	-	-	-	-	1.99	4.90	3.38	(0.65)	1.70	1.13	8.33
Uganda	9	Low Income	1994	-	-	-	-	1.10	3.10	3.56	(0.45)	2.21	4.32	6.40
Uganda	9	Low Income	1995	-	-	-	-	2.10	8.13	3.71	(0.54)	2.11	3.37	11.52
Uganda	9	Low Income	1996	-	-	-	-	3.99	5.81	4.41	(0.50)	2.00	8.71	9.07
Uganda	9	Low Income	1997	-	-	-	-	3.00	2.01	4.51	(0.51)	2.79	10.74	5.10
Uganda	9	Low Income	1998	-	-	-	-	2.99	1.82	4.62	(0.64)	3.19	5.68	4.91
Uganda	9	Low Income	1999	-	-	-	-	1.89	4.82	5.23	(0.65)	2.34	8.03	8.05
Uganda	9	Low Income	2000	-	-	-	-	1.99	(0.03)	5.31	(0.01)	2.59	8.04	3.14
Uganda	9	Low Income	2001	0.60	2.00	0.00	1.87	1.87	1.85	5.87	(0.01)	2.59	7.01	5.18
Uganda	9	Low Income	2002	0.79	3.00	0.02	2.38	1.45	5.21	6.83	(0.34)	2.99	6.37	8.73
Uganda	9	Low Income	2003	0.74	3.00	0.01	2.98	1.78	2.97	7.56	(0.34)	3.19	7.17	6.47
Uganda	9	Low Income	2004	1.21	5.00	0.01	3.12	2.50	3.27	7.70	0.00	3.72	10.08	6.81
Uganda	9	Low Income	2005	1.14	5.00	0.03	3.02	3.10	2.81	7.93	(0.18)	4.21	11.72	6.33
Uganda	9	Low Income	2006	1.17	5.00	0.06	5.48	2.60	7.12	8.74	(0.20)	6.48	8.05	10.78
Uganda	9	Low Income	2007	1.17	5.00	0.06	5.48	2.12	4.83	9.20	(0.20)	6.45	8.76	8.41
Uganda	9	Low Income	2008	1.17	5.00	0.06	5.48	4.58	5.12	11.23	(0.22)	5.12	15.28	8.71
Uganda	9	Low Income	2009	22.04	8.00	0.06	0.29	3.68	3.26	12.36	(0.15)	4.63	12.79	6.76

Uganda	9	Low Income	2010	9.51	8.00	0.05	0.36	3.88	2.22	13.27	(0.15)	2.69	15.35	5.67
Uganda	9	Low Income	2011	41.41	8.00	0.08	0.33	4.16	5.85	16.40	(0.14)	4.37	12.38	9.39
Uganda	9	Low Income	2012	30.74	10.00	0.05	0.15	2.56	0.49	15.35	(0.24)	5.13	14.16	3.83
Uganda	9	Low Income	2013	30.74	10.00	0.05	0.15	2.99	0.24	15.03	(0.28)	4.39	17.77	3.56
Uganda	9	Low Income	2014	30.74	10.00	0.05	0.15	2.01	1.82	13.45	(0.24)	3.81	17.02	5.18
Uganda	9	Low Income	2105	30.74	10.00	0.05	0.15	2.65	1.78	13.45	(0.23)	3.84	13.28	5.14
Uganda	9	Low Income	2016	30.74	10.00	0.05	0.15	2.88	1.78	13.45	(0.34)	3.84	13.28	5.14
Zambia	11	Low Income	1990	30.74	10.00	0.05	0.15	1.99	(3.20)	6.78	(0.42)	6.17		(0.48)
Zambia	11	Low Income	1991	-	-	-	-	0.77	(2.65)	5.30	(0.23)	1.02		(0.04)
Zambia	11	Low Income	1992	-	-	-	-	0.99	(4.20)	4.15	(0.43)	1.41		(1.73)
Zambia	11	Low Income	1993	-	-	-	-	1.10	4.16	3.69	(0.41)	9.61		6.80
Zambia	11	Low Income	1994	11.24	2.00	0.01	0.05	1.99	(10.90)	4.66	(0.54)	1.09		(8.63)
Zambia	11	Low Income	1995	11.24	2.00	0.01	1.23	2.01	0.28	6.09	(0.65)	2.55		2.90
Zambia	11	Low Income	1996	6.03	2.00	0.07	1.59	1.91	3.44	7.55	(0.54)	3.26		6.22
Zambia	11	Low Income	1997	11.66	5.00	0.19	0.46	2.34	1.03	7.23	(0.43)	4.82		3.81
Zambia	11	Low Income	1998	8.08	6.00	0.04	0.46	2.43	(3.07)	6.57	(0.43)	5.60		(0.39)
Zambia	11	Low Income	1999	30.74	10.00	0.05	0.15	2.99	1.86	6.18	(0.32)	4.76		4.65
Zambia	11	Low Income	2000	30.74	10.00	0.05	0.15	2.99	1.19	6.69	(0.32)	3.38		3.90
Zambia	11	Low Income	2001	6.19	9.00	0.12	21.66	4.13	2.64	6.69	(0.70)	3.54		5.32
Zambia	11	Low Income	2002	5.56	11.00	0.12	0.82	4.01	1.89	5.90	(0.62)	7.11		4.51
Zambia	11	Low Income	2003	15.28	12.00	0.13	2.21	4.08	4.27	5.81	(0.49)	7.08		6.94
Zambia	11	Low Income	2004	7.30	13.00	0.04	1.11	6.05	4.30	6.00	(0.51)	5.85		7.03
Zambia	11	Low Income	2005	11.87	15.00	0.13	1.96	3.78	4.40	6.74	(0.70)	4.28		7.24
Zambia	11	Low Income	2006	9.29	14.00	0.09	2.11	4.56	4.96	7.09	(0.62)	4.83		7.90
Zambia	11	Low Income	2007	16.69	16.00	0.10	4.07	4.80	5.31	10.13	(0.49)	9.42		8.35
Zambia	11	Low Income	2008	17.26	19.00	0.09	4.01	4.90	4.68	13.46	(0.45)	5.24		7.77
Zambia	11	Low Income	2009	18.29	19.00	0.01	4.01	5.00	6.04	13.46	(0.50)	4.53		9.22
Zambia	11	Low Income	2010	13.90	19.00	0.10	4.33	6.00	7.05	9.94	(0.48)	8.53		10.30

Zambia	11	Low Income	2011	16.89	20.00	0.09	2.94	4.10	2.43	12.11	(0.42)	4.73		5.56
Zambia	11	Low Income	2012	12.04	20.00	0.07	5.58	4.30	4.37	15.68	(0.43)	6.79		7.60
Zambia	11	Low Income	2013	12.04	20.00	0.07	5.58	4.30	1.89	15.49	(0.43)	7.49		5.06
Zambia	11	Low Income	2014	12.04	20.00	0.07	5.58	4.30	1.53	15.82	(0.43)	5.55		4.70
Zambia	11	Low Income	2015	12.04	20.00	0.07	5.58	4.30	(0.19)	22.43	(0.43)	7.48		2.92
Zambia	11	Low Income	2016	12.04	20.00	0.07	5.58	4.30		23.43	(0.43)	7.48	17.45	2.92
Zimbabwe	12	Low Income	1990	9.57	46.00	0.35	4.57	0.99	3.93	19.49	(0.98)	(0.14)	15.82	6.99
Zimbabwe	12	Low Income	1991	8.99	46.00	0.57	3.68	0.65	2.80	20.71	(0.79)	0.03	10.98	5.53
Zimbabwe	12	Low Income	1992	10.00	43.00	0.68	3.99	0.43	(11.13)	24.56	(1.46)	0.22	21.05	(9.02)
Zimbabwe	12	Low Income	1993	21.91	62.00	0.76	3.49	0.87	(1.07)	25.76	(1.97)	0.43	21.81	1.05
Zimbabwe	12	Low Income	1994	24.45	65.00	2.51	10.26	0.75	7.14	25.13	(2.00)	0.50	16.98	9.24
Zimbabwe	12	Low Income	1995	29.95	65.00	1.96	6.55	1.01	(1.61)	29.55	(2.03)	1.66	18.73	0.16
Zimbabwe	12	Low Income	1996	42.48	63.00	2.74	6.44	1.91	8.55	27.49	(2.21)	0.95	11.12	10.36
Zimbabwe	12	Low Income	1997	22.62	64.00	3.67	16.22	2.00	1.13	32.29	(1.93)	1.58	19.02	2.68
Zimbabwe	12	Low Income	1998	14.93	67.00	1.25	8.39	2.99	1.48	31.80	(2.14)	6.94	18.29	2.89
Zimbabwe	12	Low Income	1999	35.88	69.00	2.93	8.17	3.10	(2.00)	23.92	(2.12)	0.86	15.82	(0.82)
Zimbabwe	12	Low Income	2000	31.88	69.00	2.90	7.91	3.00	(4.04)	20.68	(2.10)	0.35	12.29	(3.06)
Zimbabwe	12	Low Income	2001	33.77	70.00	3.09	8.00	2.88	0.60	14.46	(2.06)	0.06	1.86	1.44
Zimbabwe	12	Low Income	2002	37.91	72.00	3.09	7.90	2.65	(9.52)	14.30	(1.92)	0.41	2.34	(8.89)
Zimbabwe	12	Low Income	2003	31.11	76.00	3.00	3.01	2.90	(17.53)	23.83	(1.88)	0.07	(2.59)	(17.00)
Zimbabwe	12	Low Income	2004	33.00	79.00	2.76	15.10	1.91	(6.49)	15.84	(1.84)	0.15	(7.42)	(5.81)
Zimbabwe	12	Low Income	2005	41.97	80.00	5.90	5.99	1.99	(6.56)	8.55	(1.90)	1.79	(9.34)	(5.71)
Zimbabwe	12	Low Income	2006	481.95	82.00	16.10	5.09	3.01	(4.52)	8.55	(1.65)	0.73	(1.49)	(3.46)
Zimbabwe	12	Low Income	2007	100.89	80.00	15.10	4.32	4.10	(4.88)	8.55	-	1.30	(21.46)	(3.65)
Zimbabwe	12	Low Income	2008	29.68	79.00	4.98	4.00	3.77	(18.87)	8.55	-	1.17	(9.35)	(17.67)
Zimbabwe	12	Low Income	2009	46.95	76.00	5.05	5.51	3.83	4.24	8.55	(2.10)	1.29	(2.83)	5.98

Zimbabwe	12	Low Income	2010	121.36	76.00	12.10	14.95	4.85	9.36	8.55	(2.05)	1.30	(14.32)	11.38
Zimbabwe	12	Low Income	2011	99.51	75.00	16.64	16.29	5.41	9.69	8.55	(1.92)	3.14	(16.71)	11.91
Zimbabwe	12	Low Income	2012	94.74	76.00	12.91	14.17	12.34	8.21	8.55	(1.83)	2.82	(16.87)	10.57
Zimbabwe	12	Low Income	2013	94.74	76.00	12.70	12.66	14.01	2.15	8.55	(1.78)	2.77	(12.20)	4.48
Zimbabwe	12	Low Income	2014	94.74	76.00	12.70	10.87	12.60	1.48	8.55	(1.89)	3.33	(9.89)	3.85
Zimbabwe	12	Low Income	2015	94.74	76.00	12.70	10.87	12.60	1.48	8.55	(1.89)	2.77	(9.89)	3.85
Zimbabwe	12	Low Income	2016	94.74	76.00	12.70	10.87	12.60	1.48	8.55	(1.89)	2.77	(9.89)	3.85

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